1969 CAR SHOP MANUAL

VOLUME ONE CHASSIS

WHEELS and TIRES, SUSPENSION, STEERING, BRAKES
CLUTCH and TRANSMISSION, REAR AXLE

Ford

FALCON

FAIRLANE

MUSTANG

FORD

THUNDERBIRD

MONTEGO

COUGAR

METEOR

MERCURY

LINCOLN CONTINENTAL

CONTINENTAL MARK III

1969 CAR SHOP MANUAL

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SERVICE PUBLICATIONS

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FOREWORD

The five volumes of this shop manual provide the Service Technician with complete information for the proper servicing of all the 1969 line of Ford Passenger Cars.

The information is grouped according to the type of work being performed, such as frequently performed adjustments and repairs, in-vehicle adjustments, major repair, etc. Specifications, maintenance information and recommended special tools are included.

The descriptions and specifications in this manual were in effect at the time this manual was approved for printing. Ford Motor Company reserves the right to discontinue models at any time, or change specifications or design, without notice and without incurring obligation.

Ford SERVICE PUBLICATIONS

GENERAL INFORMATION

Individual carline shop manuals have been combined in one Car Shop Manual divided into five volumes for 1969.

The 1969 Car Shop Manual has been organized into general Groups as in previous shop manuals. All Groups are listed in the Group index on the first page of each Volume. Groups not contained in a given Volume are listed with a solid gray background.

To locate the beginning page of any particular Group, first select the Volume containing that Group. Bend the manual until the black mark on the first page of the Group can be seen in line with the Group title on the first page of the Volume.

The first page of each Group lists the material contained in the Group under Part headings and also lists the beginning page of each Part.

On the beginning page of each Part, there is a Part index which lists in detail all information appearing in the Part, the page where the information is given, and the vehicles to which the information applies.

All pages carry a six-digit number which indicates the Group, Part and Page number.

For Example: Page 03-02-01 indicates
Group 3, Part 2, Page 1

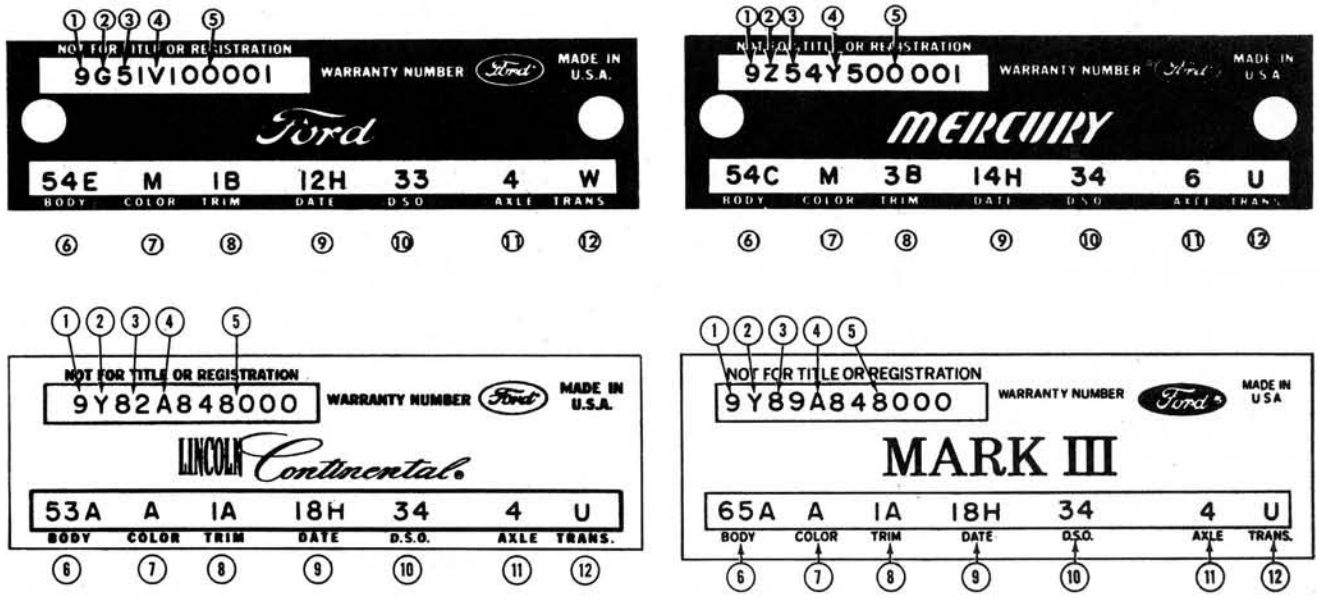
Part Indexes will use only the Part and Page reference numbers. For Example: Page 03-02-01 will appear in the Part Index as 02-01.

Each Part will start with Page 01.

01-01-01

Vehicle Identification

GROUP 1



(1)	MODEL YEAR CODE	(7)	COLOR CODE
(2)	ASSEMBLY PLANT CODE	(8)	TRIM CODE
(3)	BODY SERIAL CODE	(9)	DATE CODE
(4)	ENGINE CODE	(10)	DISTRICT–SPEC. EQUIP. CODE
(5)	CONSECUTIVE UNIT NO.	(11)	REAR AXLE CODE
(6)	BODY TYPE CODE	(12)	TRANSMISSION CODE

W 1001-A

Fig. 1—Warranty Plates—Passenger Cars

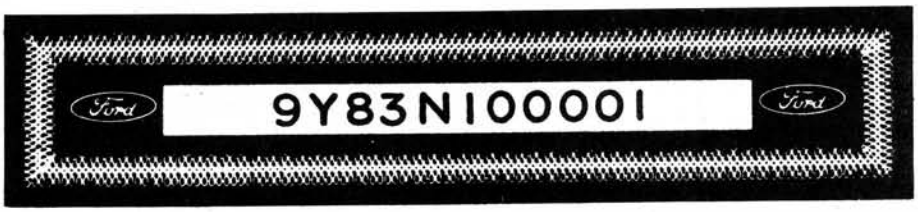


Fig. 2—Typical Vehicle Identification Number (VIN) Tab

W 1002-A

VEHICLE WARRANTY NUMBER

The vehicle warranty number is the first line of numbers and letters appearing on the Warranty Plates (Fig. 1). The Warranty Plate is riveted to the left front door lock face panel. The first number indicates the model year. The letter following the model year number indicates the manufacturing assembly plant. The next two numbers designate the Body Serial Code followed by a letter expressing the Engine Code. The group of six digits remaining on the first line indicate the Consecutive Unit Number.

VEHICLE DATA

The vehicle data appears on the second or lower line on the Warranty Plate. The first two numbers and a letter identify the Body Style. A letter or a number appears next indicating the Exterior Paint Color followed by a number-letter combination designating the Interior Trim. To the right of this code appears the Date Code indicating the date the car was manufactured. A two-digit number next designates the district in which the car was ordered and may appear in conjunction with a Domestic Special Order or Foreign Special Order number when applicable. The final two spaces indicate the Rear Axle Ratio (numbers for regular axles, letters for locking-types) and the Transmission type (numbers for manual, letters for automatic).

OFFICIAL VEHICLE IDENTIFICATION NUMBER

The official Vehicle Identification Number (VIN) for title and registration purposes is stamped on an aluminum tab that is riveted to the instrument panel close to the windshield on the driver's side of the car and is visible from outside (Fig. 2).

MODEL YEAR CODE

The number 9 designates 1969.

ASSEMBLY PLANT CODES

Code Letter		Code Letter	
A	Atlanta	L	Michigan Truck
B	Oakville (Canada)	N	Norfolk
C	Ontario Truck	P	Twin Cities
D	Dallas	R	San Jose
E	Mahwah	S	(Pilot) Allen Park
F	Dearborn	T	Metuchen
G	Chicago	U	Louisville
H	Lorain	W	Wayne
J	Los Angeles	X	St. Thomas
K	Kansas City	Y	Wixom
		Z	St. Louis

BODY SERIAL AND STYLE CODES

The two-digit numeral which follows the assembly plant code identifies the body series. This two-digit number is used in conjunction with the Body Style Code, in the Vehicle Data, which consists of a two-digit number with a letter suffix. The following chart lists the Body Serial Codes, Body Style Codes and the model.

LINCOLN CONTINENTAL

Body Serial Code	Body Style Code	Body Type
82	53A	4-Door Sedan
80	65A	2-Door Hardtop

CONTINENTAL MARK III

Body Serial Code	Body Style Code	Body Type
89	65A	2-Door Hardtop

COUGAR

Body Serial Code	Body Style Code	Body Type	Model
91	65A	2-Door Hardtop③	Standard
92	76A	Convertible③	
93	65B	2-Door Hardtop③	XR-7 Luxury
94	76B	Convertible③	
91	65C	2-Door Hardtop①	Standard

①Bench Seat ②Split Bench ③Bucket Seats

MERCURY

Body Serial Code	Body Style Code	Body Type	Model
44	54A	4-Door Sedan①	Monterey
46	65A	2-Door Hardtop–Formal①	
48	57A	4-Door Hardtop①	
45	76A	Convertible①	
		CANADA ONLY	
40	53M	4-Door Hardtop Sedan①	Marquis
41	65M	2-Door Hardtop–Formal①	
42	57M	4-Door Hardtop①	
54	54C	4-Door Sedan①	Monterey–Custom
56	65B	2-Door Hardtop–Formal①	
58	57B	4-Door Hardtop①	
63	53F	4-Door Hardtop Sedan①②	Marquis
66	65F	2-Door Hardtop–Formal①②	
68	57F	4-Door Hardtop①②	
65	76F	Convertible①②	
63	53C	4-Door Hardtop Sedan②	Brougham (Option)
66	65C	2-Door Hardtop–Formal②	
68	57C	4-Door Hardtop②	
60	63G	2-Door Hardtop (Tunnel Roof)①③	Marauder
61	63H	2-Door Hardtop (Tunnel Roof)①②③	
72	71B	4-Door 2 Seat①	Monterey Wagon
72	71C	4-Door 3 Seat (Side Facing)①	
74	71F	4-Door 2 Seat①	Monterey–Custom Wagon
74	71G	4-Door 3 Seat (Side Facing)①	
76	71E	4-Door 2 Seat①②	Marquis Colony Park
76	71A	4-Door 3 Seat (Side Facing)①②	

①Bench Seat ②Split Bench ③Bucket Seats

METEOR (CANADA)

Body Serial Code	Body Style Code	Body Type	Model
20	54A	4-Door Sedan①	Rideau
21	54B	4-Door Sedan①	Rideau 500
23	65B	2-Door Hardtop–Formal①	
30	54C	4-Door Sedan①	Montcalm
35	65C	2-Door Hardtop–Formal①	
35	65E	2-Door Hardtop–Formal(5-33)①③	
33	57C	4-Door Hardtop①	
34	76C	Convertible①	
34	76E	Convertible (S-33)①③	
24	65F	2-Door Hardtop–Formal①③	LeMoyne
27	57F	4-Door Hardtop①③	
28	71B	Rideau 500–6 Passenger①	Station Wagons
29	71C	Rideau 500–Dual Face Rear①	
38	71E	Montcalm–6 Passenger①	
39	71A	Montcalm–Dual Face Rear①	

①Bench Seat ②Splite Bench ③Bucket Seats

BODY SERIAL AND STYLE CODES—(continued)

MONTEGO

Body Serial Code	Body Style Code	Body Type	Model
01	65A	2-Door Hardtop–Formal (Sports Coupe)①	Comet
02	54A	4-Door Sedan (Sports)①	
06	54B	4-Door Sedan①	Montego
07	65B	2-Door Hardtop–Formal①	
10	54D	4-Door Sedan①	Montego MX
11	65D	2-Door Hardtop–Formal①	
12	76D	Convertible①	
11	65E	2-Door Hardtop–Formal③	Montego MX
12	76B	Convertible③	
10	54C	4-Door Sedan①	Montego MX Brougham
11	65C	2-Door Hardtop–Formal①	
15	63A	2-Door Hardtop Fastback① (GT Appearance Opt.③)	Cyclone
15	63C	2-Door Hardtop Fastback③	
16	63H	2-Door Hardtop Fastback① (Sports Appearance Opt.③)	Cyclone CJ
03	71B	Montego①	Station Wagons–4 Door
08	71C	Montego MX①	
08	71A	Montego MX (Woodgrain)①	

①Bench Seat ②Split Bench ③Bucket Seats

THUNDERBIRD

Body Serial Code	Body Style Code	Body Type	Model
83	65A	2-Door Hardtop③	
83	65C	2-Door Hardtop①	
84	65B	2-Door Landau ③④	
84	65D	2-Door Landau ①④	
87	57B	4-Door Landau ③	
87	57C	4-Door Landau ①	

①Bench Seat ②Split Bench ③Bucket Seats ④Blind Quarter Roof

FALCON

Body Serial Code	Body Style Code	Body Type	Model
10	62A	2-Door Sedan①	Standard
11	54A	4-Door Sedan①	
20	62B	2-Door Sedan①	Futura
22	62C	2-Door Sports Coupe③	
21	54B	4-Door Sedan①	
12	71A	Standard①	Station Wagons –4 Door
23	71B	Futura①	

①Bench Seat ②Split Bench ③Bucket Seat

MUSTANG

Body Serial Code	Body Style Code	Body Type	Model
01	65A	2-Door Hardtop③④	Standard
02	63A	2-Door Fastback③④	
03	76A	Convertible③④	
01	65B	2-Door Hardtop③④	Luxury
02	63B	2-Door Fastback③④	
03	76B	Convertible③④	
01	65C	2-Door Hardtop①	Standard
01	65D	2-Door Hardtop①	Luxury
01	65E	2-Door Hardtop③	Grand
02	63C	2-Door Fastback④	Mach 1

①Bench Seat ②Split Bench ③Bucket Seats ④Hi-Back Bucket

FORD

Body Serial Code	Body Style Code	Body Type	Model
50	62E	2-Door Sedan①	Custom
51	54E	4-Door Sedan①	
52	62B	2-Door Sedan①	Custom 500
53	54B	4-Door Sedan①	
54	54A	4-Door Sedan①	Galaxie 500
55	63B	2-Door Hardtop–Fastback①	
58	65C	2-Door Hardtop–Formal①	
56	57B	4-Door Hardtop①	
57	76A	Convertible①	
60	63C	2-Door Hardtop–Fastback①③	Ford XL
61	76B	Convertible①③	
64	54C	4-Door Sedan①②	Ford LTD
62	65A	2-Door Hardtop–Formal①②	
66	57F	4-Door Hardtop①③	
70	71D	Ranchwagon–6 Passenger①	Station Wagons–4 Door
71	71H	Custom 500 Ranchwagon– 6 Passenger①	
72	71J	Custom 500 Ranchwagon– Dual Face Rear①	
73	71B	Country Sedan–6 Passenger①	
74	71C	Country Sedan–Dual Face Rear①	
75	71E	Country Squire–6 Passenger①	
76	71A	Country Squire–Dual Face Rear①	

①Bench Seat ②Split Bench ③Bucket Seats

BODY SERIAL AND STYLE CODES—(continued)

FAIRLANE

Body Serial Code	Body Style Code	Body Type	Model
30	65A	2-Door Hardtop—Formal①	Fairlane
31	54A	4-Door Sedan①	
34	54B	4-Door Sedan①	Fairlane 500
35	63B	2-Door Hardtop—Fastback①	
33	65B	2-Door Hardtop—Formal①	
36	76B	Convertible①	
35	63E	2-Door Hardtop—Fastback③	Fairlane 500
33	65E	2-Door Hardtop—Formal③	
36	76E	Convertible③	
40	65C	2-Door Hardtop—Formal①	Torino
41	54C	4-Door Sedan①	
42	63F	2-Door Hardtop—Fastback①	Torino GT
44	65F	2-Door Hardtop—Formal①	
43	76F	Convertible①	
42	63D	2-Door Hardtop—Fastback③	Torino GT
44	65D	2-Door Hardtop—Formal③	
43	76D	Convertible③	
46	63B	2-Door Hardtop—Fastback①	Cobra
46	63E	2-Door Hardtop—Fastback③	
45	65A	2-Door Hardtop—Formal①	
45	65E	2-Door Hardtop—Formal③	
32	71D	Fairlane①	Station Wagons—4 Door
37	71B	Fairlane 500①	
38	71E	Fairlane Torino Squire①	
47	66A	Ranchero①	Ranchero
48	66B	Ranchero 500①	
48	66B (Opt.)	Ranchero 500③	Ranchero
49	66C	Ranchero①	Ranchero GT
49	66D	Ranchero③	

①Bench Seat ②Split Bench ③Bucket Seats

REAR AXLE RATIO CODES

Conventional	Limited-Slip	Ratio
1	J	2.50:1
2	K	2.75:1
3	L	2.79:1
4	M	2.80:1
5	N	2.83:1
6	O	3.00:1
7	P	3.10:1
8	Q	3.20:1
9	R	3.25:1
A	S	3.50:1
B	T	3.07:1
C	U	3.08:1
D	V	3.91:1
E	W	4.30:1

TRANSMISSION CODES

Code	Type
1	3-Speed Manual
5	4-Speed Manual—wide ratio (2.78 1st Gear)
6	4-Speed Manual—close ratio (2.32 1st Gear)
W	Automatic (C4) (XP-3)
U	Automatic (C6) (XPL)
Y	Automatic (MX)
X	Automatic (FMX)
Z	Automatic (C6 Special) (XPL, Special)①

①For Police & trailer towing – Not available with bucket seats

ENGINE CODES

Code	Type
U	6 Cyl. 170 Cu. In. (1V)
T	6 Cyl. 200 Cu. In. (1V)
2	6 Cyl.① 200 Cu. In. (1V)
L	6 Cyl. 250 Cu. In. (1V)
3	6 Cyl.① 250 Cu. In. (1V)
V	6 Cyl. 240 Cu. In. (1V)
5	6 Cyl.① 240 Cu. In. (1V)
B	6 Cyl. 240 Cu. In. (1V) Police
E	6 Cyl. 240 Cu. In. (1V) Taxi
F	8 Cyl. 302 Cu. In. (2V)
6	8 Cyl.① 302 Cu. In. (2V)
D	8 Cyl. 302 Cu. In. (2V) Police & Taxi
H	8 Cyl. 351 Cu. In. (2V)
M	8 Cyl. 351 Cu. In. (4V)
Y	8 Cyl. 390 Cu. In. (2V)
X	8 Cyl.② 390 Cu. In. (2V)
S	8 Cyl.③ 390 Cu. In. (4V)
P	8 Cyl.④ 428 Cu. In. (4V) Police Interceptor
Q	8 Cyl. 428 Cu. In. (4V) CJ
R	8 Cyl.⑤ 428 Cu. In. (4V) CJ
K	8 Cyl. 429 Cu. In. (2V)
N	8 Cyl. 429 Cu. In. (4V)
A	8 Cyl. 460 Cu. In. (4V)

①Low Compression ②Premium Fuel ③Improved Performance
④High Performance ⑤Ram Air Induction

CONSECUTIVE UNIT NUMBER

Starting Serial Numbers—1969 Passenger Cars
100,001—Ford, Fairlane, Falcon, Mustang, Thunderbird
500,001—Mercury, Montego, Cougar, Meteor
848,000—Lincoln Continental & Continental Mark III

EXTERIOR PAINT COLOR CODES

Code	Reference Number	Color
A	1724-A	Black
B	3059-A	Maroon
C	3197-A	Dk. Ivy Green Met.
D	3303-A	Pastel Gray
E	3191-A	Lt. Aqua
F	3065-A	Dk. Aqua Met. (Brt.)
G	3203-A	Med. Orchid Met.
H	2067-A	Lt. Green
I	2041-A	Med. Lime Met.
J	3080-A	Dk. Aqua Met.
K	3204-A	Dk. Orchid Met.
L	3060-A	Lt. Gray Met.
M	1619-A	White
N	921-A	Platinum
P	3064-A	Med. Blue Met.
Q	1624-A	Med. Blue Met.
R	3198-A	Lt. Gold
S	3199-A	Med. Gold Met.
T	2008-A	Red
U	1070-A	Med. Aqua Met.
V	3201-A	Lt. Aurora Copper Met.
W	3120-A	Yellow
X	3061-A	Dk. Blue Met.
Y	3202-A	Burnt Orange Met.
Z	2044-A	Dk. Grey Met.
2	3071-A	Lt. Ivy Yellow
3	1730-A	Calypso Coral
4	3230-A	Med. Emerald Met.
6	3077-A	Med. Blue Met. (Brt.)
7	3193-A	Lt. Emerald Green Met.
8	3190-A	Lt. Blue
9	M6J-49B	Red Primer
9	M6J-50B	Grey Primer

INTERIOR TRIM CODES

Code	Trim Schemes
1A	Black Vinyl (Cougar, Falcon)
1A	Black Cloth & Vinyl
1B	Med. Blue Cloth/Lt. Blue Vinyl
1B	Med. or Lt. Blue Vinyl
1B	Dk. Blue Cloth & Vinyl (Lincoln, T-Bird, Mark III, Mercury)
1B	Lt. Blue Cloth & Vinyl (Ford, Montego, Meteor)
1D	Dk. Red Cloth and Vinyl
1F	Med. Saddle Vinyl (Cougar)
1G	Dk. Ivy Gold Cloth & Vinyl
1G	Lt. Ivy Gold Vinyl (Cougar)
1K	Lt. Aqua Cloth and/or Vinyl
1P	Med. Grey Cloth & Vinyl (Mark III)
1Y	Lt. Nugget Gold Vinyl (Cougar-Falcon)
1Y	Lt. Nugget Gold Cloth & Vinyl
2A	Black Vinyl
2A	Black Leather & Vinyl (Lincoln)
2A	Black Leather (Mark III)
2B	Dk. or Lt. Blue Vinyl
2B	Dk. Blue Leather & Vinyl (Lincoln)
2B	Dk. Blue Leather (Mark III)
2D	Dk. Red Vinyl
2D	Dk. Red Leather & Vinyl (Lincoln)
2D	Dk. Red Leather (Mark III)
2F	Med. Saddle Vinyl (Cougar)
2F	Med. Saddle Leather & Vinyl (Lincoln)
2F	Med. Saddle Leather (Mark III)
2G	Lt. or Dk. Ivy Gold Vinyl
2G	Dk. Ivy Gold Leather & Vinyl (Lincoln)
2G	Dk. Ivy Gold Leather (Mark III)
2K	Lt. Aqua Vinyl
2K	Lt. Aqua Leather & Vinyl (Lincoln)
2K	Lt. Aqua Leather (Mark III)
2P	Med. Grey Leather (Mark III)
2U	Pastel Parchment w/Black Leather (Mark III)
2W	White w/Black Vinyl
2W	White w/Black Leather & Vinyl (Lincoln)
2W	White w/Black Leather (Mark III)
2Y	Lt. Nugget Gold Vinyl
2Y	Lt. Nugget Gold Leather & Vinyl (Lincoln)
2Y	Lt. Nugget Gold Leather (Mark III)
3A	Black w/Red Knit and/or Vinyl (Mustang, Montego)
3A	Black Knit and/or Vinyl
3A	Black Cloth & Vinyl
3A	Black Leather & Vinyl (Lincoln)
3B	Lt. Blue Knit and/or Vinyl
3B	Lt. or Dk. Blue Cloth & Lt. Blue Vinyl
3B	Lt. Blue Cloth & Vinyl (Fairlane, Ford, Montego, Meteor)
3B	Med. Blue Cloth & Lt. Blue Vinyl
3B	Dk. Blue Cloth & Vinyl (T-Bird, Mercury)
3B	Dk. Blue Leather & Vinyl (Lincoln)
3D	Dk. Red Cloth & Vinyl
3D	Dk. Red Knit and/or Vinyl
3G	Dk. Ivy Gold Cloth & Vinyl
3G	Dk. Ivy Gold Leather & Vinyl (Lincoln)
3K	Lt. Aqua Cloth & Vinyl
3W	White w/Black Knit and/or Vinyl
3W	White w/Black Leather & Vinyl (Lincoln)
3Y	Lt. Nugget Gold Cloth & Vinyl
3Y	Lt. Nugget Gold Knit and/or Vinyl (T-Bird)
4A	Black Cloth & Vinyl
4A	Black Knit and/or Vinyl
4B	Dk. Blue Vinyl
4B	Dk. or Lt. Blue Vinyl
4D	Dk. Red Vinyl
4G	Dk. Ivy Gold Cloth & Vinyl
4G	Dk. Ivy Gold Vinyl
4K	Lt. Aqua Vinyl
4W	White w/Black Vinyl
4Y	Lt. Nugget Gold Knit and/or Vinyl
5A	Black Cloth & Vinyl
5A	Black Knit and/or Vinyl
5A	Black Leather & Vinyl (Lincoln)
5B	Lt. Blue Cloth and/or Vinyl
5B	Lt. Blue Knit and/or Vinyl
5B	Dk. Blue Leather & Vinyl (Lincoln)
5B	Dk. Blue Cloth & Vinyl (Mercury)
5D	Dk. Red Cloth & Vinyl (Montego)

INTERIOR TRIM CODES—(continued)

Code	Trim Schemes
5D	Dk. Red Knit and/or Vinyl
5D	Dk. Red Leather & Vinyl (Lincoln)
5F	Med. Saddle Leather & Vinyl (Lincoln)
5G	Dk. Ivy Gold Knit and/or Vinyl
5G	Dk. Ivy Gold Cloth & Vinyl
5G	Dk. Ivy Gold Leather & Vinyl (Lincoln)
5K	Lt. Aqua Cloth & Vinyl (Montego)
5K	Lt. Aqua Vinyl
5K	Lt. Aqua Leather & Vinyl (Lincoln)
5W	White w/Black Knit and/or Vinyl
5W	White w/Black Leather & Vinyl (Lincoln)
5Y	Lt. Nugget Gold Cloth & Vinyl
5Y	Lt. Nugget Gold Knit and/or Vinyl (Mustang, Fairlane)
5Y	Lt. Nugget Gold Leather & Vinyl (Lincoln)
6A	Black Knit and/or Vinyl
6A	Black Cloth & Vinyl (Lincoln)
6A	Black Leather & Vinyl (Cougar)
6B	Dk. or Lt. Blue Vinyl
6B	Dk. Blue Leather & Vinyl (Cougar)
6D	Dk. Red Knit and/or Vinyl
6D	Dk. Red Leather & Vinyl (Cougar)
6F	Med. Saddle Leather & Vinyl
6G	Dk. Ivy Gold Vinyl
6G	Dk. Ivy Gold Leather & Vinyl (Cougar)
6K	Lt. Aqua Vinyl
6K	Lt. Aqua Leather & Vinyl (Cougar)
6W	White w/Black Vinyl
6Y	Lt. Nugget Gold Vinyl
6Y	Lt. Nugget Gold Leather & Vinyl (Cougar)
7A	Black Vinyl
7A	Black Cloth & Vinyl (Fairlane)
7A	Black Leather & Vinyl (Lincoln)
7B	Lt. Blue Vinyl (Cougar, Montego, Ford)
7B	Dk. Blue Cloth & Vinyl
7B	Dk. Blue Leather & Vinyl (Lincoln)
7D	Dk. Red Vinyl (Mustang)
7D	Dk. Red Cloth & Vinyl
7G	Dk. Ivy Gold Cloth and/or Vinyl
7G	Dk. Ivy Gold Leather & Vinyl (Lincoln)
7K	Lt. Aqua Cloth & Vinyl
7W	White w/Black Vinyl
7W	White Leather & Vinyl (Lincoln)
7Y	Lt. Nugget Gold Cloth & Vinyl
7Y	Lt. Nugget Gold Vinyl (Ford, Meteor, Mustang)
8A	Black Knit and/or Vinyl
8A	Black Leather & Vinyl (T-Bird)
8B	Dk. or Lt. Blue Knit and/or Vinyl
8D	Dk. Red Knit and/or Vinyl
8F	Med. Saddle Knit and/or Vinyl
8G	Dk. Ivy Gold Knit and/or Vinyl
8K	Lt. Aqua Knit and/or Vinyl
8W	White w/Black and/or Vinyl
8W	White w/Black Leather & Vinyl (T-Bird)
8Y	Lt. Nugget Gold Knit and/or Vinyl
9A	Black Knit and/or Vinyl
9A	Black Cloth & Vinyl (Ford, Meteor)
9B	Lt. Blue Knit and/or Vinyl
9B	Dk. Blue Cloth & Vinyl (Ford, Meteor)
9D	Dk. Red Knit and/or Vinyl
9D	Dk. Red Cloth & Vinyl (Ford-Meteor)
9G	Dk. Ivy Gold Cloth & Vinyl
9K	Lt. Aqua Cloth & Vinyl
9Y	Lt. Nugget Gold Cloth and/or Vinyl
9Y	Lt. Nugget Gold Knit and/or Vinyl
AA(1W)	White Vinyl With Black (Cougar)
AA	Black Cloth & Vinyl (Lincoln)
AB(1W)	White Vinyl With Blue (Cougar)
AB	Lt. Blue Cloth & Vinyl (Lincoln)
AD(1W)	White Vinyl With Red (Cougar)
AG(1W)	White Vinyl With Ivy Gold (Cougar)
AG	Lt. Ivy Gold Cloth & Vinyl (Lincoln)
AK (1W)	White Vinyl With Aqua (Cougar)
AK	Lt. Aqua Cloth & Vinyl (Lincoln)
AL	Lt. Silver Cloth & Vinyl (Lincoln)
AY	Lt. Nugget Gold Cloth & Vinyl (Lincoln)
AY(1W)	White Vinyl With Nugget Gold (Cougar)
BA(2W)	White Vinyl With Black (Cougar)
BA	Black Vinyl (Fairlane)
BB(2W)	White Vinyl With Blue (Cougar)

INTERIOR TRIM CODES—(continued)

Code	Trim Schemes
BB	Lt. Blue Vinyl (Fairlane)
BB	Lt. Blue Leather & Vinyl (Lincoln)
BD(2W)	White Vinyl With Red (Cougar)
BG(2W)	White Vinyl With Ivy Gold (Cougar)
BG	Lt. Ivy Gold Leather & Vinyl (Lincoln)
BK(2W)	White Vinyl With Aqua (Cougar)
BY(2W)	White Vinyl With Lt. Nugget Gold (Cougar)
BY	Lt. Nugget Gold Vinyl (Fairlane)
CA	Black Cloth & Vinyl
CA	Black Vinyl (Montego)
CB	Dk. Blue Cloth & Vinyl
CB	Lt. Blue Vinyl (Montego)
CD	Dk. Red Cloth & Vinyl
CD	Dk. Red Vinyl
CG	Dk. Ivy Gold Cloth & Vinyl
CG	Lt. Ivy Gold Leather & Vinyl (Lincoln)
CK	Lt. Aqua Cloth & Vinyl
CY	Lt. Nugget Gold Cloth & Vinyl
CY	Lt. Nugget Gold Vinyl (Montego)
DA	Black Cloth & Vinyl
DA(4W)	White Vinyl With Black (Cougar)
DA	Black Knit and/or Vinyl
DB	Dk. Blue Cloth & Vinyl
DB	Dk. Blue Vinyl (Mercury)
DB(4W)	White Vinyl With Blue (Cougar)
DD(4W)	White Vinyl With Red (Cougar)
DD	Dk. Red Knit and/or Vinyl
DD	Dk. Red Cloth & Vinyl
DG	Dk. Ivy Gold Vinyl
DG	Dk. Ivy Gold Cloth & Vinyl
DK	Lt. Aqua Cloth & Vinyl
DW	White w/Black Knit and/or Vinyl
DY	Lt. Nugget Gold Cloth & Vinyl
DY	Lt. Nugget Gold Vinyl (Mercury)
EA	Black Knit and/or Vinyl
EA	Black Cloth & Vinyl
EB	Dk. Blue Cloth & Vinyl
ED	Dk. Red Cloth & Vinyl
EG	Dk. Ivy Gold Cloth & Vinyl
EK	Lt. Aqua Cloth & Vinyl
EW	White w/Black Knit and/or Vinyl
EY	Lt. Nugget Gold Cloth & Vinyl
FA	Black Knit and/or Vinyl
FA(6W)	White Vinyl With Black (Cougar)
FB	Lt. or Dk. Blue Vinyl
FB(6W)	White Vinyl With Blue (Cougar)
FD	Dk. Red Knit and/or Vinyl
FD(6W)	White Vinyl With Red (Cougar)
FG	Dk. Ivy Gold Vinyl
FG(6W)	White Vinyl With Ivy Gold (Cougar)
FK(6W)	White Vinyl With Lt. Aqua (Cougar)
FW	White w/Black Knit and/or Vinyl
FY	Lt. Nugget Gold Vinyl
FY(6W)	White Vinyl With Nugget Gold (Cougar)
GA	Black Vinyl
GB	Lt. Blue Vinyl
GD	Dk. Red Vinyl
GG	Dk. Ivy Gold Vinyl
GY	Lt. Nugget Gold Vinyl
HA	Black Knit and/or Vinyl
HA(8W)	White Vinyl With Black (Cougar)
HA	Black Leather & Vinyl (Mercury)
HB	Lt. Blue Vinyl
HB (8W)	White Vinyl With Blue (Cougar)
HD	Dk. Red Vinyl
HD	Dk. Red Leather & Vinyl (Mercury)
HD(8W)	White Vinyl With Dk. Red (Cougar)
HG	Dk. Ivy Gold Vinyl
HG(8W)	White Vinyl With Ivy Gold (Cougar)
HK	Lt. Aqua Vinyl
HK(8W)	White Vinyl With Lt. Aqua (Cougar)
HW	White w/Black Leather & Vinyl (Mercury)
HW	White w/Black Vinyl (Fairlane)

INTERIOR TRIM CODES—(continued)

Code	Trim Schemes
HY(8W)	White Vinyl With Nugget Gold (Cougar)
HY	Lt. Nugget Gold Knit and/or Vinyl
JA	Black Knit and/or Vinyl
JB	Lt. Blue Cloth & Vinyl (Lincoln)
JG	Lt. Ivy Gold Cloth & Vinyl
JW	White w/Black Knit and/or Vinyl
JY	Lt. Nugget Gold Knit and/or Vinyl
JY	Lt. Nugget Gold Cloth & Vinyl (Lincoln)
KA	Black Knit and/or Vinyl
KA	Black Cloth & Vinyl (Ford-Mercury-Meteor)
KA	Black Leather & Vinyl (Lincoln)
KB	Dk. Blue Cloth & Vinyl
KB	Med. Blue Cloth & Lt. Blue Vinyl (Ford-Montego)
KB	Dk. Blue Leather & Vinyl (Lincoln)
KD	Dk. Red Cloth & Vinyl
KG	Dk. Ivy Gold Leather & Vinyl (Lincoln)
KG	Dk. Ivy Gold Cloth & Vinyl
KL	Lt. Silver Leather & Vinyl (Lincoln)
KW	White W/Black Leather & Vinyl (Lincoln)
KY	Lt. Nugget Gold Knit and/or Vinyl
KY	Lt. Nugget Gold Cloth & Vinyl
LA	Black Knit and/or Vinyl
LA	Black Leather & Vinyl (Lincoln)
LB	Lt. Blue Knit and/or Vinyl
LB	Dk. Blue Leather & Vinyl (Lincoln)
LD	Dk. Red Knit and/or Vinyl
LE	Lt. & Med. Beige Vinyl
LG	Dk. Ivy Gold Leather & Vinyl (Lincoln)
LW	White w/Black Knit and/or Vinyl
LW	White w/Black Leather & Vinyl (Lincoln)
LY	Lt. Nugget Gold Knit and/or Vinyl
MA	Black Vinyl
MB	Lt. Blue Vinyl
MD	Dk. Red Vinyl
MW	White w/Black Vinyl
NA	Black Knit and/or Vinyl
NB	Lt. Blue Vinyl
NY	Lt. Nugget Gold Knit and/or Vinyl
PA	Black Vinyl
PB	Lt. Blue Vinyl
PY	Lt. Nugget Gold Vinyl
QA	Black Knit and/or Vinyl
QB	Lt. Blue Vinyl
QW	White Knit and/or Vinyl
QY	Lt. Nugget Gold Vinyl
RA	Black Knit and/or Vinyl
RA	Black Leather & Vinyl
RB	Lt. Blue Knit and/or Vinyl
RD	Dk. Red Knit and/or Vinyl
RD	Dk. Red Leather & Vinyl
RW	White w/Black Leather & Vinyl
RW	White W/Black Knit and/or Vinyl
RY	Lt. Nugget Gold Knit and/or Vinyl
SB	Lt. Blue Leather & Vinyl (Lincoln)
SG	Lt. Ivy Gold Leather & Vinyl (Lincoln)
TG	Lt. Ivy Gold Leather & Vinyl (Lincoln)
VA	Black Knit and/or Vinyl
VB	Dk. Blue Vinyl
VG	Dk. Ivy Gold Vinyl
VW	White w/Black Knit and or Vinyl
VY	Lt. Nugget Gold Vinyl
WA	Black Knit and/or Vinyl
WW	White w/Black Knit and/or Vinyl
WY	Lt. Nugget Gold Knit and/or Vinyl
YA	Black Cloth & Vinyl
YB	Dk. Blue Cloth & Vinyl
YD	Dk. Red Cloth & Vinyl
YG	Dk. Ivy Gold Cloth & Vinyl
YK	Lt. Aqua Cloth & Vinyl
YY	Lt. Nugget Gold Cloth & Vinyl
ZA	Black Cloth & Vinyl
ZB	Dk. Blue Cloth & Vinyl
ZG	Dk. Ivy Gold Cloth & Vinyl

DATE CODES

A number signifying the date precedes the month code letter. A second-year code letter will be used if the model exceeds 12 months.

Month	Code First Year	Code Second Year
January	A	N
February	B	P
March	C	Q
April	D	R
May	E	S
June	F	T
July	G	U
August	H	V
September	J	W
October	K	X
November	L	Y
December	M	Z

DISTRICT CODES (DSO)

Units built on a Domestic Special Order, Foreign Special Order, or other special orders will have the complete order number in this space. Also to appear in this space is the two-digit code number of the District which ordered the unit. If the unit is a regular production unit, only the District code number will appear.

FORD

Code	District	Code	District
11	Boston	51	Denver
13	New York	53	Kansas City
15	Newark	54	Omaha
16	Philadelphia	55	St. Louis
17	Washington	56	Davenport
21	Atlanta	61	Dallas
22	Charlotte	62	Houston
24	Jacksonville	63	Memphis
25	Richmond	64	New Orleans
28	Louisville	65	Oklahoma City
32	Cleveland	71	Los Angeles
33	Detroit	72	San Jose
35	Lansing	73	Salt Lake City
37	Buffalo	74	Seattle
38	Pittsburgh	75	Phoenix
41	Chicago	83	Government
43	Milwaukee	84	Home Office Reserve
44	Twin Cities	85	American Red Cross
46	Indianapolis	89	Transportation Services
47	Cincinnati	90's	Export

LINCOLN-MERCURY

Code	District	Code	District
11	Boston	34	Detroit
15	New York	41	Chicago
16	Philadelphia	42	St. Louis
17	Washington	46	Twin Cities
21	Altanta	51	Denver
22	Dallas	52	Los Angeles
23	Jacksonville	53	Oakland
26	Memphis	54	Seattle
31	Buffalo	84	Home Office Reserve
32	Cincinnati		
33	Cleveland	90's	Export

FORD OF CANADA

Code	District	Code	District
B1	Central	B4	Midwestern
B2	Eastern	B6	Western
B3	Atlantic	B7	Pacific
I1 thru I7	Export		

Note: Canadian Lincoln-Mercury units use prefix "A" in place of "B".

Brakes

GROUP 2

PART 2-1 PAGE
General Brake Service 02-01-01
PART 2-2
Brake System 02-02-01
PART 2-3 PAGE
Specifications 02-03-01

Part 2-1 General Brake Service

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
ANTI SKID CONTROL SYSTEM												
Tests		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	01-03	01-03
BRAKE BOOSTER												
Adjustments	01-04											
Cleaning and Inspection	01-07											
Tests	01-02											
BRAKE PEDAL												
Free Height Test	01-01											
Total Travel Test	01-01											
DISC BRAKES												
Cleaning and Inspection	01-07											
Service Precautions	01-07											
DRUM BRAKES												
Cleaning and Inspection	01-08											
HYDRAULIC SYSTEM BLEEDING	01-05											
PARKING BRAKE CONTROL												
Vacuum Release Test		01-03	01-03	01-03	N/A	N/A	N/A	N/A	N/A	01-03	01-03	01-03
PARKING BRAKE LINKAGE												
Adjustment		01-03	01-03	01-03	01-03	01-03	01-03	01-03	01-03	01-04	01-04	01-04
PRESSURE DIFFERENTIAL VALVE												
Adjustment (Centralize)	01-07											

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 BRAKE SYSTEM TESTS

Always check the fluid level in the master cylinder before performing the test procedures. If the fluid level is not within 1/4 inch of the top of the master cylinder reservoirs, add Ford Brake Fluid — Extra Heavy Duty — Part Number C6AZ-19542-A (ESA-M6C25-A) or equivalent for all brake applications. **The extra heavy duty brake fluid is colored blue for identification purposes. Do not mix low temperature brake fluids with the specified brake fluid.**

Should one of the wheel brakes be locked and the vehicle must be moved, open the bleeder screw long enough to let out a few drops of brake fluid. **This bleeding operation will release the brakes but will not correct the cause of trouble.**

BRAKE PEDAL FREE HEIGHT AND TRAVEL MEASUREMENTS

With the engine running for full power brake operation, measure the brake pedal free height, and check the brake pedal travel with the use of the Brake Pedal Pressure Gauge, Tool WRE-500-50 as follows:

BRAKE PEDAL FREE HEIGHT MEASUREMENT

1. Insert a slender, sharp pointed prod through the carpet and sound deadener to the dash panel metal and measure the distance to the brake pedal (Fig. 1).

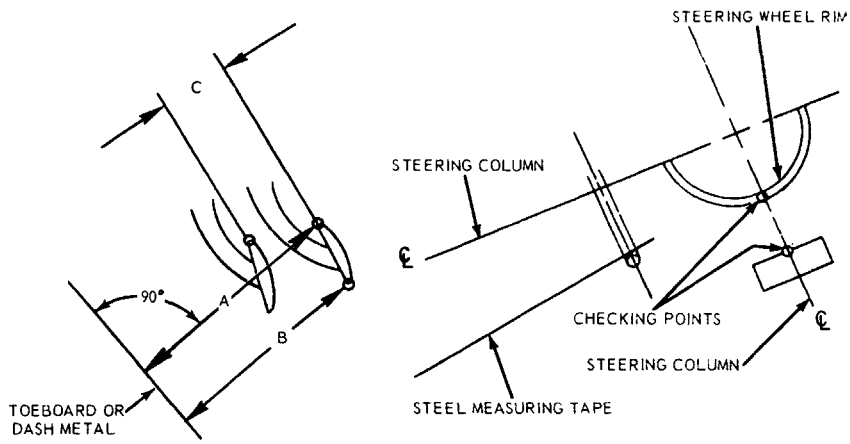
2. If the position of the pedal is not within specification, check the brake pedal linkage for missing, worn, or damaged bushings, or loose attaching bolts and replace them, if required.

3. If the pedal free height is still out of specification, check the brake pedal booster or master cylinder to be sure the correct parts are installed. Replace the worn or damaged parts as necessary.

BRAKE PEDAL TRAVEL MEASUREMENT

1. Install a Brake Pedal Effort Gauge on the brake pedal pad (Fig. 2).

2. Hook a steel measuring tape to the brake pedal as shown in Fig. 1. Measure and record the distance from the brake pedal free height position to the reference point, which is at the six



VEHICLE	TYPE	PEDAL FREE HEIGHT - A	PEDAL FREE HEIGHT - B	PEDAL TRAVEL - C
FORD, MERCURY AND METEOR	NON-POWER DRUM	8.09 - 7.17		3.10
FORD, MERCURY AND METEOR	POWER DRUM & DISC	6.18 - 5.99		3.27
FORD, MERCURY AND METEOR	NON-POWER DISC	8.65 - 7.82		2.18
FORD, MERCURY AND METEOR	POLICE POWER DISC	7.58 - 6.72		3.27
FAIRLANE, MONTEGO AND FALCON	NON-POWER DRUM	8.13 - 6.91		2.90
FAIRLANE, MONTEGO AND FALCON	POWER DISC	7.25 - 5.71		2.35
MUSTANG AND COUGAR	NON-POWER DRUM	7.49 - 6.43		2.58
MUSTANG AND COUGAR	POWER DISC	6.25 - 5.56		1.75
THUNDERBIRD	POWER DISC		5.96 - 5.04	3.00
CONTINENTAL MARK III	POWER DISC		5.96 - 5.04	3.00
LINCOLN CONTINENTAL	POWER DISC		6.50 - 5.50	2.25

NOTE: A & B DIMENSION TO BE MEASURED TO SHEET METAL

C DIMENSION TO BE MEASURED PARALLEL TO THE VERTICAL CENTERLINE OF THE STEERING COLUMN WITH A 50 POUND LOAD APPLIED TO THE CENTERLINE OF THE BRAKE PEDAL PAD. (CHECKS ON POWER BRAKE VEHICLES MADE WITH ENGINE RUNNING

H1630-A

FIG. 1 — Brake Pedal Height and Travel Measurements

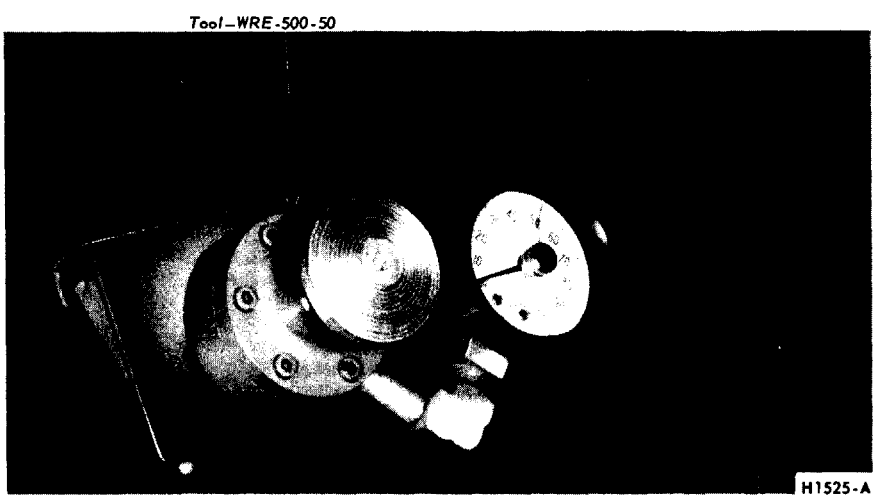


FIG. 2—Brake Pedal Effort Gauge Installed

o'clock position on the steering wheel rim.

3. With the steel tape still hooked to the brake pedal depress the brake pedal by pressing downward on the brake pedal effort gauge. Apply a 50 pound load to the center of the pedal by observing the pressure gauge, and measure the distance from the brake pedal to the fixed reference point on the steering wheel rim parallel to the centerline of the steering column.

4. The difference between the brake pedal free height and the depressed pedal measurement under a 50 pound load should be within the specified maximum pedal travel service specification B in Fig. 1.

5. If the pedal travel is more than the specified maximum shown in Fig. 1, dimension C, make several sharp reverse stops (equivalent to 50 pounds pedal pressure) with a forward stop before each. Move the vehicle in reverse and forward for a distance of approximately ten feet; then, apply the brakes sharply and hold the brake pedal down until the vehicle is completely stopped. This will actuate the brake self-adjusters. If these stops do not bring the brake pedal travel within specification, make several additional forward and reverse stops as outlined above.

6. If the second series of stops do not bring the brake pedal travel within specification, remove the brake drums and check the brake adjusters to make sure they are functioning. Check the brake linings for wear or damage. Repair or replace all worn or damaged parts and non-functioning adjusters. Adjust the brake lining outside diameter to the approximate inside diameter of the brake drum with Rotunda Tool HRE-8650 (Fig. 12, Part 2-2).

7. If all the brake adjusters, brake drums and linings are functional and the brake travel is not within specifications, check the pedal linkage for missing or worn bushings, or loose attachments. Bleed the brakes and centralize the differential valve.

POWER BRAKE FUNCTIONAL TEST

1. Check the hydraulic brake system for leaks or insufficient fluid.

2. With the transmission in neutral, stop the engine and apply the parking brake. Depress the brake pedal several times to exhaust all vacuum in the system.

3. With the engine shut off and all vacuum in the system exhausted, depress the pedal, and hold it in the applied position. Start the engine. If the

vacuum system is operating, the pedal will tend to fall away under foot pressure and less pressure will be required to hold the pedal in the applied position. If no action is felt, the vacuum booster system is not functioning.

If the brake pedal movement feels spongy, bleed the hydraulic system to remove air from the system. Refer to Hydraulic System Bleeding, Part 1, Section 2.

VACUUM TESTS—VACUUM RELEASE PARKING BRAKES

Visually check the operation of the brake linkage as the brake pedal is depressed. Then, check the operation of the brake linkage when the manual release lever is activiated. These checks should indicate whether the manual parking brake control linkage is operating properly or requires repair or adjustment due to inability of the parking brake to hold against moderate vehicle movement. Perform tests of the parking brake system and controls after making certain the linkage and manual controls operate properly.

When testing a parking brake vacuum release system, a minimum of 10 inches of vacuum (Hg.) should be available at all points where vacuum is applied. This can be checked with a Rotunda Fuel Pump Tester Gauge (ARE345) and two Distributor Tester hose adapters (Marked Q) connected together with a coupling. This allows the Fuel Pump Tester Gauge hose to be adapted to any other vacuum hose or rubber connector in the vacuum systems.

Failure to maintain 10 inches of vacuum (Hg.) during vacuum system tests could be caused by a loose hose connection, resulting in a vacuum leak. When checking for vacuum between two points, trace the hose along the entire routing to be sure it is not crossed with another hose and connected to the wrong connection.

All of the vacuum parking brake control checks are to be performed with the engine running at idle speed.

Leaks in the parking brake hoses or a disconnected or improperly connected hose can usually be found by listening for a hissing sound along the hose routings. **Under no circumstances should air pressure be applied to the vacuum system as the actuator diaphragm in the parking brake vacuum motor may be damaged.**

1. Start the engine and run it at idle speed. With the transmission shift control in neutral, depress the parking brake pedal to apply the parking brake. Move the transmission shift control to D range and observe the parking brake pedal to see that the pedal moves upward and the parking brake releases. If the parking brake releases, the parking brake vacuum control is working properly.

2. If the parking brake does not release, test for vacuum at the steering column neutral switch port in the junction block, vacuum lines and the parking brake release vacuum motor. Use the Rotunda Vacuum and Fuel Pump Tester 345. This can be accomplished by removing the hose from each component and attaching it to the vacuum gauge. Connect two distributor tester vacuum hose adapters together with a coupling as a connector to attach the gauge. A minimum of ten inches of vacuum is required to actuate the parking brake vacuum motor. **Do not remove any of the vacuum hoses from the junction block unless the junction block is being replaced, as the plastic nipples are thin and very brittle and damage may result.** If a minimum reading is not present when checking each of the aforementioned components, they must be replaced.

ROAD TEST

A road test should be conducted only when the operator is sure the brakes will stop the vehicle.

If the road test reveals one or more problem conditions, correct all malfunctions of the vacuum system, brake booster and hydraulic system prior to removing brake drums, brake calipers, brake shoes and linings or backing plates.

ANTI-SKID CONTROL SYSTEM TESTS

No adjustments or repairs are to be performed on the skid control system. Damaged or worn parts are to be replaced.

Refer to Ford Car and Truck Diagnosis Manual for Testing procedures.

2 COMMON ADJUSTMENTS AND REPAIRS

PARKING BRAKE LINKAGE ADJUSTMENT

FORD, MERCURY, METEOR, FAIRLANE, MONTEGO, FALCON, MUSTANG AND COUGAR

Check the parking brake cables when the brakes are fully released. If the cables are loose, adjust them as follows:

1. Fully release the parking brake pedal by pulling the release lever.

2. Depress the parking brake pedal until it is engaged in the first notch of the control. On a vacuum release brake, the first notch will be approximately two inches of pedal travel.

3. Raise the vehicle. With the transmission in neutral, turn the adjusting nut forward against the equalizer (Figs. 3 and 4) until there is 100

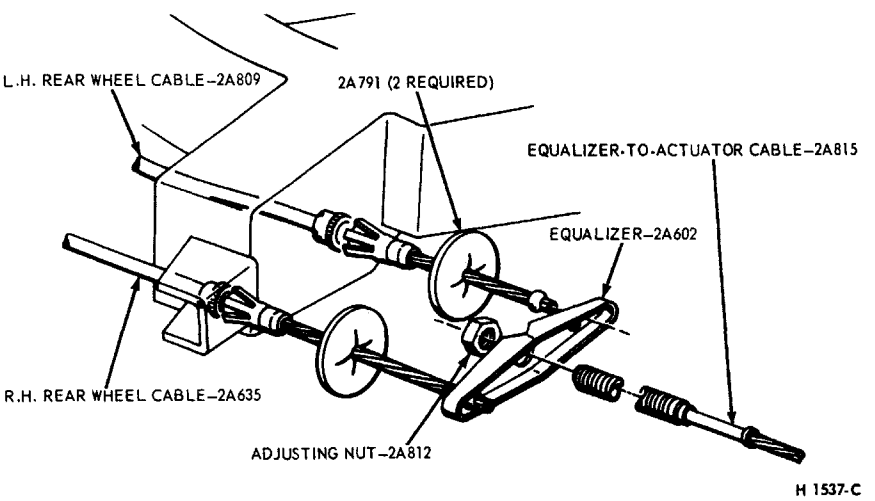


FIG. 3—Parking Brake Adjustment—Ford, Mercury, Meteor, Thunderbird and Continental Mark III

ft-lb breakaway torque. The breakaway torque is the torque required to turn the rear wheels the direction of forward rotation with a torque wrench and tool shown in Fig. 5. **The torque measurement must be made relative to the center line of the wheel.**

4. Release the parking brake, and check to make sure that the brake shoes return to the fully released position.

5. Depress the parking brake pedal to the third notch. Under normal conditions, this will hold the vehicle satisfactorily.

6. Release the parking brake again, and check as in step 4.

7. If the rear brakes do not fully release, check the cables for kinks or binds. Free the cables as required.

8. Lower the vehicle. Remove the torque wrench and tool. Install the wheel attaching nuts and torque them to specification. Install the wheel cover.

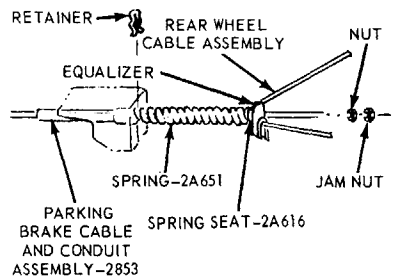


FIG. 4—Parking Brake Linkage Adjustment—Fairlane, Montego, Falcon, Mustang and Cougar

THUNDERBIRD, CONTINENTAL MARK III, AND LINCOLN CONTINENTAL

Check the parking brake cables when the brakes are fully released. If the cables are loose, adjust them as follows:

1. Fully release the parking brake pedal by pushing down the manual release lever.

2. Depress the parking brake pedal 1 1/4 inch from its normal released position.

3. Raise the vehicle with the transmission in neutral.

4. Loosen the lock nut and turn the adjusting nut forward against the equalizer (Figs. 3 and 6) until there is 100 ft-lbs breakaway torque. The breakaway torque is the torque required to turn the rear wheels the direction of forward rotation with a torque wrench and tool shown in Fig. 5. **The torque measurement must be made relative to the centerline of the wheel.** Tighten the lock nut.

5. Release the parking brake, and check to make sure that the brake shoes return to the fully released position.

6. Depress the parking brake pedal until it is fully engaged.

7. Release the parking brake again, and check as in step 5.

8. Depress the pedal 1/2 inch. The brakes should not drag.

9. If the rear brakes do not fully release, check the cables for kinks or binds. Free the cables as required.

10. Lower the vehicle. Remove the torque wrench and tool. Install the wheel attaching nuts and torque them to specification. Install the wheel cover.

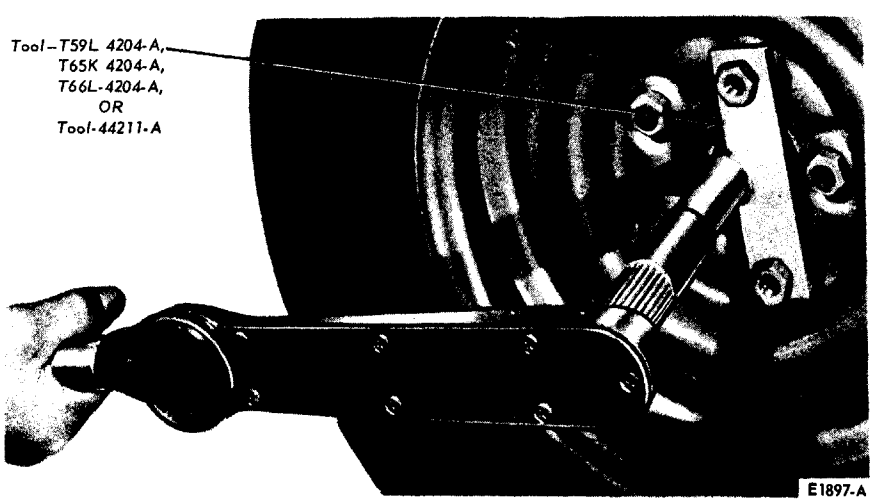


FIG. 5—Checking Parking Brake Breakaway Torque

POWER BRAKE MASTER CYLINDER PUSH ROD ADJUSTMENT

The push rod is provided with an adjustment screw to maintain the correct relationship between the booster control valve plunger and the master cylinder. If the plunger is too long it will prevent the master cylinder piston from completely releasing hydraulic pressure and can cause the brakes to drag. If the plunger is too short it will result in excess pedal travel and an undesirable clunk in the booster area.

The adjustment screw is set to the correct height at the time of original assembly of the power unit. **Under normal service the adjustment screw does not require any further attention providing the original push rod assembly remains in the original unit.**

If a check of the push rod adjustment is necessary, the push rod length may be verified with a push rod length gauge and measured with the engine running to apply vacuum to the booster (Fig. 7).

The push rod length verification and adjustment of Midland-Ross power brake booster assemblies must be done according to the following procedure:

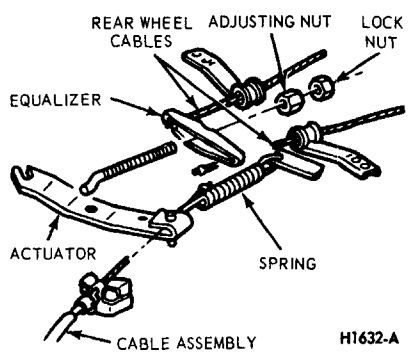


FIG. 6—Parking Brake Linkage Adjustment—Lincoln Continental

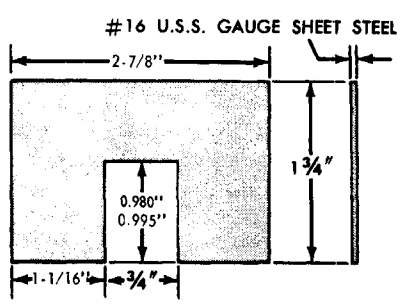


FIG. 7—Push Rod Gauge Dimensions

1. Disconnect the master cylinder from the booster assembly and secure away from the booster without disconnecting the brake tubes.
2. Reinstall the air filter assembly on the booster if it was removed with the master cylinder (Fig. 8).
3. Install and tighten the master cylinder retaining nuts to retain the air filter assembly securely against the booster body and to seal the booster bellows against air leaks.
4. Place the gauge against the master cylinder mounting surface of the air filter assembly.
5. Adjust the push rod screw to provide a slight tension against the inner edge of the adjustment gauge slot. (Approximately 5 pounds of tension against the push rod is required to assure that the push rod is firmly seated in the booster assembly.)
6. Remove the retaining nuts from the booster master cylinder mounting studs.
7. Install the master cylinder on the brake booster and tighten the retaining nuts to the specified torque.

The push rod length verification of the Bendix power brake booster assemblies is accomplished as follows:

1. Disconnect the master cylinder from the booster assembly and secure away from the booster without disconnecting the brake tubes.
2. Adjust the push rod screw to provide a slight tension against the inner edge of the adjustment gauge slot. (Approximately 5 pounds of tension against the push rod is required to assure that the push rod is firmly seated in the booster assembly.) See Figure 8.
3. Install the master cylinder on the brake booster and tighten the retaining nuts to the specified torque.

Do not set up side forces on the push rod as it may break the valve plunger.

This is an approximate adjustment only. To verify the adjustment, look through the make-up (rear) port of the master cylinder when installing the master cylinder to the booster. The master cylinder piston should not move more than 0.015 inch as it contacts the push rod. No movement (exact contact) is ideal.

HYDRAULIC SYSTEM BLEEDING AND CENTRALIZING OF THE DIFFERENTIAL VALVE

When any part of the hydraulic system has been disconnected for repair or replacement, air may enter the system and cause spongy pedal action. Bleed the hydraulic system after it has been properly connected, to be sure that all air is expelled.

MANUAL BLEEDING

The Lincoln Continental hydraulic brake system is to be bled only with pressure bleeding equipment.

The primary and secondary (front and rear) hydraulic brake systems are individual systems and are bled separately. Bleed the longest line first on the individual system being serviced. **During the complete bleeding operation, DO NOT allow the reservoir to run dry.** Keep the master cylinder reservoirs filled with Ford Fluid—Extra Heavy Duty — Part Number C6AZ-19542-A (ESA-M6C 25-A). **The extra heavy duty brake fluid is colored blue for identification purposes. Do not mix low temperature brake fluids with the specified fluid during the bleeding operations. Never re-use brake fluid which has been drained from the hydraulic systems.**

1. If the master cylinder is equipped with a bleed screw, loosen the bleed screw. Push the brake pedal down slowly through its full travel. Close the bleeder fitting and return the pedal to the fully released position. Repeat this operation until fluid is free of air bubbles, then tighten the bleeder screw. **Do not use the secondary piston stop screw, located on the bottom of the master cylinder to bleed the brake system. Loosening or removing this screw could result in damage to the secondary piston or stop screw.**
2. To bleed the secondary (rear) brake system, position a suitable 3/8 inch box wrench (Fig. 9) on the bleeder fitting on the brake wheel cylinder. Attach a rubber drain tube to the bleeder fitting. **The end of the tube should fit snugly around the bleeder fitting.**

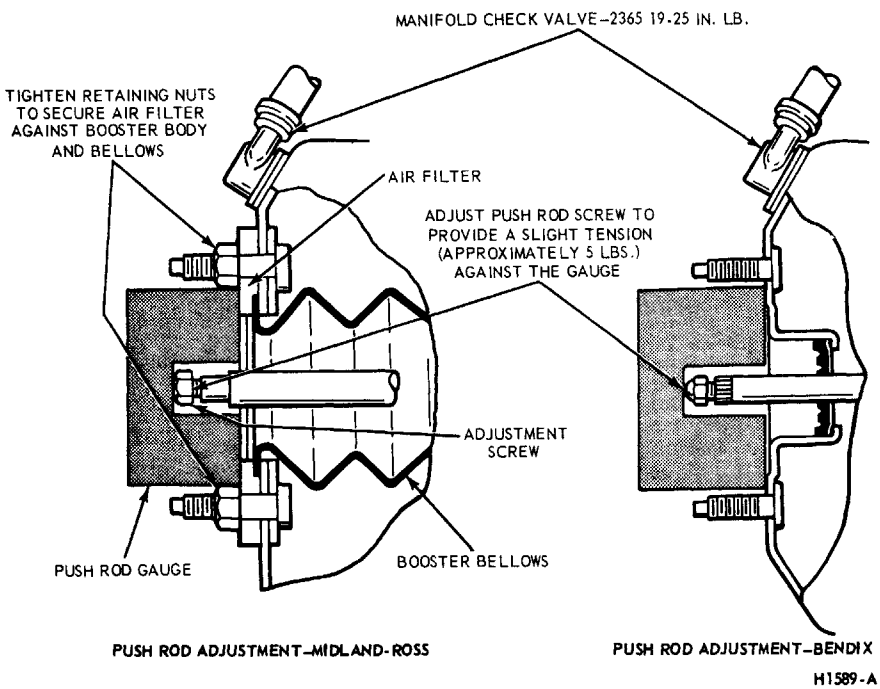


FIG. 8—Brake Booster Push Rod Measurement

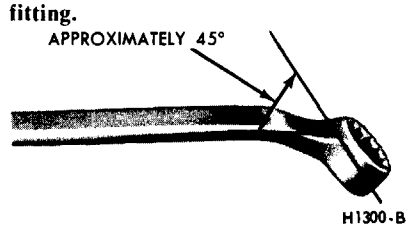


FIG. 9—Wrench for Bleeding Brake Hydraulic System

3. Submerge the free end of the tube in a container partially filled with clean brake fluid, and loosen the bleeder fitting approximately 3/4 turn.
4. Push the brake pedal down slowly through its full travel. Close the bleeder fitting, then return the pedal to the full-released position. Repeat this operation until air bubbles cease to appear at the submerged end of the bleeder tube.
5. When the fluid is completely free of air bubbles, close the bleeder fitting and remove the bleeder tube.
6. Repeat this procedure at the brake wheel cylinder on the opposite

side. Refill the master cylinder reservoir after each wheel cylinder is bled and install the master cylinder cover and gasket. **Be sure the diaphragm type gasket is properly positioned in the master cylinder cover. When the bleeding operation is completed, the fluid level should be filled to within 1/4 inch of the top of the reservoirs.**

7. If the primary (front brake) system is to be bled. Repeat steps 2 through 6 at the right front brake caliper or cylinder and ending at the left front brake caliper or cylinder.

8. On disc brake equipped models be sure that the front brake pistons are returned to their normal positions and that the shoe and lining assemblies are properly seated by depressing the brake pedal several times until normal pedal travel is established.

9. Centralize the pressure differential valve. Refer to the Centralizing the Pressure Differential Valve procedures which follow.

PRESSURE BLEEDING

The Lincoln Continental hydraulic brake system is to be bled only with pressure bleeding equipment.

Bleed the longest lines first. The bleeder tank should contain enough new Ford Brake Fluid to complete the bleeding operation. Use Ford Brake Fluid — Extra Heavy Duty — Part Number C6AZ-19542-A (ESA-M6C25-A) or equivalent for all brake applications. **The brake fluid is colored blue for identification purposes. Do not mix low temperature brake fluid with the specified brake fluid during the bleeding operations. Never re-use brake fluid that has been drained from the hydraulic system.** The tank should be charged with approximately 10 to 30 pounds of air pressure. **Never exceed 50 pounds pressure.**

1. Clean all dirt from the master cylinder reservoir cover.

2. Remove the master cylinder reservoir cover and rubber gasket, and fill the master cylinder reservoir with the specified brake fluid. Install the pressure bleeder adapter tool to the master cylinder, and attach the bleeder tank hose to the fittng on the adapter.

Master cylinder pressure bleeder adapter tools can be obtained from the various manufacturers of pressure bleeding equipment. Follow the instructions of the manufacturer when installing the adapter.

3. If the master cylinder is equipped with a bleed screw, loosen the bleed screw and bleed the master cylinder until the fluid is free of air bubbles; then, tighten the bleed screw. **Do not use the secondary piston stop screw, located on the bottom of the master cylinder, to bleed the master cylinder.**

4. If the rear wheel cylinders, the secondary brake system, are to be bled, position a 3/8 inch box wrench (Fig. 9) on the bleeder fitting on the right rear brake wheel cylinder. Attach a bleeder tube to the bleeder fitting. **The end of the tube should fit snugly around the bleeder fitting.**

5. Open the valve on the bleeder tank to admit pressurized brake fluid to the master cylinder reservoir.

6. Submerge the free end of the tube in a container partially filled with clean brake fluid, and loosen the bleeder fitting.

7. When air bubbles cease to appear in the fluid at the submerged end of the bleeder tube, close the bleeder fitting and remove the tube.

8. Repeat steps 3 through 7 at the left rear wheel cylinder.

9. **If the vehicle is equipped with disc brakes,** repeat steps 4 through 7, starting at the right front disc caliper and ending at the left front disc caliper.

On Lincoln Continental models the front wheel and tire assemblies must be removed to gain access to the bleeder fittings on the calipers. Also on Lincoln Continental models the metering valve release rod must be pulled outward and held a minimum of 1/16 inch (Fig. 10) while bleeding the primary brake system.

10. If the vehicle contains drum-type front brakes and the primary (front) brake system is to be bled, repeat steps 4 through 7, starting at the right front wheel cylinder ending at the left front wheel cylinder.

11. When the bleeding operation is completed, close the bleeder tank valve and remove the tank hose from the adapter fitting.

12. On disc brake equipped vehicles, be sure that the front brake pistons are returned to their normal positions and that the shoe and lining assemblies are properly seated by depressing the brake pedal several times until normal pedal travel is established.

13. Remove the Pressure Bleeder Adapter Tool. Fill the master cylinder reservoirs to within 1/4 inch of the top. Install the master cylinder cover and gasket. **Be sure the Diaphragm type gasket is properly positioned in the master cylinder cover.**

14. Centralize the pressure differential valve as follows.

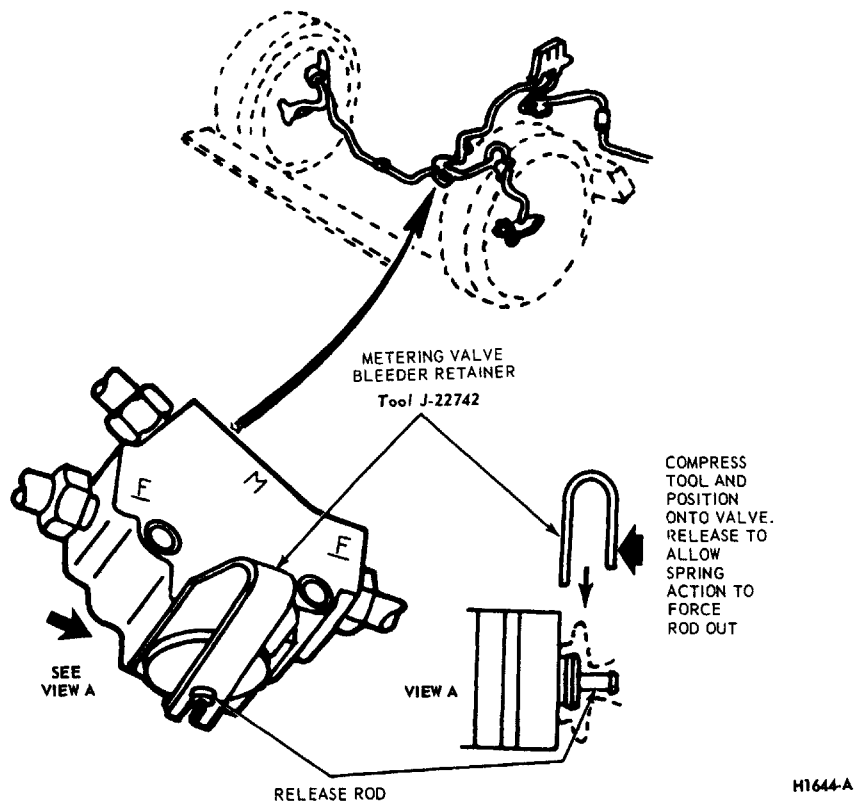


FIG. 10—Disc Brake Metering Valve—Lincoln Continental

CENTRALIZING THE PRESSURE DIFFERENTIAL VALVE

After a failure of the primary (front brake) or secondary (rear brake) system has been repaired and bled, the dual-brake warning light will usually continue to be illuminated due to the pressure differential valve remaining in the off-center position.

To centralize the pressure differential valve and turn off the warning light after a repair operation, a pressure differential or unbalance condition must be created in the **opposite brake system from the one that was repaired or bled last.**

1. Turn the ignition switch to the ACC or ON position. Loosen the differential valve assembly brake tube nut at the outlet port on the opposite side of the brake system that was wheel balanced, repaired and/or bled last. Depress the brake pedal slowly to build line pressure until the pressure differential valve is moved to a centralized position and the brake warning light goes out; then, immediately tighten the outlet port tube nut.
2. Check the fluid level in the master cylinder reservoirs and fill them to within 1/4 inch of the top with the specified brake fluid, if necessary.
3. Turn the ignition switch to the OFF position.
4. Before driving the vehicle, check the operation of the brakes and be sure that a firm pedal is obtained.

3 CLEANING AND INSPECTION

DISC BRAKES

1. Remove the wheel and tire and the shoe and lining assemblies as outlined in Part 2-2, Section 2.
2. On all models except Lincoln Continental, make thickness measurements with a micrometer across the thinnest section of the shoe and lining. If the assembly has worn to a thickness of 0.230-inch (shoe and lining together) or 0.030-inch (lining material only) at any one of three measuring locations or if there is more than 0.125 taper from end to end or if lining shows evidence of brake fluid contamination, replace all (4) shoe and lining assemblies on both front wheels.

On Lincoln Continental brakes make three thickness measurements with a micrometer across the middle section of the shoe and lining. Take one reading at each side and one in the center. If the assembly has worn to a thickness of 0.231 inch (shoe and lining together) or 0.066 inch (lining material only) at any one of the three measuring locations, replace all (4) shoe and lining assemblies on both front wheels.

3. Check the caliper to spindle attaching bolts torque. Torque them to specification, if required.
4. To check rotor runout, first eliminate the wheel bearing end play by tightening the adjusting nut. After tightening the nut, check to see that the rotor can still be rotated.
5. Clamp a dial indicator to the caliper housing so that the stylus contact the rotor at a point approximately 1 inch from the outer edge. Rotate the rotor and take an indicator reading. If the reading exceeds 0.003 inch total lateral runout on the indicator, replace or resurface the disc brake rotor. **The following requirement must be met when resurfacing disc brake rotors:**

Rotunda Disc Brake Attachment FRE-2249-2 is the **only approved** tool to be used to refinish the disc brake rotors. The step-by-step resurfacing procedure provided with the tool must be adhered to.

The finished braking surface of the rotor must be flat and parallel within 0.0007 inch; lateral runout must not exceed 0.003 inch total indicator reading, braking surface are to be 80/15 micro inches.

On all models except Lincoln Continental the minimum limiting dimension from the inboard bearing cup to the inboard rotor face and the minimum rotor thickness dimension, must be observed when removing material from the rotor braking surfaces. A ball and gage bar (Rotunda Kit FRE 70160) is to be used when checking minimum dimensions (Fig. 11).

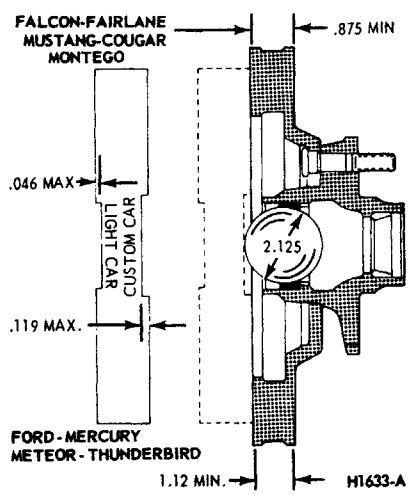


FIG. 11—Disc Brake Rotor Service Limits—All Models Except Lincoln Continental

On Lincoln Continental models the minimum limiting dimension (Fig. 12) from the inboard bearing cup to the inboard rotor face (dimension B) and the outboard rotor surface and the inboard bearing cup (dimension A), must be observed when removing material from the rotor braking surfaces.

When the runout check is finished be sure to adjust the bearings as outlined in Group 3, in order to prevent bearing failure.

6. Check the rotor for scoring. Minor scores can be removed with a fine emery cloth. If the rotor is excessively scored, refinish it as outlined in step 5 or replace the rotor, if required.
7. Visually check the caliper. If the caliper housing is leaking it should be replaced. If a seal is leaking the caliper must be disassembled and new seals installed. If a piston is seazed in the bore a new caliper housing is required.

On Lincoln Continental models the two halves of the caliper assembly should never be separated. Damage or failure of one requires replacement of both as a unit.

Check the brake hoses for signs of cracking, leaks or abrasion. Replace them if necessary.

DISC BRAKE SERVICE PRECAUTIONS

1. Grease or any other foreign material must be kept off the caliper assembly, surfaces of the rotor and external surfaces of the hub during service operations. Handling of the rotor and caliper assemblies should be done in a way to avoid deformation of the brake rotor and nicking or scratching of brake linings.
2. If a caliper piston is removed for any reason, the piston seal must be replaced.
3. During removal and installation of a wheel assembly, exercise care not to interfere with and damage the cali-

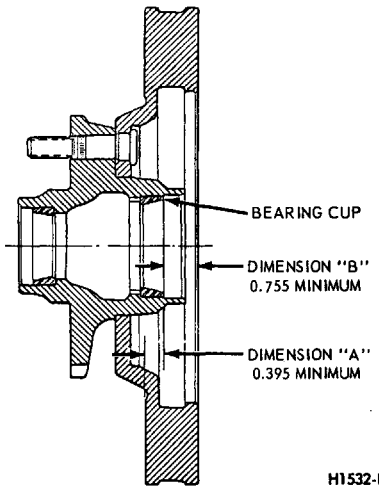


FIG. 12—Disc Brake Rotor Service Limits—Lincoln Continental

per splash shield or the bleeder screw fitting.

4. Front wheel bearing end play is critical and must be within specifications.

5. Be sure the vehicle is centered on the hoist before servicing any front end components, to avoid bending or damaging the rotor splash shield on full right or left wheel turns.

6. The proportioning valve should not be disassembled or adjustments attempted on it.

7. Riding of the brake pedal (common on left foot applications) should be avoided during vehicle operation.

8. The wheel and tire must be removed separately from the brake rotor, unlike drum brakes where the wheel, tire and drum are removed as a unit.

9. On floating caliper type disc brakes whenever the caliper is removed the caliper locating pins should be inspected for wear or damage.

10. On floating caliper type disc brakes, the caliper assembly must be removed from the spindle prior to removal of the shoe and lining assemblies.

11. On floating caliper type disc brakes the calipers must not be interchanged from one side to the other. When the caliper is installed on its proper anchor plate and spindle, the bleeder screw will point to the rear of the vehicle (Fig. 22). If a caliper is installed on the wrong side of the vehicle, it is not possible to bleed the system properly.

12. Do not attempt to clean or restore oil or grease soaked brake linings. When contaminated linings are found, brake linings must be replaced in complete axle sets.

DRUM BRAKES

1. Remove the wheel from the drum, and remove the drum as outlined in Part 2-2, Section 2.

2. Brush all dust from the backing plates and interior of the brake drums.

3. Inspect the brake shoes for excessive lining wear or shoe damage. If the lining is worn within 1/32 inch of the rivet heads or if the shoes are damaged, they must be replaced. Replace any lining that had been contaminated with oil, grease or brake fluid. Replace lining in axle sets. Prior to replacement of lining, the drum diameter should be checked to determine if oversize linings must be installed.

4. Check the condition of brake shoes, retracting springs, hold-down springs, and drum for signs of overheating. If the shoes have a slight blue coloring, indicating overheating, replacement of the retracting and hold-down springs is strongly recommended. **Overheated springs lose their pull and could cause the new lining to wear prematurely, if they are not replaced.**

5. If the vehicle has 30,000 or more miles of operation on the brake linings or signs of overheating are present when relining brakes, the wheel cylinders should be disassembled and inspected for wear and entrance of dirt into the cylinder. The cylinder cups should be replaced, thus avoiding future problems.

6. Inspect all other brake parts and replace any that are worn or damaged.

7. Inspect the brake drum and, if necessary, refinish. Refer to Part 2-2, Section 4 for refinishing.

BRAKE BOOSTER

Check the booster operation as noted in Part 2-1, Section 1. Power Brake Functional Test. If the brake booster is damaged or defective, replace it with a new booster. **The brake booster is serviced only as an assembly.**

Part 2-2 Brake System

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
ANTI SKID CONTROL SYSTEM												
Description		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-07	02-07
ANTI SKID CONTROL ACTUATOR												
Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-36	02-36
ANTI SKID CONTROL MODULE												
Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-38	02-38
ANTI SKID CONTROL SENSOR												
Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-38	02-38
BRAKE BACKING PLATE (DRUM)												
Removal and Installation	02-16											
BRAKE BOOSTER												
Cleaning and Inspection - See Part 2-1												
Description	02-06											
Removal and Installation	02-24											
BRAKE DRUM												
Cleaning and Inspection - See Part 2-1												
Refinishing	02-39											
Removal and Installation (Front)	02-09	02-09	02-09	02-09	02-09	02-09	02-09	02-09	02-09	N/A	N/A	N/A
Removal and Installation (Rear)	02-09											
BRAKE PEDAL												
Removal and Installation		02-25	02-25	02-25	02-25	02-25	02-25	02-25	02-25	02-27	02-26	02-26
BRAKE SHOES (DRUM)												
Adjustments	02-07											
Relining	02-39											
Removal and Installation	02-09											
DISC BRAKE												
Description	02-03											
DISC BRAKE CALIPER												
Cleaning and Inspection		02-41	02-41	02-41	02-41	02-41	02-41	02-41	02-41	02-42	04-41	02-41
Disassembly and Overhaul		02-41	02-41	02-41	02-41	02-41	02-41	02-41	02-41	02-41	02-41	02-41
Removal and Installation		02-16	02-16	02-16	02-16	02-16	02-16	02-16	02-16	02-17	02-16	02-16
DISC BRAKE ROTOR AND HUB												
Cleaning and Inspection — See Part 2-1												
Refinishing	02-39											
Removal and Installation	02-19											
DISC BRAKE ROTOR SPLASH SHIELD												
Removal and Installation	02-19											
DISC BRAKE SERVICE PRECAUTIONS												
— See Part 2-1												

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
DISC BRAKE SHOE AND LINING												
Cleaning and Inspection - See Part 2-1												
Removal and Installation		02-18	02-18	02-18	02-18	02-18	02-18	02-18	02-18	02-18	02-18	02-18
DRUM BRAKE												
Description	02-05											
DUAL BRAKE SYSTEM												
Description	02-03											
HYDRAULIC LINES												
Removal and Installation (Hose)	02-08											
Removal and Installation (Tube)	02-08											
MASTER CYLINDER												
Cleaning and Inspection	02-40											
Disassembly and Overhaul	02-39											
Removal and Installation - Non-Power		02-19	02-19	02-19	02-20	02-20	02-20	02-20	02-20	N/A	N/A	N/A
Removal and Installation - Power	02-21											
PARKING BRAKE												
Description	02-06											
PARKING BRAKE ACTUATOR TO CONTROL CABLE												
Removal and Installation		02-34	02-34	02-34	N/A	N/A	N/A	N/A	N/A	N/A	02-34	02-34
PARKING BRAKE ACTUATOR TO EQUALIZER CABLE												
Removal and Installation		02-35	02-35	02-35	N/A	N/A	N/A	N/A	N/A	N/A	02-35	02-35
PARKING BRAKE CONTROL												
Removal and Installation		02-27	02-27	02-27	02-30	02-27	02-27	02-27	02-30	02-30	02-30	02-30
PARKING BRAKE EQUALIZER TO CONTROL CABLE												
Removal and Installation		N/A	N/A	N/A	02-34	02-34	02-34	02-34	02-34	02-35	N/A	N/A
PARKING BRAKE EQUALIZER TO REAR WHEEL CABLE												
Removal and Installation		02-35	02-35	02-35	02-36	02-36	02-36	02-36	02-36	02-36	02-35	02-35
PRESSURE DIFFERENTIAL VALVE												
Removal and Installation	02-22											
PRESSURE METERING VALVE												
Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-24	N/A	N/A
PROPORTIONING VALVE												
Removal and Installation		02-23	02-23	02-23	02-23	02-23	02-23	02-23	02-23	02-24	02-24	02-24
WHEEL CYLINDER												
Cleaning and Inspection	02-08											
Disassembly and Overhaul	02-07											
Removal and Installation	02-10											

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

Disc brakes are available as optional equipment for the front wheels on Ford, Mercury, Meteor, Fairlane, Montego, Falcon, Mustang and Cougar models and are standard on Thunderbird, Continental Mark III, and Lincoln Continental models. The dual-master cylinder equipped hydraulic brake system employs single anchor, internal expanding and self-adjusting drum brake assemblies on the rear wheels of vehicles with disc brakes, and on the front and rear wheels of all others.

A vacuum booster is used with the power disc brake system.

DUAL MASTER CYLINDER BRAKE SYSTEM

The dual-master cylinder brake system has been incorporated in all models to provide increased safety. The system consists of a dual-master cylinder (Fig. 1), pressure differential valve assembly and a switch (Fig. 2). The switch on the differential valve activates a dual-brake warning light, located on the instrument panel.

DISC BRAKE

The disc brake consists of a ventilated rotor and caliper assembly. The caliper used on all models except Lincoln Continental is a single piston floating caliper (Fig. 3). The caliper used on Lincoln Continental models is a four piston fixed caliper (Fig. 4).

A proportioning valve in the rear hydraulic circuit provides balanced braking action between front and rear brakes.

On all models except Lincoln a pressure impulse valve located at the primary inlet of the pressure differential valve prevents brake fluid surge back to the master cylinder reservoir.

On Lincoln Continental models a metering valve, in the hydraulic line between the differential valve and the front wheel disc brakes, prevents the front brakes from applying until approximately 125 psi is obtained in the system (Fig. 21). This delaying action is required to prevent the front brakes from performing all the braking action on low speed stops and thereby increasing the rate of lining wear.

FLOATING CALIPER— ALL MODELS EXCEPT LINCOLN CONTINENTAL

The caliper assembly is made up of a floating caliper housing assembly and an anchor plate. The anchor plate is bolted to the wheel spindle arm by two bolts. The floating caliper is attached to the anchor plate by steel stabilizers on Ford, Mercury, Meteor, Thunderbird and Continental Mark III models and by one stabilizer on Fairlane, Montego, Falcon, Mustang and Cougar models. The floating caliper slides on two locating pins which also attach to the stabilizers. The floating caliper contains the single cylinder and piston assembly. The cylinder bore contains a piston with a molded rubber dust boot to seal the cylinder bore from contamination (Fig. 5). A square section rubber piston seal is positioned in a groove in the cylinder bore and is used to provide sealing between the cylinder and piston (Fig. 7).

The outer brake shoe and lining assembly is longer than the inner assembly, and the shoe and lining assem-

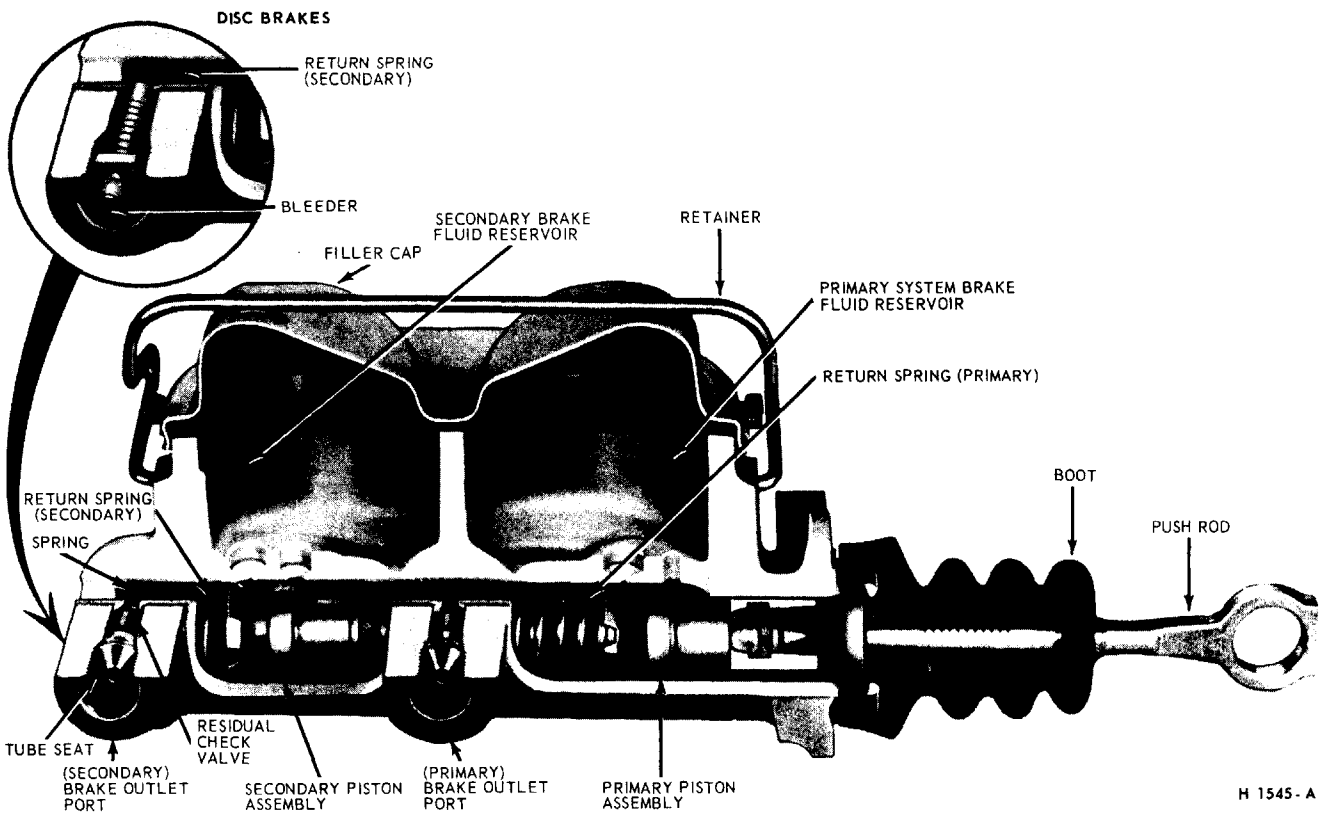


FIG. 1—Dual Master Cylinder—Typical

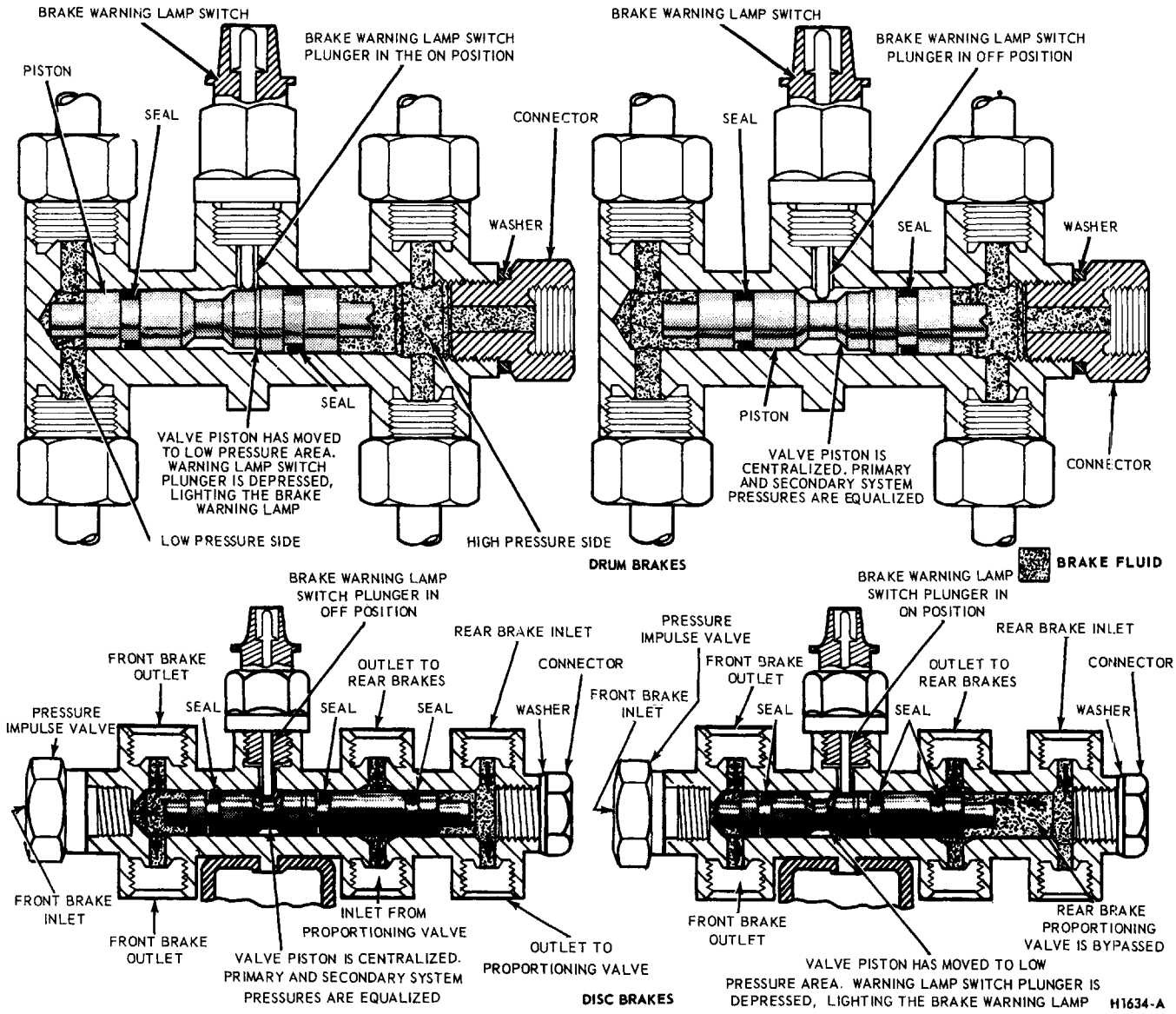


FIG. 2—Pressure Differential Valve and Brake Warning Light Switch

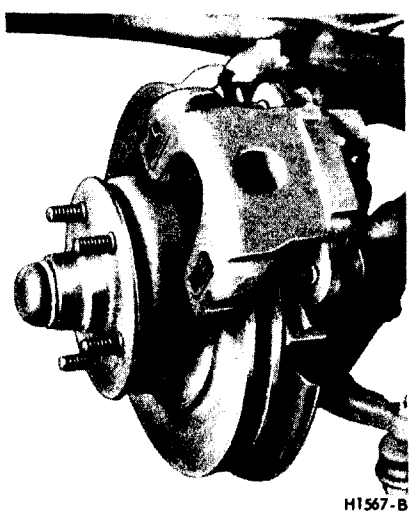


FIG. 3—Disc Brake Assembly—Floating Caliper—All Models Except Lincoln Continental

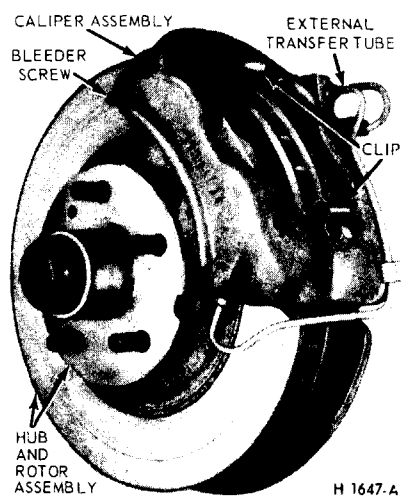


FIG. 4—Disc Brake Assembly—Fixed Caliper—Lincoln Continental

blies are not interchangable (Fig. 23). The outboard shoe and lining is fixed to the floating caliper and is retained by two pins and spring clips. The shoe and lining assembly consists of friction material bonded to a metal plate called the shoe. It is replaced as a unit.

FIXED CALIPER LINCOLN CONTINENTAL

The caliper assembly is bolted directly to the wheel spindle arm by two bolts. The caliper assembly consists of two caliper housings bolted together with each half containing two cylinder bores of 1.938 inch diameter. Each cylinder bore contains a piston with an attached molded rubber dust boot to seal the cylinder bore from contamination (Fig. 6). Square-section rubber

piston seals are positioned in grooves in the cylinder bores and are used to provide hydraulic sealing between the cylinders and pistons (Fig. 7).

The cylinders are connected hydraulically by means of internal passages in the caliper housings and an external transfer tube between the two halves of the caliper assembly. One bleeder screw and fluid inlet fitting is provided on each caliper assembly.

The shoe and lining assemblies are located in between parallel machined abutments within the caliper, and are supported radially by tabs on the outer ends of the shoe assemblies (Fig. 46). The shoes slide axially in the caliper abutments by means of the tabs which ride on machined ledges (bridges) when hydraulic pressure is applied to the piston (Fig. 6). A shoe and lining assembly consists of friction material riveted to a metal plate called the shoe. It is replaced as a unit. Clips are attached to the top of the caliper to retain the shoe and lining assemblies. The caliper assembly is mounted on the front wheel spindle to the rear of the wheel vertical centerline.

ROTOR

The cast iron disc is of the ventilated rotor-type incorporating forty fins and is attached to, and rotates with the wheel hub. A splash shield bolted to the spindle is used primarily to prevent road contaminants from contacting the inboard rotor and lining surfaces. The wheel provides protection for the outboard surface of the rotor.

DRUM BRAKE

The drum brake system employs single anchor, internal expanding and self adjusting brake assemblies.

The self-adjusting brake mechanism consists of a cable, cable guide, adjusting lever, adjusting screw assembly, and adjuster spring (Fig. 8). The cable is hooked over the anchor pin at the top and is connected to the lever at the bottom. The cable is routed along the webb of the secondary brake shoe by means of the cable guide. The adjuster spring is hooked to the primary brake shoe and to the lever. The automatic adjuster operates only when the brakes are applied while the vehicle is moving rearward and only when the secondary shoe is free to move toward the drum beyond a predetermined point.

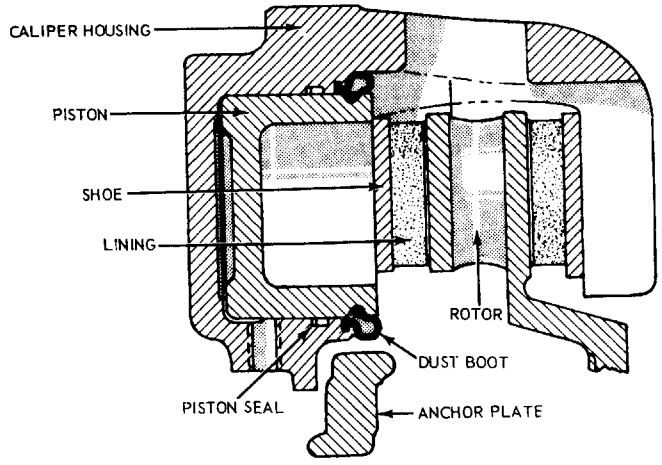


FIG. 5—Floating Caliper Assembly—Sectional View

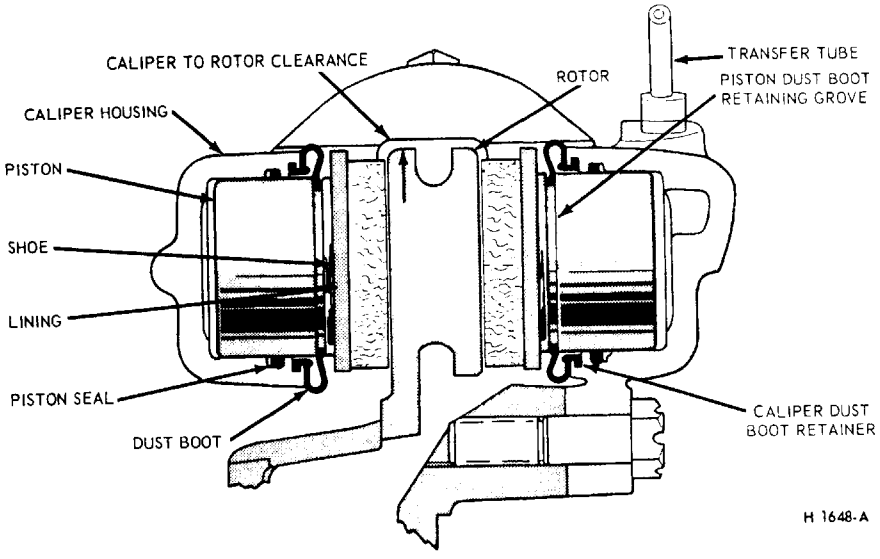


FIG. 6—Fixed Caliper Assembly—Sectional View

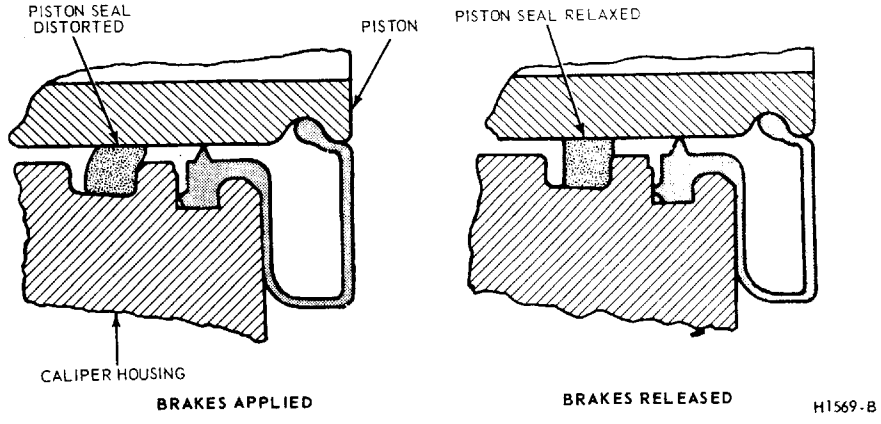


FIG. 7—Function of Piston Seal

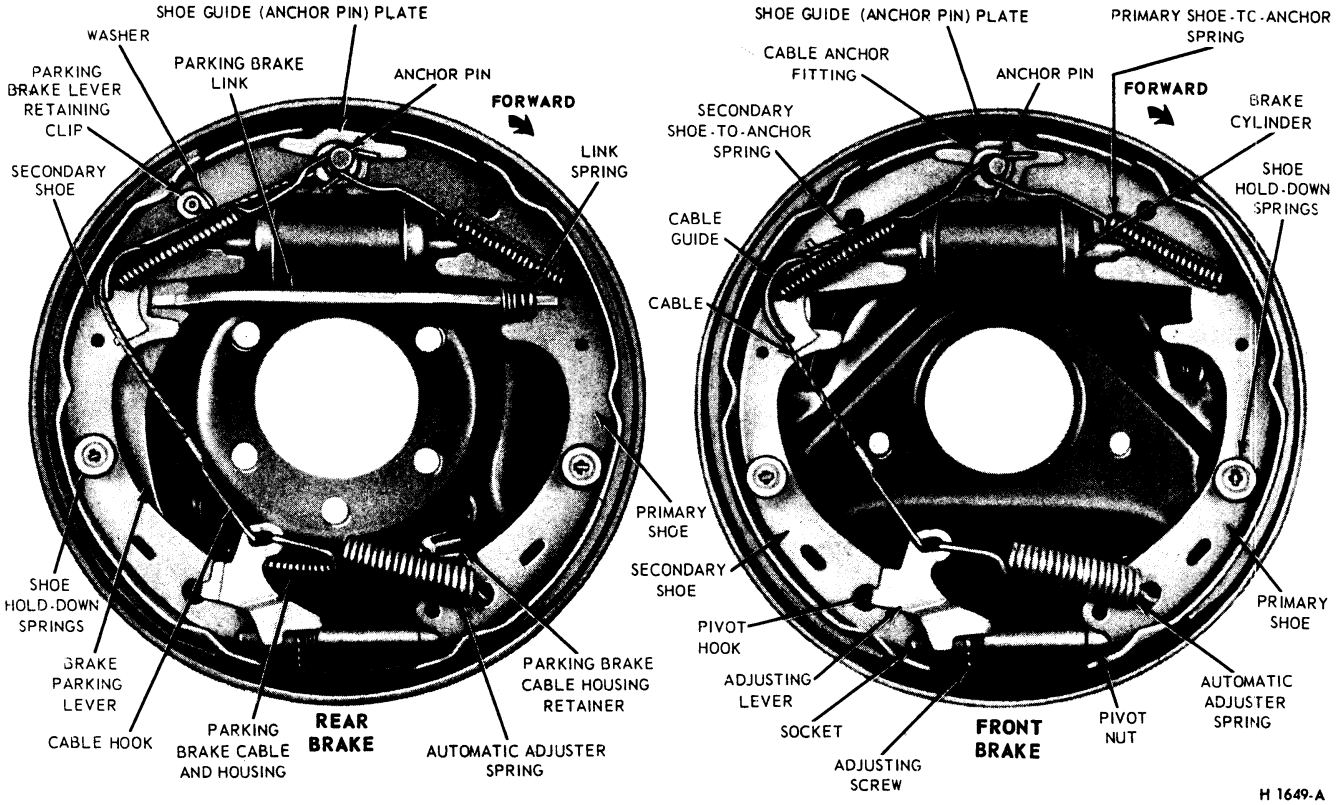


FIG. 8—Self-Adjusting Brake Assemblies—Typical

BRAKE BOOSTER SYSTEM

This diaphragm-type brake booster is a self-contained vacuum-hydraulic braking unit mounted on the engine side of the dash panel.

The brake booster is of the vacuum suspended-type which utilizes engine intake manifold vacuum and atmospheric pressure for its power.

Adjustment of the push rod and replacement of the check valve and grommet are the only services permitted on the brake booster. The booster unit is to be exchanged when it is inspected, checked and found to be defective.

PARKING BRAKE

An independent foot-operated parking brake control actuates the rear wheel brake shoes through a cable linkage. On all models except Ford, Mercury, Meteor, Thunderbird and Continental Mark III, the operating cable is routed from the parking brake control assembly to the equalizer. On Ford, Mercury, Meteor, Thunderbird, and Continental Mark III, the operating cable is routed from the parking brake control assembly to the actuator assembly. An intermediate cable connects the actuator to the equalizer. The rear brake cables connect the equalizer assembly to the parking brake lever at each rear secondary shoe (Fig. 8).

Two types of brake pedal control are used. The automatic (vacuum) release type (Fig. 9) is used on the Mercury, Ford LTD, Meteor LeMoyne, Thunderbird, Continental Mark III and Lincoln Continental models. All other models use the manual release-type (Fig. 10).

On the automatic-type, the vacuum

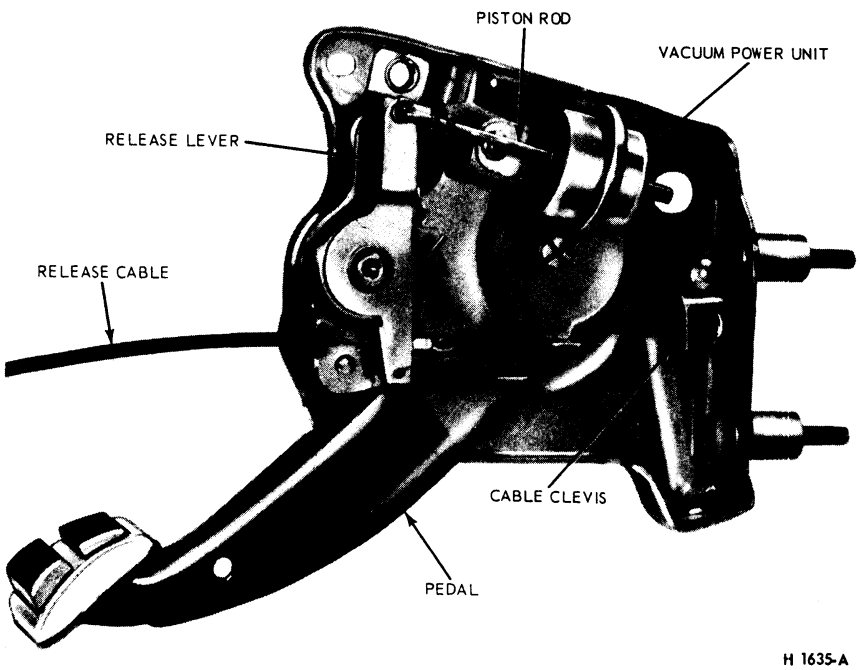


FIG. 9—Parking Brake Control Assembly With Automatic Release—Typical

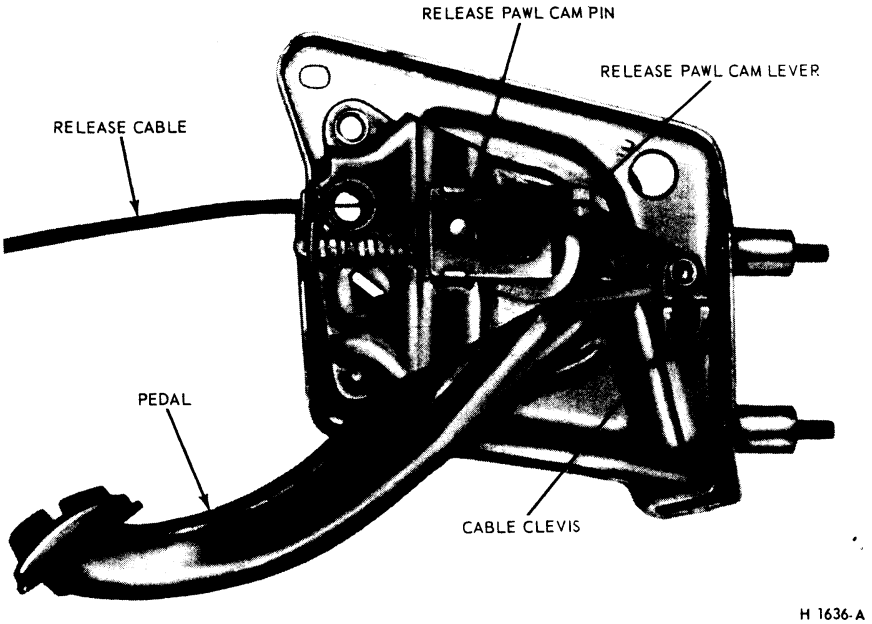


FIG. 10—Parking Brake Control Assembly With Manual Release—Typical

power unit with mounting bracket is riveted to the control assembly. The vacuum actuated piston within the unit is connected by a rod to the upper end of the release lever (Fig. 9). The lower end of the release lever extends out for alternate manual release in the event of vacuum power failure or for optional manual release at any time.

Hoses connect the power unit and the engine manifold to a vacuum release valve in the transmission neutral safety switch.

ANTI-SKID CONTROL SYSTEM

The anti-skid control system consists of three major components (Fig. 39). Mechanically driven electromagnetic sensors at each rear wheel; an electronic control module mounted under the glove box; a vacuum powered actuator attached to a bracket on the inside of the right front frame rail under the toe board.

The sensors consist of steel rings having teeth on their outer diameters, pressed on each axle shaft just outboard of the wheel bearing. The teeth rotate past corresponding teeth on the inside diameter of stationary steel rings mounted in the bearing retainers. Also mounted in the retainers, are ring-shaped permanent magnets and coils of wire. Two wires from each sensor connect the sensors to the control module.

The control module consists of solid state electronic components sealed in a container. It is connected to the sensors and to a solenoid on the actuator.

The actuator is similar to a vacuum brake booster and consists of three parts. A chamber divided by a vacuum suspended diaphragm; a hydraulic cylinder connected to the diaphragm; and a solenoid connected electrically to the control module.

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

After any brake service work, obtain a firm brake pedal before moving the vehicle. Riding the brake pedal (common on left foot application) should be avoided when driving the vehicle.

BRAKE SHOE ADJUSTMENTS—DRUM BRAKES

The hydraulic drum brakes are self-adjusting and require a manual adjustment only after the brake shoes have been relined, replaced, or when the length of the adjusting screw has been changed while performing some other service operation. **The manual adjustment is performed with the drums removed, using the tool and the procedure detailed below.**

When adjusting the rear brake shoes, check the parking brake cables for proper adjustment. Make sure that the equalizer operates freely.

To adjust the brake shoes:

1. Use Rotunda Tool HRE 8650, (Fig. 11) to determine the inside diameter of the drum braking surface.

2. Reverse the tool as shown in Fig. 11 and adjust the brake shoe diameter to fit the gauge. Hold the automatic adjusting lever out of engagement while rotating the adjusting screw, to prevent burring the screw slots. Make sure the adjusting screw rotates freely. If necessary, lubricate the adjusting screw threads with a thin, uniform coating of MIC-100-A.

3. Rotate Tool HRE 8650 around the brake shoes to be sure of the setting.

4. Apply a small quantity of high temperature grease to the points where the shoes contact the backing plate, being careful not to get the lubricant on the linings.

5. Install the drums. Install Tinnerman nuts and tighten securely.

6. Install the wheels on the drums and tighten the nuts to specification.

7. Complete the adjustment by applying the brakes several times with a minimum of 50 lbs pressure on the pedal while backing the vehicle. After each stop the vehicle must be moved forward.

8. After the brake shoes have been properly adjusted, check the operation of the brakes by making several stops while operating in a forward direction.

WHEEL CYLINDER REPAIR—DRUM BRAKE

Wheel cylinders should not be disassembled unless they are leaking or unless new cups and boots are to be installed. It is not necessary to remove the brake cylinder from the backing plate to disassemble, inspect, or hone and overhaul the cylinder. Removal is necessary only when the cylinder is damaged or scored beyond repair.

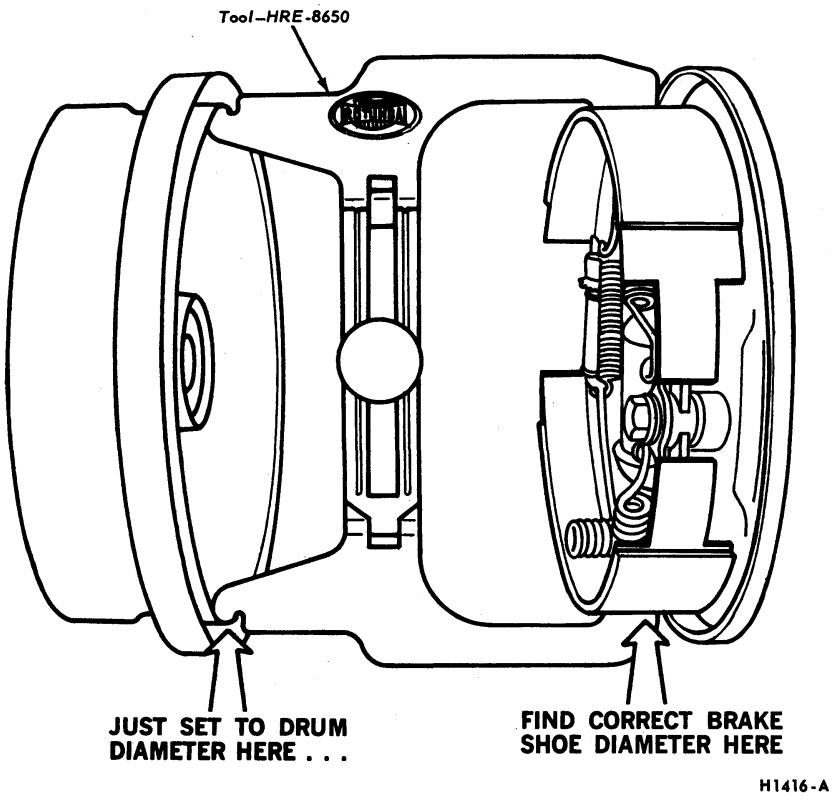


FIG. 11—Adjusting Brake Shoes Using Tool HRE-8650

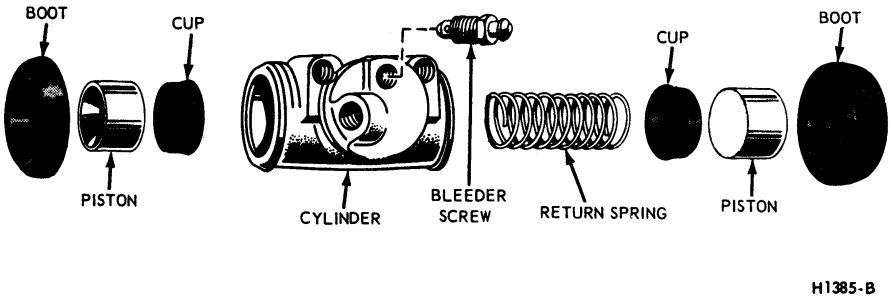


FIG. 12—Brake Wheel Cylinder—Typical

DISASSEMBLY

1. Remove the links and the rubber boots from the ends of the brake cylinder. Remove the pistons, cups, and return spring from the cylinder bore (Fig. 12).
2. Remove the bleeder screw from the cylinder.

INSPECTION

1. Wash all parts in clean brake fluid. Dry with compressed air.
2. Replace scored pistons. Always replace the rubber cups and dust boots.
3. Inspect the cylinder bore for score marks or rust. If either condition is present the cylinder bore must be honed. **However, the cylinder should not be honed more than 0.003 inch beyond its original diameter.**
4. Check the bleeder hole to be sure that it is open.

ASSEMBLY

1. Apply a light coating of heavy-duty brake fluid to all internal parts.
2. Thread the bleeder screw into the cylinder and tighten securely.
3. Insert the return spring, cups, and pistons into their respective positions in the cylinder bore (Fig. 12). Place a boot over each end of the cylinder. Bleed the brake system.

HYDRAULIC LINE REPAIR

Steel tubing is used throughout the brake system with the exception of the flexible hoses at the front wheels and at the rear axle housing brake tube connection (Figs. 17 thru 21).

Always bleed the applicable primary or secondary brake system after primary or secondary brake system hose or line replacement. Centralize the pressure differential valve after bleeding the system.

BRAKE TUBE REPLACEMENT

If a section of the brake tubing becomes damaged, the entire section should be replaced with tubing of the same type, size, shape and length. **Copper tubing should not be used in a hydraulic system.** When bending brake tubing to fit underbody or rear axle contours, be careful not to kink or crack the tube.

All brake tubing should be double flared properly to provide good leak-proof connections. Clean the brake tubing by flushing with clean brake fluid before installation.

When connecting a tube to a hose, tube connector, or brake cylinder, tighten the tube fitting nut to specified torque with Milbar tool 1112-144 or equivalent.

BRAKE HOSE REPLACEMENT

A flexible brake hose should be replaced if it shows signs of softening, cracking, or other damage.

When installing a new front brake hose, position the hose to avoid contact with other chassis parts. Place a new copper gasket over the hose fitting and thread the hose assembly into the front wheel cylinder. Engage the opposite end of the hose to the bracket on the frame. Install the horseshoe-type retaining clip, and connect the tube to the hose with the tube fitting nut (Figs. 17 thru 21).

A rear brake hose should be installed so that it does not touch the muffler outlet pipe or shock absorber. Thread the hose into the rear brake tube connector. Engage the front end of the hose to the bracket on the frame. Install the horseshoe-type retaining clip, and connect the tube to the hose with the tube fitting nut.

3 REMOVAL AND INSTALLATION

FRONT BRAKE DRUM

REMOVAL

1. Raise the vehicle until the wheel and tire clear the floor. Remove the wheel cover or hub cap, and remove the wheel and tire from the drum.
2. Remove the grease cap from the hub. Remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle. Remove the outer bearing cone and roller assembly.
3. Pull the drum off the wheel spindle.
4. If the drum will not come off, pry the rubber cover from the brake backing plate. Insert a narrow screwdriver through the slot and disengage the adjusting lever from the adjusting screw. While holding the adjusting lever away from the screw, back off the adjusting screw with the brake adjusting tool (Fig. 13). **Be very careful not to burr, chip, or damage the notches in the adjusting screw; otherwise the self-adjusting mechanism will not function properly.**

INSTALLATION

1. If the drum is being replaced, remove the protective coating from the new drum with carburetor degreaser. Then, use sandpaper to insure that no residue remains. Wipe the drum with a cloth soaked with denatured alcohol. Install new bearings and grease seal. Pack the wheel bearings, install the inner bearing cone and roller assembly in the inner cup, and install the new grease seal see Part 3-5, Section 4.

If the original drum is being installed, make sure that the grease in the hub is clean and adequate.

2. Adjust the brakes and install the drum assembly as outlined under Brake Shoe Adjustments in this section.
3. Install the outer wheel bearing, washer and adjusting nut.
4. Adjust the wheel bearing as outlined in Part 3-7, Section 2, then install the grease cap. Install the wheel and hub cap.

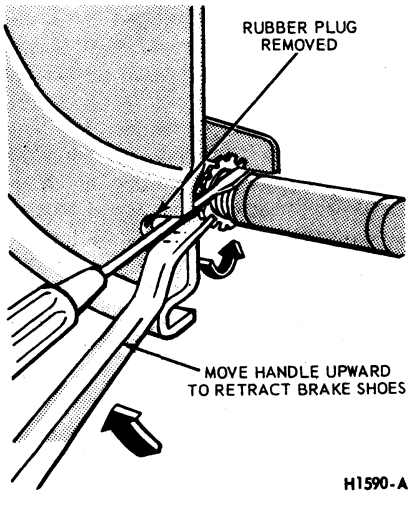


FIG. 13—Backing Off Brake Adjustment

REAR BRAKE DRUM

REMOVAL

1. Raise the vehicle so that the tire is clear of the floor.
2. Remove the hub cap and wheel. Remove the three Tinnerman nuts and remove the brake drum. If the drum will not come off, pry the rubber cover from the backing plate. Insert a narrow screwdriver through the hole in the backing plate, and disengage the adjusting lever from the adjusting screw. While holding the adjusting lever away from the adjusting screw, back off the adjusting screw with the brake adjusting tool (Fig. 13). **Be very careful not to burr, chip, or damage the notches in the adjusting screw; otherwise, the self-adjusting mechanism will not function properly.**

INSTALLATION

1. Remove the protective coating from a new drum with carburetor degreaser; then sand lightly and wipe with a cloth soaked with denatured alcohol.

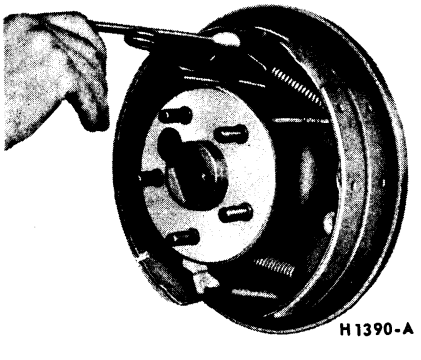


FIG. 14—Retracting Spring Removal

2. Adjust the brakes as outlined under Brake Shoe Adjustments in this section. Place the drum over the brake assembly and into position.
3. Install the three Tinnerman nuts and tighten securely. Install the wheel on the axle shaft flange studs against the drum, and tighten the attaching nuts to specifications.

BRAKE SHOES AND ADJUSTING SCREW—DRUM BRAKES

REMOVAL

1. With the wheel and drum removed install a clamp over the ends of the brake cylinder as shown in Fig. 14.
2. Remove the secondary shoe to anchor spring with the tool shown in Fig. 14. With the same tool remove the primary shoe to anchor spring and unhook the cable eye from the anchor pin.
3. On Ford, Mercury, Meteor, Thunderbird, Continental Mark III and Lincoln Continental models, remove the shoe guide (anchor pin) plate (Fig. 8).
4. Remove the shoe hold-down springs, shoes, adjusting screw, pivot nut, socket and automatic adjustment parts.
5. On rear brakes, remove the parking brake link and spring. Disconnect the parking brake cable from the parking brake lever.
6. After removing the rear brake secondary shoe, disassemble the parking brake lever from the shoe by removing the retaining clip and spring washer (Fig. 8).

INSTALLATION

1. Before installing the rear brake shoes, assemble the parking brake lever to the secondary shoe and secure with the spring washer and retaining clip.
2. Apply a light coating of high-temperature grease at the points where the brake shoes contact the backing plate.
3. Position the brake shoes on the backing plate and secure the assembly with the hold down springs. On the rear brake, install the parking brake link and spring, back off the parking

brake adjustment then connect the parking brake cable to the parking brake lever (Fig. 8).

4. Install the shoe guide (anchor pin) plate on the anchor pin when so equipped.

5. Place the cable eye over the anchor pin with the crimped side toward the backing plate.

6. Install the primary shoe to anchor spring (Fig. 15).

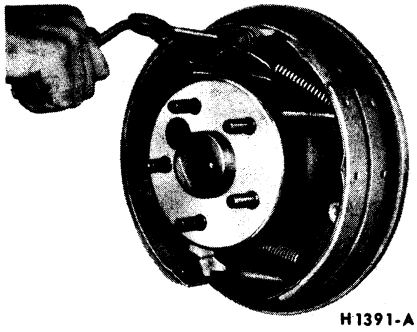


FIG. 15—Retracting Spring Installation

7. Install the cable guide on the secondary shoe web with the flanged hole fitted into the hole in the secondary shoe web. Thread the cable around the cable guide groove (Fig. 8).

It is imperative that the cable be positioned in this groove and not between the guide and the shoe web.

8. Install the secondary shoe to anchor spring with the tool shown in Fig. 15.

Be certain that the cable eye is not cocked or binding on the anchor pin when installed. All parts should be flat on the anchor pin. Remove the brake cylinder clamp.

9. Apply high-temperature grease (MIC-100-A) to the threads and the socket end of the adjusting screw. Turn the adjusting screw into the adjusting pivot nut to the limit of the threads and then back off 1/2 turn.

Interchanging the brake shoe adjusting screw assemblies from one side of the vehicle to the other would cause the brake shoes to retract rather than expand each time the automatic adjusting mechanism operated. To prevent installation on the wrong side of the vehicle, the socket end of the adjusting screw is stamped with an R or L (Fig. 16). The adjusting pivot nuts can be distinguished by the number of grooves machined around the body of the nut. Two grooves on the nut indicate a right thread; one groove indicates a left thread.

10. Place the adjusting socket on the screw and install this assembly between the shoe ends with the adjusting screw toothed wheel nearest the secondary shoe.

11. Hook the cable hook into the hole in the adjusting lever. The adjusting levers are stamped with an R or L to indicate their installation on right or left brake assembly (Fig. 16).

12. Position the hooked end of the

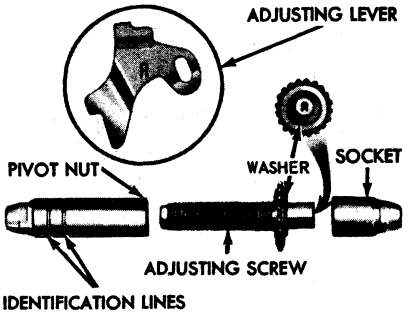


FIG. 16—Adjusting Screw and Lever Identification

adjuster spring completely into the large hole in the primary shoe web. The last coil of the spring should be at the edge of the hole. Connect the loop end of the spring to the adjuster lever hole.

13. Pull the adjuster lever, cable and automatic adjuster spring down and toward the rear to engage the pivot hook in the large hole in the secondary shoe web (Fig. 8).

14. After installation, check the action of the adjuster by pulling the section of the cable between the cable guide and the anchor pin toward the secondary shoe web far enough to lift the lever past a tooth on the adjusting screw wheel. The lever should snap into position behind the next tooth, and release of the cable should cause the adjuster spring to return the lever to its original position. This return action of the lever will turn the adjusting screw one tooth.

If pulling the cable does not produce the action described, or if the lever action is sluggish instead of positive and sharp, check the position of the lever on the adjusting screw toothed wheel. With the brake in a vertical position (anchor at the top), the lever should contact the adjusting wheel 3/16 inch (plus or minus 1/32 inch) above the centerline of the screw. If the contact point is below this centerline, the lever will not lock on the teeth in the adjusting screw wheel, and the screw will not be turned as the lever is actuated by the cable.

To determine the cause of this condition:

a. Check the cable end fittings. The cable should completely fill or extend slightly beyond the crimped section of the fittings. If it does not meet this specification, possible damage is indicated and the cable assembly should be replaced.

b. Check the cable length. On Ford, Mercury, Meteor, Thunderbird, Continental Mark III, and Lincoln Continental models, the cable should measure 11 1/8 inches (plus or minus 1/64 inch) from the end of the cable anchor to the end of the cable hook. On Fairlane, Montego, Falcon, Mustang, and Cougar models the cable should measure 8 13/32 inches on 9 inch brakes or 9 3/4 inches on 10 inch brakes from the end of the cable anchor to the end of the cable hook.

c. Check the cable guide for damage. The cable groove should be parallel to the shoe web, and the body of the guide should lie flat against the web. Replace the guide if it shows damage.

d. Check the pivot hook on the lever. The hook surfaces should be square with the body of the lever for proper pivoting. Replace the lever if the hook shows damage.

e. See that the adjusting screw socket is properly seated in the notch in the shoe web.

WHEEL CYLINDER DRUM BRAKE

REMOVAL

1. Remove the wheel and the drum.

2. Remove the brake shoe assemblies, following procedures outlined in this section.

3. Disconnect the brake line from the brake cylinder Figs. 17 thru 21. **On a vehicle with a vacuum brake booster, be sure the engine is stopped and there is no vacuum in the booster system before disconnecting the hydraulic lines.**

To disconnect the hose at a front cylinder, loosen the tube fitting that connects the opposite end of the hose to the brake tube at a bracket on the frame. Remove the horseshoe-type retaining clip from the hose and bracket, disengage the hose from the bracket, then unscrew the entire hose assembly from the front wheel cylinder.

At a rear cylinder, unscrew the tube

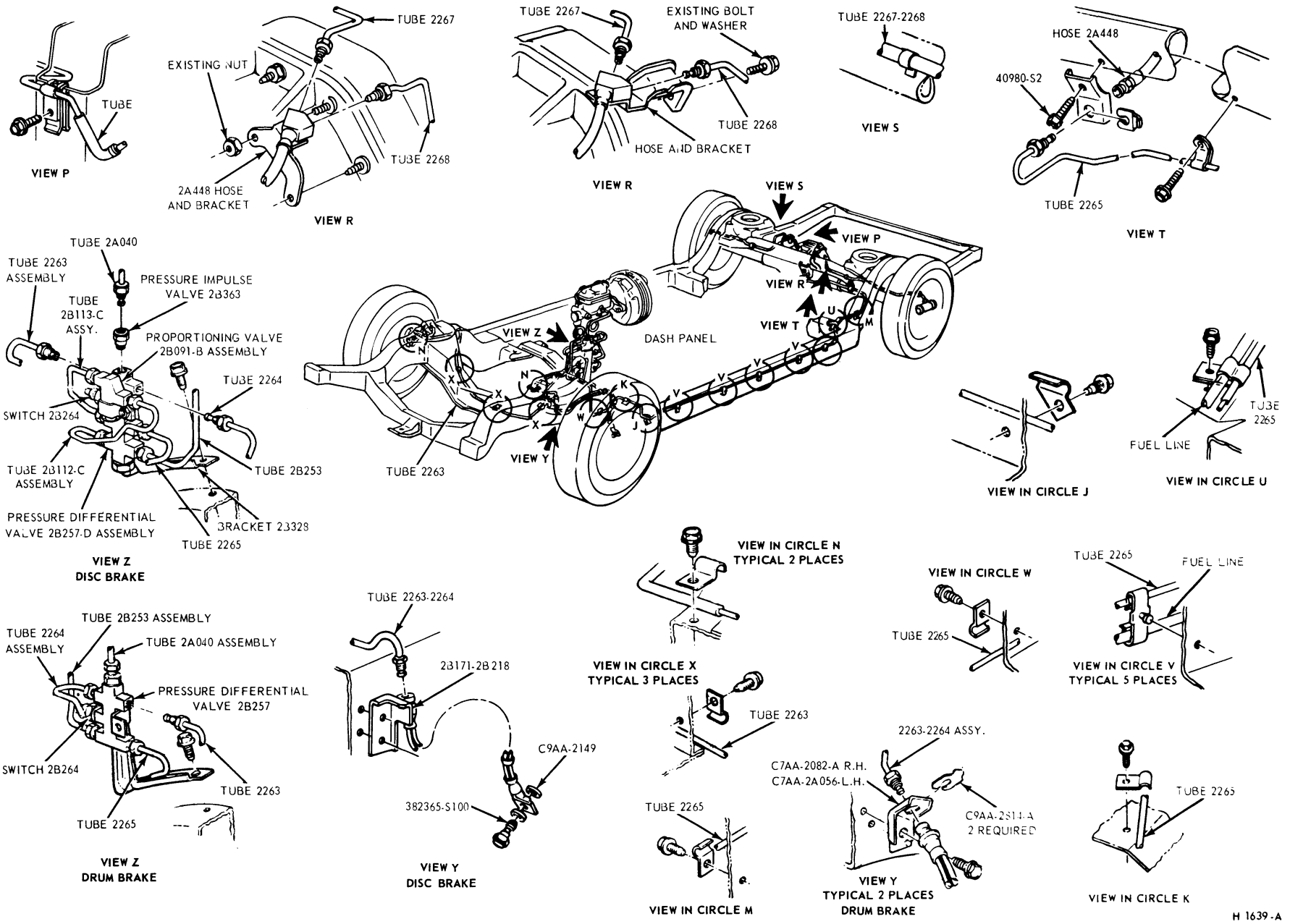
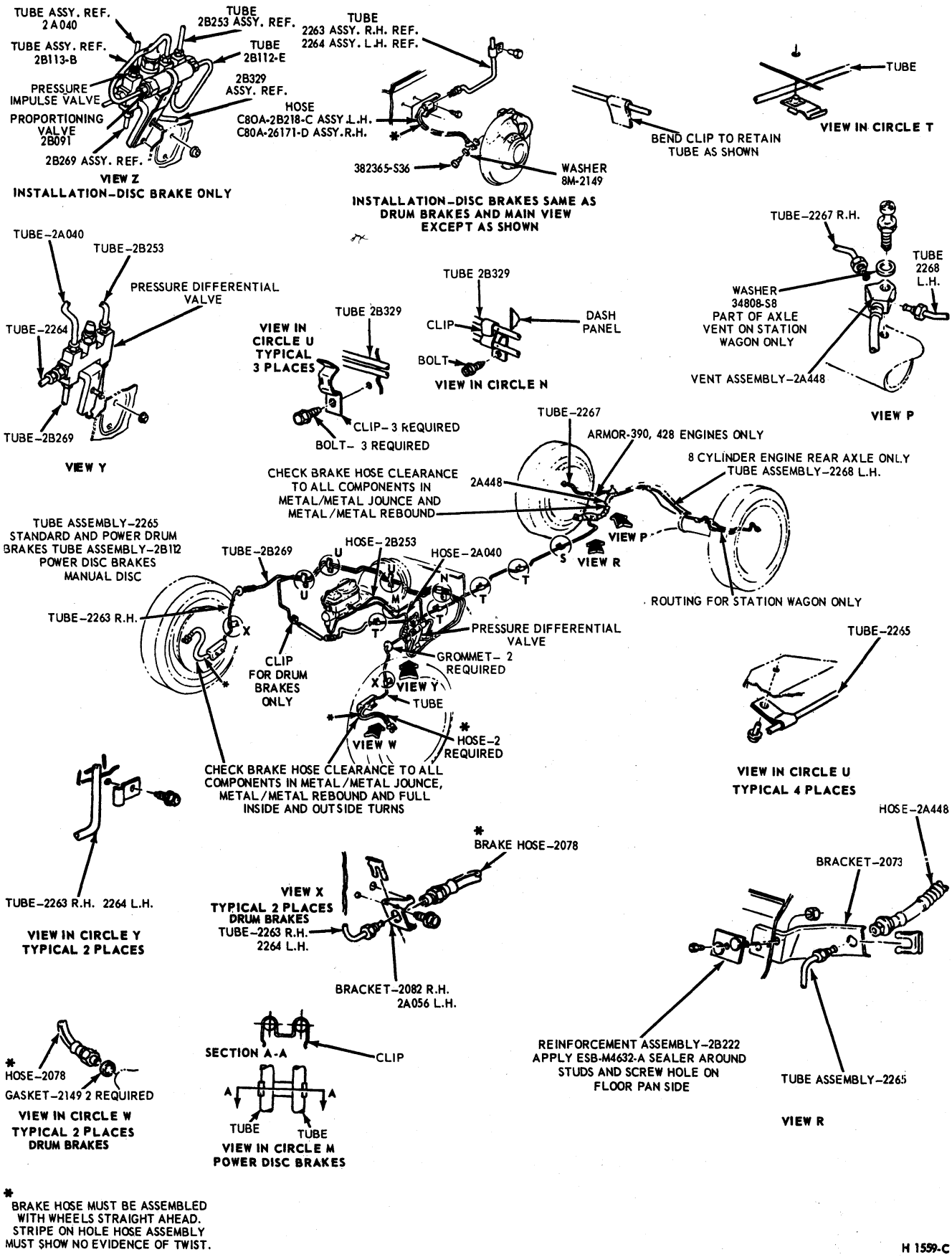


FIG. 17—Service Brake System—Ford, Mercury and Meteor



* BRAKE HOSE MUST BE ASSEMBLED WITH WHEELS STRAIGHT AHEAD. STRIPE ON HOLE HOSE ASSEMBLY MUST SHOW NO EVIDENCE OF TWIST.

H 1559-C

FIG. 18—Service Brake System—Fairlane, Montego and Falcon

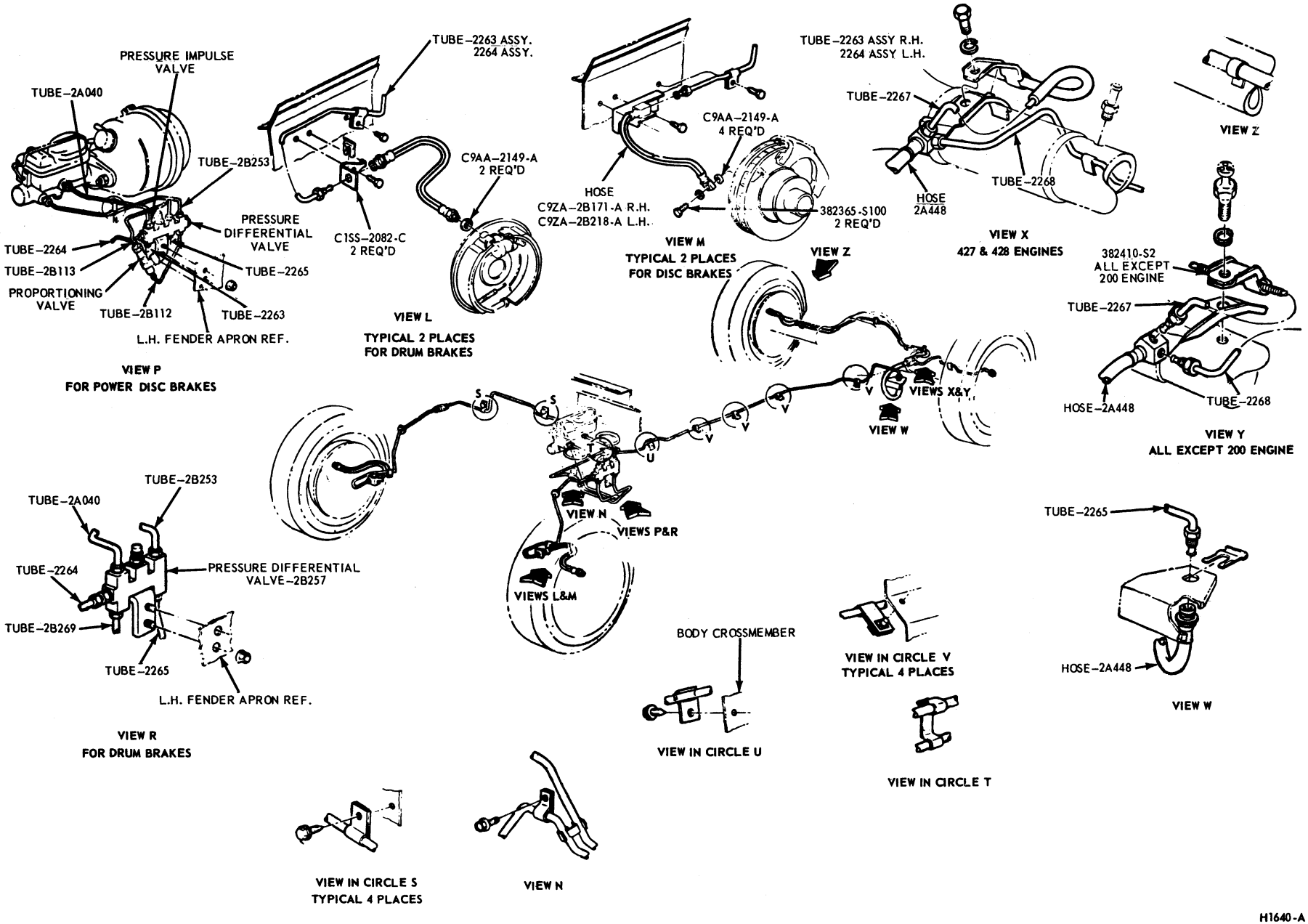


FIG. 19—Service Brake System—Mustang and Cougar

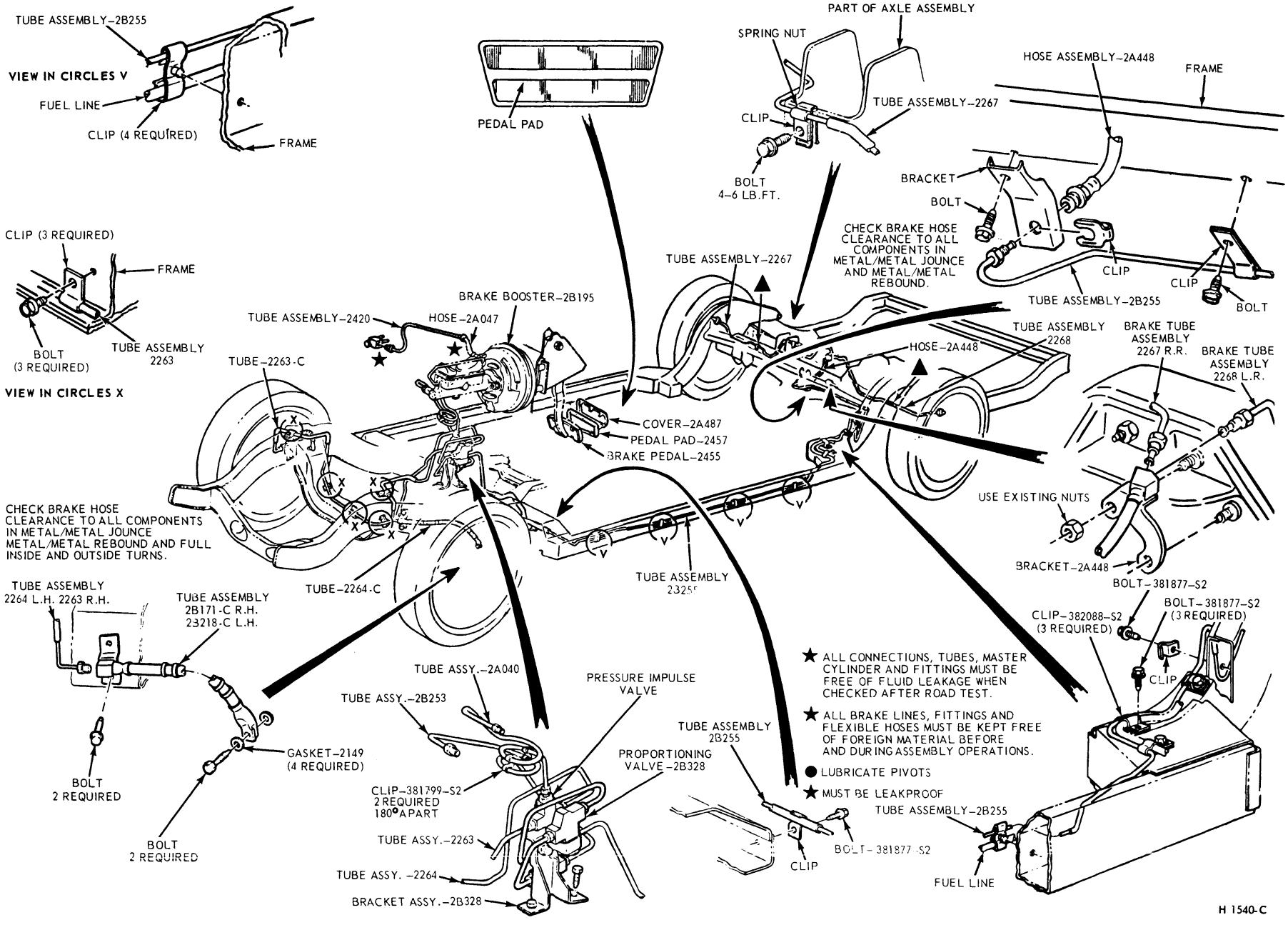
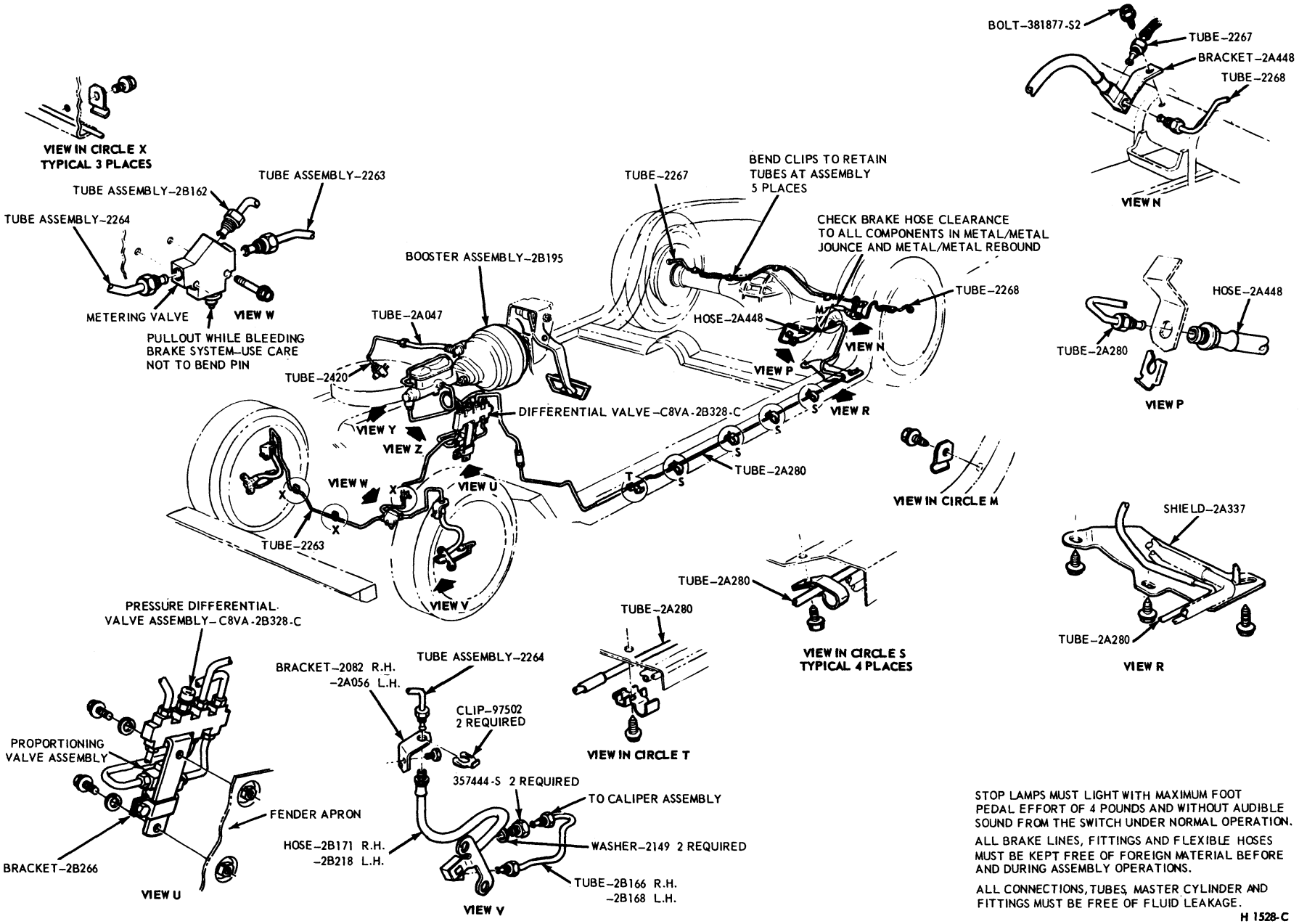


FIG. 20—Service Brake System—Thunderbird, Continental Mark III



STOP LAMPS MUST LIGHT WITH MAXIMUM FOOT PEDAL EFFORT OF 4 POUNDS AND WITHOUT AUDIBLE SOUND FROM THE SWITCH UNDER NORMAL OPERATION.

ALL BRAKE LINES, FITTINGS AND FLEXIBLE HOSES MUST BE KEPT FREE OF FOREIGN MATERIAL BEFORE AND DURING ASSEMBLY OPERATIONS.

ALL CONNECTIONS, TUBES, MASTER CYLINDER AND FITTINGS MUST BE FREE OF FLUID LEAKAGE.

H 1528-C

FIG. 21—Service Brake System—Lincoln Continental

fitting that connects the tube to the cylinder. **Do not pull the metal tube away from the cylinder. Pulling the tube out of the cylinder connection will bend the metal tube and make installation difficult.** The tube will separate from the cylinder when the cylinder is removed from the backing plate.

4. On all except the front wheels on Ford, Mercury, and Meteor models, remove the wheel cylinder attaching bolts and lock washers and remove the cylinder. On the front wheel of Ford, Mercury and Meteor models, remove the nut and washer that attaches the cylinder to the anchor pin. Remove the cylinder from the anchor pin.

INSTALLATION

Wipe the end(s) of the hydraulic line to remove any foreign matter before making connections.

1. On all models except Ford, Mercury and Meteor, to install a front wheel cylinder, position the cylinder to the backing plate. Install the two lock washers and attaching bolts. Torque them to specifications.

On Ford, Mercury and Meteor models, to install a front wheel cylinder, position the cylinder on the anchor pin against the backing plate. Install the washer and cylinder attaching nut on the anchor pin, and torque it to specification. Lock the washer retainer securely.

2. Install a new copper gasket over the hose fitting. Thread the hose into the cylinder and tighten it to specified torque.

3. Engage the opposite end of the hose to the bracket on the frame. Install the horseshoe-type retaining clip, and connect the brake tube to the hose with the tube fitting nut. Tighten the nut to specification with tool 1112-144.

4. To install a rear wheel cylinder, place the rear wheel cylinder into position. Enter the tubing into the cylinder, and start the tube fitting nut into the threads of the cylinder.

5. Secure the cylinder to the backing plate by installing the attaching bolts and lock washers.

6. Tighten the tube fitting nut to specification with tool 1112-144.

7. Install the links in the ends of the wheel cylinder, install the shoes and adjuster assemblies, and adjust the shoes as outlined in this section.

8. Adjust the brakes (Part 2-2, Section 2). Install the brake drum and wheel. Bleed the brakes and centralize the differential valve as outlined in Part 2-1, Section 2.

BRAKE BACKING PLATE—DRUM BRAKE

REMOVAL

1. Remove the wheel and brake drum. Disconnect the brake line from the brake cylinder.

2. Remove the brake shoe and adjuster assemblies and the wheel cylinder as outlined in this section. On the rear wheels, disconnect the parking brake lever from the cable.

3. If the rear backing plate is being replaced, remove the axle shaft from the applicable rear axle as outlined in Group 4, Part 4-2— Rear Axle, Section 2, disengage parking brake cable retainer from backing plate. Remove the backing plate and gasket.

If the front backing plate is being replaced, remove the bolts and nuts that secure the backing plate to the front wheel spindle and remove the plate and gasket.

INSTALLATION

If a **rear** backing plate is to be replaced, position a new rear backing plate and gasket on the attaching bolts in the axle housing flange. Insert parking brake cable into backing plate and secure retaining fingers. Install the rear axle shaft for applicable rear axle. Refer to Group 4, Part 4-2— Rear Axle, Section 2 for the proper installation procedure.

1. If the front brake backing plate is to be replaced, position a new **front** backing plate and gasket to the wheel spindle and install the attaching bolts and nuts.

2. Install the wheel cylinder and connect the brake line as outlined in this section.

3. Install the brake shoe and adjuster assemblies as outlined in this section. On a rear brake, connect the parking brake cable to the lever.

4. Adjust the brake shoes (Section 2), and install the brake drums and wheels. Bleed the brake system and centralize the differential valve as outlined in Part 2-1, Section 2.

DISC BRAKE CALIPER ASSEMBLY

ALL MODELS EXCEPT LINCOLN CONTINENTAL

Removal

Refer to Figs. 22 and 23.

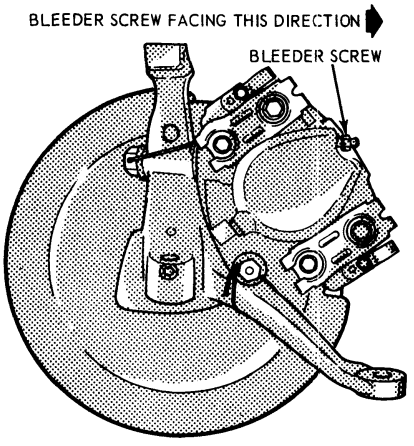


FIG. 22—Floating Caliper Installed

1. Remove the front wheel cover. Remove the wheel and tire assembly from the hub and rotor assembly. **Be careful to avoid damage or interference with the caliper splash shield or bleeder screw fitting.**

2. Disconnect the brake line from the caliper. Cap the hose to prevent the brake fluid from leaking from the master cylinder.

3. Remove the safety wire and the two bolts that attach the caliper assembly to the spindle.

4. Lift the caliper assembly off the rotor and place it on the bench.

Installation

1. Position the caliper assembly on the rotor, and mate the mounting bolt holes in the caliper with those in the spindle. It may be necessary to push the caliper piston into the cylinder bore to obtain clearance between the shoe and lining assembly and the rotor.

2. Install the caliper to spindle attaching bolts and torque them to specification. **The upper bolt must be tightened first.** Install the safety wire on the bolts and twist the wire ends at least five turns. Push the wire ends against the spindle to avoid interference with the brake hose and the steering stop. Check to insure that the rotor runs squarely and centrally between the two brake shoes.

3. Position the brake hose fitting with a new copper washer on each side of the fitting on the caliper assembly. Install the bolts and torque to specification.

4. Bleed the brake system and centralize the differential valve as outlined in Part 2-1. Check the master

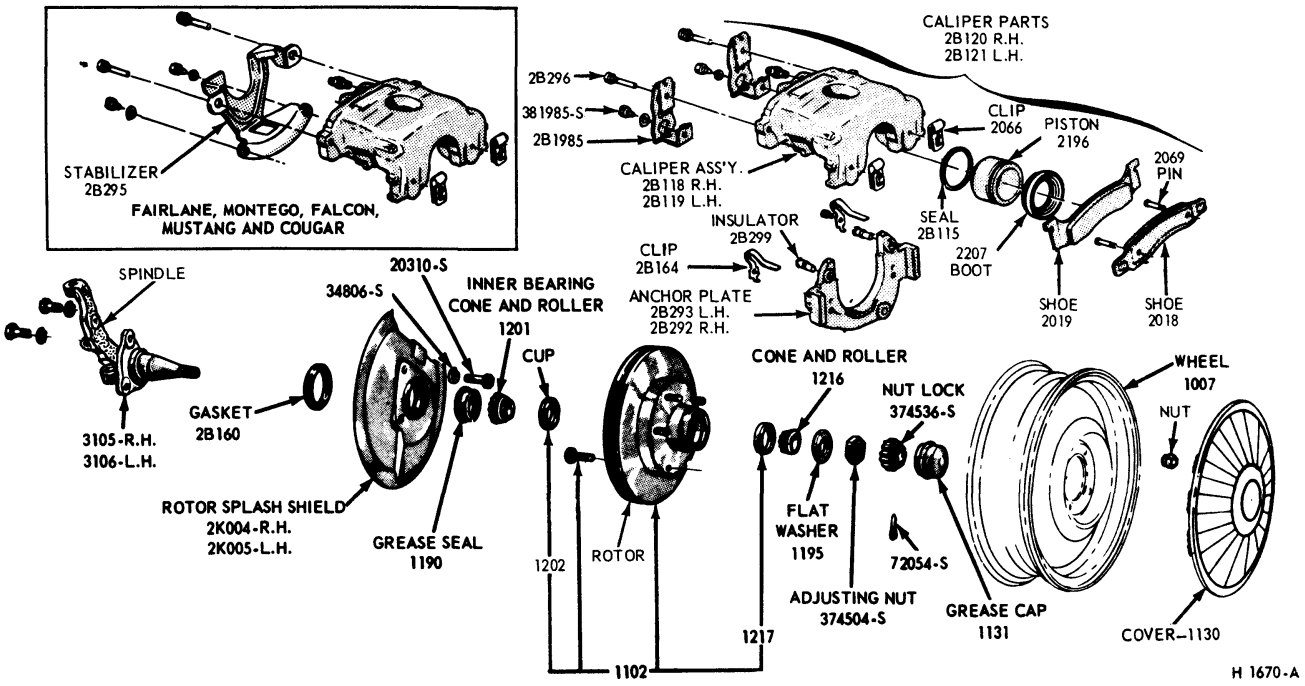


FIG. 23—Disc Brake—Disassembled—All Models Except Lincoln

cylinder fluid level and add the specified fluid, as required. **Pump the brake pedal several times to actuate the piston seals and to position the shoe and lining assemblies.**

5. Install the wheel and tire assembly and the wheel cover.

6. Road test the vehicle.

LINCOLN CONTINENTAL

Removal

Refer to Fig. 24.

1. Remove the front wheel cover. Remove the wheel and tire assembly from the hub and rotor assembly. **Be careful to avoid damage or interference with the caliper splash shield, bleeder screw fitting or transfer tube.**

2. Disconnect the steel brake line transfer tube from the caliper (Fig. 21). **Leave the steel tube connected to**

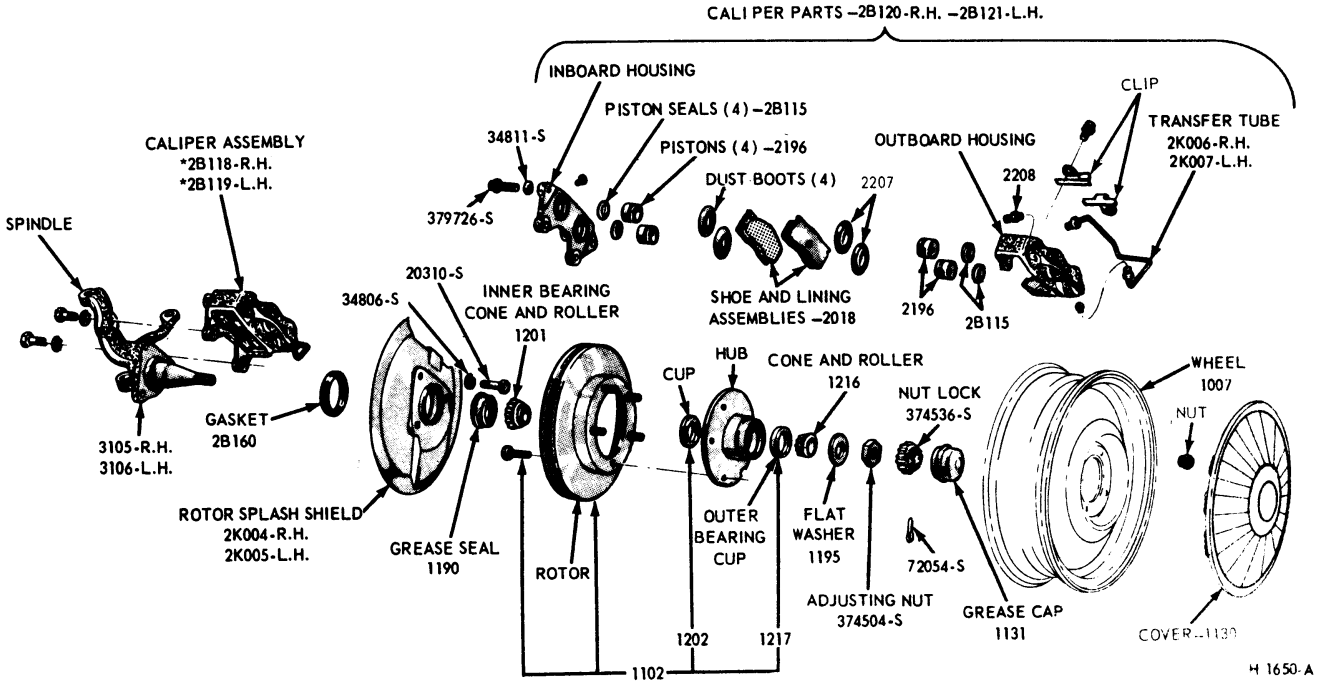


FIG. 24—Disc Brake Disassembled—Lincoln Continental

the brake hose connector and bracket assembly.

3. Remove the two bolts retaining the brake hose bracket and caliper assembly to the spindle. **Take care to avoid loosening the bridge bolts that hold the two halves of the caliper together.**

4. Lift the caliper assembly off the rotor and place it on the bench.

Installation

1. If the caliper assembly is to be replaced, transfer the steel tubing and the bleeder screw to the new caliper.

2. Position the caliper assembly on the rotor, and mate the mounting bolt holes in the caliper with those in the spindle. It may be necessary to push the caliper pistons into the cylinder bores to obtain clearance between the shoe and lining assembly and the rotor. The shoe and lining assemblies should be seated properly on the bridges.

3. Install the caliper to spindle retaining bolts and torque them to specification. Check to insure that the rotor runs squarely and centrally between the two halves of the caliper. These should be approximately 0.090-0.120 inch clearance between the caliper and the rotor outside diameter (Fig. 6).

4. Position the steel transfer tube brake hose bracket and caliper assembly to the spindle. Install the retaining bolts then torque them to specification.

5. Connect the front wheel steel transfer tube from the caliper to the front brake hose connector. Check the hose for proper installation (Fig. 21).

6. Bleed the brake system and centralize the differential valve as outlined in Part 2-1. Check the master cylinder fluid level and add the specified fluid, as required. **Pump the brake pedal several times to actuate the piston seals and to position the shoe and lining assemblies.**

7. Install the wheel and tire assembly and the wheel cover.

8. Road test the vehicle.

DISC BRAKE SHOE AND LINING

ALL MODELS EXCEPT LINCOLN CONTINENTAL

Removal

1. Remove the wheel and tire from the hub and rotor assembly.

2. Remove the caliper from the vehicle following the procedures outlined under Disc Brake Caliper Assembly.

3. To facilitate removal of the caliper assemblies, the piston may have to be pushed into its bore. Apply a steady inward pressure against the inner shoe and lining assembly. Maintain the pressure for at least a minute.

4. Slide the two outer shoe retaining clips off the retaining pins (Fig. 23).

5. Remove the two retaining pins from the outer shoe, then remove the shoe from the stationary caliper.

6. Slide the inner brake shoe outward until it is free of the hold-down springs, then remove the brake shoe.

7. Remove the caliper locating pins and stabilizer attaching bolts, then remove and discard the stabilizer or stabilizers.

8. Remove the locating pin insulators from the anchor plate.

Installation

When installing new shoes and linings it will be necessary to force the piston to the bottom of its bore. Apply sufficient pressure to overcome the grip of the piston seal on the piston.

1. Install new caliper locating pin insulators in the anchor plate.

2. Position the caliper assembly in the anchor plate.

3. Position the new stabilizer or stabilizers and install the caliper locating pins to engage approximately four threads.

If the caliper locating pins are rusted or corroded they should be replaced.

Apply water or isopropyl alcohol to the caliper locating pins before installation. **Oil or grease must not be used on the locating pins.**

4. Position the outer brake shoe on the caliper and install the two retaining pins and clips.

5. Install the inner brake shoe so that the ears of shoe are on top of the anchor plate bosses and under the shoe hold-down springs.

6. Position the shoe and lining assemblies so that the caliper assembly can be placed over the rotor. Rotate a hammer handle between the linings to reset the stabilizers.

7. Install the caliper assembly over the rotor and on the spindle. Install the two caliper attaching bolts, and torque them to specifications. **The upper bolt must be tightened first.** Install the safety wire and twist the ends at least five turns. Push the wire ends against the spindle to avoid interference with the brake hose and the steering stop.

8. With moderate pressure applied to the brake pedal, torque the stabilizer attaching screws and caliper locating pins to specification.

LINCOLN CONTINENTAL

Removal

1. Remove the wheel and tire assembly from the hub and rotor assembly. **Be careful to avoid damage or interference with the caliper splash shield, bleeder screw fitting or transfer tube.**

2. Remove the two bolts that retain the caliper splash shield, and remove the shield (Fig. 4).

3. To facilitate removal and installation of the shoe and lining assemblies, the pistons must be pushed into their bores. Apply a steady inward pressure against each shoe and lining assembly toward its respective caliper housing on each side of the rotor (Fig. 6). Maintain the pressure for at least a minute. If the pistons will not go in easily, force them in with water pump pliers.

4. Grasp the metal flange on the outer end of the shoe with two pairs of pliers and pull the shoe out of the caliper (Fig. 25).

Installation

1. Position a new shoe and lining assembly on each side of the rotor so that the lining faces the rotor. Be sure

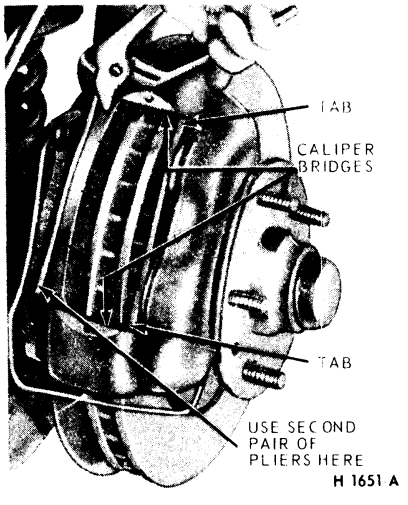


FIG. 25—Removing Disc Brake Shoe and Lining Assembly—Lincoln Continental

that the tabs on the shoe flanges seat fully against the caliper bridges (Fig. 25).

2. Install the caliper splash shield and secure the shield to the caliper with two retaining bolts (Fig. 4).

3. Pump the brake pedal several times until a firm pedal is obtained and the shoe and lining assemblies are properly seated.

4. Install the wheel and tire assembly on the hub and rotor assembly.

5. Check and refill the master cylinder reservoir with specified brake fluid as required.

6. Road test the car.

It should not be necessary to bleed the system after a shoe and lining replacement.

FRONT WHEEL HUB AND ROTOR ASSEMBLY— DISC BRAKES

REMOVAL

1. Remove the wheel and tire from the hub (Figs. 23 and 24). **Be careful to avoid damage or interference with the bleeder screw fitting. On Lincoln Continental models be careful to avoid damage to the caliper splash shield or transfer tube.**

2. Remove the caliper assembly from the spindle and the rotor. If the caliper does not require servicing, it is not necessary to disconnect the brake hose or remove the caliper from the vehicle. Position the caliper out of the way, and support it with a wire to avoid damaging the caliper or stretching the hose. Insert a **clean** cardboard spacer between the linings to prevent the piston from coming out of the cylinder bore while the caliper is removed.

Handle the rotor and caliper assemblies in such a way as to avoid deformation of the rotor and nicking, scratching or contamination of the brake linings.

3. Remove the grease cap from the hub. Remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle. Remove the outer bearing cone and roller assembly.

4. Remove the hub and rotor assembly from the spindle.

INSTALLATION

1. If the rotor is being replaced, remove the protective coating from the new rotor with carburetor degreaser. Pack a new set of bearings with specified grease (M-IC75B), and install the inner bearing cone and roller assembly in the inner cup. Pack grease lightly between the lips of a new grease seal and install the seal (Figs. 23 and 24).

If the original rotor is being installed, make sure that the grease in the hub is clean and adequate, that the inner bearing and grease seal are lubricated and in good condition, and that the rotor braking surfaces are clean.

2. Install the hub and rotor assembly on the spindle.

3. Lubricate and install the outer wheel bearing, washer and adjusting nut.

4. Adjust the wheel bearings to specification, and then install the nut lock, cotter pin, and grease cap. **The wheel bearing adjustment is especially important with disc brakes.**

5. Mount the caliper assembly on the spindle following the Disc Brake Caliper Assembly Installation procedure in this section.

DISC BRAKE ROTOR SPLASH SHIELD

REMOVAL

1. Remove the caliper and the hub and rotor assembly as outlined under Removal in the foregoing procedure (it is not necessary to disconnect hydraulic connections).

2. Remove the three bolts that attach the splash shield to the spindle, and remove the shield (Figs. 23 and 24).

3. Remove and discard the splash shield to spindle gasket.

INSTALLATION

1. Install a new splash shield to spindle gasket.

2. If the shield is bent, straighten it out before installation. Position the shield to the mounting bracket, install the attaching bolts, nuts and torque them to specification.

3. Install the hub and rotor assembly and the caliper as outlined under Installation in the foregoing procedure.

DUAL MASTER CYLINDER— NON POWER BRAKES

FORD, MERCURY AND METEOR

Removal

Refer to Fig. 26.

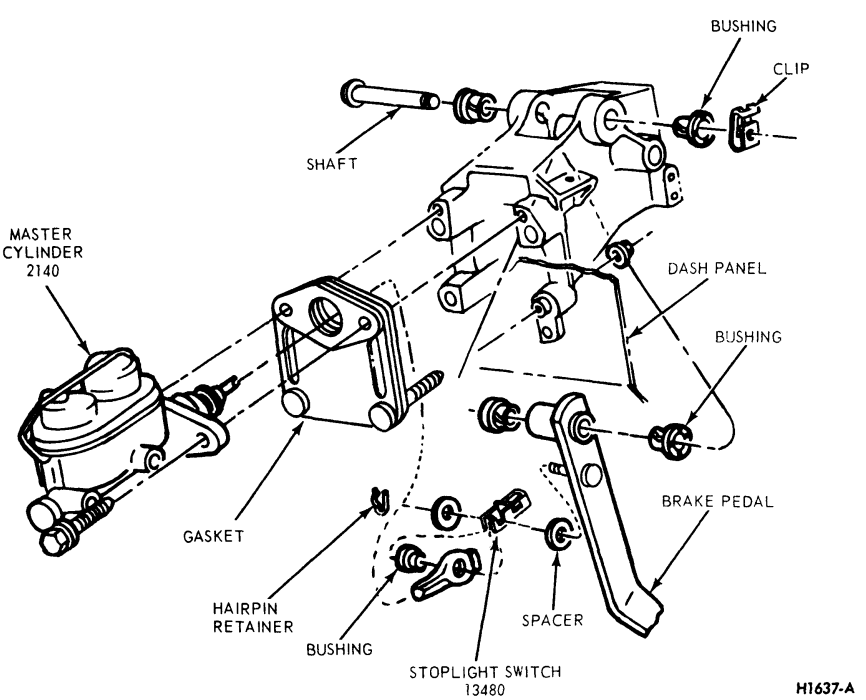


FIG. 26—Dual Master Cylinder Installation— Non Power Brakes Ford, Mercury, and Meteor

1. Disconnect the stoplight switch wires at the connector. Remove the spring retainer. Slide the stop light switch off the brake pedal pin just far enough to clear the end of the pin, then lift the switch straight upward from the pin. **Use care to avoid switch damage during removal.**
2. Slide the master cylinder push rod and the nylon washers and bushings off the brake pedal pin.
3. Remove the brake tube from the primary and secondary outlet ports of the master cylinder.
4. Remove the cap screws and lockwashers that secure the master cylinder to the dash panel and lift the cylinder forward and upward from the vehicle.

Installation

1. Position the boot on the push rod and secure the boot to the master cylinder. Carefully insert the master cylinder push rod and boot through the dash panel opening and position the master cylinder on the panel.
2. Install the cap screws at the dash panel and torque them to specification.
3. **Coat the nylon bushings with SAE 10W oil.** Install the nylon washer and bushing on the brake pedal pin.
4. Position the stop light switch on the brake pedal pin, install the nylon bushing and washer and secure them in position with the spring retainer.
5. Connect the wires at the stop light switch connector.
6. Connect the brake lines to the master cylinder leaving the brake line fittings loose.
7. Fill the master cylinder with the specified brake fluid to within 1/4 inch of the top of the dual reservoirs. Use Ford Brake Fluid—Extra Heavy Duty—Part Number C6AZ-19542-A (ESA-M6C25-A) or equivalent for all drum brake applications. **The extra heavy duty brake system fluid is colored blue for identification. Do not mix low temperature brake fluids with the specified fluid for the power disc brake system.**
8. Bleed the dual-master cylinder and the primary and secondary brake systems. Centralize the pressure differential valve. Refer to Hydraulic System Bleeding and Centralizing of the Differential Valve, Part 2-1, Section 2 for proper procedure.
9. Operate the brakes several times, then check for external hydraulic leaks.

FAIRLANE, MONTEGO, FALCON, MUSTANG AND COUGAR

Removal

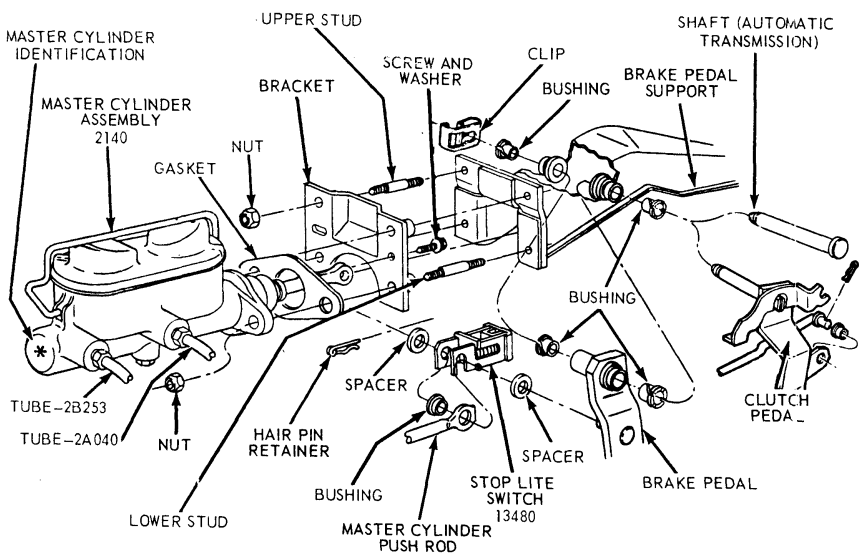
Refer to Figs. 27 and 28.

1. Working from inside the vehicle below the instrument panel, disconnect the master cylinder push rod from the brake pedal assembly. **The push rod cannot be removed from the master cylinder.**
2. Disconnect the stoplight switch wires at the connector. Remove the hairpin retainer. Slide the stop light switch off the brake pedal pin just far enough to clear the end of the pin, then lift the switch straight upward from the pin. **Use care to avoid switch damage during removal.**
3. Slide the master cylinder push rod and the nylon washers and bushings off the brake pedal pin.
4. Remove the brake tubes from the primary and secondary outlet ports of the master cylinder.
5. Remove the lock nuts or cap screw and lockwashers that secure the master cylinder to the dash panel and lift the cylinder forward and upward from the car.

Installation

Refer to Figs. 27 and 28.

1. Position the boot on the push rod and secure the boot to the master cylinder. Carefully insert the master cylinder push rod and boot through the dash panel opening.
2. On Fairlane, Falcon or Montego models, position the gasket and master cylinder on the mounting studs on the dash panel. Install the lock nuts on the studs at the dash panel and torque them to specification.
3. On Mustang or Cougar models, position the gasket and master cylinder on the dash panel. Install the retaining screws and torque them to specification. Coat the nylon bushings with SAE 10W oil. Install the nylon washer and bushing on the brake pedal pin.
4. Position the stop light switch on the brake pedal pin, install the nylon bushing and washer and secure them in position with the spring retainer.
5. Connect the wires at the stop light switch connector.
6. Connect the brake lines to the master cylinder and tighten to specified torque.
7. Fill the master cylinder with the specified brake fluid to within 1/4



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FIG. 27—Dual Master Cylinder Installation—Non Power Brake Fairlane, Montego, and Falcon

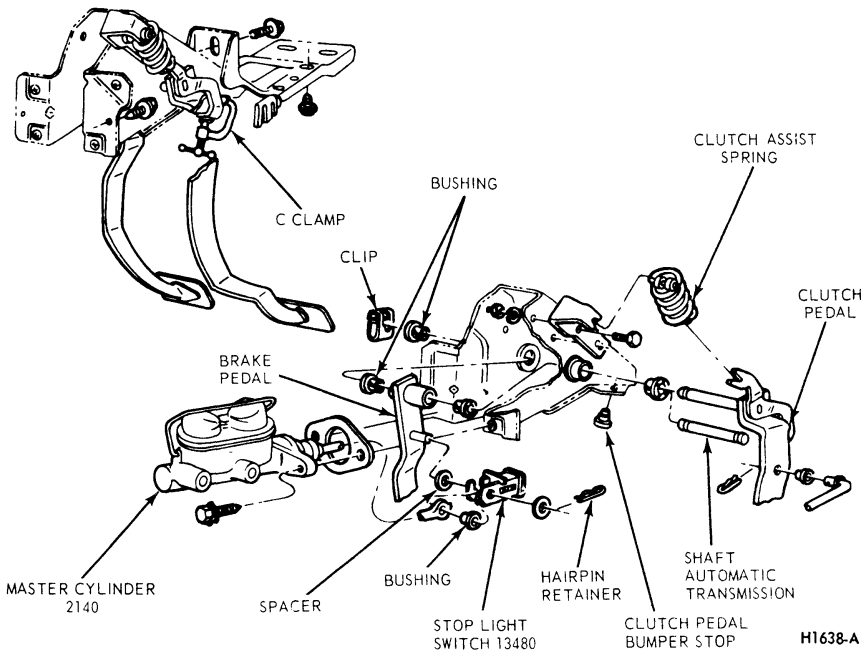


FIG. 28—Dual Master Cylinder Installation—Non Power Brake—Mustang and Cougar

inch of the top of the dual reservoirs. Use Ford Brake Fluid—Extra Heavy Duty—Part Number C6AZ-19542-A for all brake applications. **The brake fluid is colored blue for identification. Do not mix low temperature brake fluids with the specified fluid for the brake system.**

8. Bleed the dual-master cylinder and the primary and secondary brake systems. Centralize the pressure differential valve. Refer to Hydraulic System Bleeding and Centralizing of the Differential Valve, Part 2-1, Section 2 for the proper procedure.

9. Operate the brakes several times, then check for external hydraulic leaks.

DUAL MASTER CYLINDER—POWER BRAKES

REMOVAL

1. Remove the brake tubes from the primary and secondary outlet ports of the master cylinder (Figs. 29 thru 33).

2. Remove the two nuts and two lock washers attaching the master cylinder to the brake booster assembly.

3. Slide the master cylinder forward and upward from the vehicle.

INSTALLATION

1. Before installing the master cylinder, check the distance from the outer end of the booster assembly push rod to the master cylinder mounting surface. Turn the push rod adjusting screw in or out as required to obtain the specified length. Refer to Part 2-1, Section 2, Power Brake Master Cylinder Push Rod Adjustment for the proper procedure.

2. Position the master cylinder assembly over the booster push rod and onto the two studs on the booster assembly (Figs. 29 thru 33).

3. Install the attaching nuts and lock washers and torque them to specifications.

4. Install the front and rear brake tubes to the master cylinder outlet fittings.

5. Fill the master cylinder with the specified brake fluid to within 1/4 inch of the top of the dual reservoirs. Use Ford Brake Fluid—Extra Heavy Duty—Part Number C6AZ-19542-A (ESA-M6C25-A) for all brake applications. **The extra heavy duty brake fluid is colored blue for identification. Do not mix low temperature brake fluids with the specified fluids for the disc brake system.**

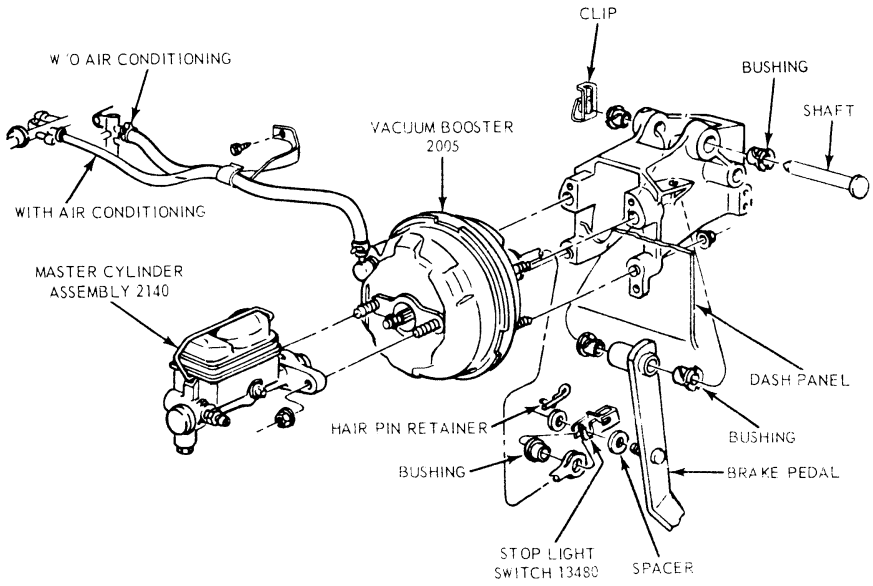


FIG. 29—Master Cylinder Installation—Power Brake—Ford, Mercury and Meteor

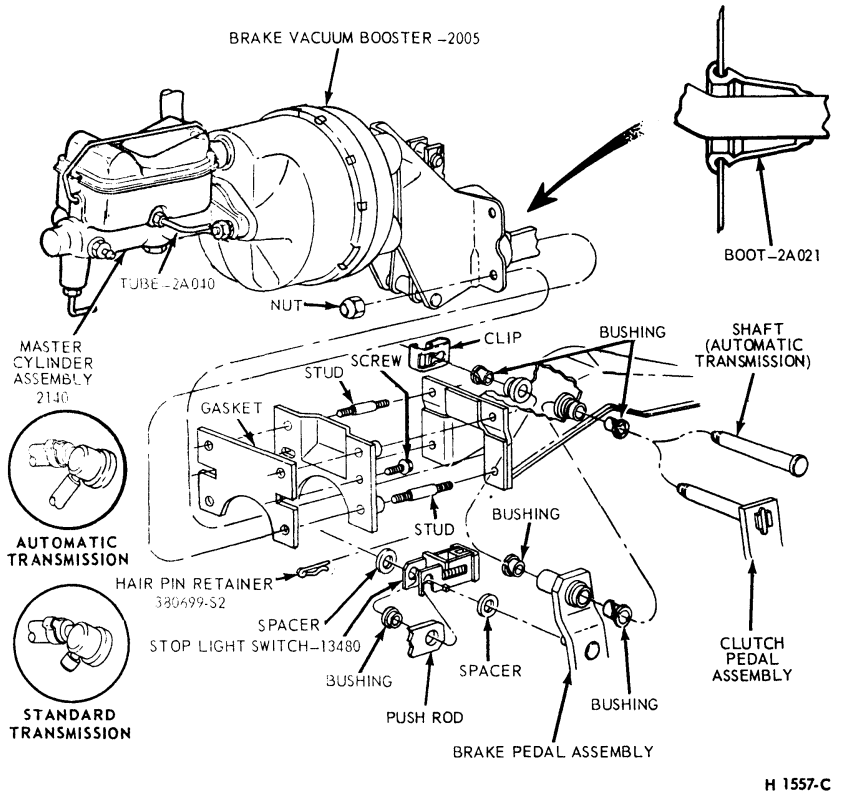


FIG. 30—Master Cylinder Installation—Power Brake—Fairlane, Montego and Falcon

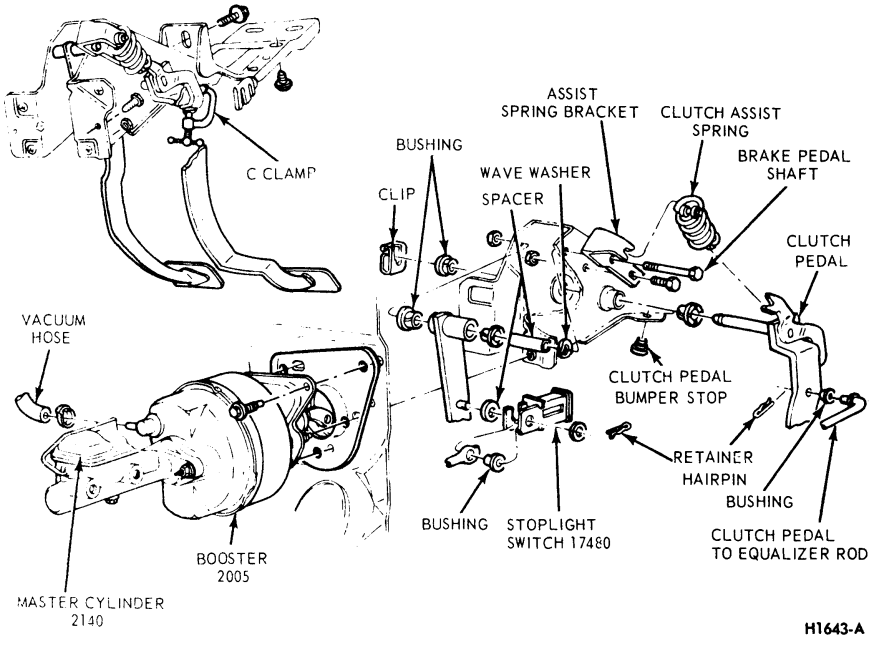


FIG. 31—Master Cylinder Installation—Power Brake—Mustang and Cougar

6. Bleed the dual-master cylinder and the primary and secondary brake systems. Centralize the pressure differential valve. Refer to Hydraulic System Bleeding and Centralizing of the Differential Valve, Part 2-1, Section 2 for the proper procedure.

7. Operate the brakes several times, then check for external hydraulic leaks.

PRESSURE DIFFERENTIAL VALVE AND PROPORTIONING VALVE ASSEMBLY

REMOVAL

1. Disconnect the brake warning light wire from the pressure differential valve assembly switch (Figs. 17 thru 21). **To prevent damage to the brake warning switch wire connector, expand the plastic lugs to allow removal of the shellwire connector from the switch body.**

2. Loosen the tube nuts connecting the primary and secondary inlet and outlet tubes at the pressure differential valve assembly and remove the tubes.

3. Remove the screw or screws retaining the pressure differential valve assembly to the chassis and remove the valve assembly.

4. On disc brake equipped vehicles, place the pressure differential valve assembly and mounting bracket in a vise. Loosen the proportioning valve tube nuts at the differential valve and at the proportioning valve. Remove the proportioning valve from the mounting bracket.

5. If the differential valve is to be replaced, remove the brake warning lamp switch and install the switch in the new differential valve. **The pressure differential valve assembly, the brake warning lamp switch, and the proportioning valve are separate units and each is serviced as a separate assembly only.**

INSTALLATION

1. On disc brake equipped vehicles, connect the proportioning valve inlet and outlet tubes to the proportioning valve and differential valve bodies. Tighten the tube nuts to specification.

2. Mount the pressure differential valve assembly on the chassis and install the attaching screw or screws.

3. Connect the primary and secondary inlet and outlet tubes to the pressure differential valve assembly and tighten the tube nuts to specifications.

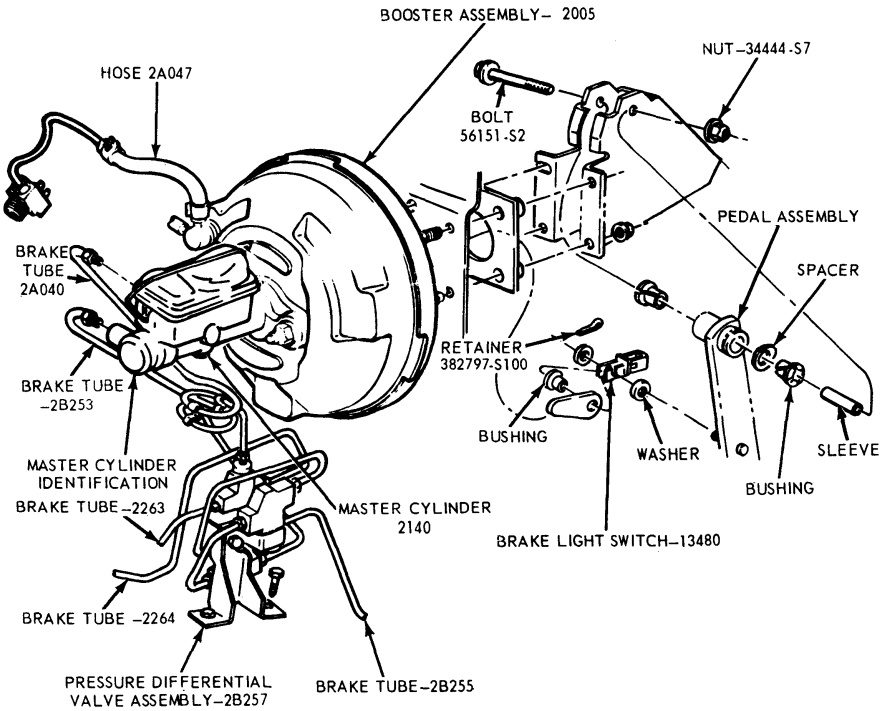


FIG. 32—Master Cylinder Installation—Thunderbird and Continental Mark III

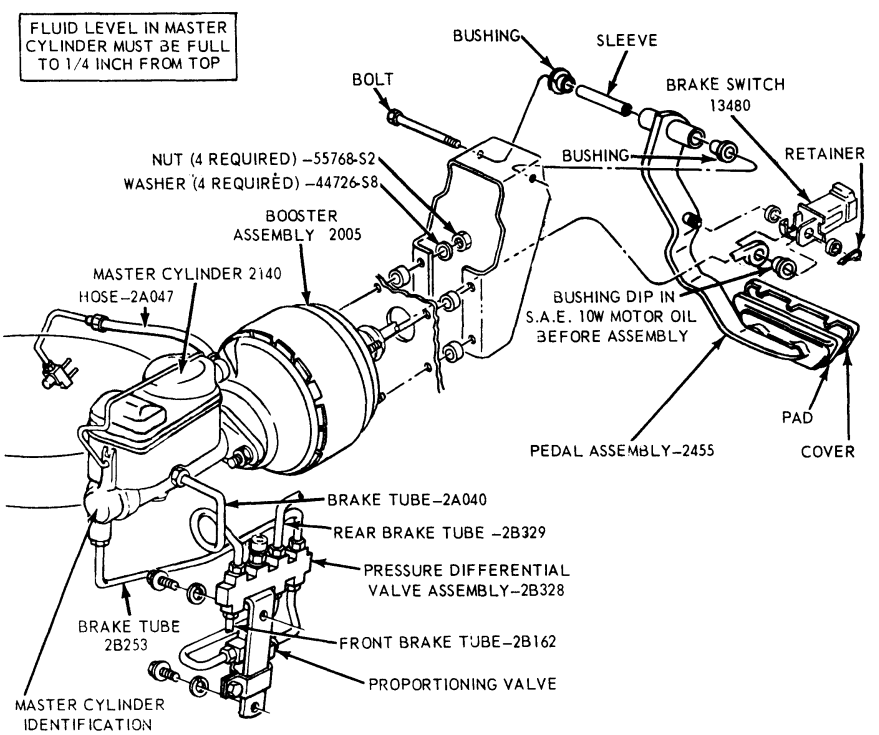


FIG. 33—Master Cylinder Installation—Lincoln Continental

4. Connect the shell-wire connector to the brake warning lamp switch. **Make sure the plastic lugs on the connector hold the connector securely to the switch.**
5. Bleed the brakes and centralize the pressure differential valve.

PROPORTIONING VALVE

FORD, MERCURY AND METEOR

On Ford, Mercury and Meteor models, the proportioning valve must be removed with the pressure differential valve. Use the procedure shown above for replacement of the proportioning valve.

FAIRLANE, MONTEGO AND FALCON

Removal

Refer to Fig. 18.
1. Disconnect the two brake lines at the proportioning valve.
2. Remove the bolt retaining the pressure differential valve bracket to the fender apron.
3. Lift the proportioning valve bracket from behind the pressure differential valve bracket and remove the proportioning valve from the vehicle.

Installation

1. Position the proportioning valve and bracket to the fender apron with the proportioning valve bracket between the pressure differential valve bracket and the fender apron.
2. Connect the two brake lines at the proportioning valve. Do not tighten.
3. Install the bolt retaining the two valve brackets to the fender apron.
4. Tighten the two brake line tube nuts at the proportioning valve to specifications.
5. Bleed the brakes and centralize the pressure differential valve.

MUSTANG AND COUGAR

Removal

Refer to Fig. 19.
1. Disconnect the two brake lines at the proportioning valve.
2. Remove the bolt retaining the

proportioning valve to the fender apron and remove the proportioning valve.

Installation

1. Position the proportioning valve to the fender apron.
2. Connect the two brake lines at the proportioning valve. Do not tighten.
3. Install the bolt retaining the proportioning valve to the fender apron.
4. Tighten the brake line tube nuts at the proportioning valve to specifications.
5. Bleed the brakes and centralize pressure differential valve.

THUNDERBIRD AND CONTINENTAL MARK III

Removal

Refer to Fig. 20.
1. Disconnect the two hydraulic brake lines at the master cylinder.
2. Remove the two nuts retaining the master cylinder to the booster and remove the master cylinder for clearance.
3. Disconnect the two brake lines at the proportioning valve.
4. Remove the bolt and nut retaining the proportioning valve to the pressure differential valve bracket and remove the proportioning valve assembly.

Installation

1. Transfer the bracket to the new proportioning valve.
2. Position the proportioning valve assembly to the pressure differential valve bracket.
3. Connect the two brake lines to the proportioning valve. Do not tighten.
4. Install the bolt and nut retaining the proportioning valve to the pressure differential valve bracket.
5. Tighten the two brake line tube nuts at the proportioning valve to specifications.
6. Position the master cylinder to the booster and install the nuts retaining the master cylinder to the booster.
7. Connect the two brake lines at the master cylinder and tighten the tube nuts to specifications.
8. Bleed the brakes and centralize the pressure differential valve.

LINCOLN CONTINENTAL

Removal

Refer to Fig. 21.
1. Disconnect the two brake lines at the proportioning valve.
2. Loosen the bolt and nut on the bracket retaining the proportioning valve to the chassis.
3. Remove the proportioning valve from the bracket.

Installation

1. Position the proportioning valve in the bracket and connect the two brake lines. Do not tighten.
2. Tighten the bolt and nut on the bracket.
3. Tighten the tube nuts on the brake lines at the proportioning valve to specifications.
4. Bleed the brakes and centralize the pressure differential valve.

PRESSURE METERING VALVE—LINCOLN CONTINENTAL

REMOVAL

Refer to Fig. 21.
1. Loosen the tube nuts connecting the inlet and outlet tubes at the metering valve, and remove the tubes.
2. Remove the two screws retaining the metering valve to the frame crossmember, and remove the metering valve. **The metering valve is serviced as an assembly only.**

INSTALLATION

1. Position the metering valve to the frame crossmember, and install the retaining screws.
2. Connect the inlet and outlet tubes to the metering valve, and tighten the tube nuts to specification.

BRAKE BOOSTER

REMOVAL

1. Working from inside the vehicle below the instrument panel, disconnect the booster push rod from the brake pedal assembly. To do this, proceed as follows:

Disconnect the stop light switch wires at the connector. Remove the hairpin retainer. Slide the stop light switch off from the brake pedal pin **just far enough for the switch outer hole to clear the pin,** and then remove the switch from the pin and booster push rod. Be careful not to damage the switch during removal. Slide the booster push rod and the nylon washers and bushing off the brake pedal pin (Figs. 29 thru 33).

2. Open the hood and remove the master cylinder from the booster. Secure it to one side without disturbing the hydraulic lines. **It is not necessary to disconnect the brake lines, but care should be taken that the brake lines are not deformed. Permanent deformation of brake lines can lead to tube failure.**
3. Disconnect the manifold vacuum hose or hoses from the booster unit.
4. Remove the booster-to-dash panel attaching nuts or bolts (Figs. 29 thru 33). Remove the booster and bracket assembly from the dash panel, sliding the push rod link out from the engine side of the dash panel.
5. On Fairlane, Montego, and Falcon models, remove the push rod link boot from the dash panel.

INSTALLATION

1. On Fairlane, Montego and Falcon models, install the push rod link boot in the hole in the dash panel as shown in Fig. 23. Install the four spacers on the mounting studs.
2. Mount the booster and bracket assembly to the dash panel by inserting the push rod or push rod link in through the hole and boot in the dash panel. Install the bracket-to-dash panel attaching lock nuts or bolts (Figs. 29 thru 33).
3. Connect the manifold vacuum hose or hoses to the booster.
4. Before installing the master cylinder, check the distance from the outer end of the booster assembly push rod to master cylinder surface. Turn the screw in or out to obtain the specified length. Refer to Part 2-1, Section 2, Power Brake Master Cylinder Push Rod Adjustment. Install the master cylinder and torque the attaching nuts to specifications.
5. Working from inside the vehicle below the instrument panel, connect the booster push rod link to the brake pedal assembly. To do this, proceed as follows:

Install the inner nylon washer, the booster push rod, and the bushing on the brake pedal pin. Position the switch so that it straddles the push rod with the switch slot on the pedal pin and the switch outer hole just

clearing the pin. Slide the switch completely onto the pin, and install the nylon washer as shown in Figs. 29 thru 33. **Be careful not to bend or deform the switch.** Secure these parts to the pin with the hairpin retainer. Connect the stop light switch wires to the connector, and install the wires in the retaining clip.

BRAKE PEDAL

FORD, MERCURY AND METEOR

Removal

1. Disconnect the stop light switch wires at the connector.
2. Remove the hairpin retainer. Slide the stop light switch off the brake pedal pin **just far enough for the switch outer hole to clear the pin,** and then lift the switch straight **upward** from the pin. **Be careful not to damage the switch during removal.** Slide the master cylinder or booster push rod and the nylon washers and bushing off the brake pedal pin (Figs. 26 and 29).
3. Remove the hairpin type retainer and washer from the brake pedal shaft, then remove the shaft, the brake pedal and the bushings from the pedal support bracket.

Installation

1. Apply a coating of SAE 10 Engine oil to the bushings and locate bushings in their proper places on the pedal assembly and pedal support bracket (Figs. 26 and 29).
2. Position the brake pedal assembly to the support bracket, then install the pedal shaft through the support bracket and brake pedal assembly. Install the retainer.
3. Install the inner nylon washer, the master cylinder or booster push rod, and the bushing on the brake pedal pin. Position the switch so that it straddles the push rod with the switch slot on the pedal pin and the switch outer hole just clearing the pin. Slide the switch completely onto the pin, and install the nylon washer as shown in Figs. 26 and 29. **Be careful not to bend or deform the switch.** Secure these parts to the pin with the hairpin retainer.
4. Connect the stop light switch wires to the connector, and install the wires in the retaining clip.
5. Check the Brake Pedal Free Height and Travel Measurements, Part 2-1, Section 1.

FAIRLANE, MONTEGO AND FALCON—MANUAL-SHIFT TRANSMISSION

Removal

1. Remove the clutch pedal assist spring.
2. Disconnect the clutch pedal-to-equalizer rod at the clutch pedal by removing the retainer and bushing.
3. Disconnect the stop light switch wires at the connector.
4. Remove the switch retainer, and slide the stop light switch off the brake pedal pin **just far enough for the switch outer hole to clear the pin. Then lower the switch away from the pin.**
5. Slide the master cylinder or booster push rod and the nylon washers and bushing off from the brake pedal pin (Figs. 27 and 30).
6. Remove the self-locking pin and washer from the clutch and brake pedal shaft, then remove the clutch pedal and shaft assembly, the brake pedal assembly, and the bushings from the pedal support bracket (Figs. 27 and 30).

Installation

1. Apply a coating of SAE 10 engine oil to the bushings and locate all bushings in their proper places on the clutch and brake pedal assemblies.
2. Position the brake pedal to the support bracket, then install the clutch pedal and shaft assembly through the support bracket and brake pedal assembly. Install the spring clip (Figs. 27 and 30).
3. Install the clutch pedal assist spring.
4. Connect the clutch pedal-to-equalizer rod to the clutch pedal assembly with the bushing and the spring clip retainer. Apply SAE 10 engine oil to the bushing.
5. Install the inner nylon washer, the master cylinder or booster push rod, and the bushing on the brake pedal pin. Position the switch so that it straddles the push rod with the switch slot on the pedal pin and the switch outer hole just clearing the pin. Slide the switch completely onto the pin, and install the outer nylon washer as shown in Figs. 27 and 30. Secure these parts to the pin with the self-locking pin.
6. Connect the stop light switch wires to the connector, and install the wires to the retaining clip.
7. Adjust the clutch pedal free play (Group 5) to specification, if required.
8. Check the Brake Pedal Free Height and Travel Measurements (Part 2-1, Section 1).

MUSTANG AND COUGAR—MANUAL-SHIFT TRANSMISSION

Removal

1. Disconnect the battery ground cable from the battery.
2. Remove the steering column. Refer to Part 3-4, Section 2 for procedure.
3. On non-power brakes, remove the two cap screws retaining the master cylinder to the dash panel and remove the two cap screws retaining the brake pedal support bracket to the dash panel. On power brakes remove the two cap screws retaining the booster to the dash panel.
4. Working inside the vehicle, secure the clutch pedal against the bumper stop with a small C-clamp as shown in Figs. 28 and 31.
5. Disconnect the clutch pedal-to-equalizer rod at the clutch pedal by removing the retainer and bushing.
6. Disconnect the stop light switch wires at the connector.
7. Remove the switch retainer and slide the stop light switch off the brake pedal pin **just far enough for the switch outer hole to clear the pin. Then lower the switch away from the pin.** Remove the master cylinder or booster push rod, bushing and nylon washer from the brake pedal pin.
8. Remove the screw retaining the pedal support bracket to the top inner cowl bracket (Figs. 28 and 31).
9. Remove the two sheet metal screws retaining the pedal support bracket to the dash panel. On power brakes remove the nuts from the brake booster studs.
10. Remove the two screws retaining the pedal support bracket to the upper cowl brace and lower the pedal support bracket away from the steering column studs.
11. Remove the pedal support bracket assembly from the vehicle.
12. Position the pedal and support bracket assembly in a vise.
13. Remove the C-clamp to release the clutch pedal from its bumper stop and pivot the pedal away from the bumper.

14. Remove the clutch pedal assist spring.

15. On non-power brakes, remove the retainer clip from the clutch and brake pedal shaft, then remove the clutch pedal and shaft assembly, the brake pedal assembly, and the bushings from the pedal support bracket. On power brakes, remove the retainer nut from the brake pedal shaft then remove the pedal shaft, the brake pedal assembly and the bushings from the pedal support bracket.

Installation

1. Apply a coating of SAE 10 engine oil to the bushings and locate all bushings in their proper places on the clutch and brake pedal assemblies.

2. On non-power brakes, position the brake pedal to the pedal support bracket, then install the clutch pedal and shaft assembly through the support bracket and brake pedal assembly. On power brakes position the brake pedal to the pedal support bracket, then install the pedal shaft and nut.

3. Install the clutch pedal assist spring and pivot the clutch pedal against its bumper stop. Secure the pedal to the stop with a small C-clamp as shown in Figs. 28 and 31.

4. Position the pedal support bracket assembly to the dash panel, and to the steering column retainer studs.

5. Align the pedal support bracket holes with the holes in the dash panel and install the two attaching sheet metal screws. On power brakes install the nuts on the brake booster studs.

6. Install the two cap screws attaching the pedal support bracket to the upper cowl bracket.

7. Install the cap screw attaching the pedal support bracket to the top inner cowl bracket (Figs. 28 and 31).

8. Install the inner nylon washer, the master cylinder push rod, and the bushing on the brake pedal pin. Position the stop light switch so that it straddles the push rod with the switch slot on the pedal pin and the switch outer hole just clearing the pin. Slide the switch completely onto the pin, and install the outer nylon washer as shown in Figs. 28 and 31. Secure these parts to the pin with the self-locking retainer.

9. Connect the stop light switch wires to the connector.

10. Connect the clutch pedal-to-equalizer rod to the clutch pedal assembly with the bushing and the spring clip retainer. Apply SAE 10 engine oil to the bushing. Remove the C-clamp from the clutch pedal.

11. Working from the engine side of the dash panel, on non-power brakes, install the two cap screws attaching the pedal support bracket to the dash panel. Then install the two screws attaching the master cylinder to the dash panel. On power brakes install the cap screws retaining the brake booster to the dash panel.

12. Install the steering column. Refer to Part 3-4, Section 2 for procedure.

13. Adjust the clutch pedal free play (Group 5) to specification, if required.

14. Check the Brake Pedal Free Height and Travel Measurements (Part 2-1, Section 1).

15. Connect the ground cable to the battery.

FAIRLANE, MONTEGO, FALCON, MUSTANG AND COUGAR— AUTOMATIC TRANSMISSION

Removal

1. Disconnect the stop light switch wires at the connector.

2. Remove the self-locking pin and slide the stop light switch off the brake pedal pin **just far enough for the switch outer hole to clear the pin.** Then lower the switch away from the pin. Slide the master cylinder or booster push rod and the nylon washers and bushing off from the brake pedal pin (Figs. 27, 28, 30 and 31).

3. On all vehicles except Mustang and Cougar with power brakes, remove the self-locking pin and washer from the brake pedal shaft, then remove the shaft, the brake pedal assembly and the bushings from the pedal support bracket. On Mustang and Cougar vehicles with power brakes, remove the locknut and bolt from the pedal. Remove the pedal assembly from the support bracket (Fig. 3).

Installation

1. Apply a coating of SAE 10 engine oil to the bushings and locate all the bushings in their proper places on the pedal assembly and pedal support bracket (Figs. 27, 28, 30 and 31).

2. Position the brake pedal assembly to the support bracket, then install the pedal shaft or bolt through the support bracket and brake pedal assembly. Install the retainer or locknut.

3. Install the inner nylon washer, the master cylinder or booster push rod, and the bushing on the brake pedal pin. Position the switch so that it straddles the push rod with the switch slot on the pedal pin, and the switch outer hole just clearing the pin. Slide the switch completely onto the pin, and install the outer nylon washer as shown in Figs. 27, 28, 30 and 31. Secure these parts to the pin with the self-locking pin.

4. Connect the stop light switch wires to the connector, and install the wires in the retaining clip.

Check the Brake Pedal Free Height and Travel Measurements, Part 2, Section 1.

THUNDERBIRD AND CONTINENTAL MARK III

Removal

1. Loosen the booster mounting nuts.

2. Disconnect the stop light switch wires at the connector.

3. Remove the hairpin retainer. Slide the stop light switch off from the brake pedal pin **just far enough for the switch outer hole to clear the pin,** and then lift the switch straight **upward** from the pin. Slide the master cylinder push rod and the nylon washers and bushing off from the brake pedal pin (Fig. 32).

4. Remove the pivot bolt and nut that holds the pedal to the pedal support bracket. Remove the brake pedal assembly from the pedal support bracket, and remove the bushings.

Installation

1. Apply a coating of SAE 10 engine oil to the bushings and locate all the bushings in their proper places on the pedal assembly (Fig. 32).

2. Install the brake pedal assembly and bushings to the support bracket, and then install the pivot bolt through the support bracket and brake pedal assembly. Install the pivot bolt nut and torque to specifications.

3. Install the inner nylon washer, the master cylinder push rod, and the bushing on the brake pedal pin. Position the switch so that it straddles the push rod with the switch slot on the pedal pin and the switch outer hole just clearing the pin. Slide the switch completely onto the pin, install the outer nylon washer as shown in Fig. 32. Secure these parts to the pin with the hairpin retainer.

4. Connect the stop light switch wires to the connector, and install the wires in the retaining clip.
5. Torque the booster mounting nuts to specifications.

LINCOLN CONTINENTAL

Removal

1. Disconnect the battery ground cable from the battery.
2. **It is necessary to obtain clearance to remove vacuum hoses and the electrical connector to the temperature heat control box.** Remove the two screws retaining the relay to the fender and push the relay aside. Disconnect the vacuum hoses and connector at the heat control box.
3. Working under the instrument panel, disconnect the vacuum hoses, wires and retaining clip from the temperature heat control box. Remove the two screws securing the temperature control box to the dash panel.
4. Remove the lower control housing retaining screws (6). Disconnect the wire harnesses at the lower control panel and place the panel aside. Remove the wire harness shield. Remove the wire harness clip. Position the wire harness aside. Remove the temperature control box and position it aside.
5. Remove the hair-pin type retainer. Slide the stop light switch off the brake pedal pin **just far enough for the switch outer hole to clear the pin.** Lift the switch upward from the pin. Slide the master cylinder push rod, nylon washers and bushing off the brake pedal pin.
6. Remove the pivot bolt and nut that holds the pedal to the pedal support bracket. Remove the brake pedal assembly from the support bracket and remove the bushings.
7. If required, remove the brake pedal pad retaining nuts and remove the brake pedal pad.

Installation

1. If the brake pedal pad was removed, position the pad on the pedal. Install the pad retaining nuts and torque them to specification.
2. Apply SAE 10 engine oil to the bushings and locate all the bushings in their proper places on the pedal assembly.
3. Install the brake pedal assembly and bushings to the support bracket, and then install the pivot bolt through the support bracket and pedal assembly. Install the pivot bolt nut and torque it to specification.
4. Install the inner nylon washer,the master cylinder push rod link, and the bushing on the brake pedal pin. Position the switch so that it straddles the push rod link with the switch slot on the pedal and the switch outer hole just clearing the pin. Install the outer nylon washer as shown in Fig. 33. Install the hair-pin type retainer on the brake pedal pin.
5. Connect the stop light switch wires to the connector, and install the wires in the retaining clip.
6. Position the wire harness and clip on the temperature control box and install the retaining screw. Position the temperature control box to the dash panel and install the two retaining bolts.
7. Connect the vacuum lines and the electrical connector to the control box. Position the wire harness to the control box and install the retaining clip.
8. Position the wire harness shield and install two retaining bolts.
9. Connect the wire harnesses to the lower control panel and install the retaining screws.
10. Working within the engine compartment, connect the wire connector to the temperature heat control box.
11. Position the relay to the fender apron and install the retaining bolts.
12. Connect the ground cable to the battery.
13. Check the brakes and light switch for proper operation. Close the hood.

PARKING BRAKE CONTROL ASSEMBLY

FORD, MERCURY AND METEOR

Removal

Refer to Fig. 34.

1. Make sure the parking brake is fully released.
2. Remove all tension from the rear cables by backing off the adjusting nut from the equalizer.
3. Remove the roll pin that secures the release knob to the cable and remove the knob.
4. Remove the nut that secures the release cable to the instrument panel and remove the cable from the rear of the instrument panel.
5. Remove the two nuts attaching the control assembly to the dash panel.
6. Remove the cap screw attaching the control assembly to the cowl side bracket.
7. Disconnect the hose to the parking brake vacuum unit, if so equipped.
8. Remove the front cable assembly retainer clip from the cable assembly and disconnect the cable ball from the control clevis.
9. Remove the control assembly from the vehicle.

Installation

1. Position the control assembly in the vehicle.
2. Fit the cable assembly through its mounting hole and install the retaining clip. Connect the cable ball to the control clevis.
3. Connect the vacuum hose to the parking brake unit, if so equipped.
4. Install the attaching cap screw to the cowl side bracket. Do not tighten.
5. Install the two control assembly-to-dash panel nuts. Tighten the nuts and the cap screw to specifications.
6. Insert the release cable into the instrument panel and install the retaining nut.
7. Install the release knob on the cable with the roll pin.
8. Check the operation of the parking brake. Adjust the parking brake as required.

FAIRLANE, MONTEGO AND FALCON

Removal

Refer to Fig. 35.

1. Make sure the parking brake is completely released.
2. Remove all tension from the rear cables by backing off the jam nut and adjusting nut from the equalizer.
3. Working inside the vehicle, remove the four bolts and one nut retaining the left air vent and cable assembly to the dash and instrument panels. Remove the vent assembly.
4. Remove the parking brake front cable ball retaining clip from the clevis.
5. Disconnect the cable ball from the notch in the brake clevis.
6. Remove the three screws that attach the control assembly to the left cowl inner side panel.

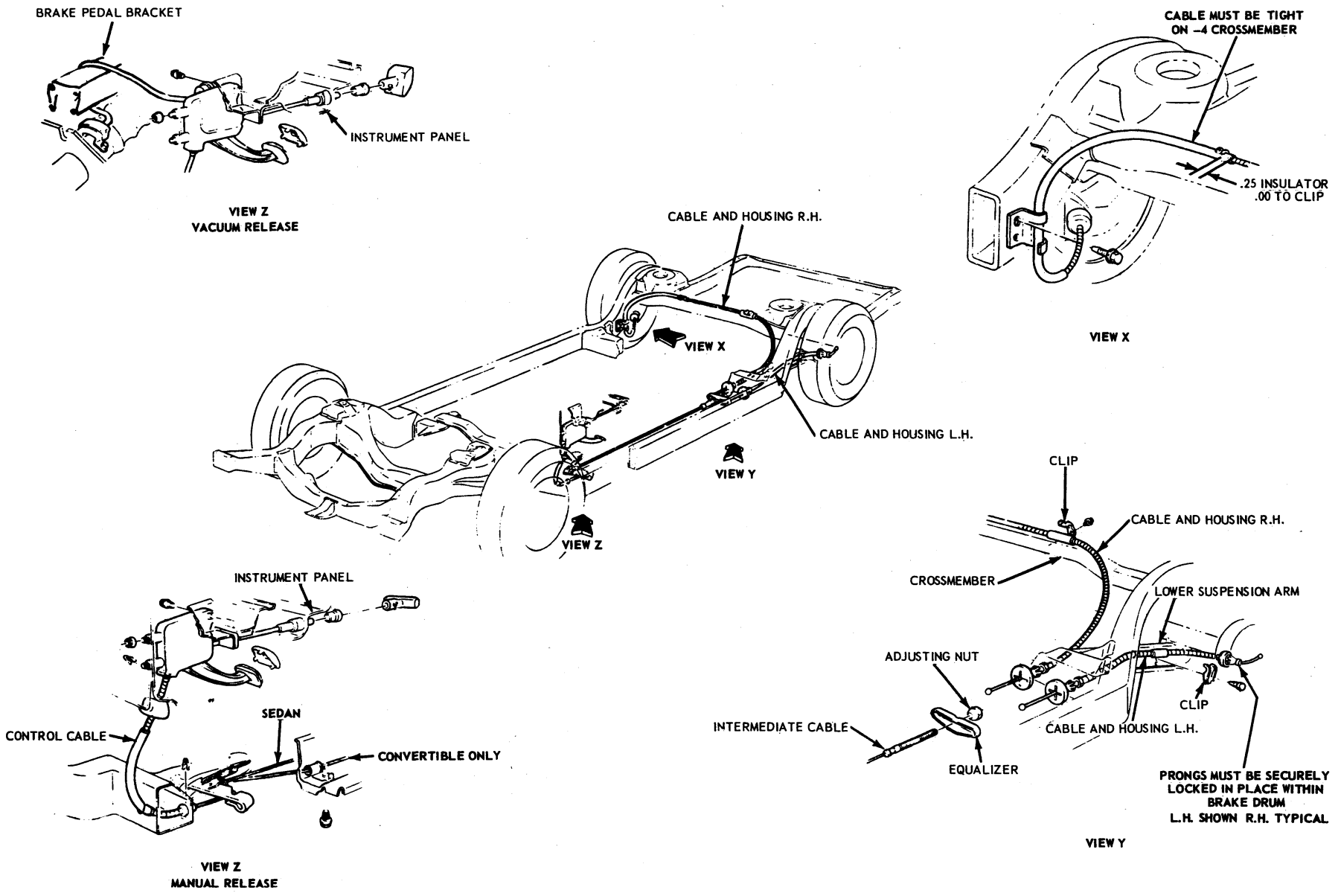


FIG. 34—Parking Brake System—Ford, Mercury and Meteor

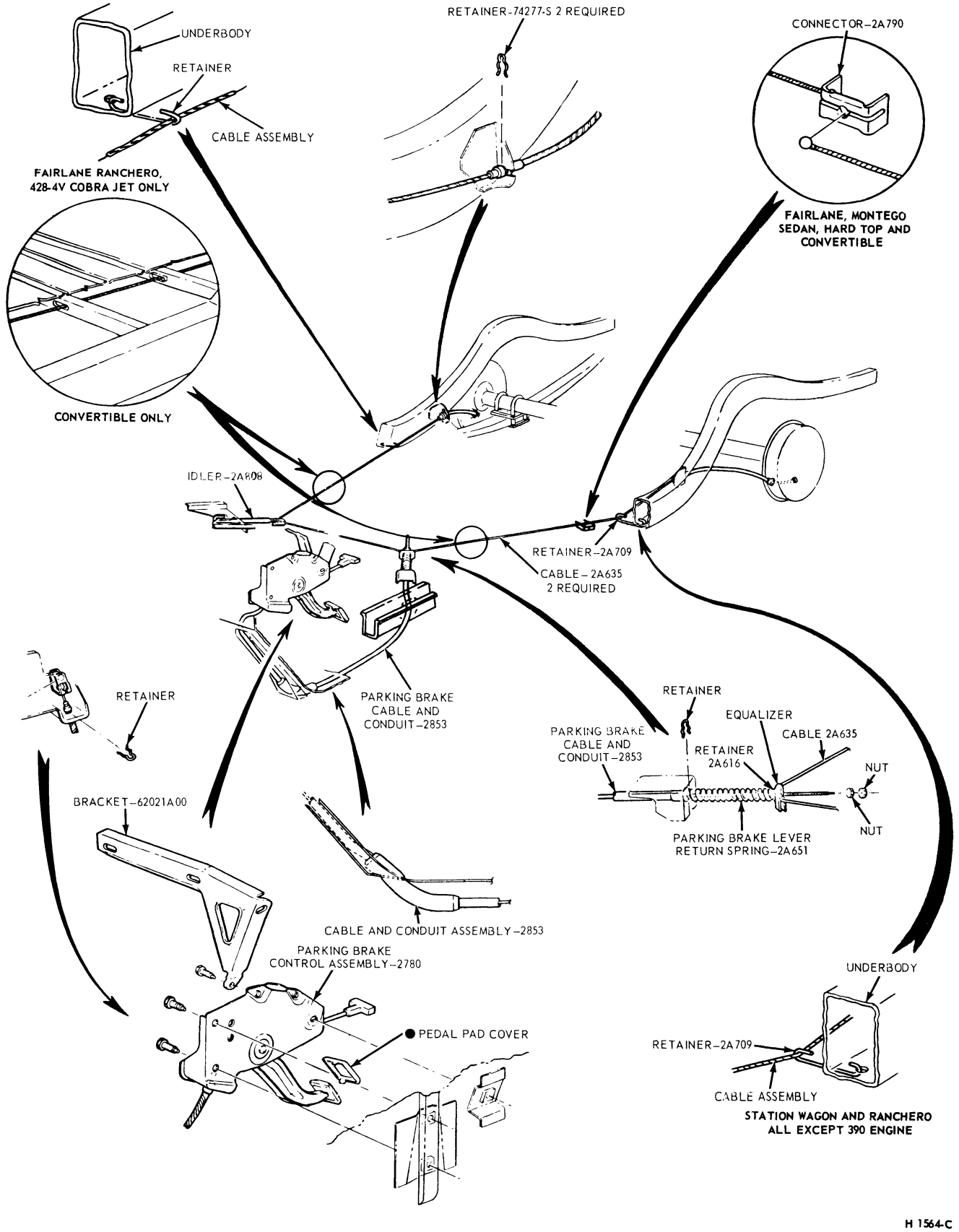


FIG. 35—Parking Brake System—Fairlane, Montego and Falcon

7. Disconnect the wire lead at the parking brake warning light switch and remove the control assembly.

Installation

1. Connect the wire lead to the parking brake warning light switch.
2. Position the control assembly to the cowl inner side panel and install the three attaching screws.
3. Connect the ball-end of the parking brake front cable assembly to the control assembly, and install the hair-pin retainer.
4. Position the cable ball in the notch in the brake clevis.
5. Position the left air vent assembly to the dash and instrument panels. Install the four bolts and one nut retaining the air vent to the panels.
6. Check the operation of the parking brake. Adjust the parking brake.

MUSTANG AND COUGAR

Removal

Refer to Fig. 36.

1. Make sure the parking brake is completely released.
2. Remove all tension from the rear cables by backing off the jam nut and adjusting nut from the equalizer.
3. Disconnect the wire lead at the parking brake warning light switch (if so equipped).
4. Remove the parking brake front cable ball retaining clip from the clevis.
5. Remove the parking brake warning light switch and attaching screw (if so equipped).
6. Disconnect the cable ball from the notch in the brake clevis.
7. Remove the three screws that attach the control assembly to the left cowl inner side panel.
8. Pull the control away from the cowl, panel. Remove the hair-pin retainer securing the front cable assembly to the control assembly. Remove the control assembly

Installation

1. Connect the ball-end of the parking brake front cable assembly to the control assembly, and install the hair-pin retainer.
2. Position the control assembly to the cowl inner side panel and install the three attaching screws.
3. Position the parking brake warning light switch and install the attaching screw. Connect the parking brake warning light switch wire lead (if vehicle is so equipped).
4. Position the cable ball in the notch in the brake clevis.
5. Check the operation of the parking brake. Adjust the parking brake.

THUNDERBIRD AND CONTINENTAL MARK III

Removal

Refer to Fig. 37.

1. Remove the two nuts retaining the control to the dash panel.
2. Remove two screws from the left scuff plate.
3. Remove one screw retaining the left cowl trim panel and remove the panel.
4. Remove the two screws retaining the left air duct and remove the air duct.
5. Remove the two screws retaining the dimmer switch and position the switch out of the way.
6. Remove the clip retaining the cable assembly to the control.
7. Disconnect the cable ball from the control clevis.
8. Disconnect the vacuum hose at the brake release.
9. Remove the bolt retaining the control to the cowl side bracket and remove the control.

Installation

1. Position the parking brake control in the vehicle.
2. Install the cable assembly in the control and connect the cable ball to the control clevis.
3. Install the clip retaining the cable to the control.
4. Install the bolt retaining the control to the cowl side bracket.
5. Connect the vacuum hose to the parking brake release vacuum motor.
6. Position the dimmer switch and install the retaining screws.
7. Position the air duct and install the retaining screws.
8. Position the cowl trim panel and install the retaining screw.
9. Install the two scuff plate screws.
10. Install the two nuts retaining the control to the dash panel.
11. Adjust the parking brake

LINCOLN CONTINENTAL

Removal

Refer to Fig. 38.

1. Raise the vehicle on a hoist.
2. Loosen the parking brake cable adjusting nut, remove the return spring and remove the cable ball end from the equalizer.
3. Lower the vehicle.
4. Disconnect the battery.
5. Disconnect the wire harness connector and two vacuum hoses at the Automatic Temperature Control box.
6. Working inside the vehicle, remove the windshield wiper control knob and bezel from the lower control panel.
7. Remove the screws retaining the lower control panel. Lower the control panel and disconnect wire harnesses and vacuum hoses. Position the control panel aside.
8. Remove the screw retaining the plastic wire cover and place the cover aside.
9. Disconnect three vacuum hoses and the wiring harness at the Automatic Temperature Control box.
10. Remove the two screws retaining the Automatic Temperature Control box to the dash panel and remove the box for clearance.
11. Disconnect the ball end of the cable from the control clevis.
12. Remove the four bolts retaining the control to the dash panel and lower instrument panel flange.
13. Disconnect the vacuum release hose from the control and remove the control assembly from the vehicle.

Installation

1. Position the control assembly to the dash panel and instrument panel flange and install the four retaining screws.
2. Connect the vacuum release hose to the control assembly.
3. Connect the cable ball to the control clevis.
4. Position the Automatic Temperature Control box to the dash panel and install the retaining screws.
5. Connect the wiring harness and vacuum hoses to the Automatic Temperature Control box.
6. Position the plastic wire cover and install the retaining screw.
7. Connect the wire harnesses and vacuum lines to the lower control panel and position the panel to the in-

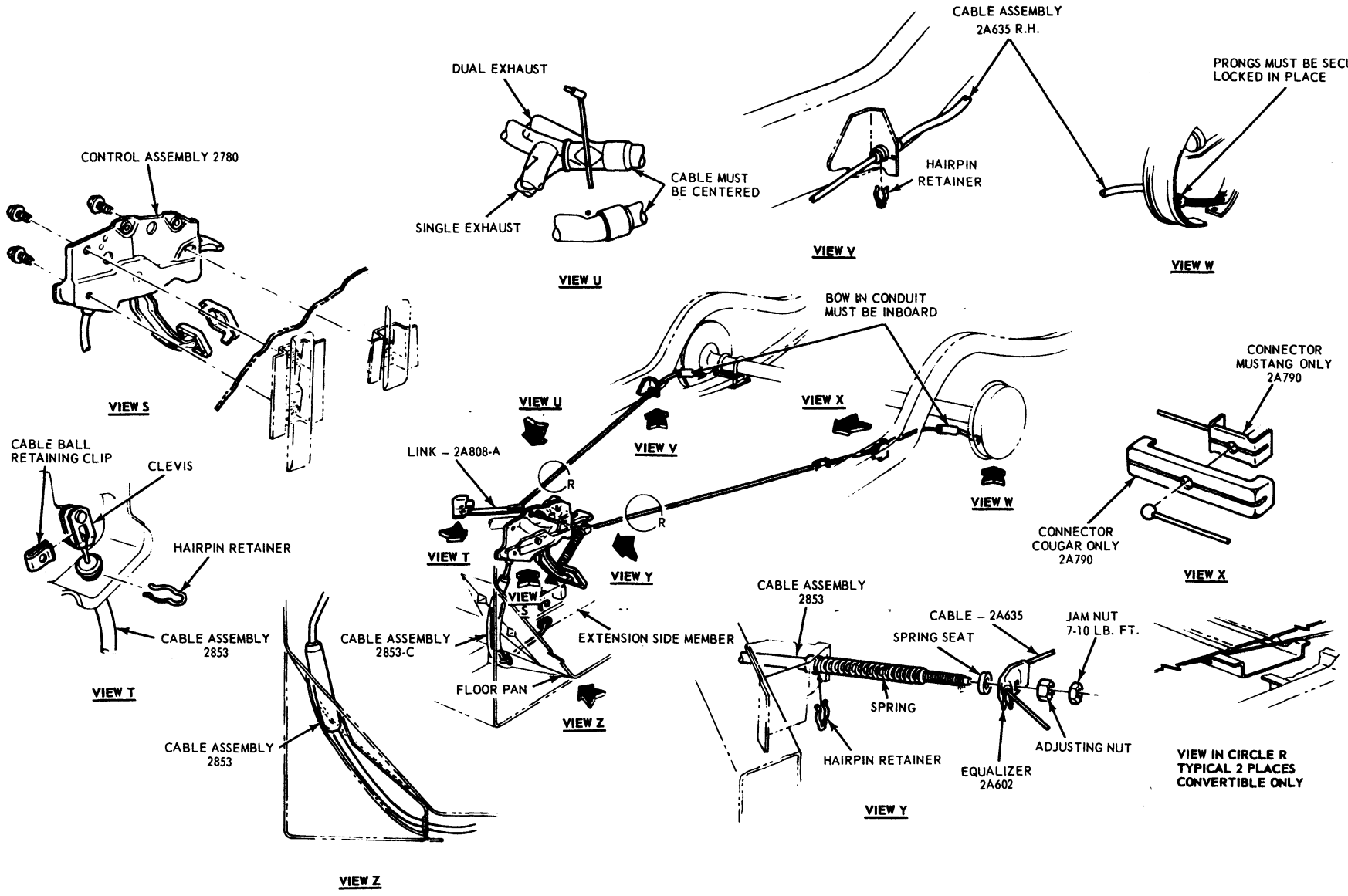


FIG. 36—Parking Brake System—Mustang and Cougar

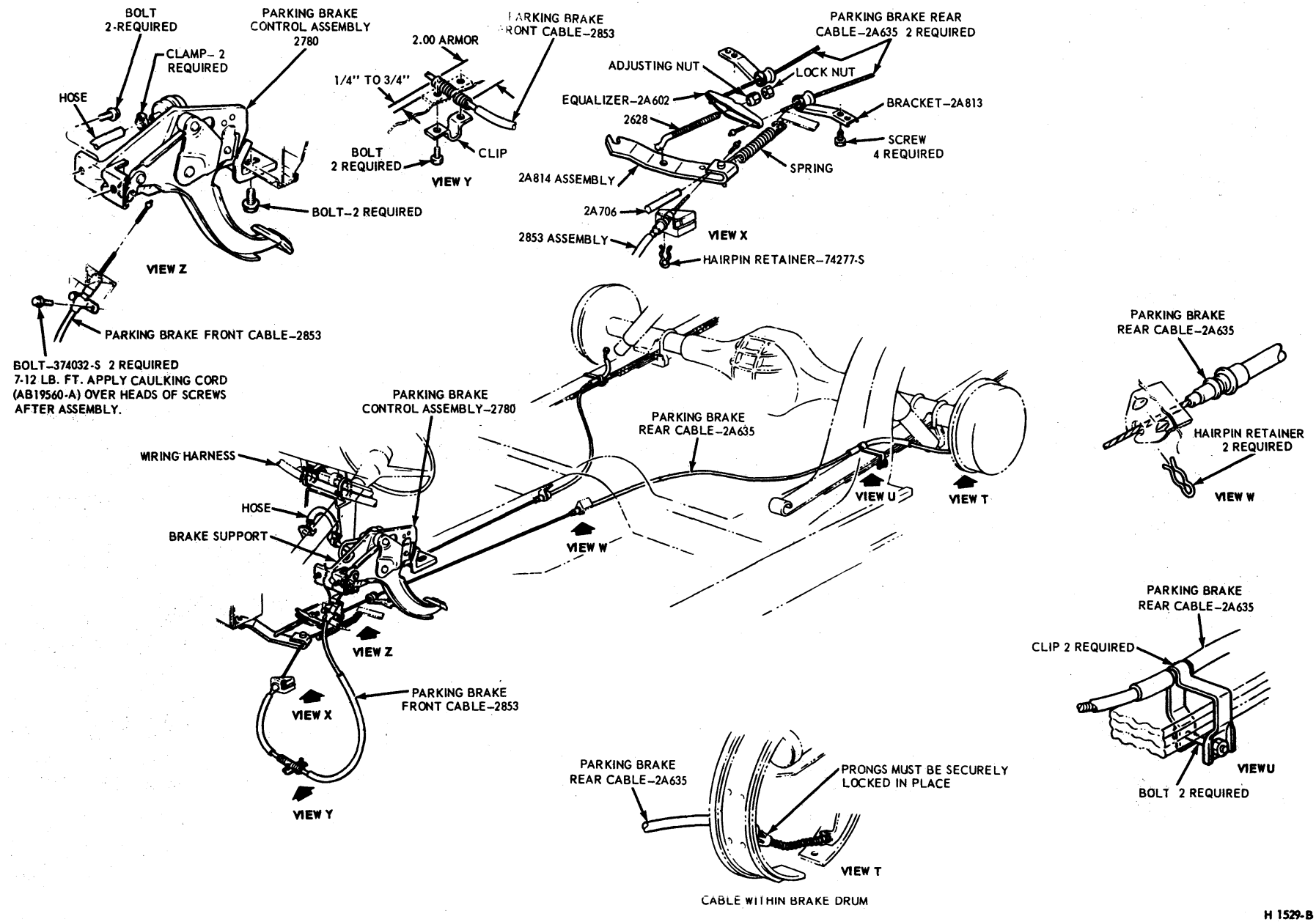


FIG. 38 Parking Brake System—Lincoln Continental

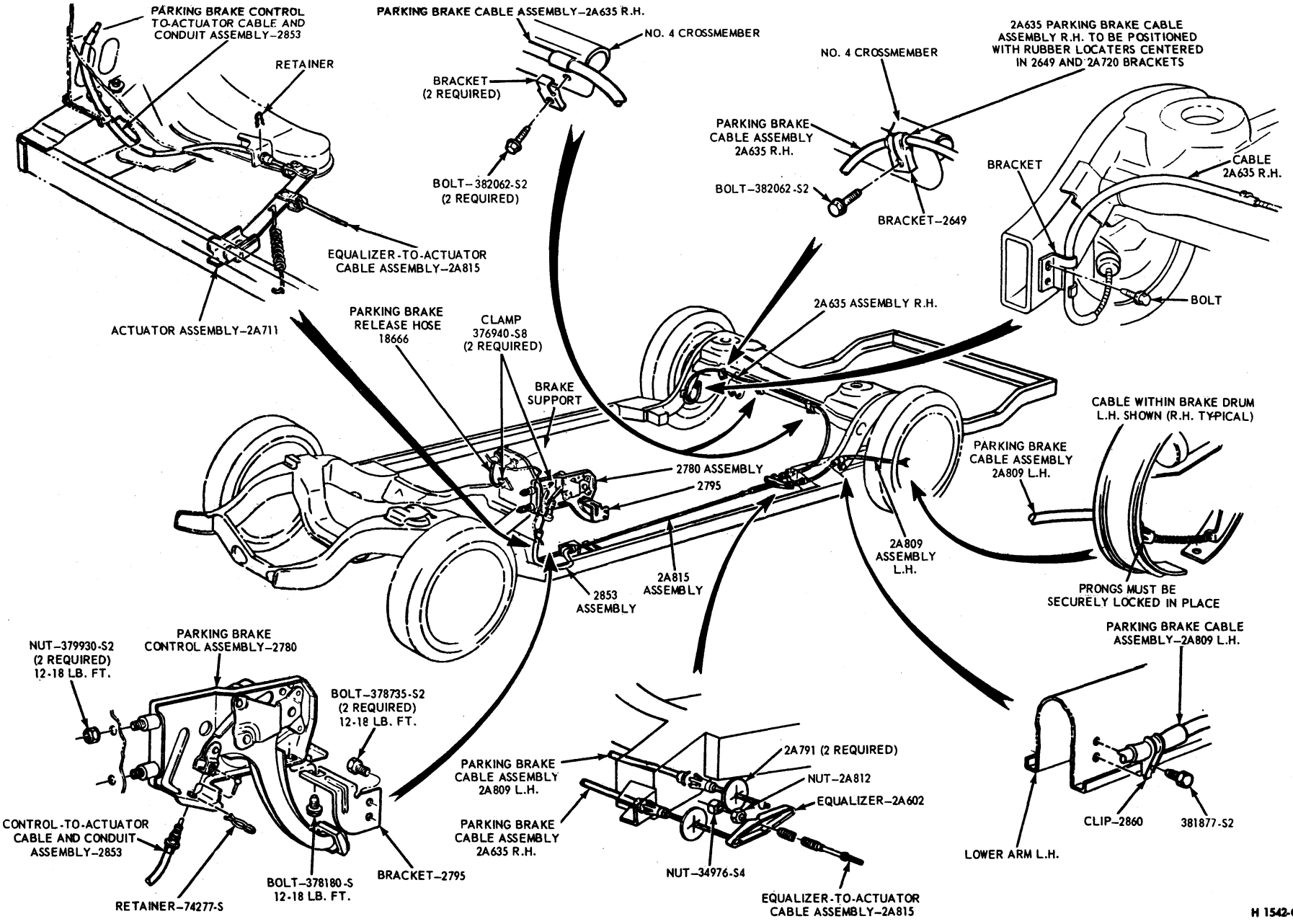


FIG. 37—Parking Brake System—Thunderbird and Continental Mark III

strument panel. Install the lower control panel retaining screws.

8. Install the windshield wiper control bezel and knob.

9. Working in the engine compartment connect the wire harness and vacuum hoses to the Automatic Temperature Control box.

10. Connect the battery cable.

11. Raise the vehicle on a hoist.

12. Connect the cable ball to the equalizer and install the equalizer lever return spring.

13. Adjust the parking brake cable tension.

14. Lower the vehicle.

PARKING BRAKE ACTUATOR—TO CONTROL CABLE

FORD, MERCURY AND METEOR

Removal

1. Raise the vehicle on a hoist.

2. Loosen the actuator lever to equalizer cable adjusting nut at the equalizer (Fig. 34).

3. Disconnect the cable ball from the clevis on the actuator lever.

4. Remove spring clip that retains the cable to the frame.

5. From inside of passenger compartment, remove spring clip that retains the cable to the parking brake control. Disconnect the cable ball from the control assembly.

6. Remove the cable assembly from the vehicle.

Installation

1. Position the cable through the provided openings and in the approximate final installation position.

2. Install the hairpin retainer on the cable at the frame crossmember.

3. Connect the ball end of the cable to the parking brake control. Install the cable-to-control hairpin retaining clip.

4. Position the cable seal at the dash panel, and slide the retaining clip upward to seal the cable at the dash opening.

5. Connect the ball end of the cable to the clevis on the actuator lever.

6. Adjust the parking brake (Part 2-1, Section 2).

7. Lower vehicle on hoist.

THUNDERBIRD AND CONTINENTAL MARK III

Removal

Refer to Fig. 37.

1. Partially raise the vehicle.

2. Back off the adjusting nut at the equalizer to relieve the tension on the cable.

3. Remove the spring at the actuator lever and disconnect the control cable from the clevis on the lever.

4. Remove the clip retaining the control cable assembly to the frame bracket.

5. Attach a length of wire to the control cable.

6. Working inside the vehicle remove two screws retaining the left scuff plate.

7. Remove one screw and remove the left cowl side trim panel.

8. Remove the two screws retaining the left air duct to the inner panel and remove the air duct.

9. Remove the two screws retaining the dimmer switch and position the dimmer switch back out of the way.

10. Remove the clip retaining the cable assembly to the control and remove the cable ball from the control clevis.

11. Pull the cable up through the opening in the dash panel and remove the cable from the length of wire.

Installation

1. Attach the cable to the length of wire and pull the cable down through the opening in the dash panel.

2. Position the upper end of the control cable to the control. Connect the cable ball to the control clevis and install the clip retaining the cable housing to the control.

3. Remove the length of wire from the cable assembly and position the cable in the frame bracket. Install the retainer.

4. Connect the cable ball to the clevis on the actuator lever and install the actuator lever spring.

5. Adjust the parking brake.

6. Reposition the dimmer switch and install the retaining screws.

7. Position the air duct to the inner panel and install the retaining screws.

8. Position the cowl side trim panel and install the retaining screw.

9. Install the two screws in the scuff plate.

PARKING BRAKE EQUALIZER TO CONTROL CABLE

FAIRLANE, MONTEGO AND FALCON

Removal

Refer to Fig. 35.

1. Make certain the parking brake is fully released.

2. Raise the vehicle on a hoist. Remove the two nuts that attach the cable to the equalizer. Remove the equalizer, spring seat and spring.

3. Remove the hairpin retainer holding the cable assembly to the body bracket and remove the cable from the slot in the bracket.

4. Lower the vehicle partially.

5. Remove the hairpin retainer which retains the cable assembly to the control.

6. Remove the cable bolt retaining clip from the control clevis and disconnect the cable ball from the clevis.

7. Pull the cable down through the opening in the floor pan and frame side rail.

Installation

1. Route the new cable through the frame side rail and up through the opening in the floor pan. Pull the cable up into position.

2. Connect the cable ball in the control clevis.

3. Insert the cable housing into the control and install the hairpin retainer.

4. Raise the vehicle.

5. Position the cable in the body bracket and install the hairpin retainer.

6. Position the spring, spring retainer and equalizer on the cable and install the two nuts.

7. Adjust the parking brake.

MUSTANG AND COUGAR

Removal

Refer to Fig. 36.

1. Make certain the parking brake is fully released.

2. Raise the vehicle on a hoist. Remove the two nuts that attach the cable to the equalizer. Remove the equalizer spring seat and spring.

3. Remove the hairpin retainer holding the cable assembly to the body bracket and pull the cable out of the side rail access holes.

4. Attach a wire to the end of the cable to assist in routing new cable.
5. Lower the vehicle.
6. Remove the parking brake front cable ball retaining clip from the clevis.
7. Disconnect the cable ball from the notch in the brake clevis.
8. Remove the hairpin retainer and remove the cable assembly from the brake control assembly.
9. Pull the cable assembly up through the opening in the floor and remove the wire from the end of the cable.

Installation

Refer to Fig. 36.
1. Connect the wire to the end of the cable assembly and pull the cable down through the opening in the floor. Remove the wire.
2. Connect the cable assembly to the brake control assembly and install the hairpin retainer.
3. Position the ball end of the cable in the notch of the brake clevis.
4. Raise the vehicle on a hoist.
5. Pull the cable grommet into position and route the cable through the access holes in the side rail and under the fuel line.
6. Insert the cable into the body bracket and install the hairpin retainer.
7. Position the spring, spring seat, and equalizer on the cable and install the two nuts.
8. Adjust the parking brake.

LINCOLN CONTINENTAL

Removal

1. Raise the car on a hoist. Disconnect the parking brake cable from the equalizer lever underneath the car (Fig. 38).
2. Remove the retaining clip at the cable bracket, and disengage the cable from the bracket (Fig. 38).
3. Remove the supporting clip retaining bolts and remove the support plate from the underbody.
4. Lower the car on a hoist.
5. With the parking brake in the fully released position, disconnect the cable at the control assembly.
6. Raise the vehicle on a hoist. Remove the left front fender apron splash shield retaining bolts and the splash shield.
7. Remove the two bolts securing the parking brake control to equalizer cable bracket to the dash panel and remove the cable from the vehicle.

Installation

1. Route the parking brake control to equalizer cable to the control assembly and the equalizer, and install the two bolts that retain the cable to the dash panel (Fig. 38).
2. Install the left front fender apron splash shield and the [illegible] attaching bolts.
3. Lower the vehicle.
4. Connect the control cable to the clevis on the control assembly.
5. Raise the car on a hoist.
6. Position the supporting clip and cable on the vehicle and install the retaining bolts. **Do not tighten the bolts.** Position the cable armor approximately 1/2 inch to the right of the clip (looking toward the rear of the car) and tighten the retaining bolts.
7. Position the equalizer control cable to the support bracket and install the retaining hairpin clip.
8. Connect the ball end of the control cable to the equalizer lever.
9. Adjust the parking brake linkage (Part 2-1, Section 2).
10. Check the operation of the automatic release mechanism.

PARKING BRAKE ACTUATOR-TO-EQUALIZER CABLE

FORD, MERCURY, METEOR, THUNDERBIRD AND CONTINENTAL MARK III

Removal

Refer to Figs. 34 and 37.
1. Raise the vehicle on a hoist.
2. Remove the lock and adjusting nut which retains the cable to the equalizer.
3. Remove the cable end from the equalizer.
4. Unhook the cable from the actuator, and remove from the vehicle.

Installation

1. Insert new cable end into actuator.
2. Insert cable end into equalizer and tighten the adjusting nut snug. Install the lock nut.
3. Adjust the parking brake cable tension and check operation as outlined in Part 2-1, Section 2.
4. Lower the vehicle.

PARKING BRAKE EQUALIZER TO REAR WHEEL CABLE

FORD, MERCURY, METEOR, THUNDERBIRD AND CONTINENTAL MARK III

Removal

1. Raise the vehicle and loosen the parking brake equalizer rod adjusting nut. Disconnect the equalizer from the rear cables (Figs. 34 and 37).
2. Compress the prongs on the left cable-to-frame side member retainer so the prong can pass through the side-member. Remove the clip that attaches the left cable to the left lower arm. Pull the cable thru the frame left side member.
3. Compress the prongs on the right cable-to-frame side member retainer bracket so the prong can pass through the bracket. Remove the clips retaining the right cable to the frame crossmember.
4. Remove the rear wheel cover and wheel. Remove the three Tinnerman nuts that hold the brake drum in place and remove the drum.
5. Working on the wheel side of the rear brake, remove the automatic brake adjuster spring. Compress the prongs on the parking brake cable retainer so that they can pass through the hole in the brake backing plate. Draw the cable retainer through the hole.
6. With the spring tension off the parking brake lever, lift the cable out of the slot in the lever and remove the cable through the backing plate hole.

Installation

1. Pull enough of the parking brake cable through the housing so that the end of the cable may be inserted over the slot in the parking brake lever on the rear brake shoe.
2. Pull the excess slack from the cable, and insert the cable housing into the brake backing plate access hole so that the retainer prongs expand. **The prongs must be securely locked in place.** Install the automatic brake adjuster spring.
3. Position the right hand cable and the two retaining clips and screws on the rear crossmember. Compress the prongs on the right cable and position the cable in the retaining bracket on the frame side member. Be sure the

locating stripe on the cable is midway between the retaining clips and tighten all retaining clip screws.

4. Position the left cable, retaining clip and screw on the left lower suspension arm. Compress the prongs on the left cable and position the cable through the frame side-member. The prongs must be securely locked in place.

5. Insert the ball ends of the cables into the equalizer assembly.

6. Install the rear drum(s) and tighten the three Tinnerman nuts and secure the drum. Install the wheel and tire and the wheel cover.

7. Adjust the parking brake linkage as outlined in Part 2-1, Section 2. Adjust the rear brakes, as required (Part 2-1, Section 2).

FAIRLANE, MONTEGO, MUSTANG AND COUGAR— EXCEPT STATION WAGON

Removal

1. Remove the equalizer lock nut and adjusting nut, equalizer, spring and spring seat.

2. With the cables slack, disconnect the ball-ends from the connector (Figs. 35 and 36).

3. Remove the cable from the retainer hooks (station wagon models) and the underbody guide (convertible models) if required.

4. Remove the hairpin lock retaining the cable housing to the side rail bracket.

5. Remove the wheel cover, wheel and tire and the rear brake drum as outlined in Section 2.

6. Remove self-adjuster springs to allow clearance to remove cable retainer from the backing plate. Disconnect the rear end of the cable from the parking brake lever on the brake shoe. Disengage the cable housing retaining grommet or steel-pronged Hi-Hat from the backing plate and withdraw the cable and housing from the inboard side of the backing plate.

7. Slide the cable and housing out of the side rail bracket.

Installation

1. Insert the rear end of the cable through the side rail bracket and pull the cable and housing into position.

2. Insert the rear end of the cable and housing through the hole in the backing plate from the inboard side.

3. Connect the cable to the parking brake lever on the brake shoe and install the cable housing retaining grommet or steel-pronged Hi-Hat in the backing plate.

4. Install the self-adjuster springs. Position the cable housing in the side rail bracket and install the hairpin type retainer.

5. Install rear hub and drum assembly, wheel and tire assemblies and wheel cover as outlined in Section 2.

6. Position the cable retainer hooks (station wagon models) in the underbody guide (convertible models) and install the connector, thus hooking the two cables together.

7. Insert the cable into the equalizer and install the equalizer, spring seat, spring, adjusting nut and lock nut to the front, parking brake control cable.

8. Adjust the parking brake as directed in Part 2-1, Section 2.

FAIRLANE AND MONTEGO STATION WAGONS AND FALCON PASSENGER MODELS

Removal and Installation

Refer to Fig. 35.

Generally follow the procedure given above, omitting separation of the cables, since the parking brake rear cable assemblies supplied for these models is in one piece. Removal and installation of both rear wheels, tires and drums will also be required.

LINCOLN CONTINENTAL

Removal

1. Raise the car. Remove the rear wheel cover. Remove the wheel and tire as an assembly.

2. Remove the three Tinnerman nuts that hold the brake drum in place, and remove the drum.

3. Remove the brake shoe retracting springs.

4. Loosen the equalizer rod adjusting nut and disconnect the cable from the equalizer (Fig. 38).

5. Remove the hairpin-type retainer clip that secures the cable housing to the body bracket, and pull the cable and housing out of the bracket (Fig. 38).

6. Remove the cable to underbody clamp attaching nuts and the clamp. Disengage the cable housing from the hook-type retainer at the spring U-bolt.

7. Working on the wheel side of the backing plate (Fig. 38), compress the prongs on the cable retainer so that it can pass through the hole in the backing plate. Draw the cable retainer out of the hole.

8. With the spring tension off the parking brake lever, lift the cable out of the slot in the lever and remove it through the backing plate hole.

Installation

1. Pull enough of the cable through the cable housing so that the end of the cable may be inserted through the backing plate hole from the inner side and engage the cable end with the slot in the parking brake lever.

2. Pull the excess slack from the cable and insert the cable housing into the backing plate access hole (Fig. 38). **The prongs must be securely locked in place.**

3. Install the brake shoe retracting springs.

4. Position the cable to the underbody and install the retaining clamp so that the cable conduit armor extends forward of the clamp as shown in Fig. 38. Install the clamp retaining nuts.

5. Hook the cable housing to the retainer at the spring U-bolt.

6. Engage the forward end of the cable housing with the frame bracket and secure it with the hairpin-type clip.

7. Insert the ball end of the cable into the equalizer.

8. Make a preliminary brake adjustment with the use of Tool HRA-8650 (Fig. 11).

9. Install the rear drum. Tighten the three Tinnerman nuts that secure the drum. Install the wheel and wheel cover.

10. Adjust the parking brake linkage.

11. Lower the vehicle.

ANTI-SKID CONTROL ACTUATOR

REMOVAL

Refer to Fig. 39.

1. Working in the passenger compartment, under the glove box, remove the screw that attaches the forward end of the control module retainer to the support assembly. Lower the forward end of the control module retainer and remove the module assembly.

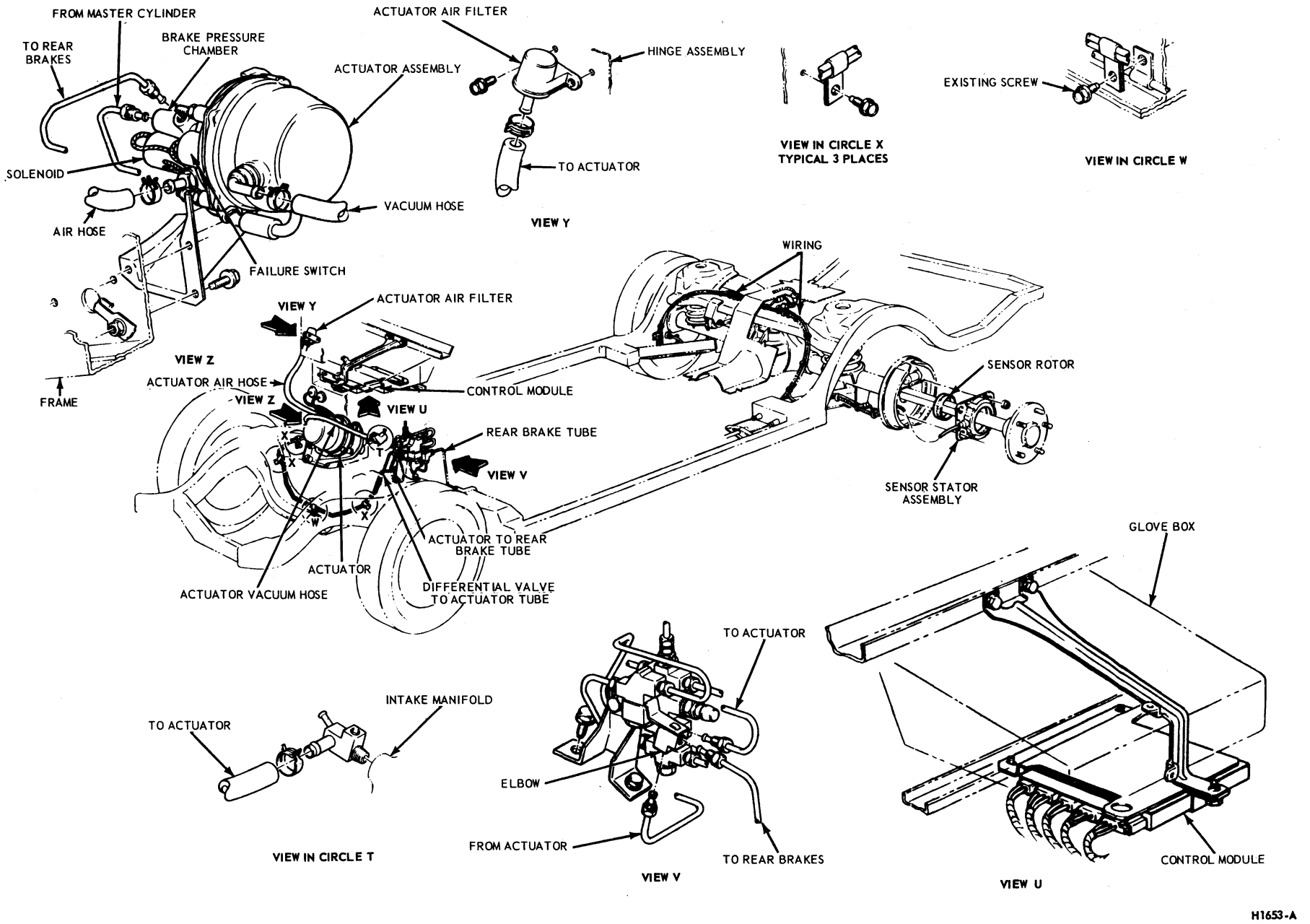


FIG. 39—Anti-Skid Control System

2. Disconnect the actuator solenoid and warning switch harness connectors from the control module.
3. Remove the two wiring harness grommets from the dash panel and push the wiring harness and connectors through the openings in the dash panel.
4. Working in the engine compartment loosen the hose clamp and remove the air hose from the air filter.
5. Remove the engine air cleaner. Loosen the hose clamp and remove the vacuum hose from the vacuum manifold fitting.
6. Raise the vehicle on a hoist.
7. Disconnect the exhaust pipes from the exhaust manifold and support with wire to provide access to the actuator assembly.
8. Remove the bolt retaining the actuator ground wire to the rear outer corner of the engine right bank.
9. Loosen the tube nuts and disconnect the brake system hydraulic tubes from the hydraulic valve housing.
10. Remove the three nuts retaining the actuator assembly to the actuator support bracket.
11. Remove the three bolts that retain the actuator mounting bracket to the side rail and remove the mounting bracket.
12. Remove the actuator assembly from the vehicle and place it on a bench.
13. Remove the air and vacuum hoses from the actuator.

INSTALLATION

1. Install the air and vacuum hoses on the new actuator.
2. Place the actuator assembly into position under the vehicle, routing the air and vacuum hoses up between the engine and fender apron and inserting the solenoid leads through the holes in the firewall.
3. Position the ground wire to the rear of the engine block and install retaining bolt.
4. Position the actuator mounting bracket to the frame side rail and install the three retaining bolts.
5. Position the actuator assembly to the mounting bracket and install the three retaining nuts.
6. Connect the hydraulic tubes to the hydraulic valve assembly and tighten the tube nuts to specifications.
7. Connect the exhaust pipes to the exhaust manifolds.
8. Lower the vehicle.
9. Pull the actuator solenoid and brake warning switch wiring harness through the two holes in the dash panel from inside the car. Seat the wiring harness grommets in the dash panel.
10. Connect the actuator solenoid and brake warning switch wiring harness connectors to the control modules.
11. Position the control module in the bracket under the glove box and install the retaining screw.
12. In the engine compartment connect the air hose to the air filter and position the hose clamp.
13. Connect the vacuum hose to the engine vacuum manifold fitting. Install the engine air cleaner.
14. Bleed the rear brake system and centralize the pressure differential valve.
15. Raise the rear wheels. Apply the brakes with the rear wheels turning to verify proper operation of the anti-skid control system.

ANTI-SKID CONTROL MODULE

REMOVAL

Refer to Fig. 39.
1. Remove the retaining strap holding the harnesses.
2. Remove the screw that attaches the forward end of the control module retainer to the support assembly.
3. Lower the forward end of the control module and retainer from the support assembly; move the module and retainer forward slightly until the flange clears the slot in the support assembly.
4. Disconnect the five wiring harness plugs from the control module.
5. Remove the control module from the vehicle.

INSTALLATION

1. Connect the five wiring harness plugs to the control module. Only one arrangement is possible.
2. Position the control module in the retainer, orienting the module per the markings on it, and insert the retainer flange into the slot at the rear of the support assembly.
3. Pivot the retainer and control module upward and align the screw hole in the forward end of the retainer with the hole in the support bracket assembly. Install the retaining screw.
4. Test the vehicle on the hoist to verify correct operation of the skid control system.
5. Secure the wiring to the module support extension with the retaining strap.

ANTI-SKID CONTROL SENSOR

REMOVAL

Refer to Fig. 39.
1. Raise the vehicle on a hoist.
2. Remove the rear wheel and tire assembly.
3. Remove the three Tinnerman nuts (3) and remove the brake drum.
4. Disconnect the sensor lead from the rear wiring harness.
5. Unseat the sensor lead grommet pushing it to the inside of the brake assembly.
6. Remove the four nuts that retain the sensor to the backing plate and pull the axle shaft, sensor assembly and wheel bearing assembly from the axle housing.
7. Press the wheel bearing retainer and wheel bearing off the axle shaft (Refer to Part 4-2).
8. Remove the sensor assembly and press the rotor off the shaft with tool T69P-2B384-A Detail 2 and TOOL 1225-DA.

INSTALLATION

1. Press a new rotor onto the axle shaft. Install a new sensor assembly on the shaft with tool T69P-2B384-ADetail 1 and TOOL 1225-DA, and press the bearing and bearing retainer onto the shaft (Refer to Part 4-2).
2. Insert the axle shaft assembly in the rear axle housing onto the four backing plate retaining bolts, feeding the sensor lead through the hole in the backing plate.
3. Seat the sensor lead grommet in the backing plate.
4. Install the four nuts on the retaining bolts and tighten to specifications.
5. Connect the sensor lead to the rear wiring harness and install two retaining straps.
6. Install the rear brake drum and retain with the Tinnerman drum retaining nuts.
7. Install the rear wheel and tire assembly and tighten the wheel nuts to specifications.
8. Test the vehicle on the hoist to verify proper operation of the skid control system.

4 MAJOR REPAIR OPERATIONS

BRAKE DRUM REFINISHING

Minor scores on a brake drum can be removed with sandpaper. A drum that is excessively scored or shows a total indicator runout of over 0.007 inch should be turned down. Remove only enough stock to eliminate the scores and true up the drum. The refinished diameter must not exceed 0.060 inch oversize.

Check the inside diameter of the brake drum with a brake drum micrometer (Tool FRE-1431).

If the drum diameter is less than 0.030 inch oversize after refinishing, standard lining may be installed. If the drum diameter is 0.030—0.060 inch oversize after refinishing, oversize lining must be installed.

After a drum is turned down, wipe the refinished surface with a cloth soaked in clean denatured alcohol. If one drum is turned down, the opposite drum on the same axle should also be cut down to the same size.

ROTOR REFINISHING

Rotunda Disc Brake Attachment, FRE-2249-2, is the **only recommended tool** to refinish the disc brake rotors. The step-by-step resurfacing procedure provided with the tool must be adhered to.

The finished braking surfaces of the rotor must be flat and parallel within 0.0007 inch; lateral runout must not exceed 0.003 inch total indicator reading, and the surface finish of the braking surfaces are to be 80/15 micro inches. The minimum limiting dimensions (Figs. 11 and 12, Part 2-1) from the inboard bearing cup to the outboard rotor face and from the inboard bearing cup to the inboard rotor face must be observed when removing material from the rotor braking surfaces. On all models except Lincoln Continental, the limiting dimensions are to be measured with a ball and gage bar (Rotunda Kit FRE-70160).

BRAKE SHOE RELINING

Brake linings that are worn to within 1/32 inch of the rivet head or are less than 0.030 inch thick (bonded lining) or have been contaminated with brake fluid, grease or oil must be replaced. Failure to replace worn linings will result in a scored drum. **When it is necessary to replace linings, they must also be replaced on the wheel on the opposite side of the vehicle.**

Inspect brake shoes for distortion, cracks, or looseness. If this condition exists, the shoe must be discarded. **Do not attempt to repair a defective brake shoe.**

1. Wash the brake shoes thoroughly in a clean solvent. Remove all burrs or rough spots from the shoes.

2. Check the inside diameter of the brake drum with a brake drum micrometer (tool FRE-1431). If the diameter is less than 0.030 inches oversize, standard lining may be installed. If the diameter is 0.030—0.060 inches oversize, oversize lining should be installed.

3. Position the new lining on the shoe. Starting in the center, insert and secure the rivets, working alternately towards each end. **Replacement linings are ground and no further grinding is required.**

4. Check the clearance between the shoe and lining. The lining must seat tightly against the shoe with not more than 0.008 inch clearance between any two rivets.

DUAL MASTER CYLINDER

DISASSEMBLY

1. Clean the outside of the master cylinder and remove the filler cover and diaphragm. Pour out any brake fluid that remains in the cylinder. Discard the old brake fluid.

2. Remove the secondary piston stop bolt from the bottom of the cylinder (Figs. 40 and 41).

3. Remove the bleed screw, if required.

4. Depress the primary piston and remove the snap ring from the retaining groove at the rear of the master cylinder bore (Fig. 42). Remove the push rod and the primary piston assembly from the master cylinder bore. **Do not remove the screw that retains the primary return spring retainer, return spring, primary cup and protector on the primary piston. This assembly is factory pre-adjusted and should not be disassembled.**

5. Remove the secondary piston assembly. **Do not remove the outlet tube seats, outlet check valves and outlet**

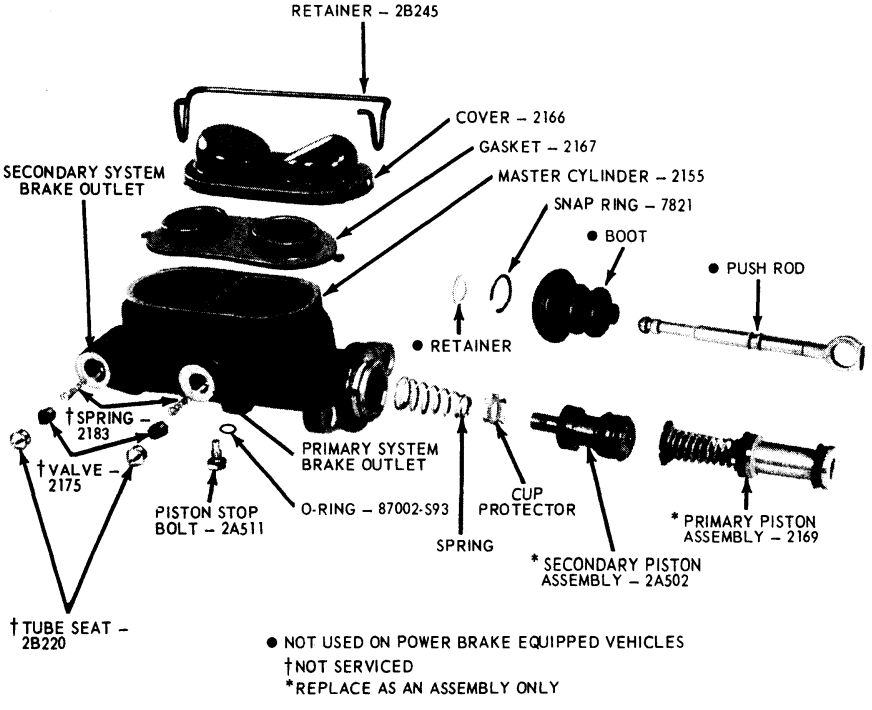


FIG. 40—Dual Master Cylinder Disassembled—Except Disc Brakes

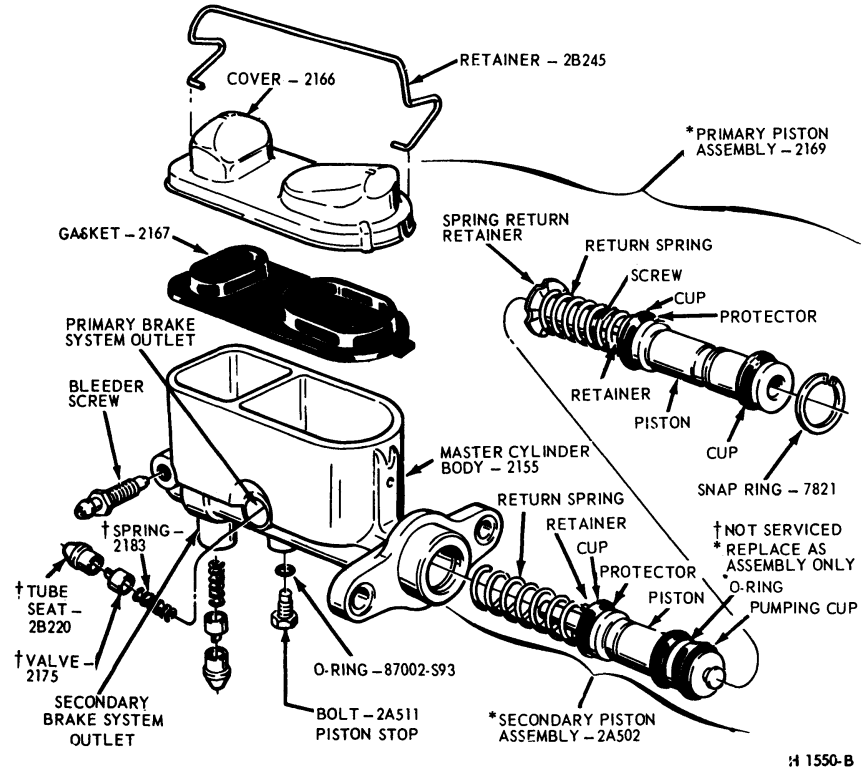


FIG. 41—Dual Master Cylinder Disassembled—Disc Brakes

check valve springs from the master cylinder body.

INSPECTION AND REPAIR

1. Clean all parts in clean isopropyl alcohol, and inspect the parts for chipping, excessive wear or damage. **When using a master cylinder repair kit, install all the parts supplied.**

2. Check all recesses, openings and internal passages to be sure they are open and free of foreign matter. Use an air hose to blow out dirt and cleaning solvent. Place all parts on a clean pan or paper.

3. Inspect the master cylinder bore for signs of etching, pitting, scoring or rust. If it is necessary to hone the master cylinder bore to repair damage, do not exceed allowable hone specifications.

ASSEMBLY

1. Dip all parts except the master cylinder body in clean Rotunda Extra Heavy Duty Brake Fluid.

2. Carefully insert the complete secondary piston and return spring assembly in the master cylinder bore.

3. Install the primary piston assembly in the master cylinder bore.

4. Depress the primary piston and install the snap ring in the cylinder bore groove.

5. Install the push rod, boot and retainer on the push rod, if so equipped. Install the push rod assembly into the primary piston. **Make sure the retainer is properly seated and holding the push rod securely.**

6. Position the inner end of the push rod boot (if so equipped) in the master cylinder body retaining groove.

7. Install the secondary piston stop

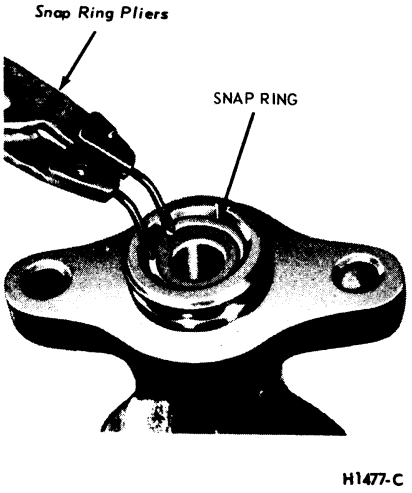


FIG. 42—Removing Snap Ring—Typical

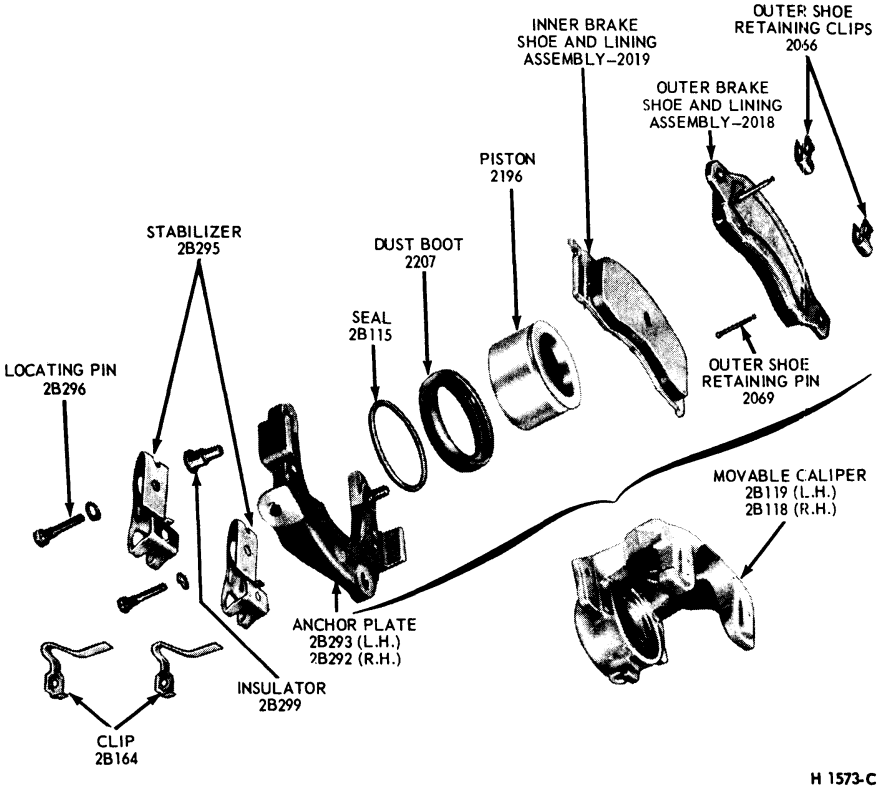


FIG. 43—Caliper Assembly—Disassembled—All Models Except Lincoln Continental

bolt and O-ring in the bottom of the master cylinder.

8. Install the bleed screw (if so equipped). Install the gasket (diaphragm) in the master cylinder filler cover. Position the gasket as shown in Figs. 40 and 41. **Make sure the gasket is securely seated.**

9. Install the cover and gasket on the master cylinder and secure the cover into position with the retainer.

DISC BRAKE CALIPER

ALL MODELS EXCEPT LINCOLN CONTINENTAL

Disassembly

1. Remove the caliper assembly from the vehicle as outlined in Section 2.
2. Remove the caliper locating pins from the caliper assembly and lift the anchor plate from the caliper.
3. Slide the two outer shoe retaining clips off the retaining pins (Fig. 43).
4. Remove the two retaining pins, then remove the outer brake shoe from the caliper.
5. Slide the inner brake shoe outward until it is free of the hold-down springs, then remove the brake shoe.
6. Apply air pressure to the fluid port in the caliper with a rubber tipped nozzle (Tool 7000-DD) as shown in Fig. 44 to remove the piston. Place a cloth over the piston before applying air pressure to prevent damage to the piston. If the piston is seized and cannot be forced from the caliper, tap lightly around the piston while applying air pressure. **Care should be taken because the piston can develop considerable force due to pressure build-up.**
7. Remove the dust boot from the caliper assembly.
8. Remove the rubber piston seal from the cylinder and discard it.

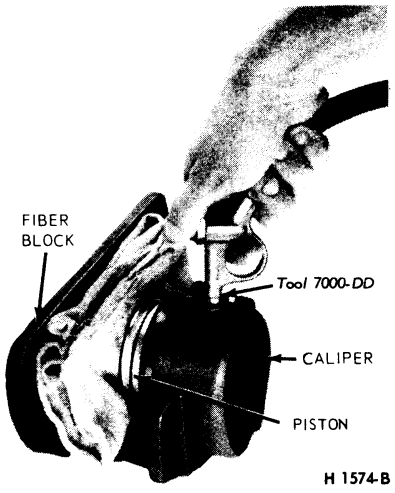


FIG. 44—Removing Piston From Caliper—All Models Except Lincoln Continental

Cleaning and Inspection

Clean all metal parts with isopropyl alcohol or a suitable solvent. Use clean, dry, compressed air to clean out and dry the grooves and passage ways. Be sure that the caliper bore and component parts are completely free of any foreign material.

Check the cylinder bore and piston for damage or excessive wear. Replace the piston if it is pitted, scored, or the chrome plating is worn off.

Assembly

1. Apply a film of clean brake fluid to the new caliper piston seal and install it in the cylinder bore. Be sure the seal does not become twisted and that it is seated fully in the groove.
2. Install a new dust boot by setting the flange squarely in the outer groove of the caliper bore.
3. Coat the piston with the specified fluid and install the piston in the cylinder bore. Spread the dust boot over the piston as it is installed. Seat the dust boot in the piston groove.
4. Position the inner brake shoe so that the ears of the shoe rests on the top of the anchor plate bosses and beneath the hold-down springs.
5. Install new caliper locating pin insulators in the anchor plate.
6. Position the caliper on the anchor plate.
7. Apply water or isopropyl alcohol to the caliper locating pins and install them loosely in the anchor plate. **Be sure the guide pins are free of oil, grease or dirt.**
8. Install the caliper on the spindle as outlined under Disc Brake Caliper Assembly.

LINCOLN CONTINENTAL

Disassembly

Do not remove the bridge bolts that hold the two halves of the caliper together. The two caliper housings are shown separated in Fig. 46 for illustration purposes only.

1. Remove the caliper assembly from the car as outlined in Section 2.
2. Remove the two attaching bolts and the caliper splash shield (Fig. 46).
3. Remove the two shoe and lining assemblies.
4. Remove the flexible brake hose from the caliper.
5. Remove the external transfer tube.
6. Remove the four dust boots from the caliper housings and piston grooves.
7. Clamp the caliper in a vise and secure it by the mounting flanges on the inboard housing (Fig. 45).
8. Remove the four pistons from the cylinder bores with the special tool shown in Fig. 45. To prevent cocking with consequent damage to the piston or bore, rotate the piston with the tool while pulling it outward at the same time. **Be careful to avoid scratching or damaging the outside diameter surface or dust boot retaining groove of the piston. Such damage causes poor sealing.**

If a piston is so completely seized in the cylinder bore that it can not be removed with the special tool, the caliper housing must be replaced, by positioning two screwdrivers in the piston dust boot retaining groove and prying outward. To prevent cocking, tap the end of the piston lightly around the circumference with a hammer, while the prying force is being applied. Be careful to avoid damaging the dust boot retainer in the caliper housing (Fig. 46). If this method of removal is used, the pistons must be replaced.

If the caliper dust boot retainer or retaining groove is damaged or scratched, pry the retainer out of the caliper housing with screwdrivers.

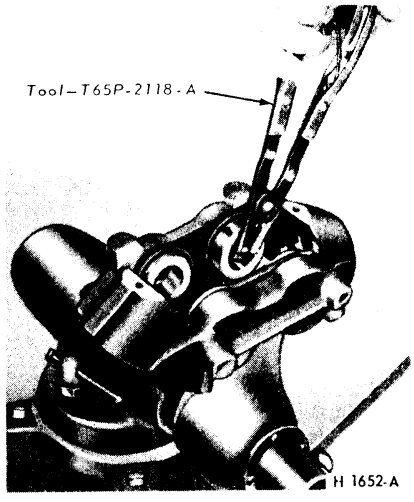


FIG. 45—Removing or Installing Pistons—Lincoln Continental

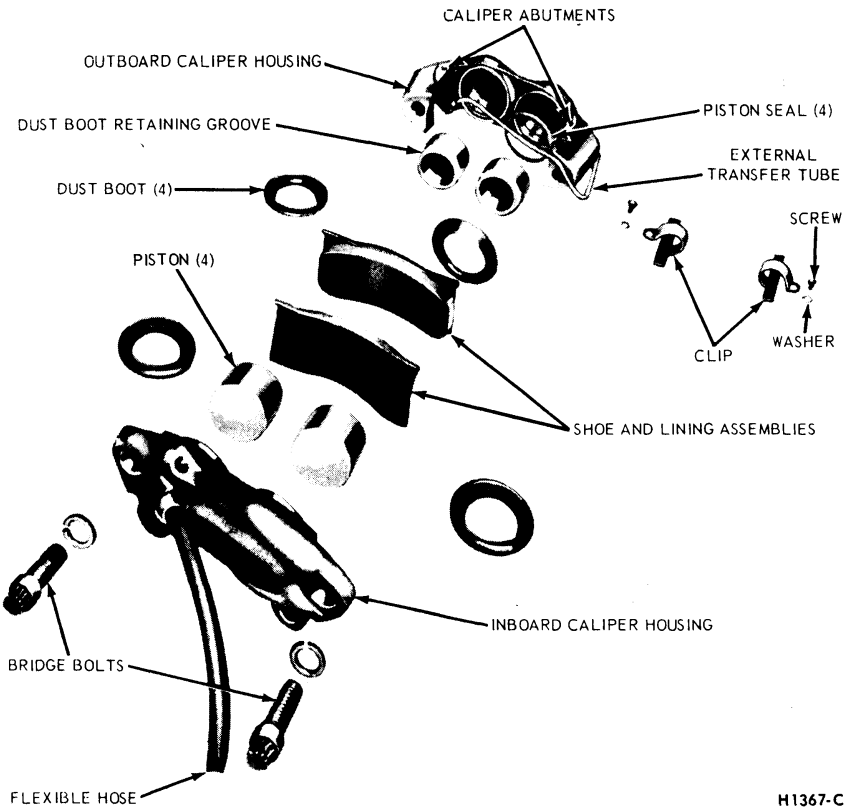


FIG. 46 —Caliper Assembly—Disassembled—Lincoln Continental

9. Remove the rubber piston seals from the grooves in the cylinder bores by carefully inserting the point of a small knife or other pointed instrument under the seal and raising the seal up far enough to be pulled out with the fingers.

Cleaning and Inspection

Clean all metal parts with isopropyl alcohol or a suitable solvent (Fig. 46). Use clean, dry, compressed air to clean out and dry the grooves and passage ways. Be sure that the caliper bore and component parts are completely free of any foreign material.

Check the cylinder bores and pistons for damage or excessive wear. Replace the piston if it is pitted, scored, or the chrome plating is worn off. Check the caliper dust boot retainer for wear or damage.

Assembly

1. Clamp the caliper in a vise and secure it by the mounting flange on the inboard housing.

2. Apply a film of clean brake fluid to **new** caliper piston seals and install them in the grooves of the cylinder bore. The seal should be positioned at one area in the groove and gently worked around. **Do not use the original seals.**

3. Install the new dust boots by setting the flanges squarely in the outer grooves of the caliper bores.

4. Coat the pistons with the specified fluid and install the pistons in the cylinder bores. Spread the dust boots over the pistons as they are installed. Seat the dust boots in the piston grooves.

5. Coat the outside diameter of the pistons with brake fluid and install them in the cylinder bores so that the open end of the piston and the boot retaining groove face out of the bore. To avoid cocking, locate the piston squarely in the bore and apply a slow steady pressure. If a piston will not easily go all the way into the bore, remove it and thoroughly inspect the cylinder bore, the piston seal and the installation of the seal. If the piston still will not go in with bore in good condition and the piston seal properly installed, use the tool shown in Fig. 45. Rotate the piston with the tool while pushing it inward at the same time.

6. Carefully install four **new** dust boots on the caliper housings and pistons. Be sure that each boot is fully seated in the groove of its respective caliper housing and piston (Fig. 46). **Do not use the original dust boots.**

7. Install the external transfer tube.

8. Install the flexible brake hose to the caliper.

9. Install the caliper assembly on the spindle, and install the shoe and lining assemblies and the splash shield as outlined in Section 2. Check the caliper for fluid leaks under maximum pedal pressures. **Do not move the car until a firm brake pedal is obtained.**

PART 2-3 Specifications

LINING DIMENSIONS – DRUM BRAKES – INCHES

Vehicle	Position	Front	Rear
FORD, MERCURY, METEOR Ford, Meteor Passenger (Riveted Lining) Except 390, 429 CID Galaxie 500XL, Ford LTD, LeMoyne.	Primary	2.50 x 9.34	2.25 x 9.34
	Secondary	2.50 x 12.12	2.25 x 12.12
Ford, Mercury, Meteor with Disc Brakes.	Primary	N/A	2.25 x 9.34
	Secondary	N/A	2.25 x 12.12
Mercury Passenger, Sta. Wag. and Conv. Ford Meteor Station Wagon and Convertible. 390, 429 CID Galaxie 500 XL, Ford LTD, LeMoyne.	Primary	3.00 x 9.34	2.25 x 9.34
	Secondary	3.00 x 12.12	2.25 x 12.12
Ford, Meteor 240, 302 CID Taxi Only (Bonded Lining) Max. Wear Resistance.	Primary	3.00 x 9.34	2.50 x 9.34
	Secondary	3.00 x 12.12	2.50 x 12.12
MONTEGO, FAIRLANE Passenger 250, 302 CID Except Convertible	Primary	2.25 x 8.43	2.00 x 8.43
	Secondary	2.25 x 10.82	2.00 x 10.82
Station Wagon, Ranchero and Convertible 250, 302 CID. Passenger and Convertible 351, 390, 428 CID.	Primary	2.50 x 8.43	2.00 x 8.43
	Secondary	2.50 x 10.82	2.00 x 10.82
Station Wagon and Ranchero 351, 390, 428 CID.	Primary	2.50 x 8.43	2.50 x 8.43
	Secondary	2.50 x 10.82	2.50 x 10.82
FALCON Sedan 6-Cylinder.	Primary	2.25 x 7.62	1.50 x 7.62
	Secondary	2.25 x 9.77	1.50 x 9.77
Station Wagon 6-Cylinder.	Primary	2.50 x 8.43	2.00 x 8.43
	Secondary	2.50 x 10.82	2.00 x 10.82
Sedan 8-Cylinder.	Primary	2.25 x 8.43	2.00 x 8.43
	Secondary	2.25 x 10.82	2.00 x 10.82
Station Wagon 8-Cylinder.	Primary	2.50 x 8.43	2.00 x 8.43
	Secondary	2.50 x 10.82	2.00 x 10.75
MUSTANG, COUGAR 200 CID Engine.	Primary	2.25 x 7.62	1.50 x 7.62
	Secondary	2.25 x 9.77	1.50 x 9.77
250, 302 CID Engines.	Primary	2.25 x 8.43	1.75 x 8.43
	Secondary	2.25 x 10.82	1.75 x 10.82
351, 390, 428 CID Engines.	Primary	2.50 x 8.43	2.00 x 8.43
	Secondary	2.50 x 10.82	2.00 x 10.82
THUNDERBIRD, CONTINENTAL MARK III	Primary	N/A	2.25 x 9.34
	Secondary	N/A	2.25 x 12.12
LINCOLN CONTINENTAL	Primary	N/A	3.00 x 9.39
	Secondary	N/A	3.00 x 12.21

Wear Limits Riveted: 1/32 inch from top of rivets.
Bonded: 0.030 inch total lining thickness.

BORE DIAMETERS–BRAKE DRUM, WHEEL CYLINDER AND MASTER CYLINDER

Models		Brake Drum		Wheel Cylinder Bore Dia.		Master Cylinder Bore Dia.	
		Inside Diameter	Boring Limit (Max.) ①	Front ②	Rear ②	With Power Brake ②	Less Power Brake ②
Ford, Mercury and Meteor	Taxi and Station Wagon	11.030	11.090	1.094	0.938	1.000	1.000
	Other	11.030	11.090	1.125	0.938	1.000	1.000
Montego and Fairlane	Pass. except Conv. 250, 302 CID Engines	10.000	10.060	1.125	0.875	0.9375	1.000
	Pass. and Conv. 351, 390, 428 CID Eng.	10.000	10.060	1.094	0.875	0.9375	1.000
	Convertible 250, 302 CID Engines	10.000	10.060	1.094	0.875	0.9375	1.000
	Station and Ranchero	10.000	10.060	1.094	0.938	0.9375	1.000
Falcon	9 Inch Brake - Passenger Car	9.000	9.060	1.062 ④	0.844 ④	0.9375	1.000
	10 Inch Brake - Station Wagon	10.000	10.060	1.094	0.938	0.9375	1.000
	10 Inch Brake - Passenger Car	10.000	10.060	1.125	0.875	0.9375	1.000
Mustang and Cougar	200 CID Engine	9.000	9.060	1.062 ④	0.844 ④	1.000	1.000
	351, 390, 428 CID Engine	10.000	10.060	1.094	0.875	1.000	1.000
	250, 302, CID Engine	10.000	10.060	1.125	0.875	1.000	1.000
Thunderbird		11.030	11.090	N/A	0.938	1.000	N/A
Continental Mark III		11.030	11.090	N/A	0.938	1.000	N/A
Lincoln Continental		11.090	11.130	N/A	0.938	1.000	N/A

①Max. Runout 0.007
②Max. Allowable Hone 0.003
③2.755 For Ford, Mercury, Meteor with Disc Brakes.
2.381 For Fairlane, Montego, Falcon, Mustang, Cougar with Disc Brakes.
④Front Wheel Cylinder cannot be honed on Falcon or Mustang with 9 inch Brakes.

SHOE AND LINING DIMENSIONS–DISC BRAKES – INCHES

	Ford, Mercury, Meteor Thunderbird, Continental Mark III	Fairlane, Montego Falcon, Mustang, Cougar
Lining Material	Bonded	Bonded
Lining Size	7.38 x 2.27 Outer 5.36 x 2.03 Inner	6.82 x 1.80 Outer 4.90 x 1.84 Inner
Lining Area - Square Inches per Segment	12.25 Outer 8.44 Inner	11.30 Outer 8.80 Inner
Lining Thickness - Nominal	0.394	0.333 Outer 0.362 Inner
Lining Wear Limit (Front Surface of Shoe) - Max.	0.030	0.030
Lining Taper – Max.	0.125	0.125
Lining to Rotor Clearance (Brakes Released)	0.000 - 0.010	0.000 - 0.010

	Lincoln Continental
Lining Material	Riveted Fomoco
Lining Size	5.36 x 1.90
Lining Area	10.03 Sq. In/segment
Shoe and Lining Thickness	0.600 nominal
Lining Thickness	0.436 nominal
Shoe and Lining Maximum Wear Limit	0.231
Lining Maximum Wear Limit (from front surface of shoe)	0.066
Lining to Rotor Clearance (brakes released)	0.000-0.010

CALIPER CYLINDER BORE DIAMETER – INCHES

Ford, Mercury, Meteor, Thunderbird, Continental Mark III	2.755
Mustang, Cougar, Falcon, Fairlane and Montego	2.381
Lincoln Continental	1.938

TORQUE LIMITS – HUB TO SPINDLE

Description	Ft-Lbs
Hub and Drum or Rotor Assembly to Front Wheel Spindle	Rotate hub while torquing to 17-25 ft-lbs. Back off the adjusting nut 1/2 turn and retighten to 10-15 inch pounds while rotating wheel Selectively position nut retainer on adjusting nut so that a set of slots are in line with cotter pin hole. Adjusting nut should not be rotated in this operation. Lock adjusting nut and nut retainer with cotter pin so that the cotter pin end does not interfere with seating of wheel static collector in spindle hole.

ROTOR DIMENSIONS

Car Line	Nom. Thickness	Diameter	
		Outside	Inside
Ford, Mercury, Meteor	1.180	11.72	7.785
Thunderbird, Continental Mark III	1.180	11.72	7.785
Fairlane, Falcon, Montego, Mustang and Cougar	0.935	11.29	7.355
Lincoln Continental	1.240	11.960	7.785

ROTOR REFINISH

The following requirements must be met when resurfacing disc brake rotors:

Rotunda Disc Brake Attachment FRE-2249-2 is the only approved tool to be used to refinish the disc brake rotors. The step-by-step resurfacing procedure provided with the tool must be adhered to.

The finished braking surfaces of the rotor must be flat and parallel within 0.0007 inch; lateral runout must not exceed 0.003 inch total indicator reading, and the surface finish of the braking surfaces are to be 15-80 micro inches.

On all models except Lincoln Continental the limiting dimension from the inner bearing cup to the inner rotor face must be measured with a ball and gage bar (Rotunda FRE-70160).

On Lincoln Continental models the limiting dimension from the inboard bearing cup to the inboard rotor face of 0.755 inch minimum and from the inboard bearing cup to the outboard rotor face of 0.395 inch minimum must be observed.

TORQUE LIMITS – GENERAL – FT-LBS.

	Ford-Mercury Meteor	Fairlane-Montego Falcon	Mustang-Cougar	Thunderbird Continental Mark III	Lincoln Continental
Parking Brake Control Assembly Mounting Nuts and Bolts	Cap Screw 12-19 Nuts 7-11	12-25	12-25	12-18	Dash Panel 10-20 Inst. Panel 7-12
Master Cylinder to Dash Panel Screw	13-20	13-20	13-20		
Master Cylinder to Booster	13-20	13-20	13-20	13-20	13-20
Booster to Dash Panel	13-20	13-20	13-20	13-20	13-20
Disc Brake Caliper to Spindle Bolts	Upper ① 110-140 Lower 90-120	Upper ① 100-140 Lower 55-75	Upper ① 100-140 Lower 55-75	Upper ① 110-140 Lower 90-120	100-140
Disc Brake Rotor Splash Shield to Spindle	9-14	9-14	9-14	9-14	9-14
Brake Hose to Caliper Connection Bolt	17-25	17-25	17-25	17-25	
Caliper Locating Pins	25-35	25-35	25-35	25-35	
Caliper Stabilizer to Anchor Plate Bolt	8-11	8-11	8-11	8-11	
Caliper Brake Shoe Clips	6-10	6-10	6-10	6-10	7-9
Caliper Bleeder Screws	6-15	6-15	6-15	6-15	6-15
Wheel Cylinder to Backing Plate Screws	10-20	10 in. Brake 10-20 9 in. Brake 5-7	10 in. Brake 10-20 9 in. Brake 5-7	10-20	10-20
Wheel Cylinder & Backing Plate Anchor Pin Nut	20-30				
Rear Brake Backing Plate to Axle Housing: Removable Carrier	50-70	50-70	50-70	50-70	30-35
Rear Brake Backing Plate to Axle Housing: Integral Type	20-40	20-40	20-40		
Front Brake Backing Plate to Spindle	25-40	28-35	28-35		
Wheel Cylinder Bleeder Screw	6-15	32-65 ② Inch-lb.	32-65 ② Inch-lb.	6-15	6-15
Brake Hose Connection to Front Wheel Cylinder	12-20	12-20	12-20		
Brake Line Connection to Rear Axle Housing: Removable Carrier	30-40	12-19	12-19	30-40	
Brake Line Connection to Rear Axle Housing: Integral Type	25-35	12-19	12-19		
Hydraulic Tube Connections ③ 3/8 x 24	10-15	10-15	10-15	10-15	10-15
7/16 x 24	10-15	10-15	10-15	10-15	10-15
1/2 x 20	10-17	10-17	10-17	10-17	10-17
9/16 x 18	10-17	10-17	10-17	10-17	10-17
Wheel to Hub and Drum or Hub and Rotor Nuts	70-115	4 lug 55-85 5 lug 70-115	4 lug 55-85 5 lug 70-115	70-115	70-115

① The upper bolt must be tightened first.
② On front disc brake calipers 6-15 ft-lbs.
③ All hydraulic lines must be tightened to the specified torque value and be free of fluid leakage.

SERVICE TOOLS

Ford Tool No.	Former No.	Description
Rotunda HRE 8650		Brake Adjusting Gage
	LM 119	Brake Cylinder Retaining Clamp
	2018-A	Brake Adjusting Tool
	2162	Adapter Cap
	2035N	Brake Shoe R & R Spring
Tool 7000-00		Rubber Tipped Air Nozzle
Rotunda 70160		Ball and Gage Bar
Tool 33621	33621	Internal Snap Ring Pliers
	Milbar 1112-144	Inch Pound Torque Wrench
Tool 4235-C	4235-C	Axle Shaft Remover
Rotunda FRE 1431		Brake Drum Micrometer
	J 22742 (Kent Moore)	Bleeder Valve Clip Spring
Rotunda FRE 22492		Disc Brake Rotor Attachment

03-01-01

Suspension, Steering, Wheels and Tires

GROUP 3

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PART 3-1 *Suspension, Steering, Wheels and Tires—General Service*

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	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
CASTER AND CAMBER ADJUSTMENTS		01-05	01-05	01-05	01-06	01-06	01-06	01-06	01-06	01-06	01-05	01-05
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Flow and Pressure Tests		01-02	01-02	01-02	01-02	01-02	01-02	01-02	01-02	01-03	01-02	01-03
POWER STEERING SYSTEM FLUSHING		01-09	01-09	01-09	01-09	01-09	01-09	01-09	01-09	N/A	01-09	N/A
SHOCK ABSORBER CHECKS	01-11											
STEERING WHEEL SPOKE POSITION Adjustment	01-07											
TOE-IN ADJUSTMENT	01-07											
WHEEL BALANCING	01-07											

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 TESTING

POWER STEERING— PRELIMINARY TESTS

The following preliminary checks should always be made before performing any operations.

AIR BLEEDING

Air in the power steering system (shown by bubbles in the fluid) should be bled. After making sure that the reservoir is filled to specification (the fluid must be at normal operating temperature when the check is made), turn the steering wheel through its full travel three or four times. **Do not hold the wheels against their stops.** Recheck the fluid level.

CHECK FLUID LEVEL

Run the engine until the fluid is at normal operating temperature. Then turn the steering wheel all the way to the left and right several times, and shut off the engine.

Check the fluid level in the power steering reservoir. The level must show on the cross hatching between the bottom of the dipstick and the full mark (Fig. 1). If the level is low, add enough automatic transmission fluid C1AZ-19582-A to raise the level to the F mark on the dipstick. **Do not overfill the reservoir.**

CHECK PUMP BELT

If the pump belt is broken, glazed, or worn, replace it with a new belt. Use only the specified type of belt. Refer to Part 3-13 for belt adjustment procedure.

CHECK FOR FLUID LEAKS

With the engine idling, turn the steering wheel from stop to stop several times. Check all possible leakage points. Tighten all loose fittings, and replace any damaged lines or defective seats.

CHECK TURNING EFFORT

With the front wheels properly aligned and tire pressures correct, check the effort required to turn the steering wheel.

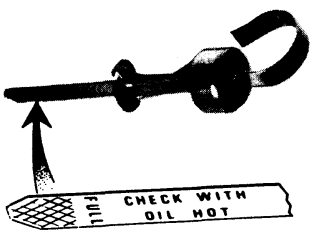


FIG. 1—Power Steering Pump Dipstick

1. With the vehicle on dry concrete, set the parking brakes.
2. With the engine warmed up and running at idle speed, turn the steering wheel to the left and right several times to warm the fluid.
3. Attach a pull scale to the rim of the steering wheel. Measure the pull required to turn the wheel one complete revolution in each direction. The effort required to rotate the steering wheel should not exceed specifications given in Part 3-13.

POWER STEERING PUMP FLOW AND PRESSURE TESTS— EXCEPT LINCOLN CONTINENTAL AND CONTINENTAL MARK III

The power steering flow and pressure tests will show whether the pump, steering gear or power assist control valve is causing the trouble. Steps outlined below should be followed to determine the cause of the trouble.

PUMP FLOW TEST

1. Depending on the equipment present on the vehicle (air conditioning, power brakes, standard transmission), **one** of the following options may be used to connect the pump pressure and return hoses to the test tool (T56L-33610-D and T68L-33610-A):

a. Disconnect the pressure and return lines at the power steering pump (Fig. 2). Obtain a power steering return hose from stock and connect the end with the fitting to the output fitting of the tool using the 5/8-18 SAE female, 1/4 N.P. thread male fitting provided. The end of the stock hose (without the fitting) should be connected to the return tube of the pump. Connect the pressure hose from the tool to the outlet fitting of the pump.

b. Disconnect the pressure line at the pump and connect the pressure line from the test tool to the outlet fitting of the pump. Disconnect the return line **at the gear** and connect it to the output fitting of the tool, using the 5/8-18 SAE female, 1/4 N.P. thread male fitting provided.

2. After installing the lines by the most advantageous method, proceed as follows:
3. Open the manual valves A and B fully (Fig. 2).

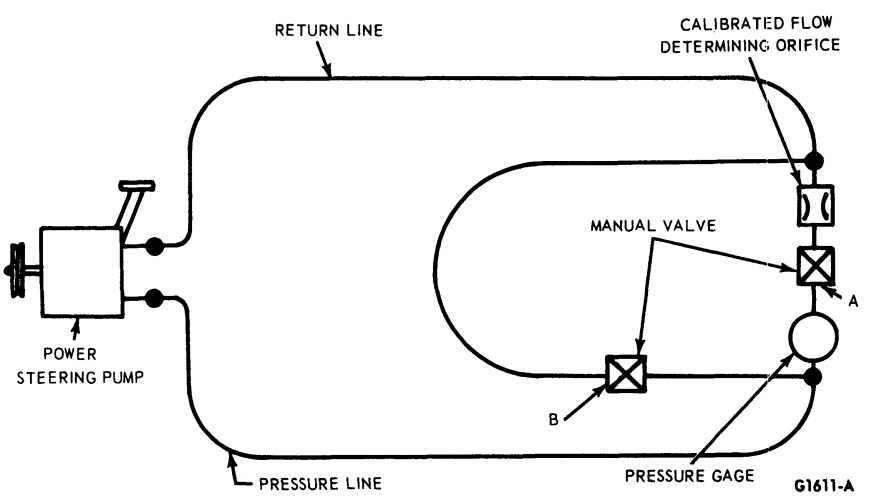


FIG. 2—Power Steering Pump Test Circuit Diagram

4. Connect a tachometer, start the engine and operate it at idle speed **until the reservoir fluid temperature reaches 165 to 175. This temperature must be maintained throughout the test.** Valve B may be partially closed to create a back pressure up to 350 psi to hasten the temperature rise. The reservoir fluid must be at the proper level.

5. With the engine operating at recommended idle rpm and fluid temperature noted in Step 4, close the manual valve B. The minimum acceptable pressure reading is 620 psi.

6. If the pressure gauge reading is **below** the minimum specification, the pump is at fault and should be repaired with necessary parts.

7. If the reading is **at or above** the minimum specification, the pump flow is normal. Open manual valve B and proceed to the Pump Fluid Pressure Test.

PUMP FLUID PRESSURE TEST

1. Keep the lines and tools connected as in the Pump Flow Test.

2. With manual valves A and B opened fully, operate the engine at recommended idle speed (Fig. 2). Close manual valve A, then manual valve B. **Do not keep both valves closed for more than 5 seconds as this would abnormally increase the fluid temperature and cause undue pump and/or gear wear.**

3. With the valves fully closed, the pressure gauge should read 1000 psi minimum for Ford, Mercury, Meteor or Thunderbird and 750 psi minimum for Cougar, Fairlane, Falcon, Montego or Mustang.

4. If the pressure gauge reading is **below** the minimum specification, the pump is at fault and should be repaired with necessary parts.

5. If the pressure gauge reading is **at or above** the minimum specifications, the pump is normal and the power steering gear or power assist control valve is at fault.

FLUID PRESSURE TEST— LINCOLN CONTINENTAL AND CONTINENTAL MARK III

The pressure testing gauge set, tool T56L-33610-D, requires modification to make it adaptable for installation in the power steering hydraulic system. The parts required and the modification procedure are as follows:

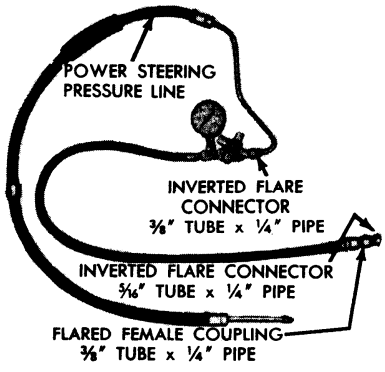


FIG. 3—Modified Pressure Gauge Assembly

a. Power Steering Pressure Line (refer to the appropriate Parts Catalog).

b. Inverted Flare Connector (3/8 inch OD Tube x 1/4 inch Pipe Thread).

c. Inverted Flare Connector (5/16 inch OD Tube x 1/4 inch Pipe Thread).

d. Flared Tube Female Coupling (3/8 inch OD Tube x 1/4 inch Pipe Thread).

The connectors and the coupling are standard-type fittings and can be purchased locally.

e. To modify tool T56L-33610-D, remove the hose from the hand shut-off valve block. Install the 3/8 inch x 1/4 inch inverted flare connector in the valve block, and assemble the pressure line to the connector (Fig. 3). Assemble the 3/8 x 1/4 inch coupling and the 5/16-inch connector to the free end of the hose leading to the pressure gauge.

1. To check the pump pressure, disconnect the front and rear sections of the pressure line over the number 6 cylinder. Connect the modified pressure-testing gauge assembly, tool T56L-33610-D, between the two sections.

2. **Make sure the hand-valve at the gauge is fully opened.** Start the engine and cycle the steering gear from stop to stop to warm up the fluid. Check the fluid level in the reservoir and add fluid, if necessary.

3. Turn the steering wheel to the full right and full left turn positions and observe the gauge readings.

Hold the wheels in this position only long enough to obtain an accurate reading. Do not exceed 5 seconds.

The gauge should read between 1120 and 1250 psi. If the pressure is less than 1120 psi, close the valve at the gauge and note the pump pressure. If it is low with the valve closed, it indicates that the pump is not operating properly. If the pressure goes up with the valve closed, it indicates that the low pressure in the system must be due to internal leakage in the power unit, providing all connections are tight.

4. Remove the pressure testing gauge set, and connect the pressure line at the steering gear. Fill and bleed the system.

FRONT WHEEL ALIGNMENT CHECKS

Do not attempt to check and adjust front wheel alignment without first making a preliminary inspection of the front-end parts. Refer to Section 3.

Check all the factors of front wheel alignment except the turning angle before making any adjustments. The turning angle should be checked only after caster, camber, and toe-in have been adjusted to specifications.

The front wheel alignment specifications given in Part 3-13, are correct only when the vehicle is at curb load. Before checking or adjusting the alignment factors, the suspension alignment spacers must be installed to obtain the curb height.

EQUIPMENT INSTALLATION

Equipment used for front wheel alignment inspection must be accurate. Whenever possible, front wheel alignment checks should be performed on stationary wheel aligning equip-

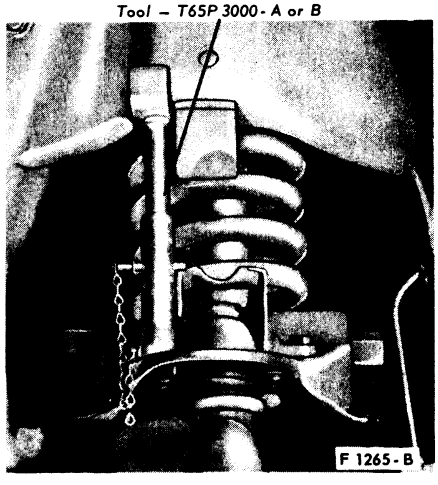


FIG. 4—Typical Front Alignment Spacer Installation—Cougar, Fairlane, Falcon, Montego, Mustang

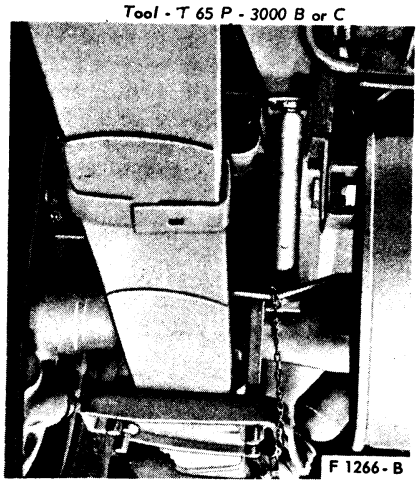


FIG. 5—Typical Rear Alignment Spacer Installation—Cougar, Fairlane, Falcon, Montego, Mustang

ment. In the absence of such equipment, portable equipment may be used and the work may be performed on a level floor. The floor area should be level within 1/4 inch from front to rear of the vehicle and within 1/8 inch from side to side. Alignment height spacers (Figs. 4, 8 and 9) are used to check caster and camber. The spacers should be omitted when checking toe-in.

1. Check the runout of each front wheel and tire using a dial indicator against the rim outer band. If the runout exceeds 1/8 inch, correction may be made by rotating the wheel on the drum. When the minimum runout has been obtained, mark the point of greatest runout so the wheels can be positioned as shown in Fig. 10 when checking the front end alignment. Hold a piece of chalk against the wheel rim or the tire sidewall while spinning the wheels. The chalk will mark the rim or tire at the point of greatest runout.

2. Drive the vehicle in a straight line far enough to establish the straight ahead position of the front wheels, and then mark the steering wheel hub and the steering column collar (Fig. 11).**Do not adjust the steering wheel spoke position at this time.** If the front wheels are turned at any time during the inspection, align the marks to bring the wheels back to the straight-ahead position.

3. With the vehicle in position for the front end alignment inspection and adjustment, install the suspension alignment spacers as follows to establish the curb height.

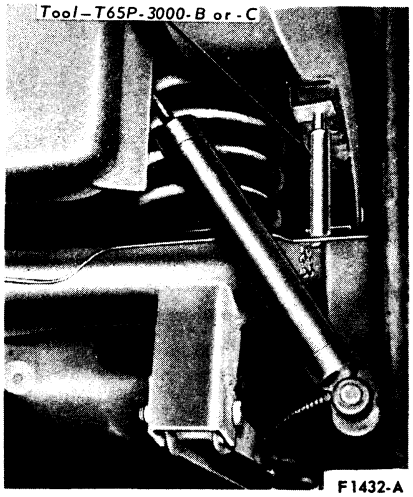


FIG. 6—Alignment Spacer Installation—Rear—Ford, Mercury, Meteor, Thunderbird, Continental Mark III

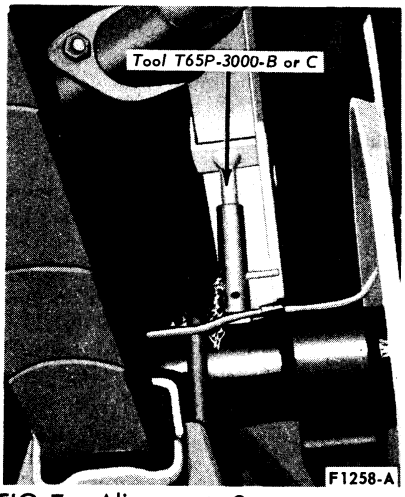


FIG. 7— Alignment Spacer Installation — Rear Lincoln Continental

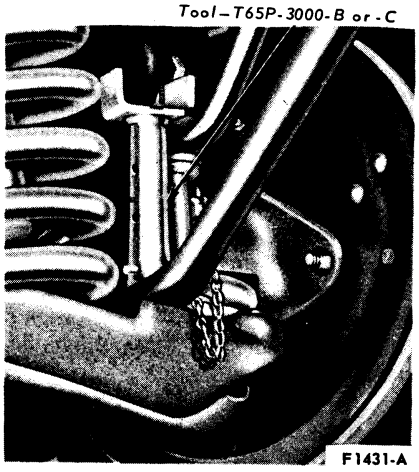


FIG. 8—Alignment Spacer Installation—Front—Ford, Mercury, Meteor, Thunderbird, Continental Mark III

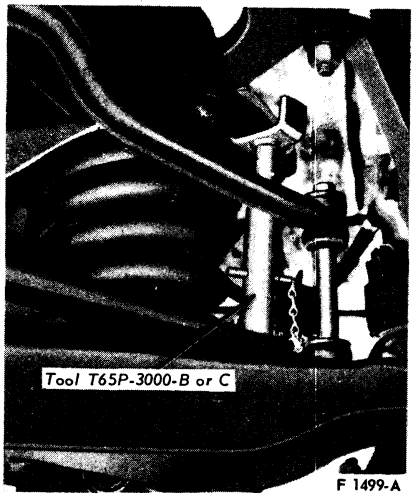


FIG. 9—Alignment Spacer Installation—Front—Lincoln Continental

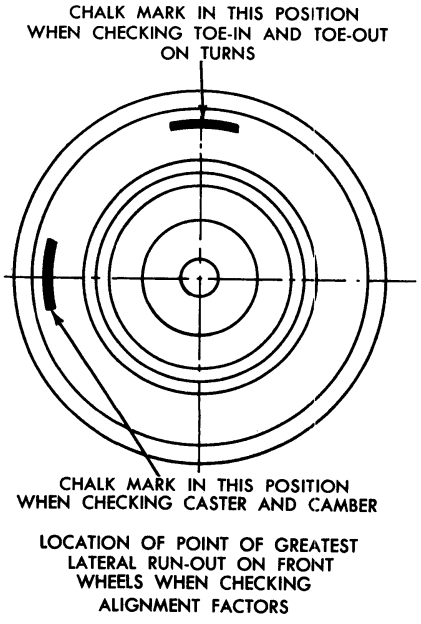


FIG. 10—Front Wheel Position For Checking Alignment

Lift the front of the vehicle and position the alignment spacers between the suspension lower arm and the frame spring pocket as shown in Figs. 4, 8 and 9. **Be sure the spacer pin is placed in the correct hole for the vehicle being checked.** The lower end of the alignment spacers should be placed over the head of the strut front attaching bolt. Remove the bumpers from the right and left rear side rails. Position the rear alignment spacers between the rear axle and the rear side rails as shown in Figs. 5, 6 and 7.

4. Install the wheel alignment equipment on the vehicle. Whichever

type of equipment is used, follow the installation and inspection instructions provided by the equipment manufacturer.

CASTER

Check the caster angle at each front wheel.

The caster is the forward or rearward tilt of the top of the wheel spindle (Fig. 12). If the spindle tilts to the rear, caster is positive. If the spindle tilts to the front, caster is negative. The correct caster angle, or tilt, is specified in Part 3-13.

On Mustang, Cougar, Fairlane, Falcon and Montego vehicles, the maximum caster difference for checking purposes must not exceed one degree. If setting is necessary, then the maximum difference must not exceed 1/2 degree. On all other vehicles, the maximum caster difference must never exceed 1/2 degree.

CAMBER

Check the camber angle at each front wheel.

Camber is the amount the front wheels are tilted at the top (Fig. 12). If a wheel tilts outward, camber is positive. If a wheel tilts inward, camber is negative. The correct camber angle, or outward (positive) tilt is specified in Part 3-13.

On Mustang, Cougar, Fairlane, Falcon and Montego vehicles, the maximum camber difference for checking purposes must not exceed one degree. If setting is necessary, then the maximum difference must not exceed 1/2 degree. On all other vehicles, the maximum camber difference must never exceed 1/2 degree.

TOE-IN

Alignment height spacers should not be used to check and adjust toe-in. Toe-in should only be checked and adjusted after the caster and camber have been adjusted to specifications.

Check the toe-in with the front wheels in the straight-ahead position. Run the engine so that the power steering control valve will be in the center (neutral) position (if so equipped). Measure the distance between the extreme front and also between the extreme rear of both front wheels. The difference between these two distances is the toe-in or toe-out.

Correct toe-in, or inward pointing of both front wheels at the front is specified in Part 3-13.

FRONT WHEEL TURNING ANGLE

When the inside wheel is turned 20 degrees, the turning angle of the outside wheel should be as specified in Part 3-13. The turning angle cannot be adjusted directly, because it is a result of the combination of caster, camber, and toe-in adjustments and should, therefore, be measured only after these adjustments have been made. If the turning angle does not measure to specifications, check the spindle or other suspension parts for a bent condition.

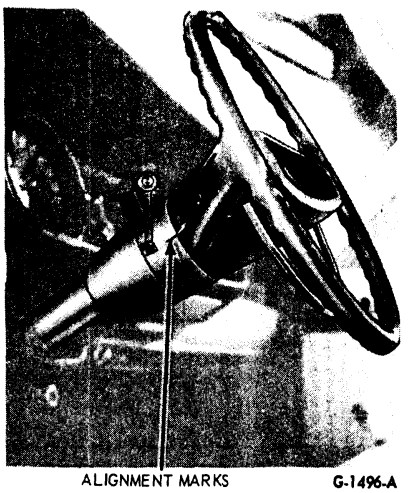


FIG. 11—Straight Ahead Position Marks—Typical

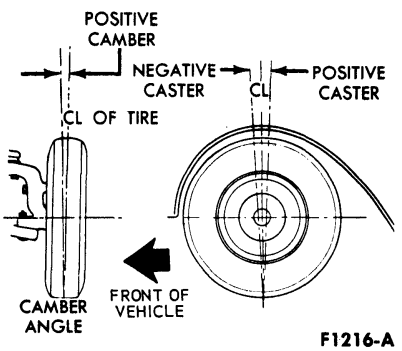


FIG. 12—Caster and Camber Angles

2 COMMON ADJUSTMENTS AND REPAIRS

After front wheel alignment factors have been checked, make the necessary adjustments. **Do not attempt to adjust front wheel alignment by bending the suspension or steering parts.**

CASTER AND CAMBER ADJUSTMENTS

FORD, MERCURY, METEOR, THUNDERBIRD AND CONTINENTAL MARK III

Caster and camber is adjusted by loosening the bolts that attach the upper suspension arm inner shaft to the frame side rail, and moving the inner shaft in or out in the elongated bolt holes with the tool shown in Fig. 13. The tool should be installed with the tool pins in the frame holes and the hooks over the upper arm inner shaft. Then, tighten the tool hook nuts snug before loosening the upper arm inner shaft attaching bolts.

Caster

To adjust the caster angle, tighten the tool front hook nut or loosen the rear hook nut (Fig. 14) as required to increase caster to the desired angle. To decrease caster, tighten the tool rear hook nut or loosen the front hook nut as required (Fig. 14). The caster angle can be checked without tightening the inner shaft attaching bolts. Check the camber adjustment to be sure it did not change during the caster adjustment and adjust if neces-

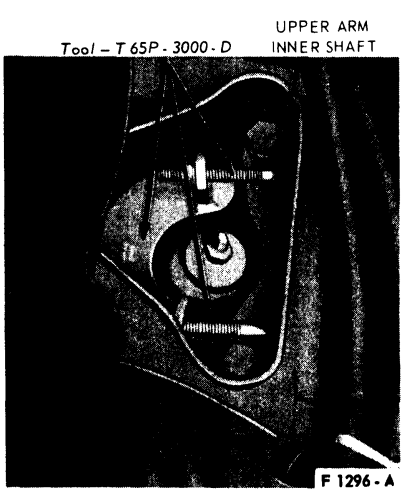


FIG. 13—Camber and Caster Adjusting Tool

SUSPENSION UPPER ARM MOVEMENT	CASTER CHANGE	CAMBER CHANGE
Front Bolt Outboard	**Tilt Backward** Increase Positive Caster or Decrease Negative Caster	**Tilt Outward** Increase Positive Camber or Decrease Negative Camber
Rear Bolt Outboard	**Tilt Forward** Decrease Positive Caster or Increase Negative Caster	
Front Bolt Inboard	**Tilt Forward** Decrease Positive Caster or Increase Negative Caster	**Tilt Inward** Decrease Positive Camber or Increase Negative Camber
Rear Bolt Inboard	**Tilt Backward** Increase Positive Caster or Decrease Negative Caster	

FIG. 14—Caster and Camber Adjustments

sary. Then, tighten the upper arm inner shaft attaching bolts to specification. Remove the adjusting bar (Tool T65P-3000-D) and the alignment spacers (Tool T65P-3000-E or F).

Camber

To adjust the camber angle, install the tool as outlined above (Fig. 13).

Loosen both inner shaft attaching bolts and tighten or loosen the hook nuts to move the inner shaft inboard or outboard as necessary with Tool T65P-3000-D to increase or decrease camber (Fig. 13). The camber angle can be checked without tightening the inner shaft attaching bolts.

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

Be sure all the equipment listed in Equipment Installation is installed before adjusting the caster and camber.

Caster is controlled by the front suspension strut (Fig. 15). To obtain positive caster, loosen the strut rear nut and tighten the strut front nut against the bushing. To obtain negative caster, loosen the strut front nut and tighten the strut rear nut against the bushing.

Camber is controlled by the eccentric cam located at the lower arm attachment to the side rail (Fig. 13).

To adjust the camber, loosen the camber adjustment bolt nut at the rear of the body bracket. Spread the body bracket at the camber adjustment bolt area just enough to permit lateral travel of the arm when the adjustment bolt is turned. Rotate the bolt and eccentric clockwise from the high position to increase camber or counterclockwise to decrease camber.

After the caster and camber has been adjusted to specification, torque the lower arm eccentric bolt nut and the strut front nut to specification.

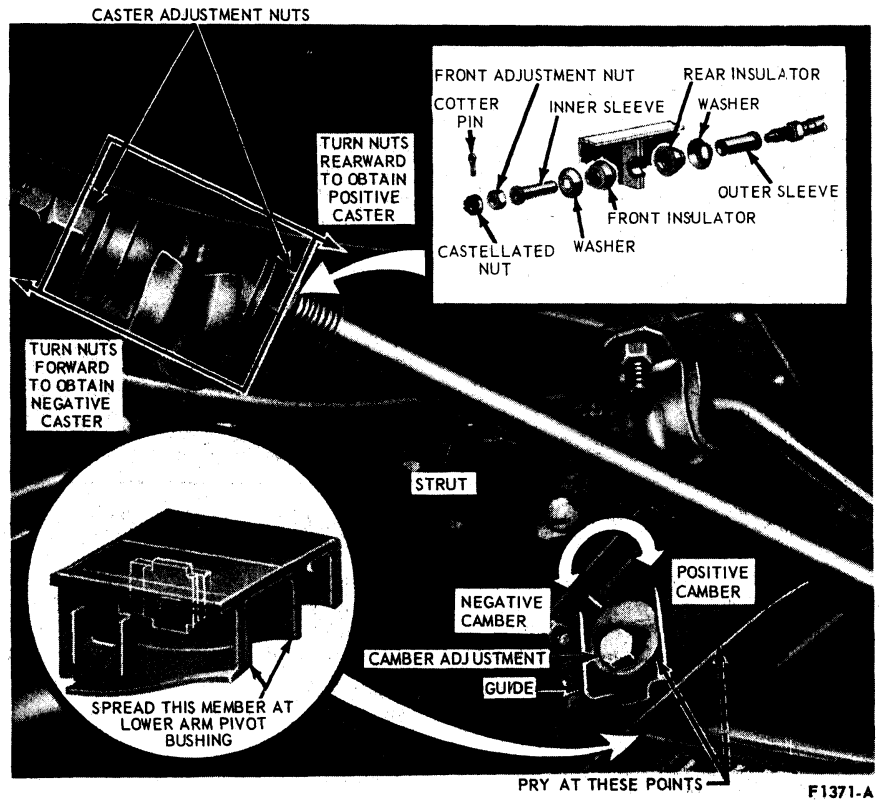


FIG. 15—Caster and Camber Adjustments

LINCOLN CONTINENTAL

Preliminary Steps

1. With the car properly positioned and wheel alignment measuring equipment properly installed, raise the hood and scribe chalk marks around the bolts and lock washers that secure the

upper arm shaft to the frame member (Fig. 3, Part 3-2).

2. Loosen the arm shaft attaching bolts, raise the front end of the vehicle and lower it again. This will break the arm shaft loose from the frame member.

3. With a pry bar, move the arm shaft back into alignment with the chalk marks made in Step 1, and tighten the shaft attaching bolts. The bolts should be tightened just enough to hold the shaft in position without preventing its being moved with the pry bar.

Caster

1. With the aid of a pry bar, move the shaft in or out, as required, to meet specifications. A movement of approximately 3 /32 inch at either the front or rear bolt location will change the caster 1/2 degree. Inboard movement of the front bolt, or outboard movement of the rear bolt, will change caster in the negative direction. Outboard movement of the front bolt, or inboard movement of the rear bolt, will change caster in the positive direction.

2. When the caster is correct, torque the shaft attaching bolts to specification and recheck the caster and camber to insure that the readings have not changed.

Camber

1. With the aid of a pry bar, move the shaft in or out, as required, to meet specifications. A movement of approximately 3/64 inch of the entire shaft will change the camber 1/4 degree. Inboard movement will change the camber in the negative direction. Outboard movement will change the camber in the positive direction.

2. When the camber is correct, torque the shaft attaching bolts to specification and recheck the camber and caster to insure that the readings have not changed. Remove all alignment equipment and alignment spacers and install the right and left side rail bumpers.

TOE-IN AND STEERING WHEEL SPOKE POSITION ADJUSTMENTS

Check the steering wheel spoke position when the front wheels are in the straight-ahead position. If the spokes are not in their normal position, they can be properly adjusted while toe-in is being adjusted.

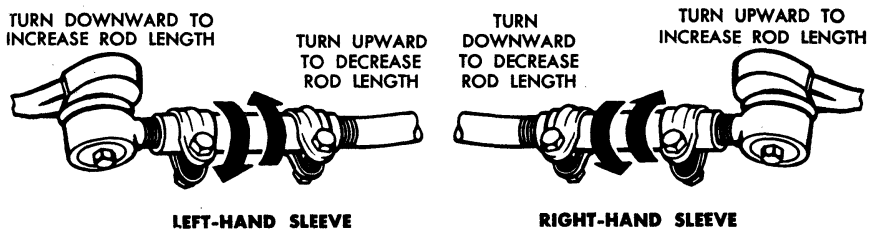


FIG. 16—Spindle Connecting Rod Adjustment

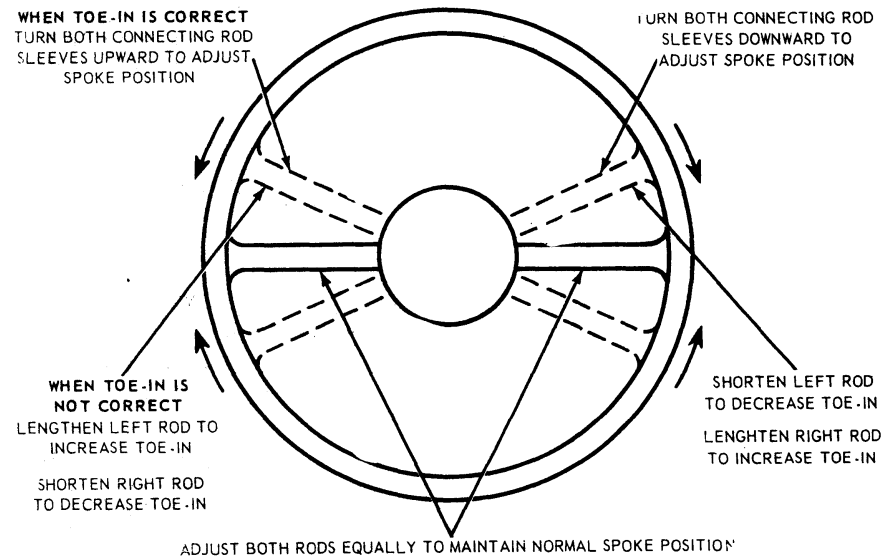


FIG. 17—Toe-in and Steering Wheel Spoke Alignment Adjustment—Typical

1. Loosen the two clamp bolts on each spindle connecting rod sleeve (Fig. 16).

2. Adjust toe-in. If the steering wheel spokes are in their normal position, lengthen or shorten both rods equally to obtain correct toe-in (Fig. 16). If the steering wheel spokes are not in their normal position, make the necessary rod adjustments to obtain correct toe-in and steering wheel spoke alignment (Fig. 17).

3. Recheck toe-in and the steering wheel spoke position. If toe-in is correct and the steering wheel spokes are still not in their normal position, turn both connecting rod sleeves upward or downward same number of turns to move the steering wheel spokes (Fig. 16).

4. When toe-in and the steering wheel spoke position are both correct, torque the clamp bolts on both connecting rod sleeves to specification (Part 3-13). Lubricate clamp, bolts and nuts prior to torquing to specification. **The sleeve position should not be changed when the clamp bolts are tightened.**

WHEEL BALANCING

See the instructions provided with the Rotunda Wheel Balancer.

Make certain that the brakes are not dragging before attempting to spin the wheels. Push the brake shoes into the caliper to free the rotor.

LUBRICANT CHECKING PROCEDURE

MANUAL STEERING GEAR

1. Center the steering wheel.

2. Remove the steering gear housing filler plug.

3. Remove the **lower** (**upper** on Mustang and Cougar) cover- to-housing attaching bolt.

4. With a clean punch or like instrument, clean out or push inward the loose lubricant in the filler plug hole and cover to housing attaching bolt hole.

5. Slowly turn the steering wheel to the left stop, lubricant should rise within the lower cover bolt hole; then slowly turn the steering wheel to the right stop, lubricant should rise within the filler plug hole. If lubricant does not rise in both the cover bolt hole and the filler plug hole, add lubricant until it comes out both holes during this check.

6. Install the **lower** (**upper** on Mustang and Cougar) cover- to-housing attaching bolt and the filler plug.

3 CLEANING AND INSPECTION

FRONT END GENERAL INSPECTION

Do not check and adjust front wheel alignment without first making the following inspection for front-end damage, or wear.

1. Check for specified air pressures in all four tires.

2. Raise the front of the vehicle off the floor. Shake each front wheel grasping the upper and lower surfaces of the tire. Check the front suspension ball joints and mountings for looseness, wear, and damage. Check the brake backing plate mountings. Torque all loose nuts and bolts to specification. Replace all worn parts as outlined in Part 3-2.

3. Check the steering gear mountings and all steering linkage connections for looseness. Torque all mountings to specifications. If any of the linkage is worn or bent, replace the parts as outlined in Part 3-5.

4. Check the front wheel bearings. If any in-and-out free play is noticed, adjust the bearings to specifications. Replace worn or damaged bearings as outlined in Part 3-12.

5. Spin each front wheel with a wheel spinner, and check and balance each wheel as required.

6. Check the action of the shock absorbers. If the shock absorbers are not in good condition, the vehicle may not settle in a normal, level position, and front wheel alignment may be affected.

WHEEL INSPECTION

Wheel hub nuts should be inspected and tightened to specification at predelivery. Loose wheel hub nuts may cause shimmy and vibration. Elongated stud holes in the wheels may also result from loose hub nuts.

Keep the wheels and hubs clean. Stones wedged between the wheel and drum and lumps of mud or grease can unbalance a wheel and tire.

Check for damage that would affect the runout of the wheels. Wobble or shimmy caused by a damaged wheel will eventually damage the wheel bearings. Inspect the wheel rims for dents that could permit air to leak from the tires.

UPPER BALL JOINT INSPECTION

Ford, Mercury, Meteor, Thunderbird, Lincoln Continental and Continental Mark III

1. Raise the vehicle and place floor jacks beneath the lower arms.

2. Ask an assistant to grasp the lower edge of the tire and move the wheel in and out.

3. As the wheel is being moved in and out, observe the upper end of the spindle and the upper arm.

4. Any movement between the upper end of the spindle and the upper arm indicates ball joint wear and loss of preload. If any such movement is observed, replace the upper ball joint.

During the foregoing check, the lower ball joint will be unloaded and may move. Disregard all such movement of the lower ball joint. Also, do not mistake loose wheel bearings for a worn ball joint.

Cougar, Fairlane, Falcon, Montego and Mustang

1. Raise the vehicle on a frame contact hoist or by floor jacks placed beneath the underbody until the wheel falls to the full down position as shown in Fig. 18. This will unload the upper ball joint.

2. Adjust the wheel bearings as described in Part 3-12.

3. Attach a dial indicator to the upper arm and position the indicator so that the plunger rests against the inner side of the wheel rim adjacent to the upper arm ball joint.

4. Grasp the tire at the top and bottom, and slowly move the tire in and out (Fig. 18). Note the reading (radial play) on the dial indicator. If

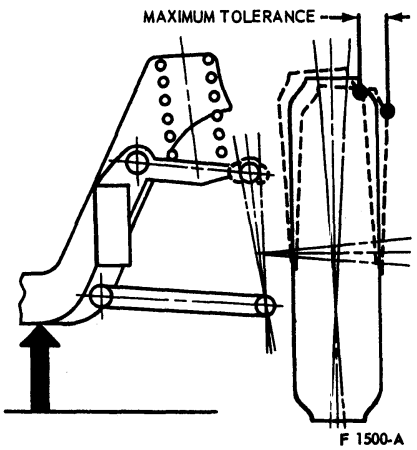


FIG. 18—Measuring Upper Ball Joint Radial Play

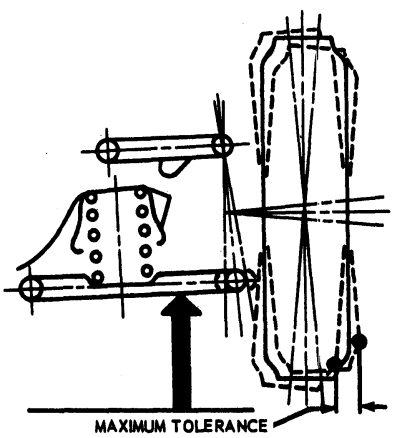


FIG. 19—Measuring Lower Ball Joint Radial Play

the reading exceeds specifications (Part 3-13), replace the upper ball joint.

LOWER BALL JOINT INSPECTION

Ford, Mercury, Meteor, Thunderbird, Lincoln Continental and Continental Mark III

1. Raise the vehicle and place jacks under the lower arms as shown in Fig. 12. This will unload the lower ball joints.
2. Adjust the wheel bearings as described in Part 3-12.
3. Attach a dial indicator to the lower arm and position the indicator so that the plunger rests against the inner side of the wheel rim adjacent to the lower ball joint.
4. Grasp the tire at the top and bottom and slowly move the tire in and out (Fig. 19). Note the reading (radial play) on the dial indicator. If the reading exceeds specifications (Part 3-13), replace the lower ball joint.

Cougar, Fairlane, Falcon, Montego, Mustang

1. Raise the vehicle on a frame contact hoist or by floor jacks placed beneath the underbody until the wheel falls to the full down position.
2. Ask an assistant to grasp the lower edge of the tire and move the wheel in and out.
3. As the wheel is being moved in and out, observe the lower end of the spindle and the lower arm.
4. Any movement between the lower end of the spindle and the lower arm indicates ball joint wear and loss of preload. If any such movement is observed, replace the lower arm.

During the foregoing check, the upper ball joint will be unloaded and may move. Disregard all such movement of the upper ball joint. Also, do not mistake loose wheel bearings for a worn ball joint.

POWER STEERING GEAR

CLEANING

Disassembly and assembly of the steering gear and the sub-assemblies must be made on a clean workbench. As in repairing any hydraulically operated unit, cleanliness is of utmost importance. The bench, tools, and parts must be kept clean at all times. Thoroughly clean the exterior of the unit with a suitable solvent and, when necessary drain as much of the hydraulic fluid as possible. Handle all parts very carefully to avoid nicks, burrs, scratches and dirt, which could make the parts unfit for use.

Do not clean, wash or soak seals in cleaning solvent.

INSPECTION

1. Check the sector shaft contact surface in the cover for wear. If worn, replace the cover.
2. Inspect the input shaft bearing for cracked races and the balls for looseness, wear, pitting, end play or other damage. Check the fit of the bearing on the input shaft. Replace the bearing, if required.
3. Inspect the valve housing for wear, scoring or burrs.
4. Inspect the tube seats in the pressure and return ports in the valve body for nicks, etc. If necessary, remove and replace.
5. Check the sector shaft contact surface in the housing for wear. If worn, replace the bushing or the housing.
6. Check all fluid passages for obstruction or leakage.
7. Inspect the steering gear housing for cracks, stripped threads, and mating surfaces for burrs. Inspect the piston bore of the housing for scoring or wear. If necessary, replace the housing.
8. Check the input shaft bearing after installation to be sure that it rotates freely.
9. If the valve spool is not free in the valve housing, check for burrs at the outward edges of the working lands in the housing and remove with a hard stone. Check the valve spool for burrs and if burrs are found, stone the valve in a **radial direction only.** Check for freedom of the valve again.
10. Check the piston rack teeth and sector shaft teeth for nicks and burrs.

FLUSHING THE POWER STEERING SYSTEM—ALL EXCEPT LINCOLN CONTINENTAL AND CONTINENTAL MARK III

Should it be necessary to replace an inoperative power steering pump, the need for flushing the steering system is required when installing the new pump.

1. Remove the power steering pump and remove the pulley as outlined in Part 3-10.
2. Install the pulley on a new pump. Install the pump and connect only the pressure hose to the pump (Part 3-10).
3. Place the fluid return line in a suitable container and plug the reservoir return pipe.
4. Fill the reservoir with lubricant (C1AZ-19582-A).
5. Disconnect the coil wire to prevent the engine from starting and raise the front wheels off the ground.
6. While approximately two quarts of steering gear fluid are being poured into the reservoir, turn the engine over using the ignition key, at the same time cycle the steering wheel from stop to stop.
7. As soon as all of the lubricant has been poured in, turn off the ignition key, and attach the coil wire.
8. Remove the plug from the reservoir return pipe, and attach the return hose to the reservoir.
9. Check the reservoir fluid level; if low, add fluid to the proper level. **Do not overfill.**
10. Lower the vehicle.
11. Start the engine and cycle the steering from stop to stop to expel any trapped air from the system.

POWER STEERING PUMP—ALL EXCEPT LINCOLN CONTINENTAL AND CONTINENTAL MARK III

CLEANING

Wash all parts (except seals) in a Naptha or Chlorinated-type solvent and dry with compressed air.

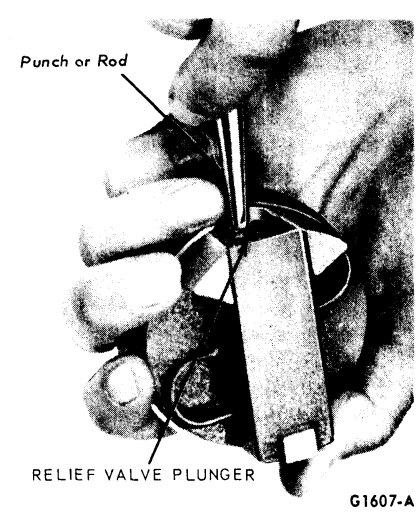


FIG. 20—Cleaning Pump Relief Valve

The following procedure should be followed when cleaning the relief valve which is a part of the pump valve assembly.

1. Using a punch or rod of suitable diameter, apply an even pressure in a straight line to the tip of the relief valve pin (Fig. 20). Depress the valve two or three times to exhaust the oil which is trapped in the assembly. Do not hammer on the valve pin or housing.

2. Submerge the assembly in a container of **clean** solvent. Again applying an even pressure to the tip of the relief valve pin, (a sudden strong force could push the pin through the relief valve spool) move the valve in and out several times, thereby thoroughly flushing the assembly. Pressure created within the valve bore when the valve is moved inward should force the cleaning fluid out through the sensing orifice. If this does not occur, the sensing orifice should be cleaned with a piece of wire. The valve must move freely and evenly. If the pin is bent or damaged, or if the valve binds, the pump valve must be replaced.

INSPECTION

The following describes the components of the power steering pump which must be replaced **regardless of condition** and how to determine when other components should be replaced.

The outlet fitting hex nut may be reused if the corners of the hex are not rounded. The housing bolts may be reused if the threads are not damaged.

All gaskets and seals must be replaced with new components except the rotor shaft seal which should be reused unless it was leaking.

The reservoir assembly may be reused if the reservoir seal and gasket areas are not damaged (dents, scratches, etc.). The soldered joints of the return and fill tubes must not be loose or bent. Be sure to check for a broken baffle.

The housing or housing assembly may be reused if there is no damage (scratches, etc.) at reservoir gasket, outlet fitting or cover seal areas.

If the outlet fitting is damaged, the pump housing must be replaced. The pressure plate springs may be reused providing they are not bent, broken or have not taken a set.

Do not reuse the retainer end plate if it is burred or damaged. The upper pressure plate may be reused if there is no scoring on the wear surface. It is acceptable to polish the phosphate coating.

The rotor and cam assembly can be reused if there is no wear other than the removal of the phosphate coating on the cam contour. Do not disassemble the rotor and cam assembly. Push the rotor part way out the cam insert taking care not to let the slippers and springs fall out. Check the cam ID for scoring and burning. Check the rotor faces and OD for scoring and chipping. Do not attempt to repair or refinish the lower and upper pressure plates, cam or rotor assembly. When wear or burning is encountered, replace them with new components.

Install a new rotor and cam assembly if the slippers are worn. Replace the springs if they are bent or broken. Polishing the phosphate coating of the slipper sealing surface is permissable.

The rotor shaft can be reused if the front and rear thrust faces, the bushing diameter and the shaft seal diameter are not excessively worn or scored.

The housing plate and bushing assembly may be reused if all of the threaded holes are not damaged beyond repair and the bushing diameter is not scored or worn .0005 inch over the maximum dimension of .6897 inch. Threaded holes can be repaired by drilling out the damaged threads and installing a helicoil insert. If the bushing is scored or excessively worn, a new plate and bushing assembly must be installed.

With Tool T69P-3D608-A (using a dial indicator) check the squareness of the fixed dowel pin in the plate (Fig. 21). The pin must be square with the adjacent surface within .001 inch per inch through a 180 degree arch.

A bent or broken dowel pin can be replaced as follows:

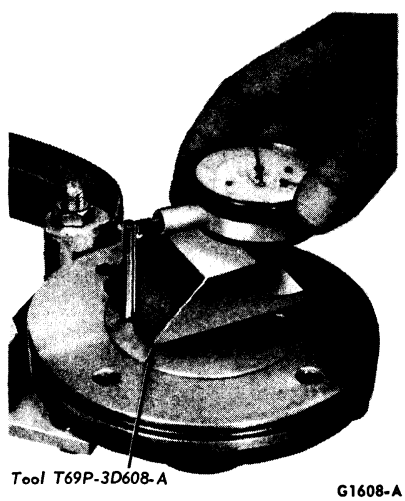


FIG. 21—Dowel Pin Squareness Check

1. Hold the plate assembly in a horizontal position and grip at least an inch of the dowel pin in a vise. Tap the plate with a plastic or a rubber hammer to pull the pin from the plate.

2. Insert the support guide (Tool T69P-3D608-B) over a dowel pin (Fig. 22) and press the pin into the plate to a height of 1.68 inch (See Fig. 23). The support guide tool will serve as a stop guide. Be careful not to bend the new dowel pin during installation.

3. Again use Tool T69P-3D608-A (with a dial indicaator) to check the dowel pin squareness as outlined above.

POWER STEERING PUMP INSPECTION—LINCOLN CONTINENTAL AND CONTINENTAL MARK III

1. Wash all parts in clean solvent and dry them with clean cloths or compressed air.

2. Inspect the rotor shaft for wear, scoring, nicks, or burrs. Replace the shaft if it is damaged or if the inner keyway is damaged.

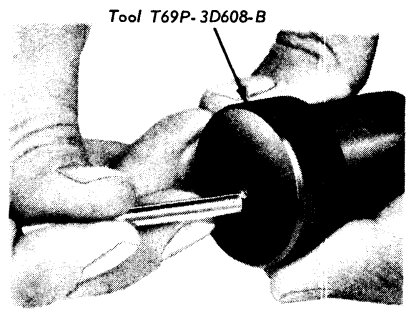


FIG. 22—Dowel Pin Insertion

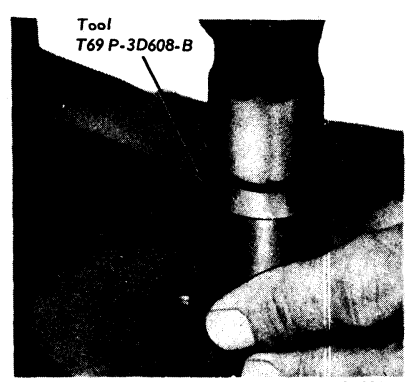


FIG. 23—Replacing Dowel Pin

3. Inspect the rotor, rollers, cam ring, pressure plate, cover, and bushing in the pressure plate for wear or scoring. If damaged, replacement of the pump (less housing) is required.

4. Make sure the inner faces of the cover and the housing are free of paint, nicks, or burrs. Check all fluid passages for restrictions.

5. Inspect the valving surfaces (areas where the rotor and rollers contact) for wear or scoring. Replace the pressure plate or the cover if worn or scored. Inspect the bushing in the pressure plate for wear or scoring, and replace the plate if necessary.

6. Inspect the control valve for scores, nicks, or burred edges. Replace the valve if damaged. **Do not disassemble the valve.** Check the valve for free movement in the housing bore.

7. Inspect the tube seat in the housing. If damaged, remove it with an E-Z-Out and install a new seat.

SHOCK ABSORBER CHECKS

All vehicles are equipped with hydraulic shock absorbers of the direct-acting type and are nonadjustable and nonrefillable. They cannot be repaired.

Before replacing a shock absorber, check the action of the shock absorbers as follows:

ON VEHICLE TESTS

1. Check the shock absorber to be sure it is securely and properly installed. Check the shock absorber insulators for damage and wear.

Replace any defective insulators and tighten attachments to the specified torque (on a shock absorber which incorporates integral insulators, replace the shock absorbers).

2. Inspect the shock absorber for evidence of fluid leakage. A light film of fluid is permissible. Be sure any fluid observed is not from sources other than the shock absorber.

Replace the shock absorber if leakage is severe.

3. Disconnect the lower end of the shock absorber. Extend and compress the shock absorber as fast as possible, using as much travel as possible.

Action should become smooth and uniform throughout each stroke. Higher resistance on extension than on compression is a normal condition. Faint swish noises are also normal.

Remove the shock absorber for a bench test if action is erratic. If the action is smooth, but the shock absorbers are suspected of being weak follow step 4:

4. Repeat step 3 on the mating shock absorber installed on the opposite side of the vehicle, and compare results of both tests. If the action is similar, it is unlikely that either shock absorber is defective. Reconnect both shock absorbers.

Replace the shock absorber having the lower resistance. Ensure that the part number of the replacement is the same as that of the original shock absorber. The replacement shock absorber resistance will appear to be higher than either original due to initial friction of the rod seal.

BENCH TEST

With the shock absorber right side up (as installed in vehicle), extend it fully. Then turn the shock absorber upside down and fully compress it. Repeat this procedure at least three times to ensure that any entrapped air has been expelled. Now place the shock absorber right side up in a vise, and hand stroke the shock absorber as described in On Vehicle Tests, step 3. If action is not now smooth and uniform, install a new shock absorber.

PART 3-2 Suspension

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
BALL JOINT Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-10	N/A	N/A
BUSHING Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-28	N/A	N/A
DRIVE SHAFT PINION ANGLE Adjustment		02-11	02-11	02-11	N/A	N/A	N/A	N/A	N/A	N/A	02-11	02-11
FRONT SHOCK ABSORBER Removal and Installation		02-21	02-21	02-21	02-21	02-21	02-21	02-21	02-21	02-21	02-21	02-21
FRONT SPRING Removal and Installation		02-12	02-12	02-12	02-13	02-13	02-13	02-13	02-13	N/A	02-12	02-12
FRONT SPRING AND LOWER ARM Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-14	N/A	N/A
FRONT SUSPENSION Description	02-02											
FRONT SUSPENSION LOWER ARM Removal and Installation		02-16	02-16	02-16	02-17	02-17	02-17	02-17	02-17	N/A	02-16	02-16
FRONT SUSPENSION LOWER ARM STRUT AND/OR BUSHING Adjustment and Repair		02-11	02-11	02-11	N/A	N/A	N/A	N/A	N/A	N/A	02-11	02-11
FRONT SUSPENSION UPPER ARM Removal and Installation		02-17	02-17	02-17	02-18	02-18	02-18	02-18	02-18	02-18	02-17	02-17
FRONT SUSPENSION UPPER ARM BUSHING - ARM REMOVED Disassembly and Overhaul		02-27	02-27	02-27	N/A	N/A	N/A	N/A	N/A	N/A	02-27	02-27
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HOISTING INSTRUCTIONS	02-08											
INNER SHAFT Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-28	N/A	N/A
LOWER ARM - REMOVED Disassembly and Overhaul		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-27	N/A	N/A
LOWER ARM STRUT AND/OR BUSHING Removal and Installation		N/A	N/A	N/A	02-11	02-11	02-11	02-11	02-11	N/A	N/A	N/A
LOWER BALL JOINT - ARM IN VEHICLE Removal and Installation		02-09	02-09	02-09	N/A	N/A	N/A	N/A	N/A	N/A	02-09	02-09
REAR SHACKLE AND HANGER ASSEMBLY Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-29	N/A	N/A
REAR SHOCK ABSORBER Removal and Installation		02-21	02-21	02-21	02-22	02-22	02-22	02-22	02-22	02-22	02-21	02-21
REAR SHOCK ABSORBER LOWER MOUNTING STUD Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-23	N/A	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
REAR SPRING												
Disassembly and Overhaul		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-28	N/A	N/A
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REAR SUSPENSION												
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Removal and Installation		02-25	02-25	02-25	N/A	N/A	N/A	N/A	N/A	N/A	02-25	02-25
UPPER ARM - REMOVED												
Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	02-27	N/A	N/A
UPPER ARM SHAFT AND/OR BUSHING												
Removal and Installation		N/A	N/A	N/A	02-09	02-09	02-09	02-09	02-09	N/A	N/A	N/A
UPPER BALL JOINT												
Removal and Installation		02-08	02-08	02-08	02-08	02-08	02-08	02-08	02-08	02-10	02-08	02-08

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

FRONT SUSPENSION

Each front wheel rotates on a spindle. The upper and lower ends of the spindle are attached to upper and lower ball joints which are mounted to an upper and lower arm respectively. The upper arm pivots on a bushing and shaft assembly which is bolted to the frame. The lower arm pivots on a bolt in the front crossmember (Figs. 1, 2 and 3). A coil spring seats between the lower (upper on Cougar, Fairlane, Falcon, Montego and Mustang) arm and the top of the spring housing. A double action shock absorber is bolted to the arm and the top of the spring housing.

REAR SUSPENSION

FORD, MERCURY, METEOR, THUNDERBIRD AND CONTINENTAL MARK III

Each rear wheel, hub, and brake drum assembly is bolted to the rear axle shaft flange. The axle shaft assembly rotates in the rear axle housing.

The rear axle housing is suspended from the frame by a coil spring and shock absorber at each side of the vehicle and by three arms (one upper and two lower) which pivot in the frame members (Fig. 4).

Each coil spring is mounted between a lower seat, which is welded to the axle housing, and an upper seat which is integral with the frame.

The upper end of the rear shock absorber is attached to the spring upper seat; the lower end is bolted to a bracket on the axle housing.

The upper suspension arm attaches to the right side of the axle housing through an eccentric pivot bolt and a bracket which is welded to the top of the housing. The forward end of the arm is connected by a pivot bolt to the frame crossmember.

Each lower suspension arm attaches to one end of the axle housing through a pivot bolt and a bracket which is welded to the underside of the housing. The forward end of the arm is connected by a pivot bolt to the frame side member.

A track bar is connected between the upper arm bracket on the axle housing and a mounting bracket on the left frame side rail.

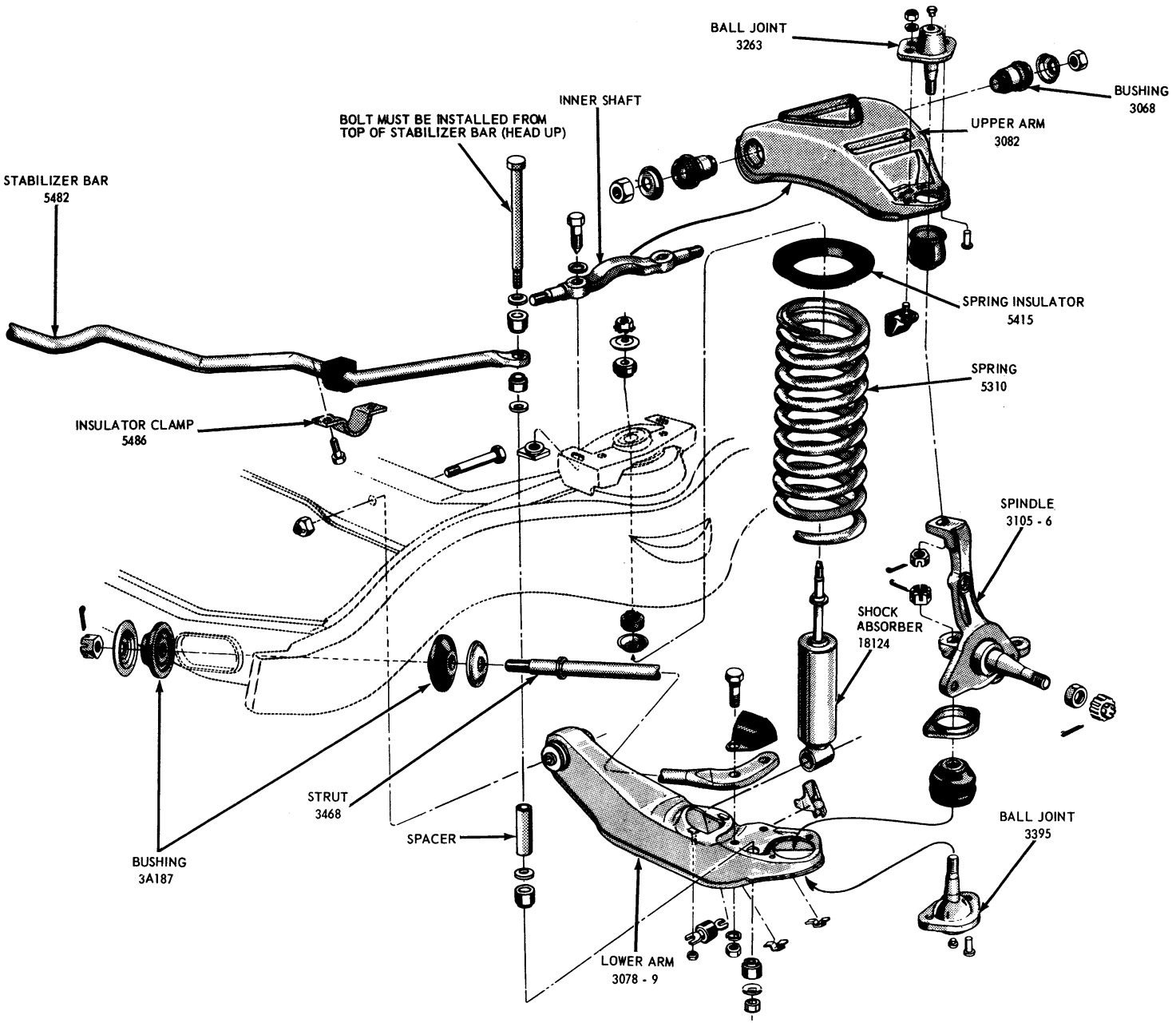


FIG. 1—Front Suspension Disassembled—Typical—Ford, Mercury, Thunderbird, Continental Mark III

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG LINCOLN CONTINENTAL

Each rear wheel, hub and brake drum assembly is bolted to the rear axle shaft flange. The wheel and axle shaft assembly rotates in the rear axle housing. Two spring pads, integral with the axle housing, rest on two leaf spring assemblies. The axle housing is fastened to the center of the springs by spring clips (U-bolts), retainers, and nuts (Figs. 5 and 6). Each spring assembly is suspended from the underbody side rail by hanger and shackle assemblies at the front and rear. The integral mounting stud at the upper end of each shock absorber is attached to the crossmember by a mounting plate. The lower end is mounted to a stud which is integral with a bracket welded to the axle housing.

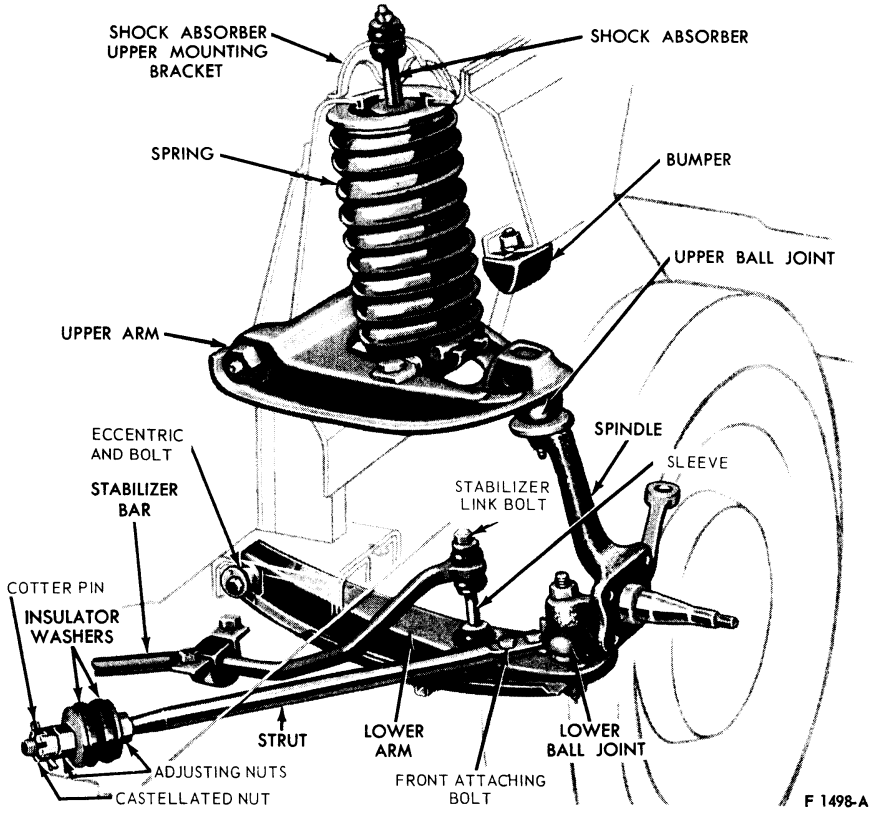


FIG. 2—Front Suspension—Typical—Cougar, Fairlane, Falcon, Montego, Mustang

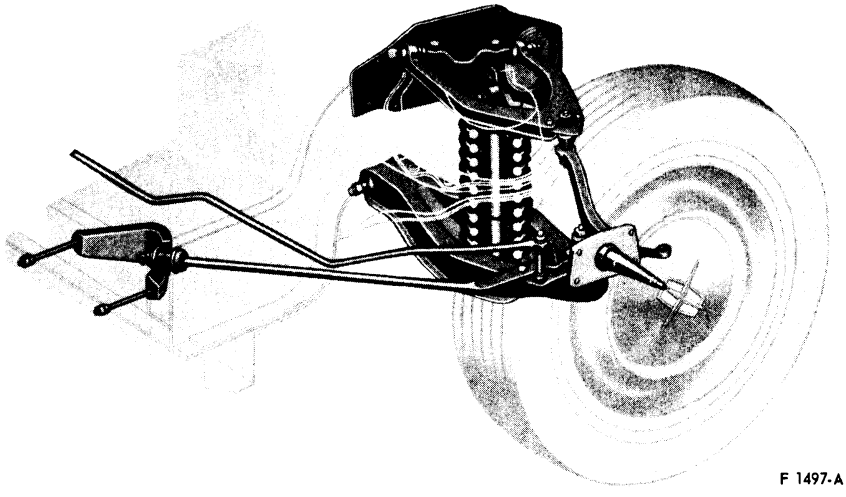


FIG. 3—Front Suspension—Lincoln Continental

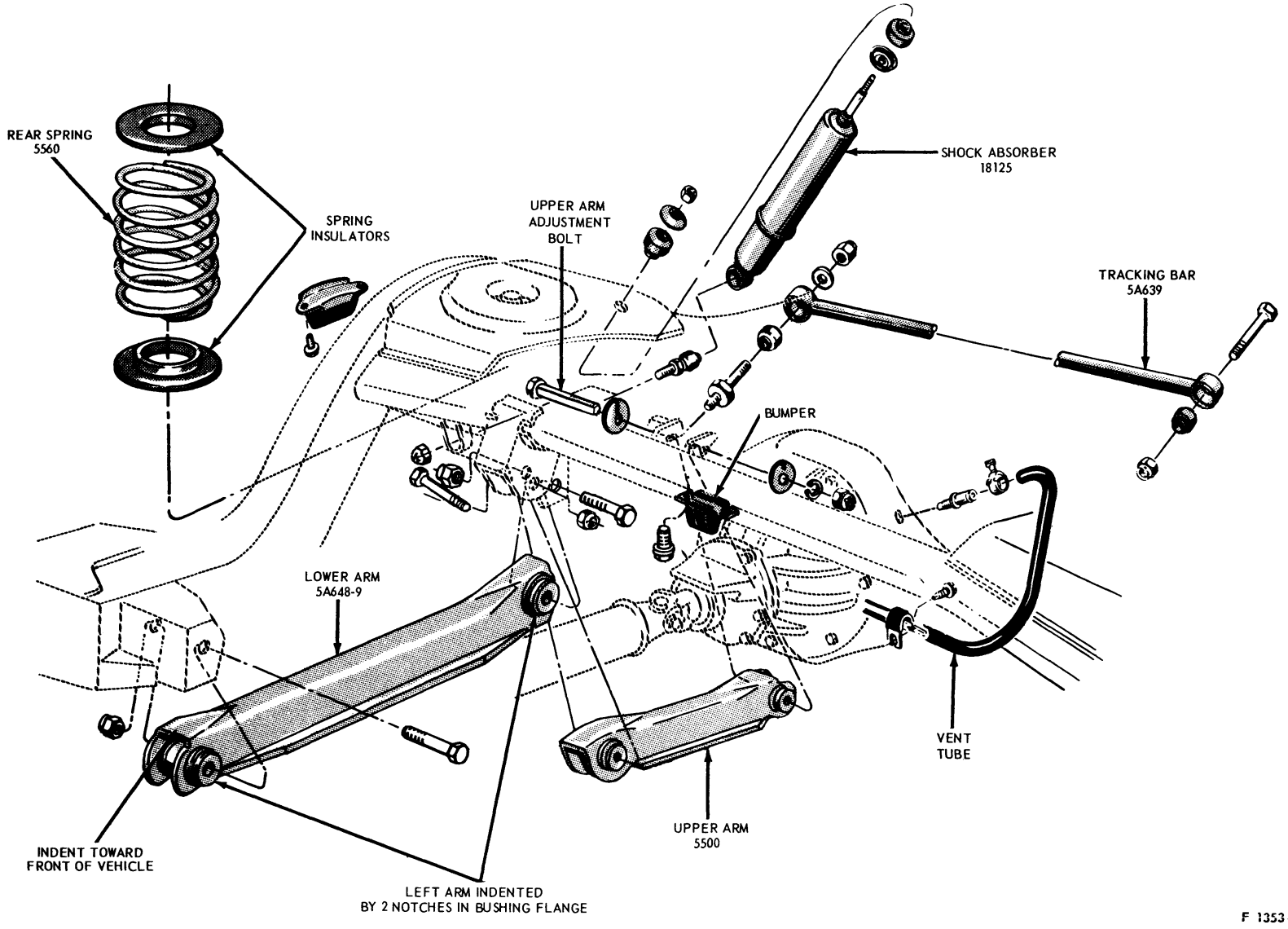


FIG. 4—Rear Suspension—Disassembled—Ford, Mercury, Thunderbird, Continental Mark III

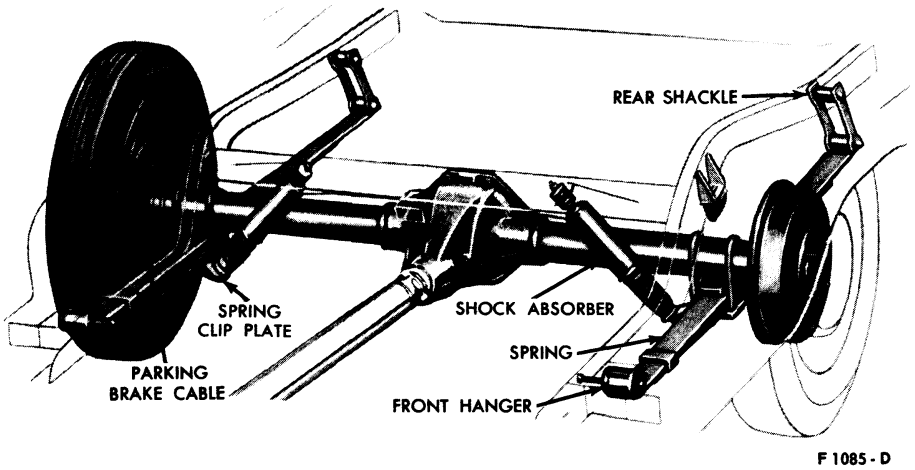


FIG. 5—Rear Suspension—Typical—Cougar, Fairlane, Falcon, Montego, Mustang

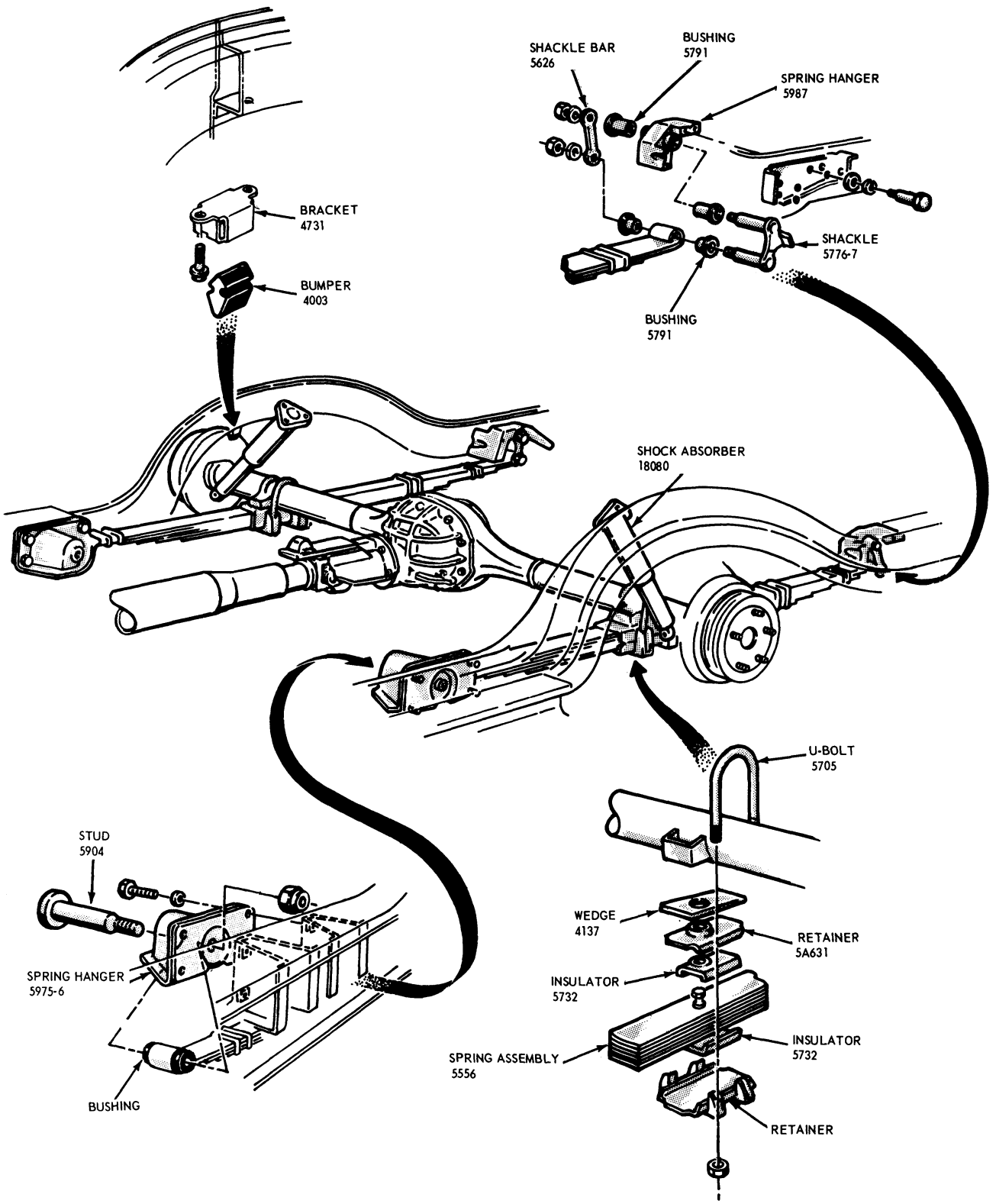


FIG. 6—Rear Suspension Components—Lincoln Continental

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

HOISTING INSTRUCTIONS

Damage to steering linkage components and front suspension struts may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the lower arms or the No. 1 crossmember. Do not allow the adapters to contact the steering linkage. If the adapters are placed under the crossmember, a piece of wood (2 x 4 x 16 inches) should be placed on the hoist channel between the adapters. This will prevent the adapters from damaging the front suspension struts.

UPPER BALL JOINT REPLACEMENT

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

1. Raise the vehicle high enough to provide working space, and place a support under the lower arm. If a chain hoist or a jack that has a narrow contact pad is to be used on the bumper to raise the vehicle, distribute the load along the bumper by using a steel plate 3 or 4 inches long as a contact pad to prevent damaging the bumper.
2. Remove the wheel and tire.
3. Drill a 1/8-inch hole through each upper ball joint retaining rivet. Using a large chisel, cut off the rivets.
4. Remove the upper arm suspension bumper.
5. Remove the cotter pin and nut from the upper ball joint stud.
6. Place a box wrench over the lower end of the ball joint remover tool, and position the tool as in Fig. 7. The tools should seat firmly against the ends of both studs, and not against the lower stud nut.
7. Turn the wrench until both studs are under tension, and then, with a hammer, tap the spindle near the upper stud to loosen the stud from the spindle. **Do not loosen the stud with tool pressure alone.** Remove the ball joint.
8. Clean the end of the arm, and remove all burrs from the hole edges. Check for cracks in the metal at the holes, and replace the arm if it is cracked.

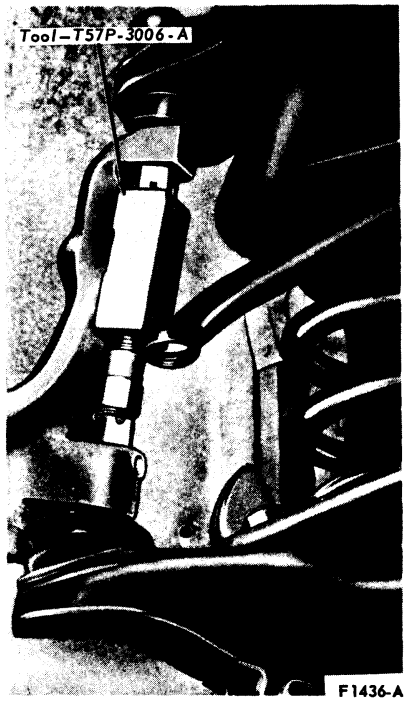


FIG. 7—Disconnecting Ball Joints—Typical

9. Attach the new ball joint to the upper arm. **Use only the specified bolts, and nuts. Do not rivet the new ball joints to the arm.** Torque the nuts to specification.
10. Install the upper arm suspension bumper. Torque the nut to specification.
11. Position the ball joint stud in the spindle bore, and torque the attaching nut to specification. Install a new cotter pin.
12. Install the wheel and tire.
13. Remove the safety stands, and lower the vehicle.
14. Check and, if necessary, adjust caster, camber, and toe-in. **Whenever any part of the front suspension has been removed and installed, front wheel alignment must be checked.**

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

1. Position a support between the upper arm and frame side rail as shown in Figs. 8 and 9; then, raise the vehicle and position safety stands.
2. Remove the wheel and tire.
3. Remove the cotter pin and nut from the upper ball joint stud.
4. Position the ball joint remover tool as shown in Fig. 10. **The tool should seat firmly against the ends of both studs, and not against the lower stud nut.** It may be necessary to remove the lower ball joint cotter pin if it prevents the tool from seating on the lower stud.
5. Turn the tool with a wrench until both studs are under tension, and then, with a hammer, tap the spindle near the upper stud to loosen the stud

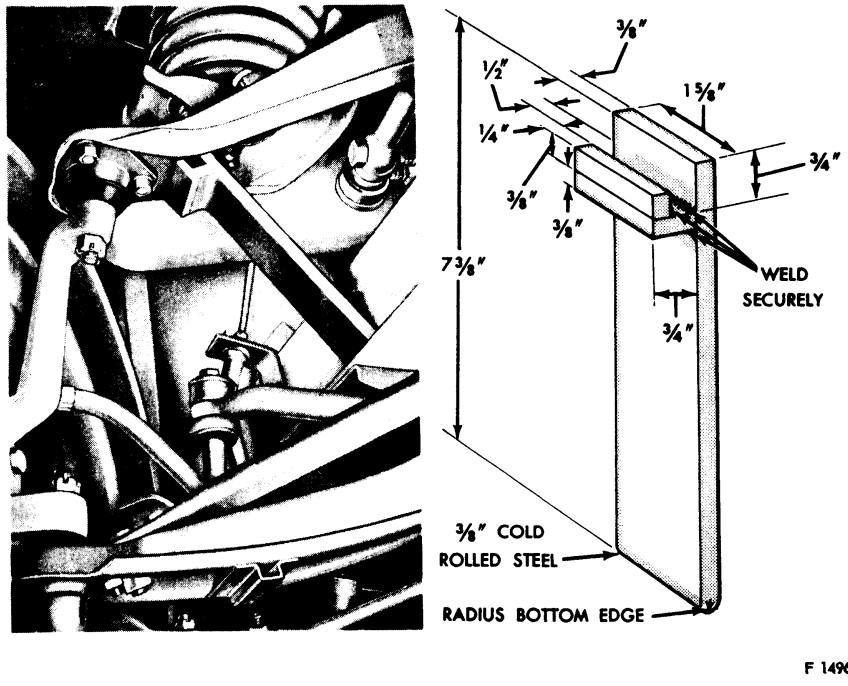


FIG. 8—Upper arm Support—Mustang

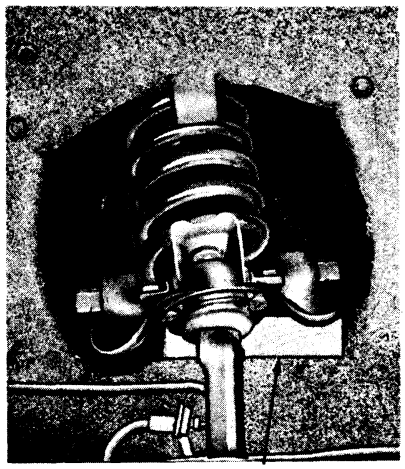


FIG. 9—Upper Arm Support—Montego, Falcon and Fairlane

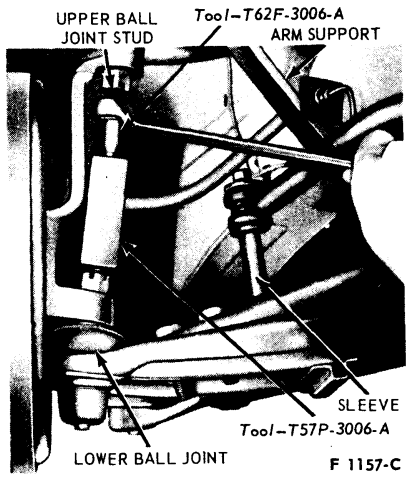


FIG. 10—Loosening Ball Joint Studs in Spindle—Typical

from the spindle. **Do not loosen the stud with tool pressure alone.** Raise the stud out of the spindle bore.

6. Using a large chisel, cut off the three upper ball joint retaining rivets and remove the ball joint.

7. Clean the end of the arm, and remove all burrs from the hole edges. Check for cracks in the metal at the holes, and replace the arm if it is cracked.

8. Attach the new ball joint to the upper arm. **Use only the specified bolts, nuts, and washers. Do not rivet the new ball joint to the arm.** Torque the nuts to specification (Part 3-13).

9. Position the lower ball joint stud in the spindle bore, and torque the attaching nut to specification. Install a new cotter pin and tighten the nut if necessary to line up the cotter pin hole. Install a new cotter pin in the lower ball joint if it was removed.

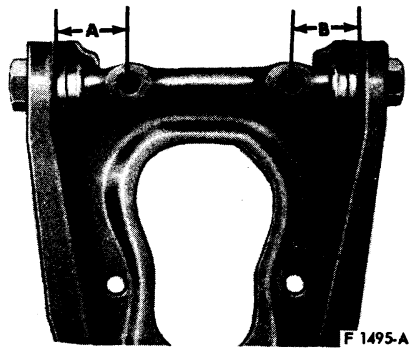


FIG. 11—Shaft Centered in Arm—Typical

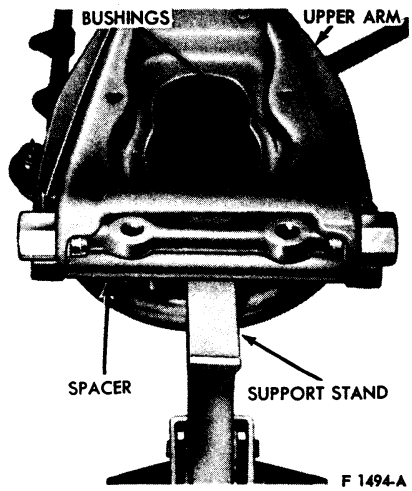


FIG. 12—Torque Upper Arm Inner Shaft Bushings—Typical

10. Lubricate the ball joint, and install the wheel and tire. Torque the lug nuts to specification (Part 3-13).

11. Remove the safety stands, and lower the vehicle.

12. Remove the support from between the upper arm and frame.

13. **Check and, if necessary, adjust caster, camber, and toe-in.**

UPPER ARM SHAFT AND/OR BUSHING REPLACEMENT

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

1. Remove the shock absorber and upper mounting bracket as an assembly.

2. Raise the vehicle on a hoist, install safety stands, and remove the wheel cover or hub cap.

3. Remove the grease cap from the hub; then, remove the cotter pin, nut lock, adjusting nut and outer bearing from the hub.

4. Pull the wheel, tire, and the hub and drum off the spindle as an assembly.

5. Install the spring compressor tool (Figs. 20, 21 and 22).

6. Remove 2 upper arm-to-spring tower attaching nuts and swing the upper arm outboard from the spring tower.

7. Rotate the inner shaft so that the studs can be removed. Remove the studs with a soft mallet.

8. Unscrew the bushings from the shaft and suspension arm; then, remove the shaft from the arm.

9. Position the shaft in the arm, apply grease to the new bushings and O-rings, and install the bushings loose on the shaft and arm. **Turn the bushings so that the shaft is exactly centered.** The shaft will be properly centered when dimensions A and B in Fig. 11 are equal.

10. Fabricate a spacer from a section of 3/4-inch diameter pipe or metal of comparable size and strength. The spacer should be 6 15/16 inches long.

11. Position the spacer parallel with the inner shaft, and force the spacer between the flanges of the upper arm (Fig. 12).

If the spacer cannot be forced between the arm flanges due to excessive distortion, replace the upper arm assembly.

12. With the spacer positioned in the arm, torque the bushings to specification. Move the arm on the shaft to be sure that no binding exists, then remove the spacer.

13. Attach the suspension upper arm to the underbody. Release the front spring.

14. Remove the spring compressor and position the wheel, tire, and hub and drum on the spindle.

15. Install the bearing, washer, adjusting nut and nut lock. Adjust the wheel bearing as outlined in Part 3-12 and install the cotter pin, grease cap and hub cap or wheel cover.

16. Lower the vehicle and install the shock absorber and upper mounting bracket.

17. **Check caster, camber, and toe-in, and adjust as necessary (Part 3-1).**

LOWER BALL JOINT REPLACEMENT— ARM IN VEHICLE

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

1. Raise the vehicle high enough to provide working space, leaving the

lower arm free to drop as coil spring tension is eased. If a chain hoist or a jack that has a narrow contact pad is to be used on the bumper to raise the car, distribute the load along the bumper by using a steel plate 3 or 4 inches long as a contact pad to prevent damaging the bumper.

2. If the ball joint is riveted to the arm, drill a 1/8-inch pilot hole completely through each rivet. Then drill off the rivet head through the pilot hole with a 3/8-inch drill, and drive out both rivets.

3. Position a jack or safety stand under the lower arm, and lower the vehicle about 6 inches to offset the coil spring tension.

4. Remove the cotter pin from the ball joint stud, and remove the nut.

5. Place a box wrench over the lower end of the tool shown in Fig. 7, and position the tool. **The tool should seat firmly against the end of both studs, and not against the upper stud nut.**

6. Turn the wrench until both studs are under tension, and then, with a hammer, tap the spindle near the lower stud to loosen the stud from the spindle. **Do not loosen the stud with tool pressure alone.** Remove the ball joint.

7. Clean the end of the arm, and remove all burrs from the hole edges. Check for cracks in the metal at the holes, and replace the arm if it is cracked.

8. Position the stud of the ball joint to the spindle bore, and install the attaching nut finger-tight.

9. Attach the ball joint to the lower arm. **Use only the specified bolts and nuts. Do not rivet the new ball joint to the arm. Torque nuts to specification.**

10. Torque the ball joint stud nut to specification, and install a new cotter pin.

11. Remove the jack.

12. Check and, if necessary, adjust caster, camber, and toe-in. **Whenever any part of the front suspension has been removed and installed, front wheel alignment must be checked.**

BALL JOINT REPLACEMENT

LINCOLN CONTINENTAL

The lower ball joint is riveted to the lower arm wheras the upper ball joint is bolted to the upper arm. When replacing a ball joint, use all the parts supplied in the kit.

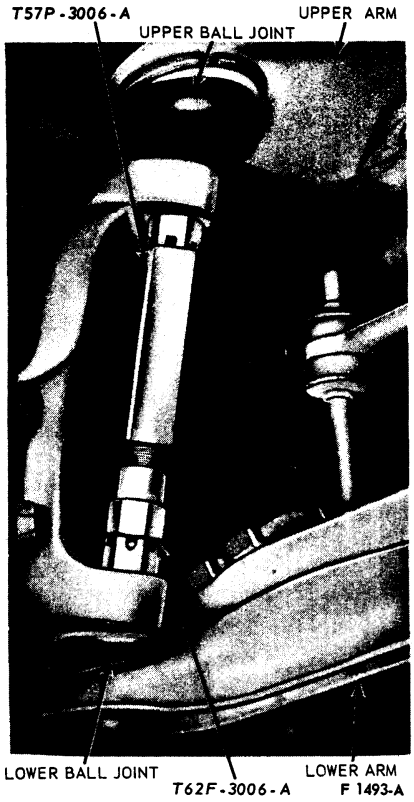


FIG. 13—Loosening Ball Joint Stud

Lower Arm

1. Raise the vehicle. Place a support under each rail to the rear of the lower arm in the lifting pad area.

2. Remove the wheel and tire from the hub.

3. Remove 2 bolts and washers that attach the caliper to the spindle. Remove the caliper from the rotor and wire it to the underbody to prevent damage to the brake hose.

4. Remove the hub and rotor from the spindle.

5. Remove the splash shield and gasket from the spindle.

6. Remove the cotter pin from the lower ball stud, and loosen the nut one to two turns.

7. Place a box wrench over the lower end of the ball joint remover tool, and position the tool as in Fig. 13. The tool should seat firmly against the ends of both studs, and not against the lower stud nut.

8. Turn the wrench until both studs are under tension, and then, with a hammer, tap the spindle near the lower stud to loosen the stud from the spindle. **Do not loosen the stud with tool pressure alone.**

9. Place a jack under the spring pocket in the lower arm, and raise the arm slightly. Place a support stand under the lower arm as a safety precaution.

10. Remove the nut from the ball joint stud. Raise the upper arm and spindle until the spindle clears the ball stud. Prop the upper arm in a raised position.

11. Remove the ball joint rivet heads with a chisel. Punch the remaining portion of the rivets from the holes, and remove the joint.

12. Install the new joint using the parts supplied in the kit. Torque the nuts to specification. Make sure the joint is completely filled with the specified lubricant.

13. Lower the upper arm while guiding the spindle over the ball stud. Install the stud nut and tighten it to specification. Continue to tighten the nut to line up the cotter pin hole. Install the cotter pin.

14. Install the gasket and shield on the spindle. Tighten the attaching bolts to specifications.

15. Install the hub and rotor on the spindle and adjust the wheel bearings.

16. Install the caliper to the spindle and tighten the attaching bolts to specifications. Check for the correct flexible hose routing (Part 2-2).

17. Install the wheel and tire. Torque the wheel nuts to specification and lower the vehicle.

Upper Arm

1. Place a jack under the outer end of the lower arm, and raise the arm. Place a support stand under the side rail in the lifting pad area.

2. Remove the wheel and tire.

3. Remove the cotter pin from the upper ball stud, and loosen the nut one to two turns.

4. Place a box wrench over the lower end of the ball joint remover tool, and position the tool as in Fig. 13). The tool should seat firmly against the ends of both studs, and not against the upper stud nut.

5. Turn the wrench until both studs are under tension, and then, with a hammer, tap the spindle near the upper stud to loosen the stud from the spindle. **Do not loosen the stud with tool pressure alone.**

6. Raise the upper arm to free the ball stud from the spindle. Wire the upper end of the spindle to the underbody to prevent damage to the brake hose.

7. Remove the ball joint retaining nuts and bolts, and remove the joint.

8. Install the new joint using the parts supplied in the kit. Torque the

nuts to specification. Make sure that the joint is completely filled with the specified lubricant.

9. Guide the ball joint stud into the spindle. Install the stud nut and torque it to specification. Continue to tighten the nut to line up the cotter pin hole. Install the cotter pin.

10. Install the wheel and tire. Torque the wheel nuts to specification.

STABILIZER REPAIR

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

To replace the end bushings on each stabilizer link, use the following procedure.

1. Raise the vehicle on a hoist.
2. Remove the nut, washer and insulator from the lower end of the stabilizer bar attaching bolt.
3. Remove the bolt and the remaining washers(3) insulators (3) and the spacer.
4. Assemble a flat washer and a new insulator on the bolt.
5. Insert the bolt through the stabilizer bar then install a new insulator and a flat washer on it.
6. Install the spacer, flat washer and another new insulator on the bolt (Fig. 1).
7. Insert the bolt through the lower arm and install a new insulator and a flat washer. Install and torque the attaching nut to specification.

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

1. Raise the vehicle high enough to provide working space, and place supports under both front wheels.
2. Disconnect the stabilizer from each link. Disconnect both stabilizer attaching brackets, and remove the stabilizer.
3. Coat the necessary parts of the stabilizer with RUGLYDE or a comparable lubricant, and slide new insulators onto the stabilizer.
4. Secure each end of the stabilizer bar to the lower arm making sure that the bolt head is at the top (Fig. 2) to eliminate interference with the brake hose.
5. Remove the supports and lower the vehicle.

FRONT SUSPENSION LOWER ARM STRUT AND/OR BUSHING

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

1. Remove the cotter pin from the lower arm strut at the frame front crossmember and remove the nut, washer, and bushing from the strut.
2. Remove nuts, washers, and bolts attaching the strut and rubber bumper to the lower arm (Fig. 1).
3. Pull the strut from the frame crossmember.
4. Remove the crossmember rear side bushing and washer from the strut.
5. Place the crossmember rear side washer and bushing on the strut and position the strut to the frame and lower arm.
6. Position the rubber bumper on the strut and install the bolts, washer, and nuts attaching the strut to the lower arm. Torque the nuts and bolts to specification.
7. Install the bushing, washer, and nut on the strut at the front crossmember. Tighten the nut and install the cotter pin.
8. Check caster, camber, and toe-in and adjust if necessary.

LOWER ARM STRUT AND/OR BUSHING REPLACEMENT

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

1. Position the support as shown in Figs. 8 and 9 under the upper arm.

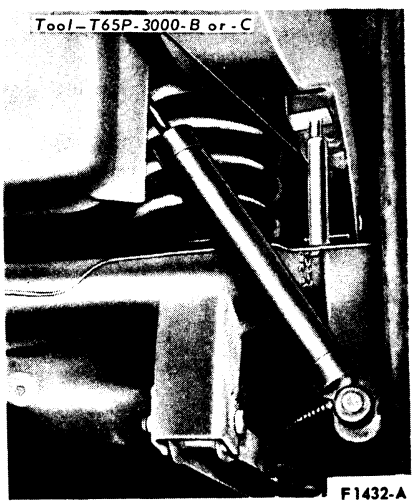


FIG. 14—Alignment Spacer Installation

2. Raise the vehicle, position safety stands, and remove the wheel and tire.
3. Remove the cotter pin, castelated nut and the adjustment nut from the front of the strut.
4. With two pry bars approximately 18 inches long, one at each side and at the rear of the front washer, pry it forward to separate the inner sleeve from the outer sleeve. Remove the front insulator from the strut (Fig. 26).
5. Install the new rear washer (large ID), outer sleeve and insulator bushing on the forward end of the strut rod.
6. Position the strut into the crossmember and to the lower suspension arm. Install the strut-to-arm attaching bolts and nuts, and torque them to specification.
7. Install the forward insulator washer (small ID), inner sleeve and adjustment nut on the forward end of the strut. The inner sleeve need not be crimped to the outer sleeve.
8. Install the wheel and tire, remove the safety stands and lower the vehicle. Remove the tool supporting the upper arm.
9. Adjust the caster and camber to specification.
10. Install the castellated nut and cotter pin.

DRIVE SHAFT PINION ANGLE ADJUSTMENT

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

The pinion-drive shaft working angle must be checked and adjusted to

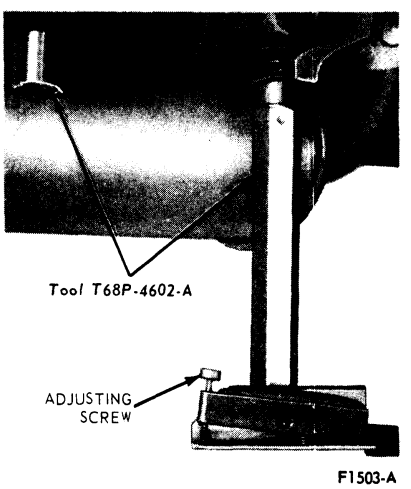


FIG. 15—Positioning Tool On U-Joint

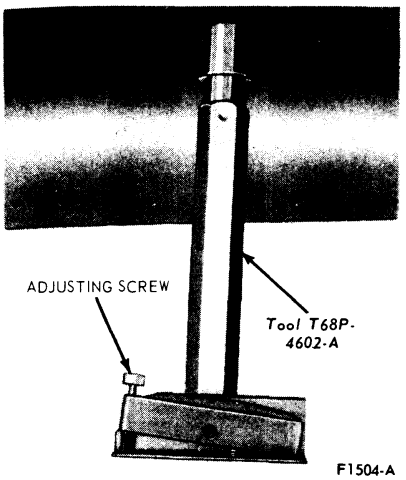


FIG. 16 —Measuring Pinion Angle

specification whenever the rear axle has been removed.

Before checking the drive shaft pinion angle, alignment height spacer (Tool T65P-3000-B or C) must be installed at a height of 4.30 inches (Fig. 14).

Checking Procedure

The checking and adjusting procedure must be done with the weight of the vehicle on the front and rear suspension.

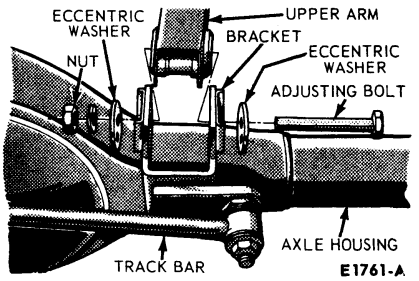


FIG. 17 —Pinion Angle Adjustment

1. Position the magnetized Tool T68P-4602-A on a U-joint bearing cap as shown in Fig. 15.

2. With the tool suspended straight down and the adjusting screw to the left, adjust the dial on the tool until the left-hand edge of the bubble is exactly on the zero line.

3. Position the vee magnet on the drive shaft away from welds and balance weights (Fig. 15).

4. Position the magnetized tool (T68P-4602-A) on the vee magnet with the adjusting screw to the left in the same relative position as it was on the bearing cap (Fig. 16).

5. Read the position of the bubbles left-hand edge on the scale to determine the drive shaft pinion angle. The reading should be 3 1/2 degrees plus 1 degree on Ford, Mercury or Meteor models, 7 1/4 degrees plus 3/4 degree on Thunderbird or Continental Mark III models.

Adjustment

If the pinion angle is not within specifications, adjust the pinion angle as follows:

The upper arm-to-axle housing bolt and two eccentric washers form an adjusting cam mechanism (Fig. 17) which will tilt the axle housing to the required angle.

1. Loosen the upper arm pivot bolt nuts.

2. If the angle is less than specifications, rotate the adjusting cam forward and recheck the angle. If the angle is more than specification, rotate the adjusting cam rearward and recheck the angle.

3. When the axle housing is adjusted in such a way that the drive shaft angle reading is within specification, install new pivot bolt nuts and torque to specification (Fig. 17).

4. Lower the vehicle and road test for proper axle operation.

3 REMOVAL AND INSTALLATION

HOISTING INSTRUCTIONS

Damage to steering linkage components and front suspension struts may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the lower arms or the No. 1 crossmember. Do not allow the adapters to contact the steering linkage. If the adapters are placed under the crossmember, a piece of wood (2 x 4 x 16 inches) should be placed on the hoist channel between the adapters. This will prevent the adapters from damaging the front suspension struts.

FRONT SPRING REPLACEMENT

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

Removal

1. Raise the vehicle and support the front end of the frame with jack stands.

2. Place a jack under the lower arm to support it.

3. Disconnect the lower end of the shock absorber from the lower arm.

4. Remove the bolts that attach the strut and the rebound bumper to the lower arm.

5. Disconnect the lower end of the sway bar stud from the lower arm.

6. Remove the nut and bolt that secures the inner end of the lower arm to the crossmember.

7. Carefully lower the jack slowly to relieve the spring pressure on the lower arm, then remove the spring (Fig. 18).

Installation

1. Position the spring on the lower arm so that the lower end properly engages the seat.

2. Raise the lower arm carefully with a jack while guiding the inner end to align with the bolt hole in the crossmember. Insert the attaching bolt in the rear of the crossmember and

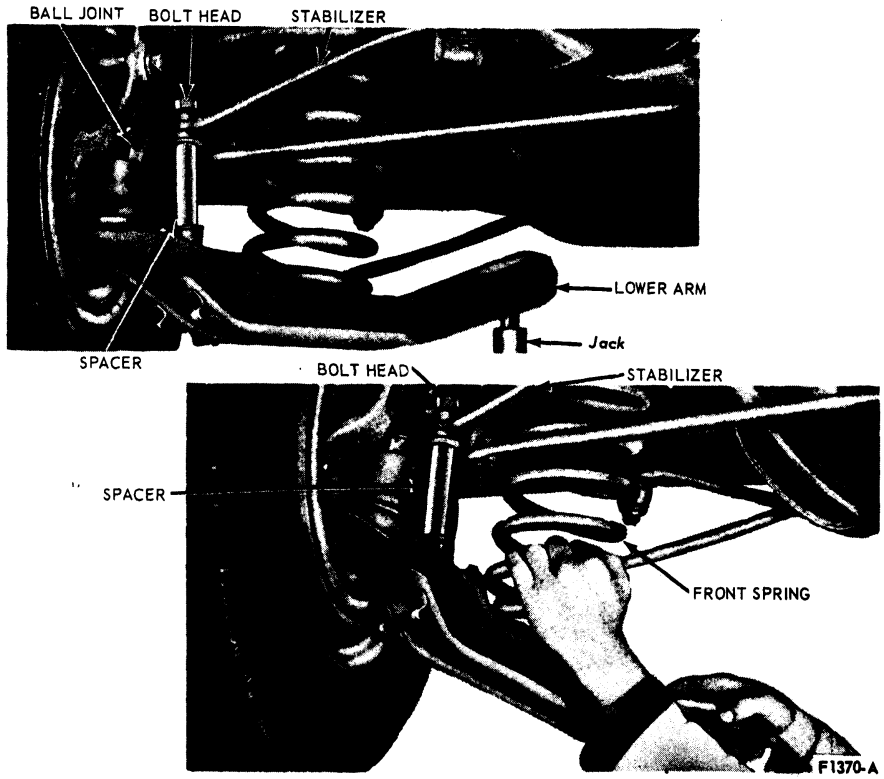


FIG. 18 —Removing or Installing Front Spring

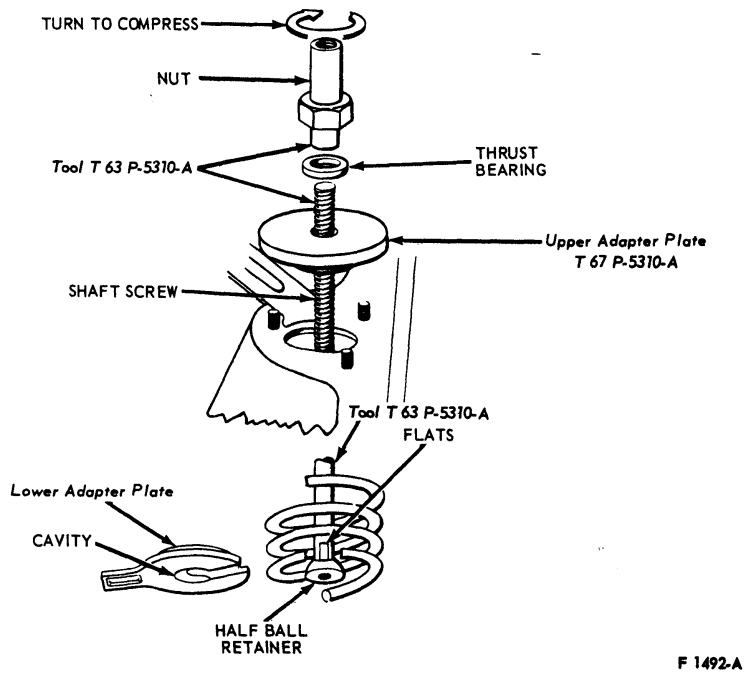


FIG. 19 —Spring Tool Installation

through the lower arm. Install and torque the nut to specification.

3. Secure the lower end of the shock absorber to the lower arm with the two attaching bolts.

4. Secure the strut and the rebound bumper to the lower arm with the two attaching bolts. Torque the bolts to specification

5. Connect the sway bar to the lower arm with the attaching washer and insulators as shown in Fig. 1. Torque the nut to specification.

6. Check the front end alignment and adjust it to the recommended specifications if required.

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

Removal

1. Remove the shock absorber and upper mounting bracket as an assembly.

2. Raise the vehicle on a hoist, install safety stands, and remove the wheel cover or hub cap.

3. Remove the grease cap from the hub; then, remove the cotter pin, nut lock, adjusting nut and outer bearing from the hub.

4. Pull the wheel, tire and the hub and drum off the spindle as an assembly.

5. Install the spring compressor tool as shown in Figs. 19, 20 and 21.

6. Remove 2 upper arm-to-spring tower attaching nuts and swing the upper arm outboard from the spring tower (Fig. 21).

7. Release the spring compressor tool and remove the tool from the spring. Then, remove the spring from the vehicle.

Installation

1. Place the spring upper insulator on the spring and secure in place with tape.

2. Position the spring in the spring tower. Install the spring compressor, (Fig. 19) and compress the spring.

3. Swing the upper arm inboard and insert the bolts through the holes in the side of the spring tower. Then, install the attaching nuts and torque them to specification.

4. Release the spring pressure and guide the spring into the upper arm spring seat. **The end of the spring must seat against the tab on the spring seat.**

5. Remove the spring compressor and position the wheel, tire, and hub and drum on the spindle.

6. Install the bearing, washer, adjusting nut and lock nut. Adjust the wheel bearing as outlined in Part 3-12 and install the cotter pin, grease cap, and hub cap or wheel cover.

7. Lower the vehicle and install the shock absorber and upper mounting bracket.

8. Check caster, camber, and toe-in and adjust as necessary (Part 3-1).

FRONT SPRING AND LOWER ARM

LINCOLN CONTINENTAL

Removal

1. Raise the vehicle. Place a support under each underbody side rail to the rear of the lower arm in the lifting pad area.
2. Remove the wheel and tire from the hub.
3. Remove 2 bolts and washers that attach the caliper to the spindle. Remove the caliper from the rotor and wire it to the underbody to prevent damage to the brake hose.
4. Remove the hub and rotor from the spindle.
5. Loosen the splash shield to provide clearance at the end of the arm when it is lowered.
6. Remove the shock absorber.
7. Disconnect the stabilizing strut (drag strut) from the lower arm.
8. Disconnect the stabilizer bar from the suspension bar.
9. Remove the cotter pin from the slotted nut attaching the lower ball joint to the end of the spindle boss. Loosen the nut one to two turns.
10. Place a box wrench over the lower end of the ball joint remover tool, and position the tool as in Fig. 13. The tool should seat firmly against the ends of both studs, and not against the lower stud nut.
11. Turn the wrench until both studs are under tension, then, tap the spindle with a hammer near the lower stud to loosen it from the spindle. **Do not loosen the stud with tool pressure alone.**
12. Place a jack under the outer end of the lower arm and raise the arm several inches.
13. Install the spring compressor Tool 5310-A (Fig. 23) inside the spring with the jaws of the tool toward the center of the vehicle.
14. Remove the nut from the ball joint stud. Lower the jack until the spindle and spring are free, and remove the spring and insulators.
15. Remove the lower arm- to-crossmember nut, bolt, washers, and spacer, then remove the arm.

Installation

1. Connect the inner end of the lower arm to the underbody crossmember. **Do not tighten the attaching nut at this time.** Refer to Fig. 22.

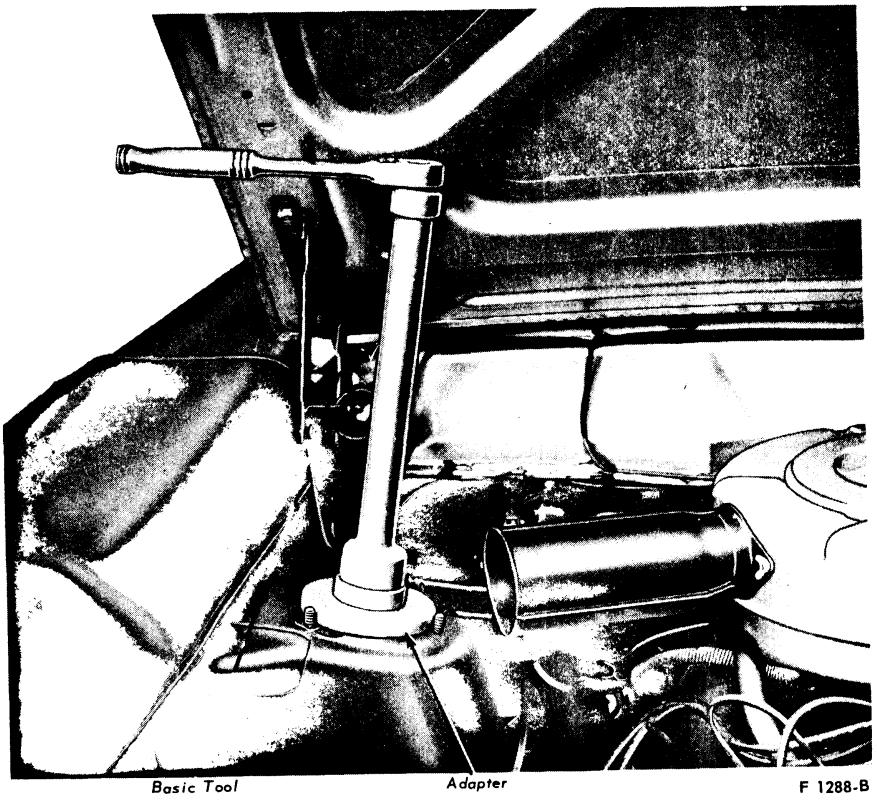


FIG. 20—Spring Compressor Tool Installed—Upper View—Typical

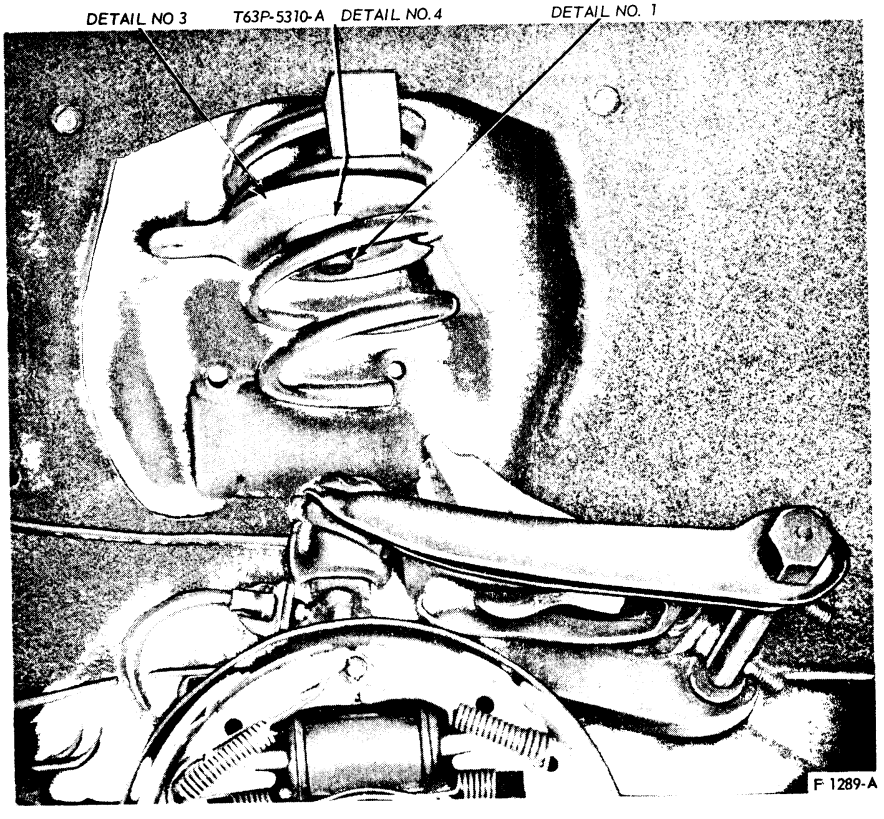


FIG. 21—Compressing Spring—Lower View—Montego, Falcon and Fairlane

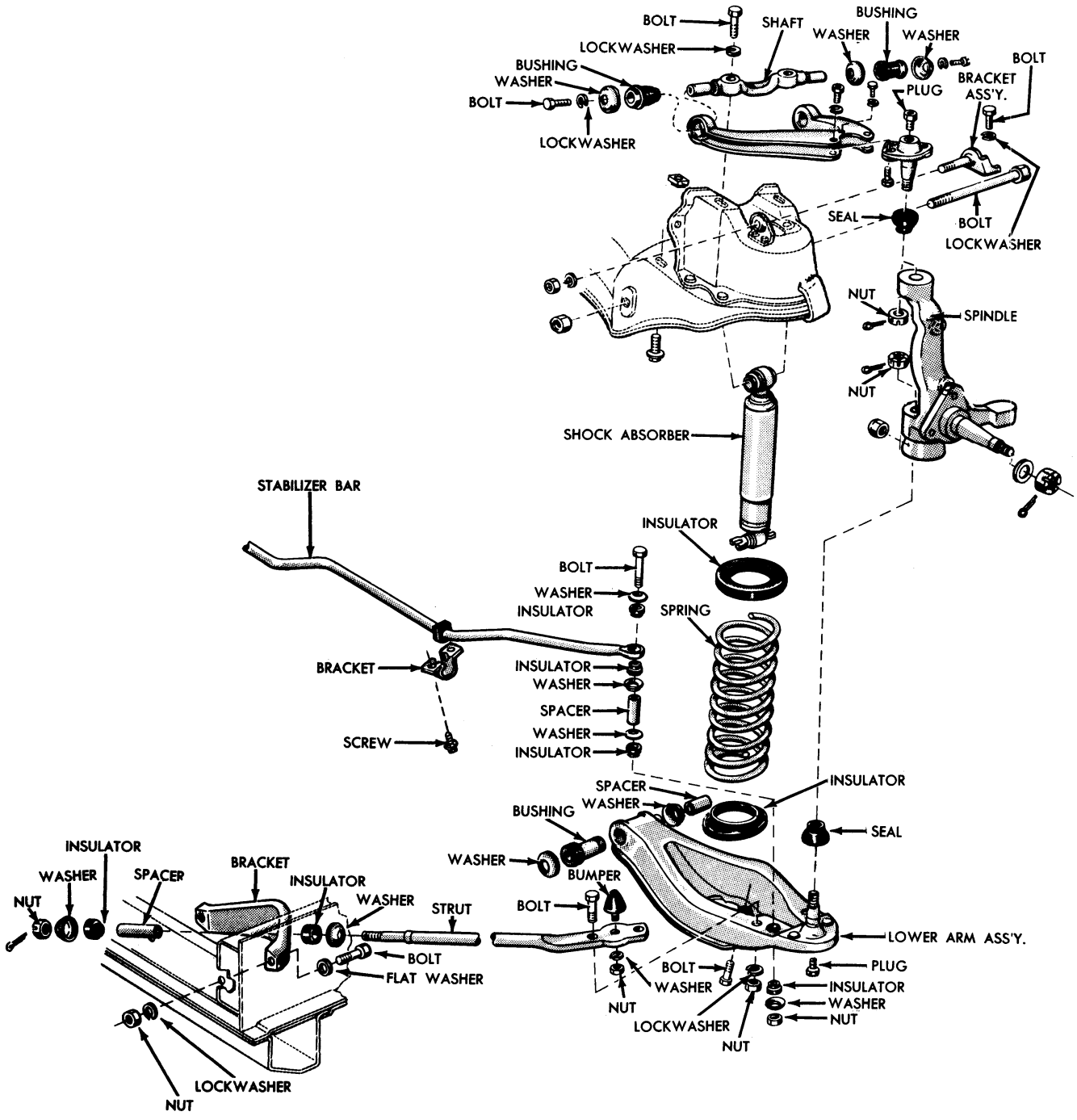


FIG. 22—Front Suspension Components

2. Place a jack under the outer end of the arm.
3. Tape the upper and lower spring insulators to the spring.
4. Compress the coil spring with Tool 5310-A (Fig. 23) and place the spring and insulators in position. Be sure both ends of the spring are properly seated, and raise the arm. Guide the spindle boss over the ball joint stud.
5. Install the ball joint stud retaining nut and torque it to specification. Continue tightening the nut to line up the cotter pin hole. Install a new cotter pin.
6. Connect the stabilizer bar to the lower arm. Torque the nut to specification.
7. Connect the drag strut to the lower arm. Torque the nuts to specification.
8. Install the shock absorber.
9. Tighten the splash shield attaching bolts to specifications.
10. Install the hub and rotor on the spindle and adjust the wheel bearings.
11. Install the caliper to the spindle and tighten the attaching bolts to specifications. Check for the correct flexible hose routing (Part 2-2).
12. Install the wheel and tire on the hub. Torque the wheel lug nuts to specifications and remove the support stands.
13. With the front end weight of the car on the wheels, torque the lower arm-to-crossmember bolt attaching nut to specification.



FIG. 23—Coil Spring Compressed for Installation

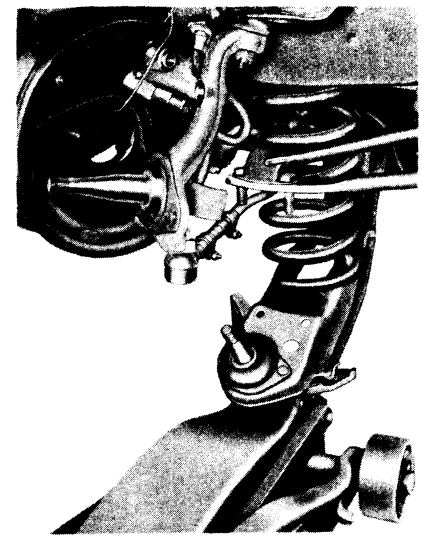


FIG. 24—Removing Front Spring —Lower Arm Replacement

FRONT SUSPENSION LOWER ARM

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

Removal

1. Raise the front of the vehicle and position safety stands under both sides of the frame just back of the lower arms.
2. Remove the hub cap or wheel cover.
3. If equipped with drum type brakes—Remove the wheel and tire and brake drum as an assembly. Remove the brake backing plate attaching bolts and remove the backing plate from the spindle. Wire the backing plate to the underbody to prevent damage to the brake hose.
4. If equipped with disc brakes—Remove the wheel and tire from the hub. Remove 2 bolts and washers that attach the caliper and brake hose to the spindle. Remove the caliper from the rotor and wire it to the underbody to prevent damage to the brake hose. Then, remove the hub and rotor from the spindle.
5. Disconnect the lower end of the shock absorber, and push it up to the retracted position.
6. Disconnect the stabilizer bar link from the lower arm.
7. Remove the cotter pins from the upper and lower ball joint stud nuts.
8. Remove 2 bolts and nuts attaching the strut to the lower arm.
9. Loosen the lower ball joint stud nut one or two turns. **Do not remove the nut from the stud at this time.**
10. Install Tool T57P-3006-A between the upper and lower ball joint studs (Fig. 7). **The tool should be seated firmly against the ends of both studs and not against the stud nuts.**
11. With a wrench, turn the adapter screw until the tool places the stud under tension. Tap the spindle near the lower stud with a hammer to loosen the stud in the spindle. **Do not loosen the stud from the spindle with tool pressure only.**
12. Position a floor jack under the lower arm (Fig. 24) and remove the lower ball joint stud nut.
13. Lower the floor jack and remove the spring and insulator (Fig. 25).
14. Remove one nut and bolt attaching the lower control arm to the No. 2 crossmember and remove the lower arm (Fig. 24).

Installation

1. Position the lower arm to the No. 2 crossmember and loosely install the attaching bolt and nut (Fig. 1).
2. Position the spring and insulator to the upper spring pad and lower arm. Using a floor jack, compress the spring and guide the lower ball joint stud into the spindle hole.
3. Install the ball joint stud attaching nut and torque to specification. Continue to tighten the nut until the cotter pin hole is in line with the nut slots. Install a cotter pin in the upper and lower ball joint studs.
4. Pull the shock absorber down and connect it to the lower arm.
5. Position the strut and bumper to the lower arm. Install the attaching bolts and nuts and torque to specification.
6. Torque the lower arm to No. 2 crossmember attaching bolt and nut to specifications.
7. Position the stabilizer bar link to the lower arm and install the attaching nuts.
8. If equipped with drum type brakes—Position the brake backing plate to the spindle and install the attaching bolts. Torque the bolts to specification. Adjust the brakes as outlined in Group 2. Install the wheel, tire, and drum to the spindle and adjust the wheel bearings as outlined in Part 3-12.

If equipped with disc brakes-Install the hub and rotor on the spindle. Position the caliper over the rotor and install the attaching bolts. Torque the bolts to specification. Install the wheel and tire on the wheel hub and adjust the wheel bearings as outlined in Part 3-12.

9. Install the hub cap or wheel cover.
10. Remove the safety stands and lower the vehicle.
11. Check the caster, camber, and toe-in and adjust as required (Section 2, Part 3-1).

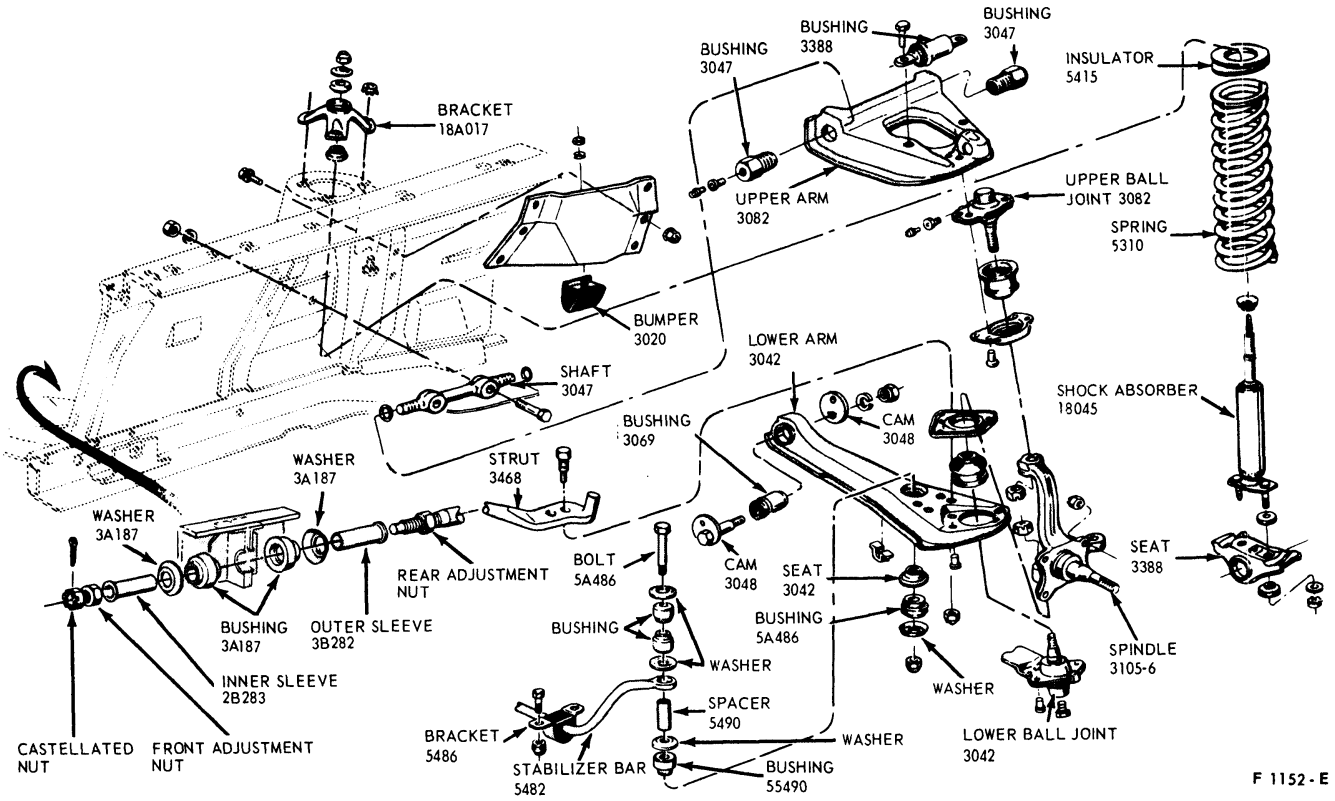


FIG. 25 —Front Suspension Assembly

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

Removal

1. Position a support between the upper arm and side rail as shown in Figs. 8 and 9).
2. Raise the vehicle, position safety stands, and remove the wheel and tire.
3. Remove the stabilizer bar and link attaching nut. Disconnect the bar from the link, and remove the link bolt
4. Remove the strut to lower arm attaching nuts and bolts.
5. Remove the cotter pin from the nut on the lower ball joint stud, and loosen the nut one or two turns. **Do not remove the nut from the stud at this time.**
6. Straighten the cotter pin on the upper ball joint stud nut. Position the ball joint remover tool between the upper and lower ball joint studs in the reverse position from that shown in Fig. 10. **The tool should seat firmly against the ends of both studs and not against the stud nuts.**
7. Turn the tool with a wrench until the tool places the studs under considerable tension, and hit the spindle near the lower stud smartly with a hammer to break the stud loose in the spindle. **Do not loosen the stud in the spindle with tool pressure only.** If both arms are being removed, loosen the upper stud in the same manner as the lower stud.
8. Remove the nut from the lower ball joint stud, and lower the arm.
9. Remove the lower arm to underbody pivot bolt, nut and washer. Remove the lower arm.

Installation

1. Position the lower arm to the underbody bracket and install the pivot bolt, washer, and nut loosely.
2. Raise the lower arm, guide the lower ball joint stud into the spindle bore, and install the stud attaching nut loosely.
3. Install the stabilizer link bolt, washers, bushings and spacer. Connect the stabilizer bar to the link. Install the attaching nut and torque to specifications (Fig. 25).
4. Position the strut to the lower arm. Install the attaching bolts and nuts, and torque to specification.
5. Torque the lower ball joint stud nut to specification, continue to tighten the nut until the cotter pin hole and slots are aligned, and install a new cotter pin.
6. Torque the lower arm- to-underbody pivot bolt and nut to specification.
7. Remove the safety stands and lower the vehicle.
8. Remove the support from between the upper arm and frame.
9. **Check and, if necessary, adjust caster, camber, and toe-in.**

FRONT SUSPENSION UPPER ARM

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

Removal

1. Raise the front of the vehicle and position safety stands under both sides of the frame just back of the lower arm.
2. Remove the hub cap or wheel cover.
3. If equipped with drum type brakes—remove the wheel and tire and brake drum as an assembly (Part 3-12).
4. If equipped with disc brakes—remove the wheel and tire from the hub.

5. Remove the cotter pin from the upper ball joint stud nut.

6. Loosen the upper ball joint stud nut one or two turns. **Do not remove the nut from the stud at this time.**

7. Install tool T57P-3006-A between the upper and lower ball joint studs with the adapter screw on top (Fig. 13). **The tool should be seated firmly against the ends of both studs and not against the nuts or lower stud cotter pin.**

8. With a wrench, turn the adapter screw until the tool places the stud under tension. Tap the spindle near the upper stud with a hammer to loosen the stud in the spindle. **Do not loosen the stud from the spindle with tool pressure only.**

9. Remove the tool from between the ball joint studs and place a floor jack under the lower arm.

10. Raise the floor jack to relieve the pressure from the upper ball joint stud nut and remove the nut.

11. Remove the upper arm inner shaft attaching bolts. Remove the upper arm and inner shaft as an assembly (Fig. 1).

12. Remove the bumper from the upper arm.

Installation

1. Position the bumper to the upper arm and install the nut and washer. Torque the nut to specifications.

2. Position the upper arm inner shaft to the frame side rail and install the 2 attaching bolts and washers snug.

3. Connect the upper ball joint stud to the spindle and install the attaching nut. Torque the nut to specification and continue to tighten the nut until the cotter pin hole in the stud is in line with the nut slots. Then, install the cotter pin.

4. If equipped with drum type brakes—Adjust the brakes as outlined in Part 2-2. Install the wheel, tire, and drum to the spindle and adjust the wheel bearings as outlined in Part 3-12.

5. If equipped with disc brakes—Install the wheel and tire on the hub and adjust the wheel bearings as outlined in Part 3-12.

6. Install the hub cap or wheel cover.

7. Remove the safety stands and lower the front of the vehicle.

8. Check caster, camber, and toe-in and adjust as required (Section 2, Part 3-1).

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

Removal

1. Raise the front of the vehicle, position safety stands under the frame, and lower the vehicle slightly.

2. Remove the wheel and tire.

3. Remove the shock absorber lower attaching nuts and washers.

4. Remove the shock absorber upper mounting bracket attaching nuts, and remove the shock absorber and bracket as an assembly (Fig. 26).

On all 8-cylinder vehicles, remove the air cleaner to obtain access for tool installation.

5. Install the spring compressor tool and compress the spring (Figs. 19, 20 and 21).

6. Position a safety stand under the lower arm.

7. Remove the cotter pin from the nut on the upper ball joint stud, and loosen the nut one or two turns. **Do not remove the nut from the stud at this time.**

8. Position the ball joint remover tool between the upper and lower ball joint studs as shown in Fig. 10. **The tool should seat firmly against the ends of both studs and not against the stud nuts.**

9. Turn the tool with a wrench until the tool places the studs under considerable tension; then, hit the spindle smartly near the upper stud with a hammer to break the stud loose in the spindle. **Do not loosen the stud in the spindle with tool pressure only.** If both arms are being removed, loosen the lower stud in the same manner as the upper stud.

10. Remove the nut from the upper stud and lift the stud out of the spindle.

11. Remove the upper arm inner shaft attaching nuts from the engine compartment, and remove the upper arm.

12. Wipe off all loose dirt from the upper arm parts. **Do not wash the ball joint with a solvent.**

Installation

1. Position the upper arm on the underbody mounting bracket, and install the nuts and lock washers on the two inner shaft attaching bolts. **The specified keystone-type lock washers must be used.** Torque the nuts to specification.

2. Position the upper ball joint stud in the top of the wheel spindle, and install the stud nut. Torque the nut to specification, and continue to tighten it until the cotter pin hole and slots line up. Install a new cotter pin.

3. Release the coil spring, remove the tool, and install the front shock absorber and the wheel and tire.

LINCOLN CONTINENTAL

Removal

1. Place a jack under the outer end of the suspension lower arm and raise the arm. Refer to Fig. 22.

2. Remove the wheel and tire.

3. Remove the cotter pin from the upper ball joint stud. Loosen the nut one or two turns.

4. Place a box wrench over the lower end of the ball joint remover tool, and position the tool as in Fig. 13. The tool should seat firmly against the ends of both studs, and not against the upper stud nut.

5. Turn the wrench until both studs are under tension, and then, tap the spindle with a hammer near the upper stud to loosen it from the spindle. **Do not loosen the stud with tool pressure alone.** Remove the nut.



FIG. 26—Removing or Installing Front Shock Absorber—Typical

6. Raise the upper arm to free the ball joint stud from the spindle. Wire the upper end of the spindle to the underbody to prevent damage to the brake hose.

7. Mark the position of the upper arm shaft on the underbody member to facilitate making caster and camber adjustments after installation of the upper arm.

8. Remove the suspension upper arm-to-underbody attaching bolts, lock washers, and attaching nuts. Then, remove the upper arm.

Installation

1. Position the upper arm shaft on the underbody member. Line up the shaft with the marks made before removal of the arm.

2. Install the attaching bolts and lock washers. FABRICATE A TOOL, AS SHOWN IN Fig. 27, to hold the nut in place while starting the attaching bolt into the nut. Remove the tool; then, tighten the attaching bolts to specification.

3. Guide the ball joint stud into the spindle. Install the attaching nut and torque it to specification. Continue tightening the nut to line up the cotter pin hole. Install a new cotter pin.

4. Install the wheel and tire, and torque the wheel lug nuts to specification.

5. With the front end weight of the car on the wheels, torque the bolts at the ends of the upper arm shaft to specification if the bushings were replaced.

6. Check the front wheel alignment.

FRONT WHEEL SPINDLE

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

Removal

1. Raise the vehicle until the front wheel clears the floor, and place a support under the frame.

2. Remove the hub cap or wheel cover.

3. If equipped with drum type brakes—remove the wheel and tire and brake drum as an assembly (Part 3-12). Remove the brake backing plate attaching bolts and remove the backing plate from the spindle. Wire the backing plate to the underbody to prevent damage to the brake hose.

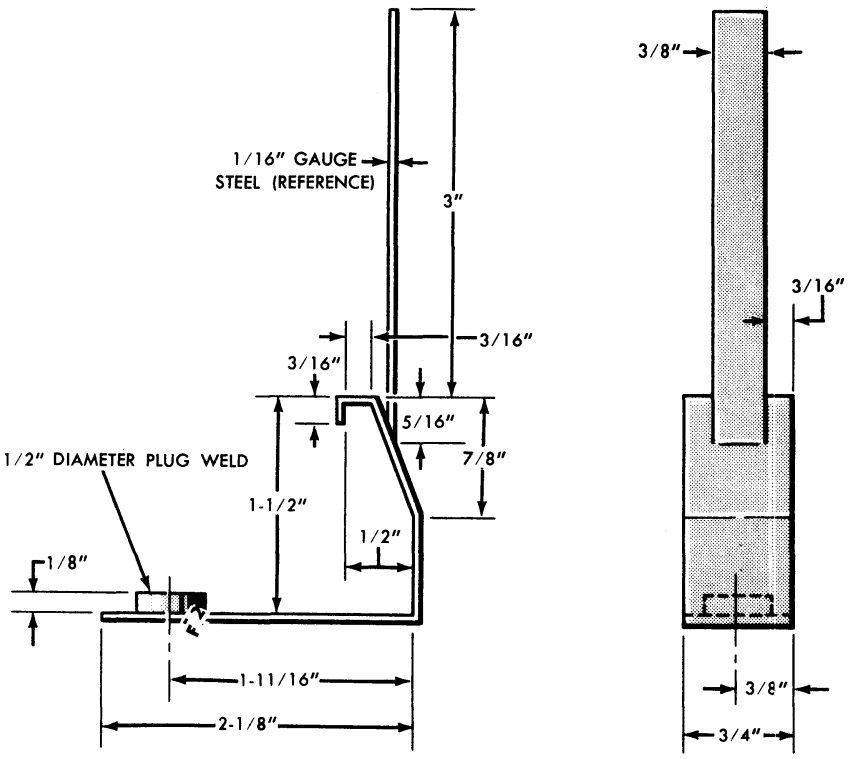


FIG. 27 —Upper Arm Shaft Installing Tool

4. If equipped with disc brakes—remove the wheel and tire from the hub. Remove 2 bolts and washers retaining the caliper and brake hose to the spindle. Remove the caliper from the rotor and wire it to the underbody to prevent damage to the brake hose. Then, remove the hub and rotor from the spindle (Part 3-12). Remove 3 bolts attaching the splash shield to the spindle and remove the splash shield.

5. Remove the steering connecting rod from the spindle arm with tool OTC462.

6. Remove the cotter pins from both ball joint stud nuts, and loosen the nuts one or two turns. **Do not remove the nuts from the studs at this time.**

7. Install the ball joint remover tool between the upper and lower ball joint studs (Fig. 7). **The tool should seat firmly against the ends of both studs and not against the stud nuts.**

8. Turn the tool nut with a wrench until the tool places the studs under tension, and, with a hammer, tap the spindle near the stud to loosen them in the spindle. **Do not loosen the studs in the spindle with tool pressure only.**

9. Position a floor jack under the lower control arm.

10. Remove the ball joint stud nuts and lower the lower arm enough to remove the spring and the spindle.

Installation

1. Position the spindle to the lower ball joint stud and install the attaching nut. Torque the nut to specification. Continue to tighten the nut until the cotter pin hole is in line with the slots in the nut. Then, install the cotter pin.

2. Position the spring and raise the lower arm and guide and upper ball joint stud into the spindle hole and install the attaching nut. Torque the nut to specification and install the cotter pin as outlined in the preceeding step.

3. Remove the floor jack from under the lower arm.

4. Attach the steering connecting rod to the spindle and install the nut. Torque the nut to specification. Continue to tighten the nut until the cotter pin hole is in line with the slots in the nut. Then, install the cotter pin.

5. If equipped with drum type brakes—Position the brake backing plate to the spindle and install the attaching bolts. Torque the bolts to specification. Adjust the brakes as outlined in Part 2-2. Install the wheel, tire, and drum to the spindle and adjust the wheel bearings as outlined in Part 3-12).

6. If equipped with disc brakes—Install the splash shield on the spindle and torque the attaching bolts to specification (Part 3-13). Install the

hub and rotor on the spindle. Position the caliper over the rotor and install the attaching bolts. Torque the bolts to specification (Part 3-13). Install the wheel and tire on the hub and adjust the wheel bearings as outlined in Part 3-12 .

7. Install the hub cap or wheel cover. Then, remove the support stand and lower the vehicle.

8. Check caster, camber, and toe-in (Part 3-1) and adjust as necessary.

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

Drum Brakes

Removal

1. Position a support between the upper arm and frame as shown in Figs. 8 and 9; then, raise the vehicle and position safety stands.
2. Remove the hub cap or wheel cover.
3. Remove the grease cap from the hub; then, remove the adjusting nut, washer, and outer bearing cone and roller assembly.
4. Pull the wheel, hub, and drum assembly off the wheel spindle.
5. Remove the brake backing plate from the spindle. Support the plate to prevent damage to the brake hose.
6. Disconnect the spindle connecting rod end from the spindle arm using Tool 3290-C.
7. Remove the cotter pins from both ball joint stud nuts, and loosen the nuts one or two turns. **Do not remove the nuts from the studs at this time.**
8. Position the ball joint remover tool between the upper and lower ball joint studs (Fig. 10). **The tool should seat firmly against the ends of both studs and not against the stud nuts.**
9. Turn the tool with a wrench until the tool places the studs under considerable tension, and, with a hammer, hit the spindle smartly near the studs to break them loose in the spindle. **Do not loosen the studs in the spindle with tool pressure alone.**
10. Remove the stud nuts and remove the spindle from both studs.

Installation

1. Position the spindle on the lower ball joint stud and install the stud nut (Fig. 25).
2. Raise the lower suspension arm and guide the upper ball joint stud into the spindle. Install the stud nut.
3. Torque the upper stud nut and then the lower stud nut to specification. Continue to tighten both nuts until the cotter pin holes and slots line up. Install new cotter pins.
4. Connect the spindle connecting rod end to the spindle arm.
5. Install the brake backing plate on the spindle, and torque the bolts to specification.
6. Install the wheel and drum and adjust the wheel bearing (Part 3-12).
7. Remove the safety stands, and lower the vehicle.
8. Remove the support from between the upper arm and frame.
9. **Check and, if necessary, adjust caster, camber, and toe-in.**

Disc Brakes

Removal

1. Remove the hub cap or wheel cover, and remove the wheel and tire from the hub.
2. Remove two bolts attaching the caliper to the spindle. Remove the caliper from the rotor and wire it to the underbody to prevent damage to the brake hose.
3. Remove the grease cap from the hub, then, remove the adjusting nut, washer, and outer bearing cone and roller assembly.
4. Pull the hub and rotor assembly off the wheel spindle.
5. Remove the three caliper shield attaching bolts and remove the shield.
6. Disconnect the spindle connecting rod end from the spindle arm using Tool-3290-C.
7. Remove the cotter pins from both ball joint stud nuts, and loosen the nuts one or two turns. **Do not remove the nuts from the studs at this time.**
8. Position the ball joint remover tool between the upper and lower ball joint studs (Fig. 10). **The tool should seat firmly against the ends of both studs and not against the stud nuts.**
9. Turn the tool with a wrench until the tool places the studs under considerable tension, and, with a hammer, hit the spindle smartly near the studs to break them loose in the spindle. **Do not loosen the studs in the spindle with tool pressure alone.**
10. Position a floor jack under the lower suspension arm.
11. Remove the upper and lower ball joint stud nuts; lower the jack and remove the spindle.

Installation

1. Position the spindle on the lower ball joint stud and install the stud nut (Fig. 25). Torque the nut to specification and install the cotter pin.
2. Raise the lower suspension arm, and guide the upper ball joint stud into the spindle. Install the stud nut.
3. Torque the nut to specifications and install the cotter pin. Then, remove the floor jack.
4. Connect the spindle connecting rod end to the spindle arm and install the attaching nut. Torque the nut to specification and install the cotter pin.
5. Position the caliper splash shield to the spindle and install the attaching bolts and nuts. Torque the nuts and bolts to specification.
6. Install the hub and rotor on the spindle.
7. Position the caliper to the rotor and spindle and install the attaching bolts. Torque the bolts to specification and install the safety wire.
8. Install the wheel and tire on the hub and adjust the wheel bearing (Part 3-12).
9. Install the hub cap or wheel cover.
10. Before driving the vehicle, pump the brake pedal several times to obtain normal brake lining-to-rotor clearance and restore normal brake pedal travel.

LINCOLN CONTINENTAL

Removal

1. Raise the vehicle. Place a support under each side rail to the rear of the lower arm in the lifting pad area.
2. Remove the wheel and tire from the hub.
3. Remove 2 bolts and washers that attach the caliper to the spindle. Remove the caliper from the rotor and wire it to the underbody to prevent damage to the brake hose.
4. Remove the hub and rotor from the spindle.
5. Remove the splash shield and gasket from the spindle.
6. Disconnect the spindle arm connecting rod from the spindle arm with Tool 3290-C. See Fig. 23.
7. Remove the cotter pins from both ball joint stud nuts. Loosen the nuts one to two turns.

8. Place a box wrench over the lower end of the ball joint remover tool, and position the tool as in Fig. 13. The tool should seat firmly against the ends of both studs, and not against the stud nuts.

9. Turn the wrench until both studs are under tension, and then, tap the spindle with a hammer near the studs to loosen them from the spindle. **Do not loosen the studs with tool pressure alone.**

10. Place a jack under the outer end of the lower arm, and raise the arm several inches. Remove both ball stud nuts, and remove the spindle.

Installation

1. Position the new spindle onto the upper and lower ball joint studs, install the stud nuts and tighten the nuts to specifications. Continue to tighten both nuts until the cotter pin holes line up with the slots, then install new cotter pines.

2. Connect the spindle connecting rod to the spindle arm. Install the retaining nut and tighten the nut to specification. Continue to tighten the nut until the cotter pin hole lines up with the slot, then install a new cotter pin.

3. Install the gasket and splash shield on the spindle. Tighten the attaching bolts to specifications.

4. Install the hub and rotor on the spindle.

5. Install the caliper to the spindle and tighten the attaching bolts to specifications. Check for the correct flexible hose routing (Part 2-2).

6. Install the wheel and tire and adjust the wheel bearings (Part 3-12).

7. Lubricate the steering stop on the lower arm and the mating flat on the spindle with the specified lubricant.

8. Remove the safety stands, lower the car and check camber, caster and toe-in.

FRONT SHOCK ABSORBER REPLACEMENT

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

1. Remove the nut, washer, and bushing from the shock absorber upper end.

2. Raise the vehicle on a hoist and install safety stands.

3. Remove 2 bolts attaching the shock absorber to the lower arm and remove the shock absorber.

4. Place a washer and bushing on the shock absorber top stud and position the shock absorber inside the front spring. Install the 2 lower attaching bolts and torque them to specifications.

5. Remove the safety stands and lower the vehicle.

6. Place a bushing and washer on the shock absorber top stud and install the attaching nut. Torque it to specification.

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

Removal

1. Raise the hood and remove 3 shock absorber upper mounting bracket-to-spring tower attaching nuts.

2. Raise the front of the vehicle and place safety stands under the lower arms.

3. Remove 2 shock absorber lower attaching nuts and washers.

4. Lift the shock absorber and upper bracket from the spring tower (Fig. 26) and remove the bracket from the shock absorber.

Installation

1. Install the upper mounting bracket on the shock absorber and torque to specification.

2. Position the shock absorber and upper mounting bracket in the spring tower, making sure the shock absorber lower studs are in the pivot plate holes.

3. Install the 2 washers and attaching nuts on the shock absorber lower studs and torque to specification.

4. Install the 3 shock absorber upper mounting bracket-to-spring tower attaching nuts and torque to specification. Then, remove the safety stands and lower the vehicle.

LINCOLN CONTINENTAL

Removal

1. Remove the stud nut at the upper eye of the shock absorber. Remove the upper eye stud bracket to crossmember attaching bolt and remove the stud bracket. Refer to Fig. 22.

2. Remove the bolts which attach the shock absorber to the suspension lower arm. Lower, and remove the shock absorber.

3. Examine the shock absorber unit and rubber bushings. Replace parts that are defective, deteriorated, or worn.

Installation

1. Fully extend the shock absorber and position it inside the coil spring. Connect the lower end of the shock absorber to the suspension lower arm. Torque the attaching nuts to specification.

2. Insert the upper bracket stud through the bushing in the shock absorber upper eye. Install the stud bracket to crossmember attaching bolt. **Do not tighten the bolt at this time.**

3. Install the upper eye bracket stud nut. Torque the nut to specification.

4. Torque the stud bracket- to-crossmember attaching bolt to specification. **The shock absorber upper eye stud nut must be tightened to compress the rubber bushing before the stud bracket is bolted to the crossmember; otherwise, the upper attachment could be loose and noisy.**

REAR SHOCK ABSORBER REPLACEMENT

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

1. Raise the vehicle on a hoist.

2. Remove the shock absorber attaching nut, washer and insulator from the upper stud at the upper side of the spring upper seat. Compress the shock absorber to clear the hole in the spring seat, and remove the inner insulator and washer from the upper attaching stud.

3. Remove the self-locking attaching nut, and disconnect the shock absorber lower stud from the mounting bracket on the rear axle housing (Fig. 4).

4. Expel all air by performing step 3 On Vehicle Tests in Part 3-1.

5. Place the inner washer and insulator on the upper attaching stud, and position the shock absorber so that the upper attaching stud enters the hole in the spring upper seat. While holding the shock absorber in this position, install the outer insulator and

washer and the nut on the upper stud from the upper side of the spring upper seat. Torque the nut to specifications.

6. Extend the shock absorber and locate the lower stud in the hole in mounting bracket on the rear axle housing. Install a new self-locking attaching nut and torque to specification.

MUSTANG AND COUGAR

Removal

1. Disconnect the shock absorber from the spring clip plate (Fig. 30).
2. Remove the shock absorber access cover from the luggage compartment (Fig. 28). (On convertible models, remove the rear seat and seat back to reach the access cover.)

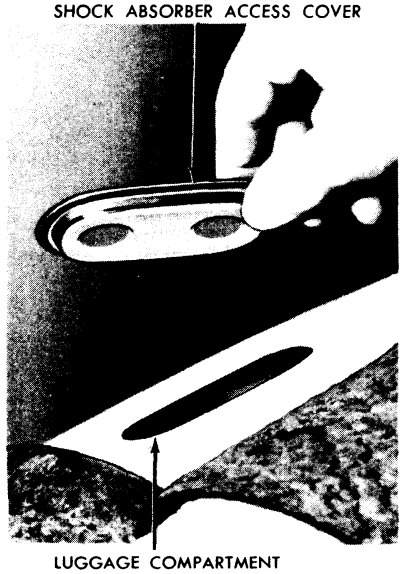


FIG. 28—Rear Shock Absorber Access Cover

3. Remove the shock absorber upper attaching nut.
4. Compress the shock absorber and remove it from the vehicle. Remove the bushings and washers from the shock absorber studs.

Installation

1. Place the bushing and inner washer on the shock absorber stud.
2. Connect the upper stud to the mounting, and install the bushing, outer washer, and new nut on the stud. Torque the nut to specification, and install the cover.
3. Connect the lower stud to the spring clip plate, and install the bushing, outer washer, and new nut on the stud. **Be sure that spring clip plate is free of burrs.** Tighten the nut to specification.

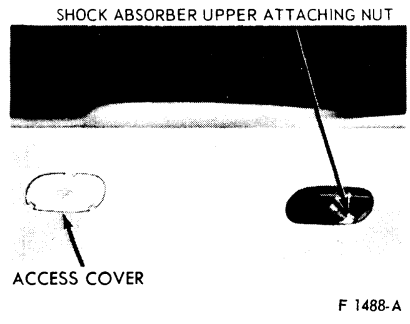


FIG. 29—Rear Shock Absorber Upper Mounting

MONTEGO, FALCON, AND FAIRLANE (EXCEPT CONVERTIBLE)

Removal

1. Open the luggage compartment door, and remove the spare wheel and tire.

On the Ranchero, remove the attaching screws, and lift the forward half of the floor panel from the body; then, remove the access cover from the opening in the floor pan over the shock absorber.

On station wagons, remove the access cover from the opening in the seat riser over the shock absorber.

2. Fold back the floor mat and remove the shock absorber access cover from the floor pan. Remove the nut, outer washer, and rubber bushing that attach the shock absorber to the upper mounting in the floor pan (Fig. 29).
3. Raise the vehicle and remove the attaching nut, outer washer and bushing from the shock absorber at the spring clip plate (Fig. 30). Compress the shock absorber and remove it from the vehicle.
4. If the shock absorber is serviceable and requires new bushings, remove the inner bushings and washers from the shock absorber studs.

Installation

1. Place the inner washer and bushing on each shock absorber stud.
2. Expand the shock absorber and position it to the spring clip plate and to the mounting in the floor pan.
3. Connect the lower stud to the spring clip plate, and install the bushing, outer washer, and new nut on the stud (Fig. 30). **Be sure the spring clip plate is free of burrs.**

On the Ranchero, after tightening the nut to specification, install the forward half of the floor panel.

4. From the luggage compartment, install the bushing outer washer and new attaching nut to the upper mounting stud (Fig. 29). Torque to specification. On a station wagon, replace the floor bed panel (14 screws).
5. Place the spare wheel and tire in the luggage compartment, and secure it in the storage position.

MONTEGO AND FAIRLANE CONVERTIBLE

Removal

1. Remove the rear seat cushion and seat back.
2. Partially raise the vehicle on a hoist. With an assistant under the vehicle holding the shock absorber, remove the nut from the top of the shock absorber.
3. Remove the lower shock absorber attaching nut and remove the shock absorber.

Installation

1. Position the washers and bushings on the shock absorber and position the shock absorber to the lower attachment. Install the bushing, outer washer, and new attaching nut and torque the nut to specification (Part 3-13).
2. Lower the vehicle and install the bushing, outer washer, and new attaching nut on the top of the shock absorber. Torque the nut to specification.
3. Install the rear seat back and seat cushion.

LINCOLN CONTINENTAL

Removal

1. Lift the vehicle and place support stands under the axle housing. Position the vehicle with a hoist to relieve tension on the shock absorbers.
2. Remove the screws that attach the shock absorber mounting plate to the crossmember (Fig. 31).

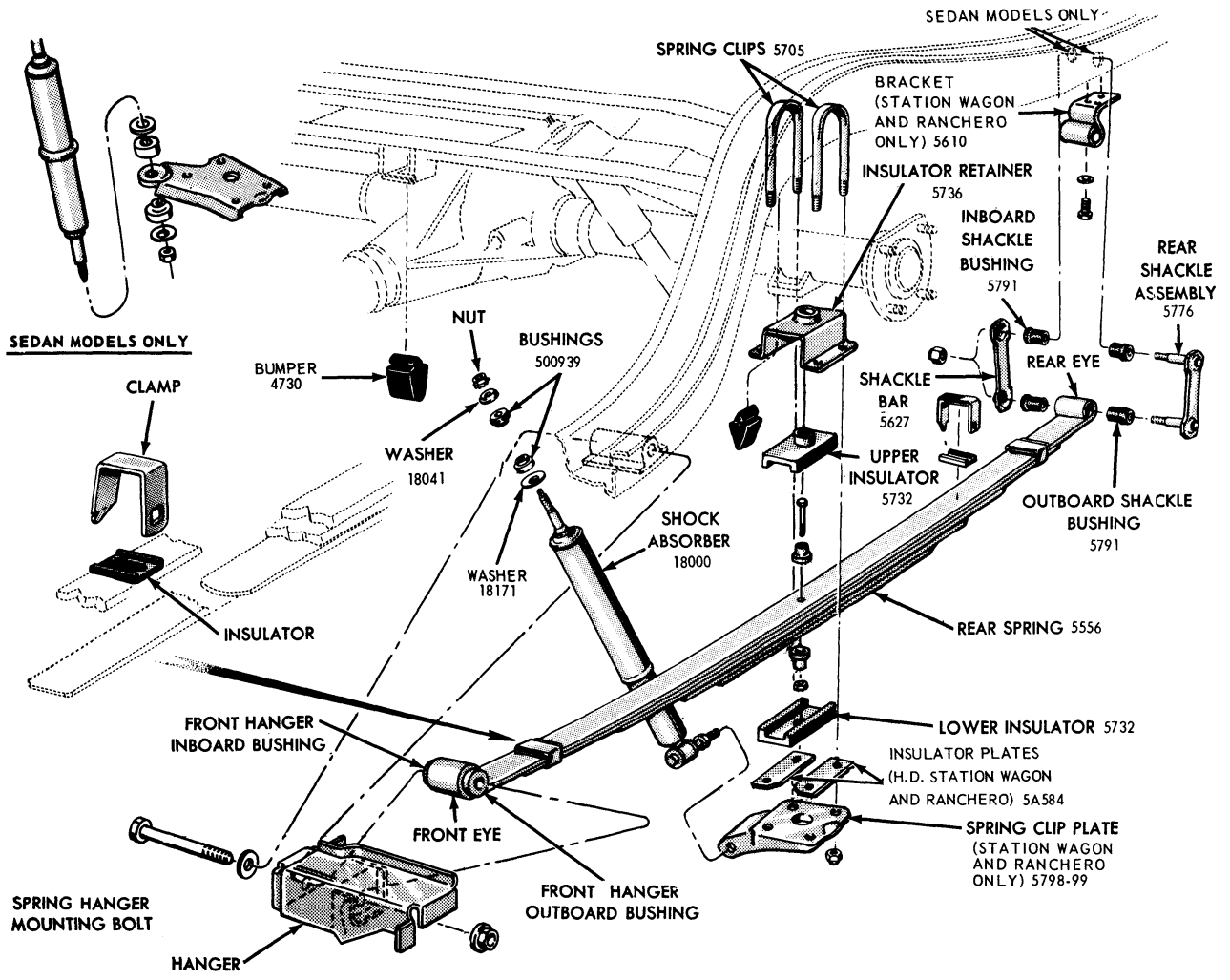


FIG. 30—Rear Spring and Shock Absorber—Typical

3. Remove the attaching nut and washers from the lower end of the shock absorber.

4. Remove the shock absorber.

5. Remove the nut, outer washer, and insulator that attach the shock absorber to the mounting plate; then remove the plate.

6. Inspect the shock absorber for damage or leaks. If the bushing must be replaced, the operation may be performed without the use of special tools. Wet the rubber bushing with a soap solution and press it into the shock absorber eye by hand. Replacethe insulators if they appear worn or damaged.

Installation

1. Place the inner washer and insulator on the upper (stud) end of the shock absorber (Fig. 31).

2. Install the mounting plate, outer insulator, washer and nut on the stud. Torque the nut to specification.

3. Attach the mounting plate and shock absorber to the crossmember with the attaching screws and washers. Torque the screws to specifications.

4. Connect the lower end of the shock absorber to the mounting stud with the washers and attaching nut. Torque the nut to specification.

REAR SHOCK ABSORBER LOWER MOUNTING STUD REPLACEMENT

LINCOLN CONTINENTAL

If the shock absorber mounting stud is damaged, replace the stud as follows:

1. Cut off the old stud as close to the bracket as possible.

2. Grind off the weld at both ends of the stud and bracket face.

3. Drive out the balance of the stud with a brass drift. Do not enlarge the hole in the bracket.

4. Remove any weld remaining on the sides of the bracket.

5. Attach the service stud to the axle housing bracket with a nut. Torque the nut to specification.

6. Stake the nut to prevent loosening.

REAR SPRING

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

Removal

1. Raise the vehicle on a hoist with the hoist under the rear axle housing.

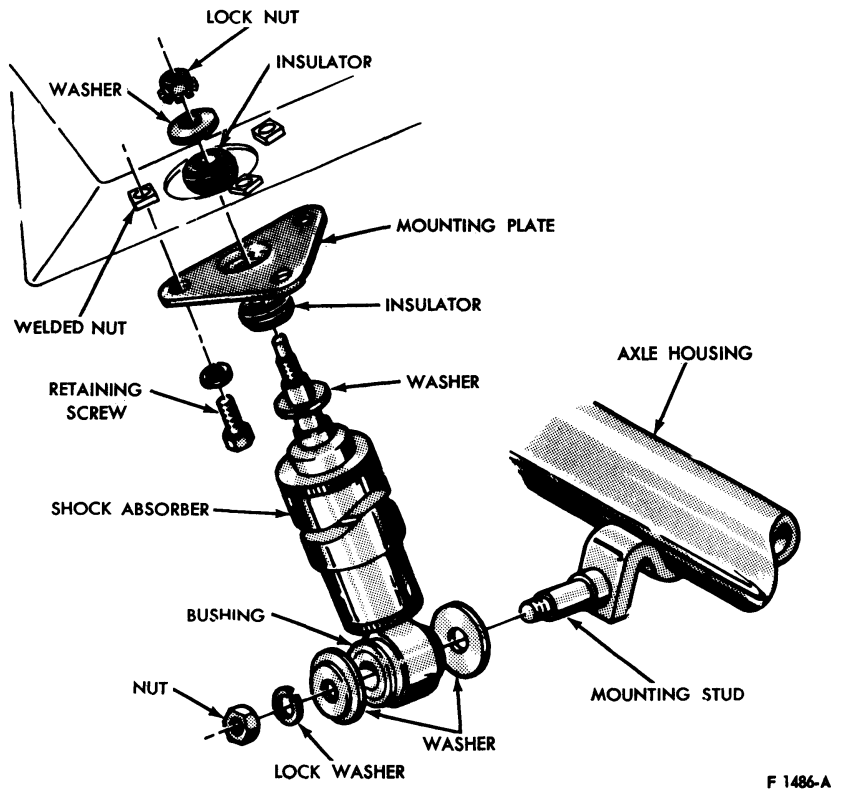


FIG. 31—Rear Shock Absorber Mounting

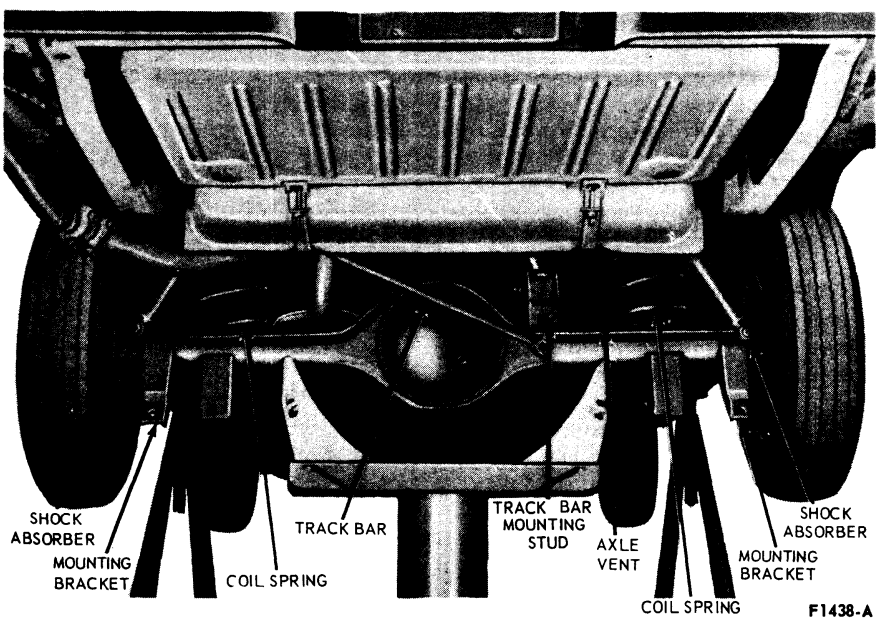


FIG. 32—Removing or Installing Rear Spring—Typical

Place jack stands under the frame side rails.

2. Disconnect the lower studs of the two rear shock absorbers from the mounting brackets on axle housing.

3. Lower the hoist and axle housing until the coil springs are released (Fig. 32).

4. Remove the springs and the insulators from the vehicle.

Installation

1. Position the spring in the upper and lower seats with an insulator between each seat and the spring.
2. Raise the hoist and axle housing with the spring in position and connect the lower studs of the rear shock absorbers to the mounting brackets on the axle housing. Install the attaching nuts, and torque to specifications.
3. Remove the jack stands and lower the vehicle.

REAR SUSPENSION LOWER ARM

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

Removal

1. Raise the vehicle on a hoist and place jack stands under the frame side rails.
2. Remove the attaching nut and bolt from the frame track bar mounting bracket and disconnect the bar from the stud (Fig. 4).
3. Lower the axle enough to relieve spring pressure.
4. Support axle under differential pinion nose as well as under axle.
5. Remove the lower arm pivot bolt and nut from the axle bracket. Then, disengage the lower arm from the bracket.
6. Remove the pivot bolt and nut from the frame bracket and remove the lower arm from the vehicle.

Installation

The rear suspension lower arms are not interchangeable. The lower arm for the left side can be identified by notches in the bushing flange (Fig. 4). The right arm does not have the notches.

1. Position the lower arm in the bracket on the frame side rail. Install a new pivot bolt and new nut (Fig. 33). Do not tighten the nut at this time.
2. Position the lower arm to the axle bracket and install a new bolt and new nut (Fig. 33). Do not tighten the nut at this time.
3. Raise the axle.
4. Install alignment spacers between the rear axle and frame (Fig. 3, Part 3-1). Then, torque the lower arm

pivot bolts and nuts to specification (Part 3-13).

5. Connect the track bar to the frame bracket with a new nut and bolt. Torque the nut to specification (Part 3-13).

6. Remove the alignment spacers and jack stands and lower the vehicle.

REAR SUSPENSION—UPPER ARM

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

Removal

1. Raise the vehicle and support the frame side rails with jack stands.

2. Support the rear axle, then disconnect the track bar from the frame bracket.

3. Lower the axle and support axle under differential pinion nose, as well as under axle.

4. Remove the nut, bolt and two washers that attach the upper arm to the axle housing. Disconnect the arm from the housing.

5. Remove the nut and bolt that secures the upper arm to the crossmember and remove the arm.

Installation

1. Hold the upper arm in place on the crossmember and install a new attaching bolt, a new lockwasher and a new nut. Do not tighten the nut at this time.

2. Secure the upper arm to the axle housing with a new attaching bolt, two washers and a new nut. Do not tighten the nut at this time.

3. Install alignment spacers between the rear axle housing and frame.

4. Connect the track bar to the frame bracket with a new nut and bolt. Torque the nut to specifications.

5. Torque the upper arm front nut to specification. Remove the alignment spacers and the jack stands.

6. Adjust the pinion angle and torque the rear nut to specification.

7. Lower the vehicle.

TRACK BAR

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

1. Raise the vehicle on an axle contact hoist.

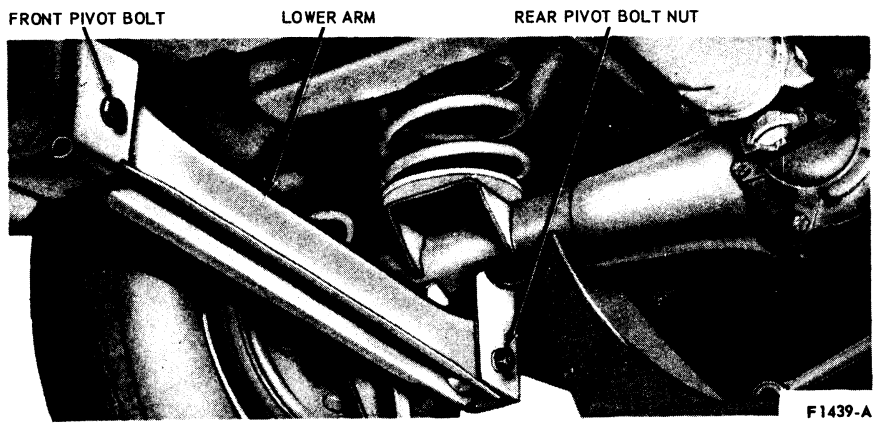


FIG. 33—Rear Suspension Lower Arm Installed

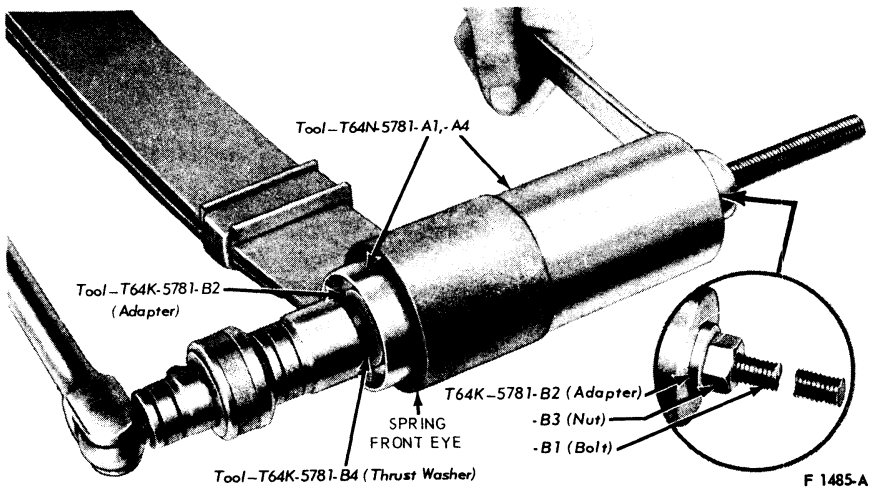


FIG. 34—Rear Spring Front Bushing Removal—Typical

2. Remove rubber cover at axle attachment on track bar.

3. Remove the nut and washer attaching the track bar to the upper arm bracket and disengage the track bar from the mounting stud (Fig. 33).

4. Remove the nut and bolt attaching the track bar to the frame side rail and remove the track bar.

5. Position the track bar to the frame side rail and install a new attaching bolt and new nut.

6. Position the track bar on the upper arm bracket mounting stud and install a new washer and a new attaching nut. Torque the track bar attaching bolt and nuts to specification (Part 3-13). Lubricate rubber cover with synthetic rubber lubricant and insert over end of stud onto washer. Then, lower the vehicle.

REAR SPRING AND/OR BUSHING

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

Removal

1. Raise the vehicle on a hoist and place supports beneath the underbody and under the axle.

2. Disconnect the lower end of the shock absorber from the spring clip plate and push the shock out of the way. Remove the supports from under the axle.

3. Remove the spring clip plate nuts from the U-bolts; then, remove the plate (Fig. 31). Raise the rear axle just enough to remove the weight from the spring.

4. Remove the two attaching nuts, and rear shackle bar, and the two shackle inner bushings.

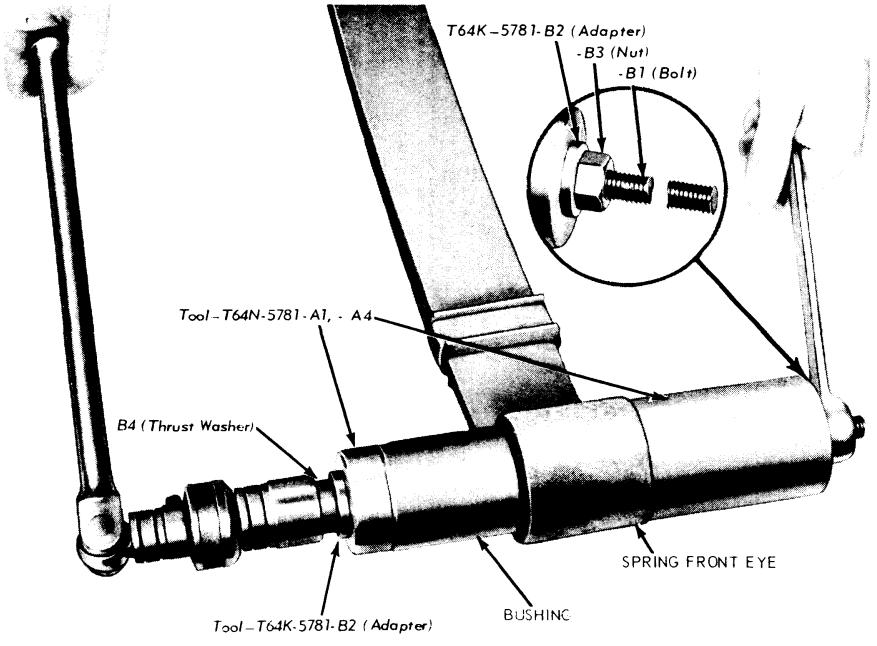


FIG. 35—Rear Spring Front Bushing Installation—Typical

5. Remove the rear shackle assembly and the two outer bushings.

6. Remove the front hanger bolt, nut, and washer from the eye at the forward end of the spring. Lift out the spring assembly.

7. If the front bushing is being replaced, assemble the special tool combination to the bushing in the spring front eye as shown in Fig. 34.

8. While holding the tool nut, tighten the tool bolt against the tool thrust washer, the adapter, and detail A1. This operation will force the bushing out of the spring eye into detail A4 of the tool as shown.

Installation

During rear suspension leaf spring assembly replacement in service, all used attaching components **must** be discarded and replaced with new components.

1. Assemble the bushing and the special tool combination to the spring front eye as shown in Fig. 35.

2. While holding the tool nut, tighten the tool bolt against the tool thrust washer, adapter, and detail A4 to force the bushing into the spring eye as shown.

3. Position the spring under the rear axle and insert the shackle assembly into the rear hanger bracket and the rear eye of the spring.

4. Install the shackle inner bushings, the shackle plate, and the locknuts. Tighten the locknuts finger-tight.

5. Position the spring front eye in the front hanger, slip the washer on the front hanger bolt, and (from the inboard side) insert the bolt through the hanger and eye. Install the locknut on the hanger bolt and tighten finger-tight.

6. Lower the rear axle until it rests on the spring. Position the spring clip plate on the clips (U-bolts). Install the U-bolt nuts and torque to specification.

7. Connect the lower end of the shock absorber to the spring clip plate using a new nut if working on a station wagon or Ranchero.

8. Place safety stands under the rear axle, lower the vehicle until the spring is in the approximate curb load position, and then torque the front hanger stud locknut to specification.

9. Torque the rear shackle locknuts to specification.

10. Remove the safety stands and lower the vehicle.

REAR SPRING

LINCOLN CONTINENTAL

Removal

1. Raise the vehicle and place support stands under the sidemembers on the rear of each rear spring hanger.

2. Lower the rear axle slightly to reduce some of the spring load; then, remove the spring U-bolts.

3. Remove the nuts, lock washers and front mounting stud. Refer to Fig. 6.

4. Remove the rear shackle nuts and mounting plate. Remove the lower inner insulator. Remove the spring. **If the rear shackle insulators are to be replaced, it will be necessary to remove the rear hanger assembly. (Hanger attaching bolts must be torqued to specification when reinstalled.)**

5. Remove the insulators from the spring.

6. Examine all parts for wear or damage. Note the condition of the spring center bolt.

7. The spring center bolt can be replaced by clamping the spring in a vise, thus keeping the spring compressed during bolt removal and installation.

Installation

1. Attach the spring and bushing to the front hanger. Torque the outboard nut to specifications. Do not tighten the inboard nut at this time.

2. Install the spring to the rear shackle assembly with the insulators in position. **Do not tighten the nuts at this time.** Refer to Fig. 6.

3. Place the insulator and retainers in position on the spring.

4. Lower the axle housing onto the insulator and retainer assembly. **If a wedge was located between the upper retainer and mounting pad, reinstall the same thickness wedge with the taper in the original direction. Raise the axle until the spring is approximately horizontal with the floor.**

5. Install the lower insulator retainer and U-bolts. **Do not tighten the U-bolt nuts at this time.** Torque the rear shackle nuts to specifications.

6. Torque the inboard nut at the front eye to specification.

7. Tighten the U-bolt nuts evenly to the specified torque.

8. **Make sure the lower insulator retainer contacts the upper retainer.**

4 MAJOR REPAIR OPERATIONS

FRONT SUSPENSION UPPER ARM BUSHINGS—ARM REMOVED

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

1. Remove the nuts and washers from both ends of the upper arm inner shaft.

2. Install Tool T65P-3044-A1 on the inner shaft and place Tool T65P-3044-A3 inside the upper arm around the inner shaft (Fig. 36).

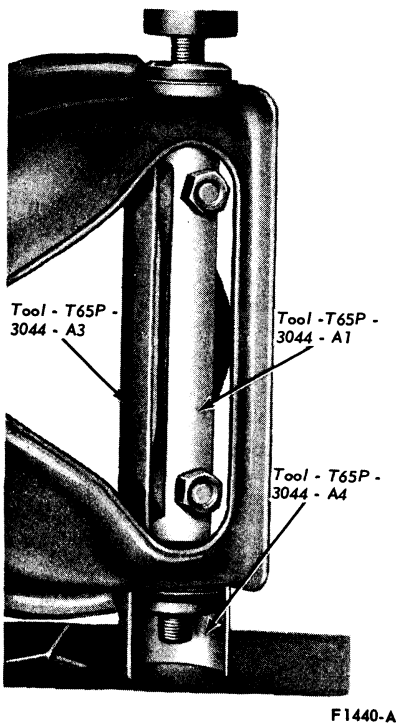


FIG. 36—Removing Upper Arm Bushings

3. Position the upper arm in an arbor press on Tool T65P-3044-A4 (Fig. 36), and press the lower bushing out of the upper arm.

4. Remove the bushing from the inner shaft; turn the assembly over and remove the bushing from the other side of the arm. **It may be necessary to remove Tool T65P-3044-A1 from the inner shaft and remove the shaft from the arm to remove the bushing from the shaft. Then, install the tool on the shaft and remove the other bushing.**

5. Position the shaft and bushings to the upper arm and install the bushings and inner shaft in the upper arm as shown in Fig. 37.

6. Install a washer and new nut on each end of the inner shaft.

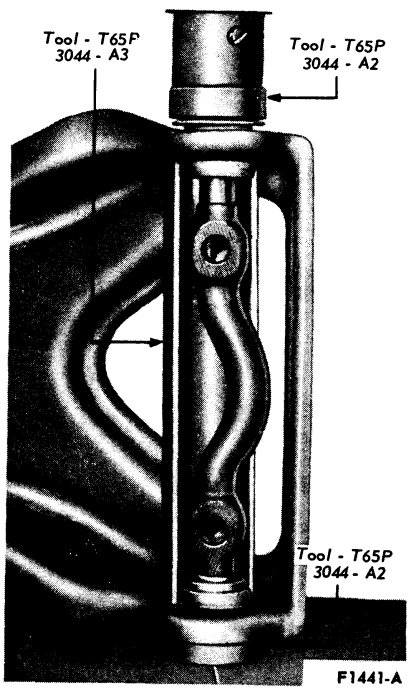


FIG. 37—Installing Upper Arm Shaft Bushings

LOWER ARM OVERHAUL—ARM REMOVED

LINCOLN CONTINENTAL

Inspect the lower arm, bushings and pivot bolt for cracks, bends, wear or other damage. Replace the arm if necessary.

1. If the ball joint requires replacement, remove the rivet heads with a chisel. Punch the remaining portion of the rivets from the holes.

Do not wash the ball joint with solvent. The solvent may attack parts within the joint.

2. If the bushing requires replacement, press it out of the arm with Tool 3069—details H, AA, and AA2 (Fig. 38).

3. Apply silicone or liquid soap to the shell of the new bushing. Place the bushing in the arm with the flange end (large end) of the bushing at the front of the arm.

4. Press the bushing into the arm until the shoulder on the bushing shell seats against the arm. Use tool 3069—details H, AA2, and M5 (Fig. 39).

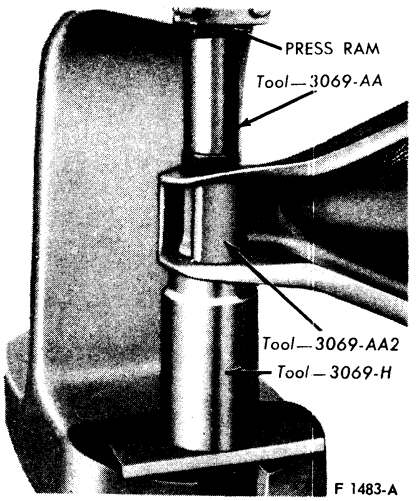


FIG. 38—Removing Lower Arm Bushing

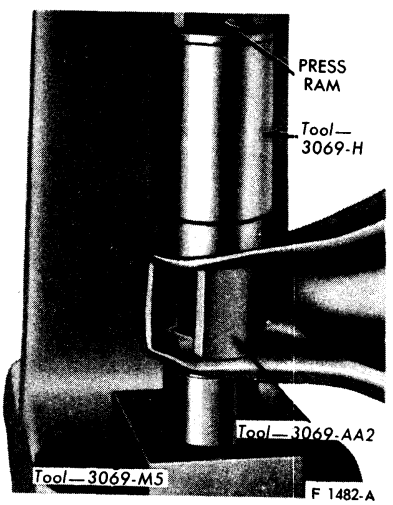


FIG. 39—Installing Lower Arm Bushing

5. If the ball joint was removed, install the new joint using the parts supplied in the ball joint kit. Torque the nuts to specification. Make sure the joint is completely filled with the specified lubricant.

UPPER ARM OVERHAUL—ARM REMOVED

LINCOLN CONTINENTAL

Inspect the upper arm and the inner shaft for cracks, bends or other damage. Replace the parts as required.

Replacement arms come with the bushings, inner shaft, and ball joint installed. If the original arm is to be

used, these components should be replaced on the bench.

Do not wash the ball joint with solvent. The solvent may attack parts within the joint.

BUSHING AND INNER SHAFT REPLACEMENT

LINCOLN CONTINENTAL

Always replace both upper arm bushings, if either bushing is worn or damaged. Install only new bushings when replacing the inner shaft. Refer to Section 3 for the upper arm removal procedure.

1. Remove the bolts, lock washers, and flat washers from the ends of the upper arm shaft.

2. Assemble the remover, tool 3044-LA, to the shaft at the front bushing. Press the bushing out of the arm using the support cup, tool 6069-H, and the remover tool 3044-AB3 (Fig. 40).

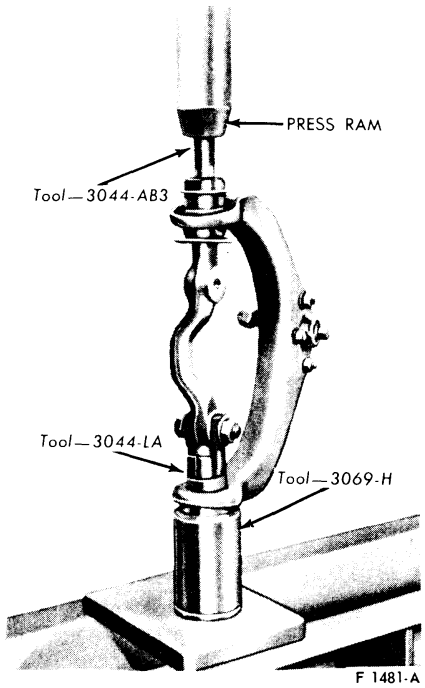


FIG. 40 —Removing Upper Arm Front Bushing

3. Remove the shaft.

4. Remove the upper arm rear bushing using the support cup, tool 3069-H, and the remover, tool 3069-L (Fig. 41).

5. Both upper arm bushings are pressed into the arm from the outside toward the inside of the arm. To facilitate installation, use silicone or liquid oap as a lubricant. See Fig. 41 for proper assembly of the shaft and bushings.

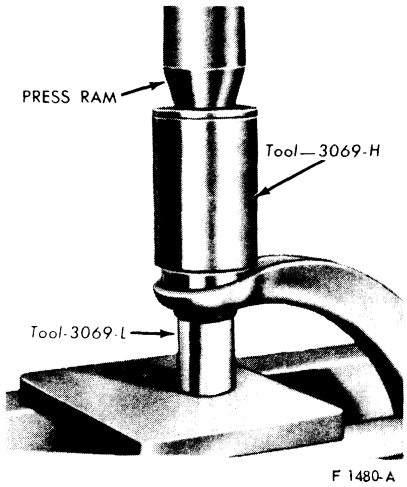


FIG. 41 —Removing Upper Arm Rear Bushing

6. Press the upper arm rear bushing into the arm using the support cup, tool 3069-H, and the replacer, tool 3068 (Fig. 43). Press the bushing in until the shoulder stop is reached.

7. Insert the end of the shaft into the rear bushing. Press the front bushing onto the shaft and into the arm using the replacer, tool 3068 (Fig. 44).

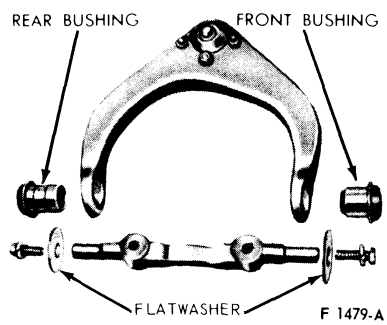


FIG. 42 —Upper Arm, Shaft, and Bushing Assembly

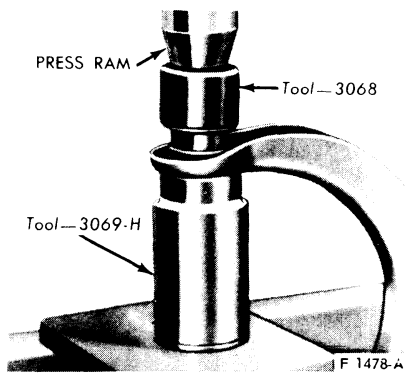


FIG. 43 —Installing Upper Arm Rear Bushing

Bottom the bushing flange against the flange in the arm.

8. Install the flat washers, lockwashers, and bolts at the ends of the upper arm shaft. **Do not tighten the bolts at this time. These must be tightened after the arm assembly has been installed, and when the front end weight of the vehicle is on the wheels.**

These bolts are made of a special material. Use only the specified bolt if replacement is necessary.

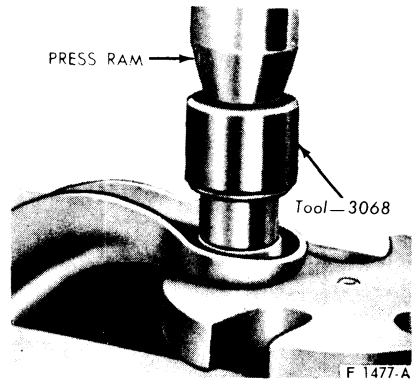


FIG. 44 —Installing Upper Arm Front Bushing

REAR SPRING OVERHAUL—SPRING REMOVED

LINCOLN CONTINENTAL

Front Hanger Assembly

If the front hanger or bushings are to be replaced, proceed as follows:

1. Remove the nuts and lock washers from the spring front mounting bolt (Fig. 6).

2. Tap the spring mounting stud out of the bushing and hanger, then separate the hanger from the spring.

3. Remove the front bushing from the spring with tool T64N-5781-A.

4. Install the bushing in the spring with tool T64N-5781-A.

5. Assemble the front hanger to the spring eye and install the spring mounting stud through the hanger, bushings, and spring eye as shown in Fig. 6.

6. Install the lock washers and nuts on the mounting stud and tighten the outboard nut to specification. Tighten the inboard nut to specification with the vehicle at curb riding height.

SPRING LEAVES AND TIE-BOLT

LINCOLN CONTINENTAL

Check for broken spring leaves. Inspect the anti-squeak inserts between the leaves, and replace them if they are worn. **The spring leaves must be dry and free of oil and dirt before new inserts are installed.**

If the spring center tie-bolt requires replacement, clamp the spring in a vise to keep the spring compressed during bolt removal and installation.

REAR SHACKLE AND HANGER ASSEMBLY

LINCOLN CONTINENTAL

Inspect the rear shackle, bushings, and studs for wear or damage. Replace parts where necessary (Fig. 6).

If the rear shackle bushings are to be replaced, it will be necessary to remove the rear hanger assembly. Torque the hanger attaching bolts to specification when installed.

PART 3-3 *Automatic Air Leveling System*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
AIR COMPRESSOR												
Disassembly and Overhaul		03-03	03-03	03-03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Removal and Installation		03-02	03-02	03-02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AIR CYLINDER												
Removal and Installation		03-02	03-02	03-02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DESCRIPTION		03-01	03-01	03-01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HEIGHT CONTROL VALVE												
Disassembly and Overhaul		03-03	03-03	03-03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Removal and Installation		03-02	03-02	03-02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

The automatic level control is an accessory item on the Ford, Mercury and Meteor vehicles (Fig. 1). This device is a supplement to the rear coil spring suspension, and will automatically maintain the rear standing height of the vehicle at an approximate constant position compensating for varying loaded conditions. The system consists of a vacuum operated compressor, control valve, air cylinders and the connecting lines and fittings. In the event of accidental air loss, the conventional coil springs will support the vehicle.

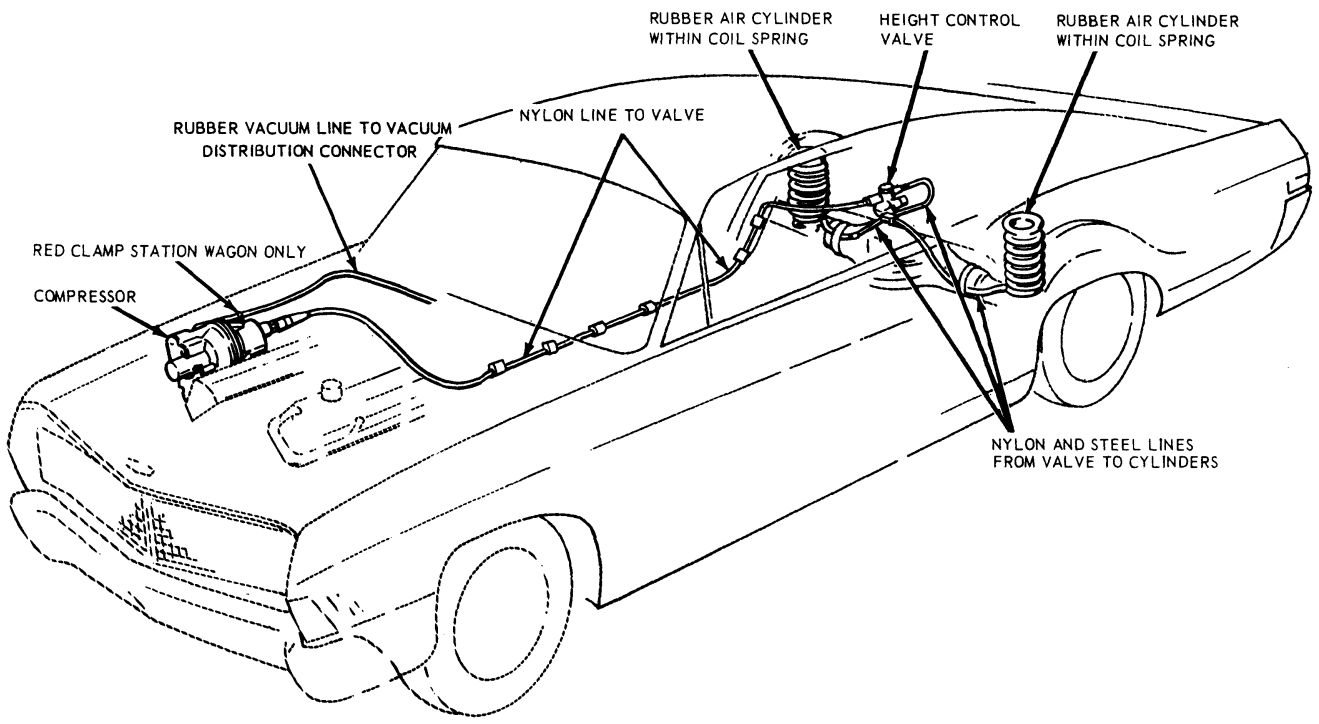


FIG. 1—Air Leveling System

2 REMOVAL AND INSTALLATION

AIR COMPRESSOR

REMOVAL

1. Slip the vacuum line off the intake fitting on the side of the compressor (Fig. 2).
2. Disconnect the output line from the rear of compressor.
3. Remove the three compressor attaching nuts from the bracket. Lift the compressor from the mounting bracket.

INSTALLATION

1. Place the star washer on each insulator. Position the compressor on the mounting bracket and install and torque the three attaching nuts to specifications.
2. Connect the vacuum line to the intake fitting at the side of the compression.
3. Start the engine and check the compressor output.
4. Connect the output line to the nylon fitting at the rear of the compressor (Fig. 2).

HEIGHT CONTROL VALVE

REMOVAL

1. Raise the vehicle on a hoist. It may be more convenient to support the rear of the frame with two jack stands and lower the axle to provide greater accessability to the valve.
2. Disconnect the compressor line from the intake port of the height control valve (Fig. 3).
3. Disconnect the air cylinder line from the rear of the height control valve.
4. Disconnect the link from the height control valve lever.
5. Remove the two control valve-to-mounting bracket attaching screws and remove the valve.

INSTALLATION

1. Position the height control valve to the mounting bracket and install the two attaching screws. Torque the screws to specification.
2. Connect the link to the height control valve lever.
3. Connect the compressor line to the height control valve.
4. Connect the air cylinder line to the height control valve.
5. Set the height control valve lever as required to obtain the correct trim height.
6. After obtaining the correct trim height, check the operation of the air leveling system.

AIR CYLINDER

REMOVAL

1. Raise the vehicle on a hoist with the hoist under the rear axle housing. Place jack stands under the frame side rails.
2. Disconnect the air cylinder line from the fitting on the lower end of the cylinder (Fig. 4).
3. Lower the hoist and axle housing until the rear shock is fully extended.
4. Squeeze all air from the bag and install the valve cap.
5. Remove the air cylinder from the rear spring.

INSTALLATION

1. Make sure all the air is out of the bag and the valve cap is on.
2. Position the air cylinder in the spring with the inlet at the lower end.
3. Remove the valve cap and connect the air cylinder line to the cylinder.
4. Remove the jack stands and lower the vehicle.

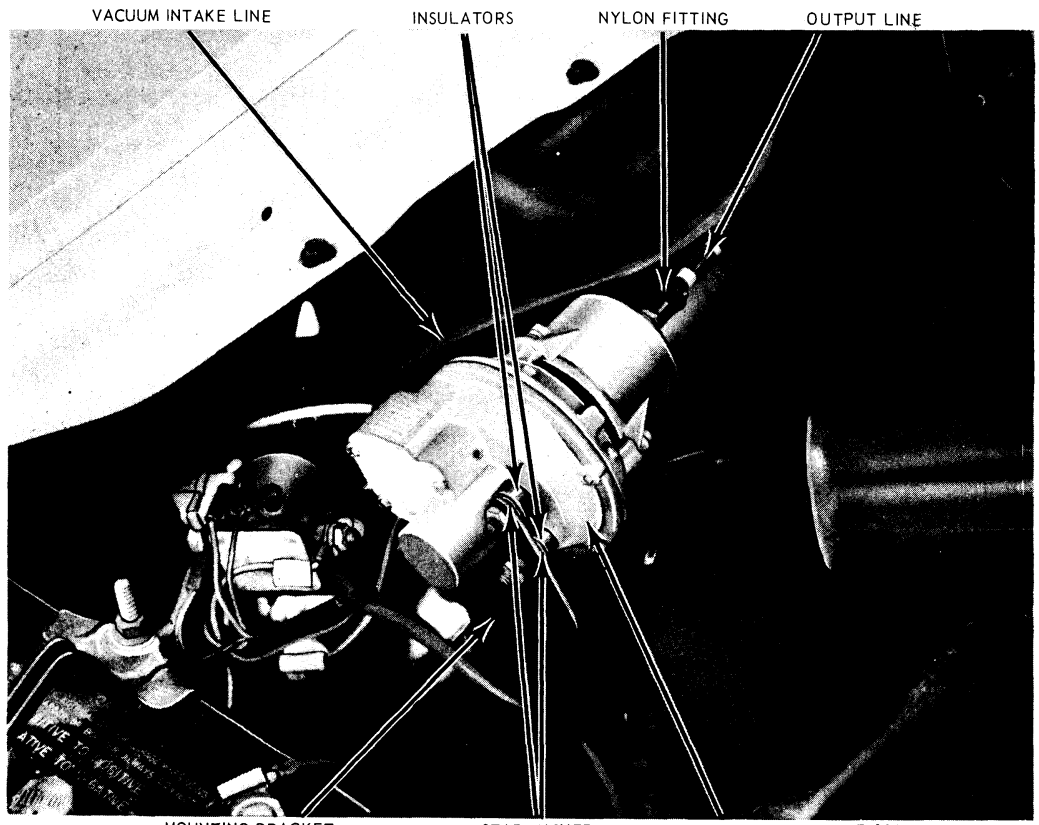


FIG. 2—Compressor Installed

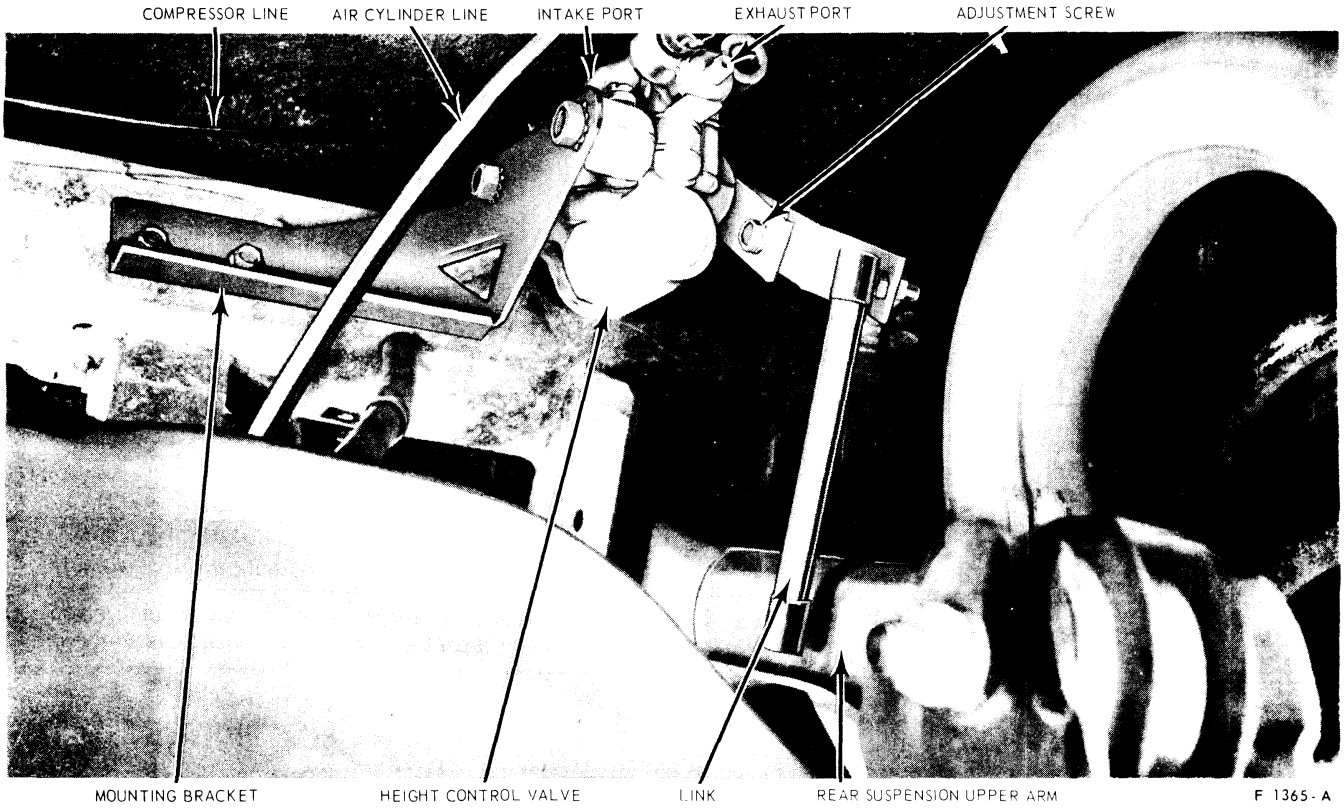


FIG. 3—Height Control Valve Installation



FIG. 4—Air Cylinder Installation

3 MAJOR REPAIRS

AIR COMPRESSOR

Compressor repair should be limited to the cleaning of the micro-bon filter.

REMOVAL

1. Remove the three cover filter attaching screws.
2. Remove the filter and cover gasket.
3. Wash the filter in solvent, blow it dry with compressed air working from the inside outward.

INSTALLATION

1. Position a new gasket and the cover on the compressor.
2. Install the three attaching screws.

HEIGHT CONTROL VALVE

Other than adjusting the trim height, no repairs should be made to the height control valve.

1. Thoroughly clean exterior of the height control valve.

2. Connect the test gauge and a 20 psi air pressure source to the intake adapter.

3. No air should escape if lever is in the neutral position. If air escapes from air cylinder port, replace the control valve.

4. Shut off the air pressure and disconnect pressure line from air intake port.

5. Connect the pressure line to the air cylinder outlet port and open air pressure.

6. With control lever in neutral position, no air should escape. If air escapes from exhaust port, replace control valve.

7. Shut off air pressure and remove line from air cylinder port.

PART 3-4 *Automatic Air Leveling System— Lincoln Continental*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
COMPRESSOR												
Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	04-02	N/A	N/A
DESCRIPTION		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	04-01	N/A	N/A
HEIGHT CONTROL VALVE												
Adjustment		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	04-03	N/A	N/A
Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	04-03	N/A	N/A
REGULATOR ADJUSTMENT		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	04-03	N/A	N/A
SUPER LIFT SHOCK ABSORBER												
Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	04-03	N/A	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

The rear suspension automatic leveling system (Fig. 1) is a pneumatic supplement to the rear suspension. It will automatically maintain the rear standing height of the vehicle at an approximate constant position as weight is added or removed from the vehicle. The system consists of a vacuum operated compressor, air filter, reserve tank, service valve pressure regulator, height control valve, two superlift rear shock absorbers and connecting lines and fittings.

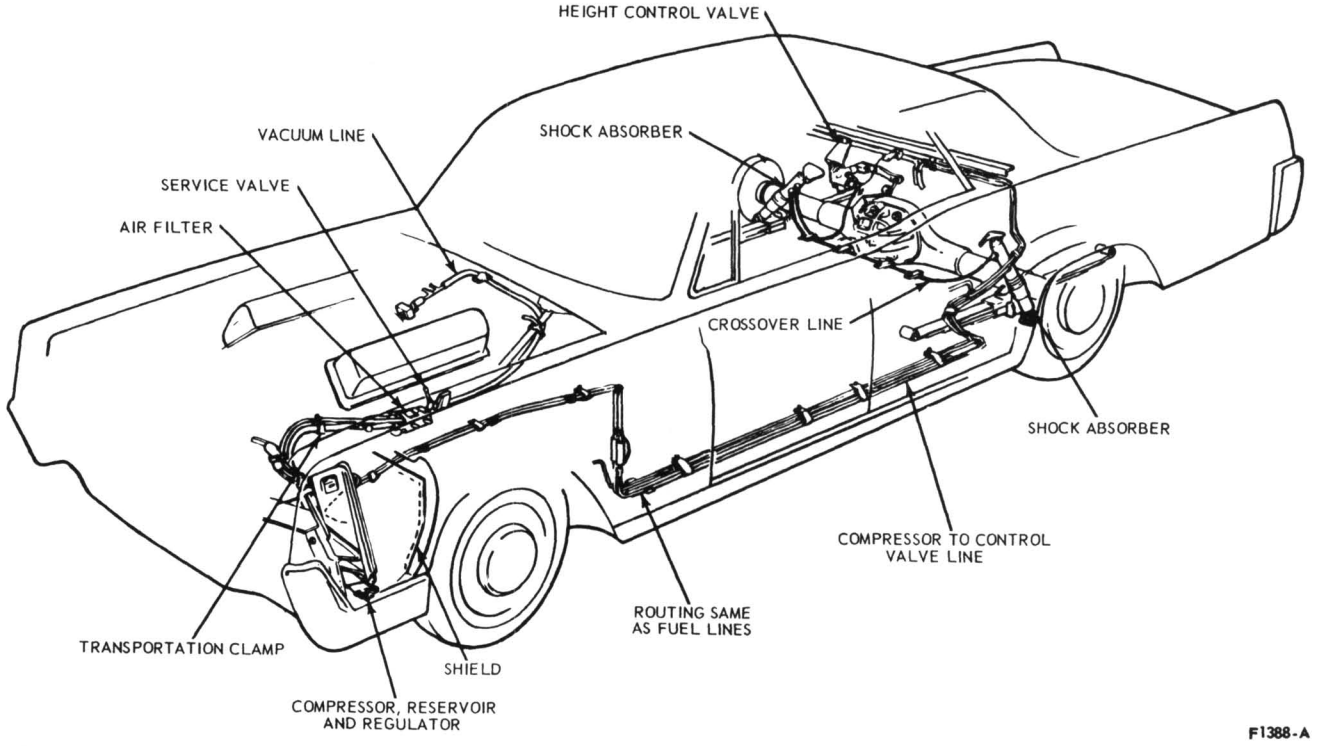


FIG. 1—Automatic Air Leveling System

2 REMOVAL AND INSTALLATION

COMPRESSOR

REMOVAL

1. Raise the front of the vehicle and place jack stands under frame side rails.
2. Turn the front wheels all the way to the right. Working from the underside of the left front fender, remove the three shield attaching screws (Fig. 2).
3. Disconnect the one vacuum line, clean air intake line and the two pressure lines from the compressor.
4. Remove the two compressor mounting bracket attaching bolts. Remove the bracket and compressor as an assembly.
5. Remove the three compressor to bracket attaching nuts. Separate the compressor from the bracket.

INSTALLATION

1. Assemble the compressor and insulators to the mounting bracket. Install and torque the three nuts to specification.
2. Position the compressor mounting bracket and compressor and secure with the two attaching nuts. Torque the nuts to specification.
3. Connect the vacuum line (coded with a red stripe), clean air intake line and the two pressure lines (Fig. 2) to the compressor.
4. Install the shield and three attaching screws.
5. Remove the jack stands and lower the vehicle.

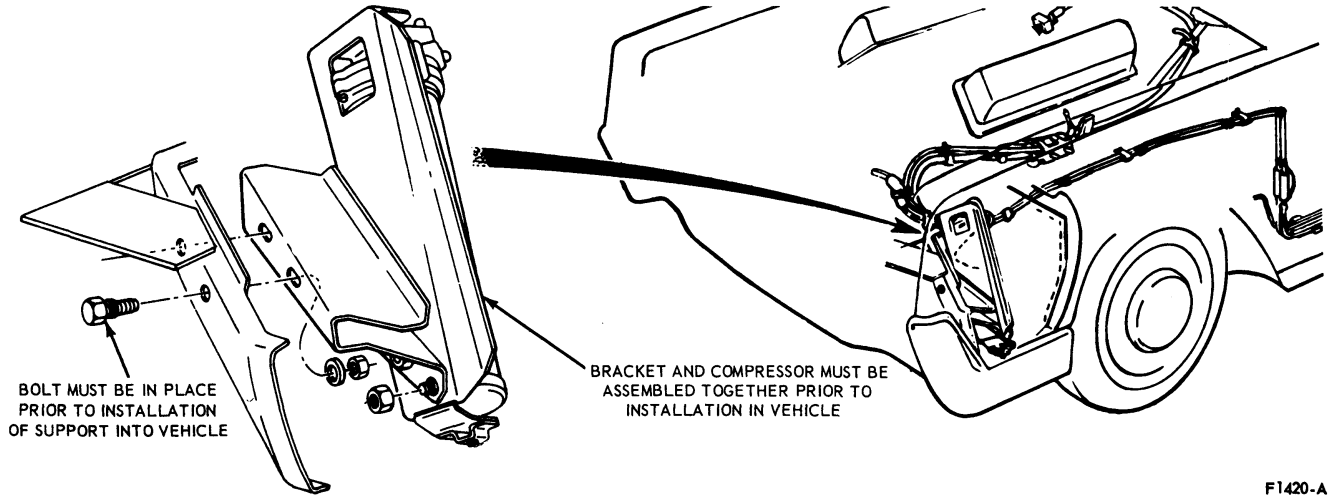


FIG. 2—Compressor Installation

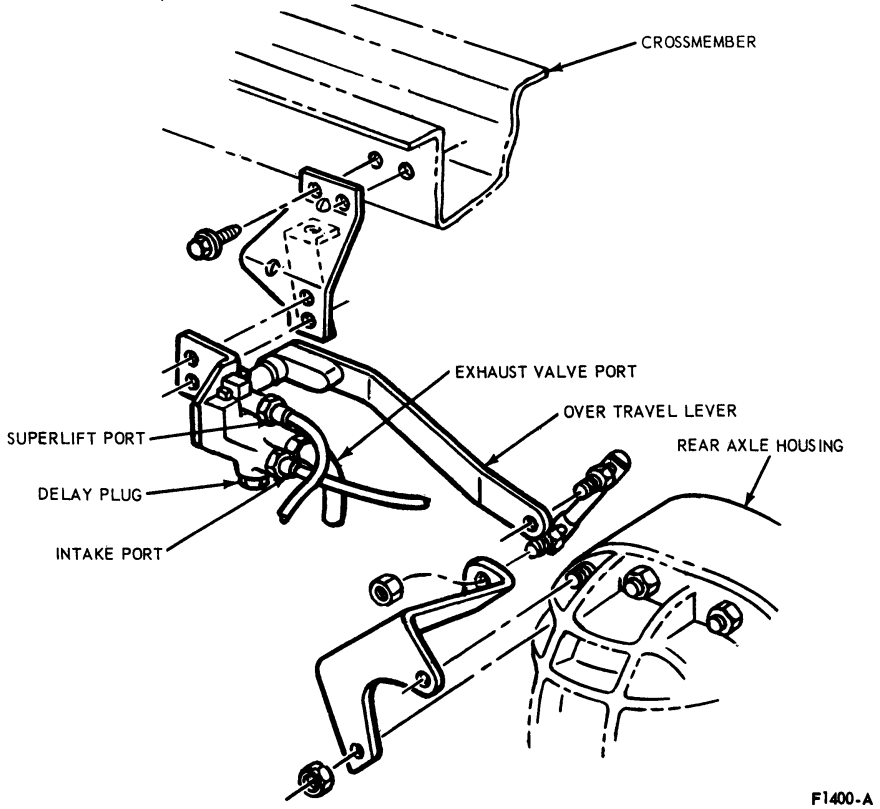


FIG. 3—Height Control Valve

HEIGHT CONTROL VALVE

REMOVAL

1. Exhaust all air from system.
2. Raise the rear of the vehicle and support it with jack stands.
3. Disconnect the link from the height control valve arm.
4. Disconnect the air inlet and the outlet line from the valve.
5. Remove the two control valve mounting bracket attaching bolts (Fig. 3) and remove the valve.

INSTALLATION

1. Position the height control valve and install the two attaching bolts. Torque the bolts to specification.
2. Connect the air inlet and the

outlet lines to their respective parts.

3. Adjust the trim height as detailed in Section 4.

4. Connect the link to the arm.

5. Remove the jack stands and lower the vehicle.

SUPER LIFT SHOCK ABSORBER

REMOVAL

1. Raise the vehicle and place jack stands under the axle to compress the super lift.

2. Loosen the air line or lines (right super lift) slowly to release the air from the system. Then, disconnect the line or lines.

3. Remove the three mounting plate attaching screws from the upper end of the super lift.

4. Remove the attaching nut and washer from the lower end of the super lift and remove it from the vehicle.

5. Remove the nut, outer washer and the insulator that attach the super lift to the mounting plate. Remove the plate, remaining insulator and washer.

INSTALLATION

1. Position a washer, insulator, mounting plate, insulator, washer and nut on the stud at the upper end of the super lift. Torque the nut to specification.

2. Install the mounting plate, outer insulator, washer and nut on the stud. Torque the nut to specification.

3. Attach the mounting plate and shock absorber to the crossmember with the attaching screws to specifications.

4. Connect the lower end of the super lift to the mounting stud with the washers and attaching nut. Torque the nut to specification.

5. Connect the air line or lines (right super lift) to the super lift.

6. Start the engine and check for leaks.

3 IN-VEHICLE ADJUSTMENTS AND REPAIRS

REGULATOR ADJUSTMENT

The regulator may be adjusted if the regulator pressure is under 100 psi with the reservoir pressure at a minimum of 140 psi. If the regulated pressure exceeds 130 psi, the regulator must be replaced.

To adjust the regulator, remove the boot and reposition the sleeve and retainer deeper into the body of the regulator, using a deep well socket (Fig. 4). If the regulator pressure remains under 100 psi, replace regulator.

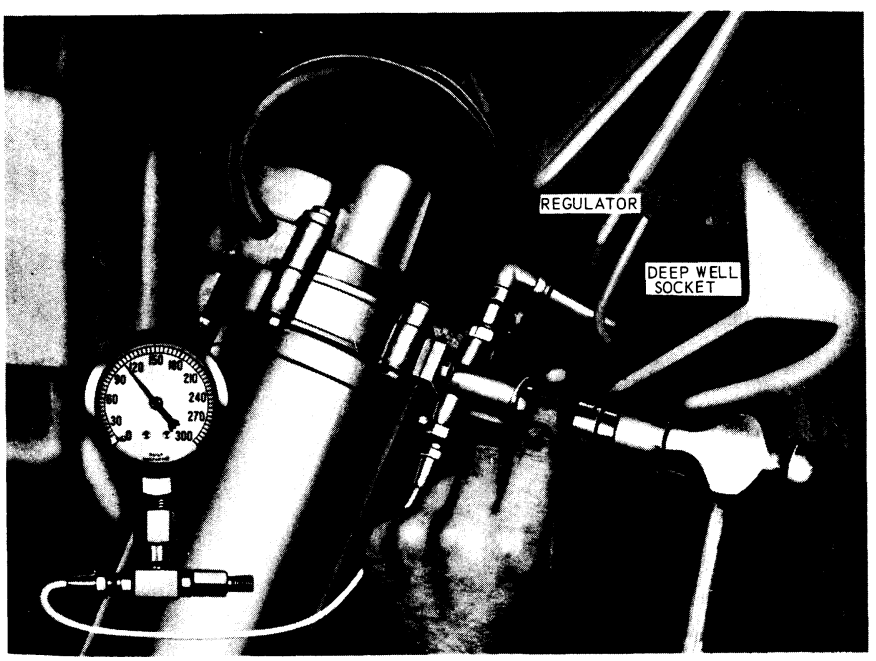


FIG. 4—Adjusting Regulator

HEIGHT CONTROL VALVE

SILICONE FLUID REPLACEMENT

If the height control valve time delay does not fall within specification, the silicone fluid must be replaced. Then repeat the time delay test. If delay is still not within specifications, replace the height control valve.

1. Remove control valve and clean the exterior of the valve thoroughly.

2. Position the valve with delay plug on top. Remove delay plug and drain silicone fluid from the chamber. Remove the O-ring from the chamber (Fig. 5), and discard the O-ring.

3. Remove the cover plate retaining ring, using snap ring pliers. Remove the delay cover from the valve body. Remove the O-ring from the chamber, and discard the O-ring.

4. Place a new O-ring over the delay plug and install the plug. Torque the plug to 20-30 in-lbs.

5. Pour silicone fluid into the delay piston chamber until fluid level is 5/16 inch below the top edge of the body. Add or remove fluid with an eye dropper until the proper fluid level is reached.

6. Hold the control valve body in a vise with the delay chamber elevated slightly. Carefully operate the lever to purge trapped air from the fluid.

7. Place a new O-ring in the groove around the delay piston bore. Install

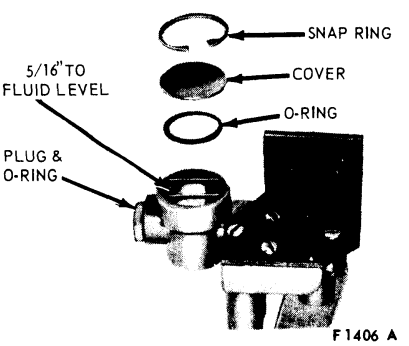


FIG. 5—Replacing Silicone Fluid

the cover and secure it with a snap ring, using snap ring pliers.

8. Place the control valve vertically in a vise with the delay chamber down. Move the overtravel lever up and down for one minute to vent air from the delay piston pin chamber. Perform a time delay check off the vehicle. If delay is not within 4-18 seconds, recheck the fluid level in the delay chamber. If the level is within specifications, replace the valve.

9. Install the height control valve.

PART 3-5 *Steering Columns and Linkage*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
ADJUSTING SLEEVE (LINKAGE) Removal and Installation	05-19											
CENTER LINK (LINKAGE) Removal and Installation	05-20											
LOCKING LEVER (TILT-AWAY COLUMN) Removal and Installation		N/A	N/A	N/A	05-06	N/A	N/A	N/A	05-06	N/A	05-06	N/A
PITMAN ARM (LINKAGE) Removal and Installation	05-20											
SPINDLE CONNECTING ROD ASSEMBLY (Inner and Outer Ends) Removal and Installation		05-19	05-19	05-19	05-19	05-19	05-19	05-19	05-19	05-19	05-19	05-19
STATIONARY STEERING COLUMNS Description	05-01											
STEERING COLUMN Alignment		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	05-06	05-07	05-06
Removal and Installation		05-08	05-08	05-08	05-10	05-09	05-09	05-09	05-10	05-11	05-14	05-11
STEERING COLUMN SHIFT TUBE Removal and Installation	05-14											
STEERING COLUMN UPPER BEARING Removal and Installation	05-02											
STEERING IDLER ARM AND BRACKET ASSEMBLY Removal and Installation	05-20											
STEERING WHEEL Removal and Installation	05-02											
Spoke Position Adjustment	05-02											
TILT-AWAY STEERING COLUMN Description		N/A	N/A	N/A	05-02	N/A	N/A	N/A	05-02	N/A	05-02	N/A
TILT STEERING COLUMN Description		05-01	05-01	05-01	N/A	N/A	N/A	N/A	N/A	05-01	N/A	05-01
TILT WHEEL STEERING COLUMN STEERING SHAFT Removal and Installation		05-16	05-16	05-16	N/A	N/A	N/A	N/A	N/A	05-16	N/A	05-16
VACUUM MOTOR (TILT-AWAY COLUMN) Removal and Installation		N/A	N/A	N/A	05-05	N/A	N/A	N/A	05-05	N/A	05-05	N/A
VACUUM RELEASE VALVE (TILT-AWAY COLUMN) Removal and Installation		N/A	N/A	N/A	05-05	N/A	N/A	N/A	05-05	N/A	05-05	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

STATIONARY STEERING COLUMNS

The steering column is of the collapsible type to lessen the possibility of injury to the driver of the vehicle should he become involved in an accident. The lower end of the steering column tube at the bellows area will collapse approximately six inches upon a hard impact.

The shift tube and the steering shaft are provided with plastic dowels and will shear and allow them to collapse in proportion to the outer tube upon impact.

Once the steering column has been collapsed, a complete new column must be installed with new brackets

which also will shear away during impact.

TILT STEERING COLUMNS

The steering column is of the collapsible type to lessen the possibility of injury to the driver of the vehicle should he become involved in an accident. The lower end of the steering column tube at the bellows area will collapse approximately six inches upon a hard impact.

The shift tube and the steering shaft are provided with plastic dowels and will shear and allow them to collapse in proportion to the outer tube upon impact.

Once the steering column has been collapsed, a complete new column must be installed.

The tilt column features nine driving positions (four up and four down from a center position). The column also features a turn signal switch with a lane-changer position turn indicating position and emergency warning flasher control.

TILT-AWAY STEERING COLUMNS

The tilt-away steering column features nine driving positions (four up and four down from a center position) and a tilt-away position that is automatically accomplished on Mustang and Cougar models when the ignition key is turned to the OFF position and the left door is opened. On Thunderbird models, the tilt-away occurs when the shift lever is placed in PARK and the driverns door is opened.

The steering column is of the collapsible type to lessen the possibility of injury to the driver of the vehicle should he become involved in an accident. The lower end of the steering column tube at the bellows area will collapse approximately six inches upon a hard impact.

The shift tube and the steering shaft are provided with plastic dowels and will shear and allow them to collapse in proportion to the outer tube upon impact.

Once the steering column has been collapsed, a complete new column must be installed along with mounting brackets which will also shear away during impact.

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

STEERING WHEEL SPOKE POSITION ADJUSTMENT

When the steering gear is on the high point, the front wheels should be in the straight-ahead position and the steering wheel spokes should be in their normal position with the Pitman arm pointing directly forward. If the spokes are not in their normal position, they can be adjusted without disturbing the toe-in adjustment (Part 3-1).

STEERING WHEEL REPLACEMENT

1. Disconnect the negative cable from the battery.
2. Working from the underside of the steering wheel spoke, remove the crash pad attaching screws. Lift the crash pad from the wheel. (On Continental Mark III models, pry out the crash pad insert and remove the two screws that secure the crash pad. Remove the crash pad. On models equipped with steering wheel mounted speed controls, refer to Group 16 for removal instructions). Remove the horn ring (if so equipped) by turning it counterclockwise.
3. Remove the steering wheel nut, and then remove the steering wheel with tool T67L-3600-A (Fig. 1). **Do not use a knock-off type steering wheel puller or strike the end of the steering shaft with a hammer. Striking the puller or shaft will damage the bearing or the collapsible column.**
4. Transfer all serviceable parts to the new steering wheel.
5. Position the steering wheel on the shaft so that the alignment mark on the hub of the wheel is adjacent to the one on the shaft. Install a new locknut and torque it to specifications.
6. Install the horn ring (if so equipped) and crash pad.

STEERING COLUMN UPPER BEARING REPLACEMENT

STATIONARY COLUMNS

Removal

1. Disconnect the horn wire and the turn indicator wires at the connector.
2. Working from the underside of the steering wheel spoke, remove the two crash pad attaching screws. Lift the crash pad from the wheel. (On Continental Mark III models, pry out the crash pad insert and remove the two screws that secure the crash pad. Remove the crash pad. On models equipped with steering wheel mounted speed controls, refer to Group 16 for removal instructions). Remove the horn ring (if so equipped) by turning it counterclockwise.
3. Remove the steering wheel attaching nut. Remove the steering wheel using tool T67L-3600-A (Fig. 1). **Do not use a knock-off type steering wheel puller or strike the end of the steering shaft with a hammer. Striking the puller or shaft will damage the bearing or the collapsible column.**
4. Remove the turn indicator lever.
5. Remove the turn signal switch attaching screws. Lift the switch over the end of the steering shaft and place it to one side.
6. Remove the snap ring from the top of the steering shaft.
7. Loosen the two flange-to-steering column tube attaching bolts to disengage them from the tube.
8. Raise the flange upward while

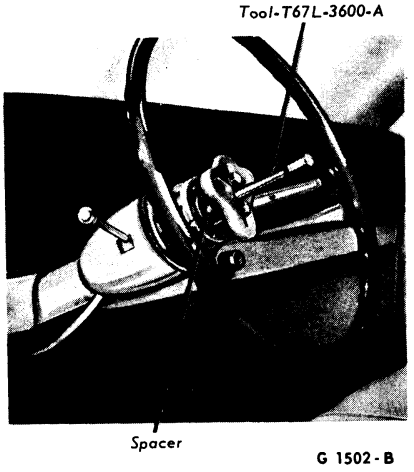


FIG. 1—Removing Steering Wheel

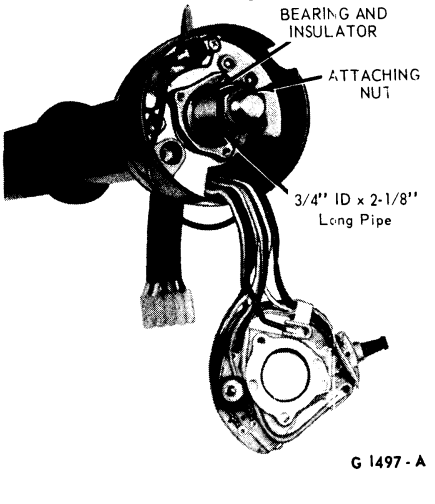


FIG. 2—Installing Upper Bearing

tapping the steering shaft lightly with a plastic hammer to free the bearing and flange from the shaft.

9. Remove the bearing and insulator from the flange.

Installation

1. Install flange bolts (square head) in flange if they were removed. Turn the nuts onto the bolts one complete turn only.

2. Position the flange onto the steering column tube.

3. Engage the two flange bolt heads with the square holes in the column tube, then tighten the two attaching nuts to specification.

4. Position the bearing and insulator on the shaft. Work it down onto the shaft as far as possible, then place a piece of 3/4 ID x 2 1/8 inch pipe over the end of the shaft and install the steering wheel attaching nut (Fig. 2).

5. Tighten the nut until the bearing is seated in the flange, then remove the nut and pipe from the shaft.

6. Position the turn signal switch on the flange and install the three attaching screws.

7. Make certain that the wheels are in the straight ahead position. Place the steering wheel on the steering shaft with the spokes in the horizontal position. Install and torque the attaching nut to specification.

8. Secure the crash pad to the steering wheel with the two attaching screws.

9. Connect the horn and turn signal wires.

10. Install the turn signal lever.

TILT WHEEL COLUMNS

Removal

1. Disconnect the negative cable from the battery.

2. Remove the steering wheel with tool T67L-3600-A (Fig. 1). Install the spring, shipping spacer (3/4 x 1 1/8-inch pipe) and a steering wheel attaching nut on the shaft. **Do not use a knock-off type steering wheel puller or strike the end of the steering shaft with a hammer. Striking the puller or shaft will damage the bearing or the collapsible column.**

3. Remove the turn indicator lever (Fig. 3).

4. Remove the three screws that attach the upper cover to the column and remove the cover. It may be necessary to rotate the cover approximately 1/4—1/2 inch to engage the cover lip in the slot of turn signal switch to permit clearance.

5. Loosen the screw on the bottom side and slide the lower cover downward on the column (on Ford and Mercury models, remove the shroud.)

6. Remove the screw that secures the turn signal wire retaining clip to the column and remove the clip.

7. Remove the two screws that attach the turn signal switch to the steering column. Move the switch wires upward enough to permit lifting the switch over the end of the steering shaft and lay the switch to one side. Be careful not to lose the turn signal lever pivot from the switch.

8. Compress the steering column locking clamp with vise grip pliers (Fig. 4) and move the steering shaft to the full up position.

9. Hold the column position spring rod with vise grip pliers to prevent flotation then compress the spring and remove the retainer. Remove the plastic cover and spring.

10. Install tool T67P-3D739-B as shown in Fig. 4. Thread the bolt inward finger tight until it bottoms, then back it out one full turn. Make sure that the handle is centered over the pivot pin to prevent bolt breakage. Hold the 3/8 inch bolt head stationary, then tighten the nut to extract the pin. Repeat this operation on the opposite pin.

11. Remove the nut, shipping spa-

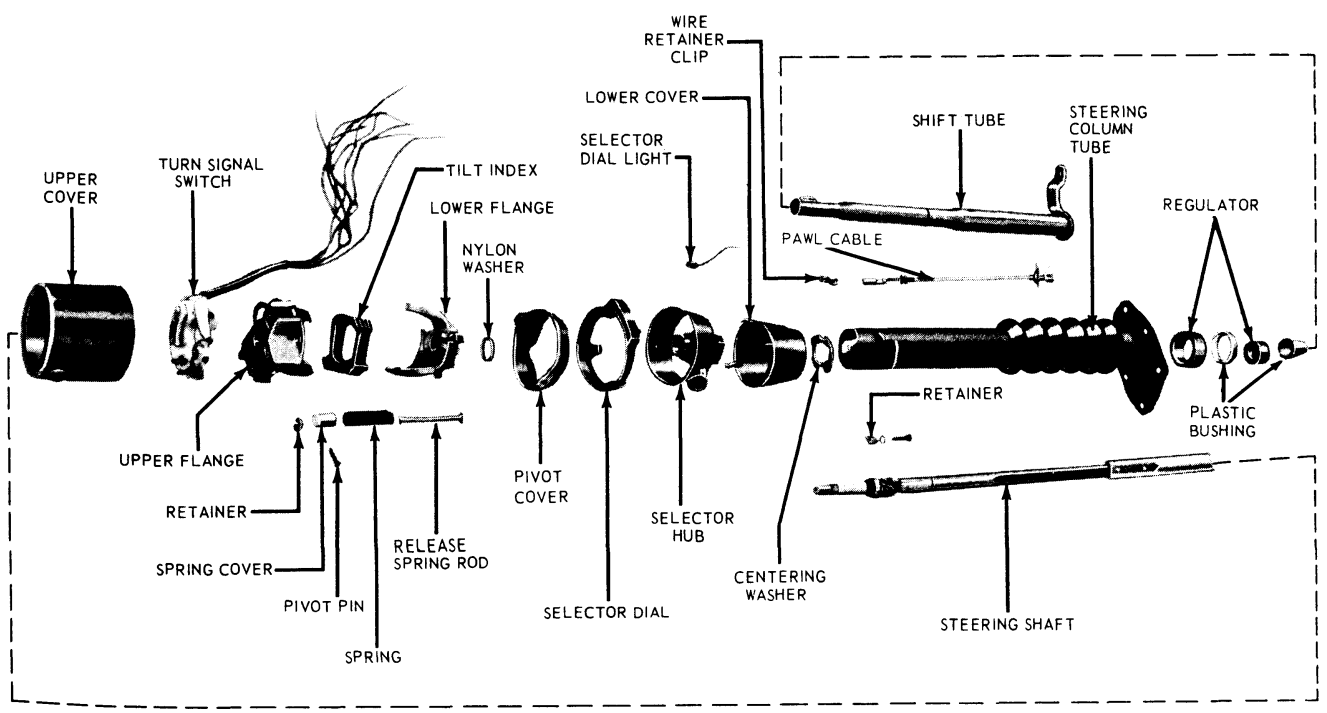


FIG. 3—Typical Steering Column—Disassembled

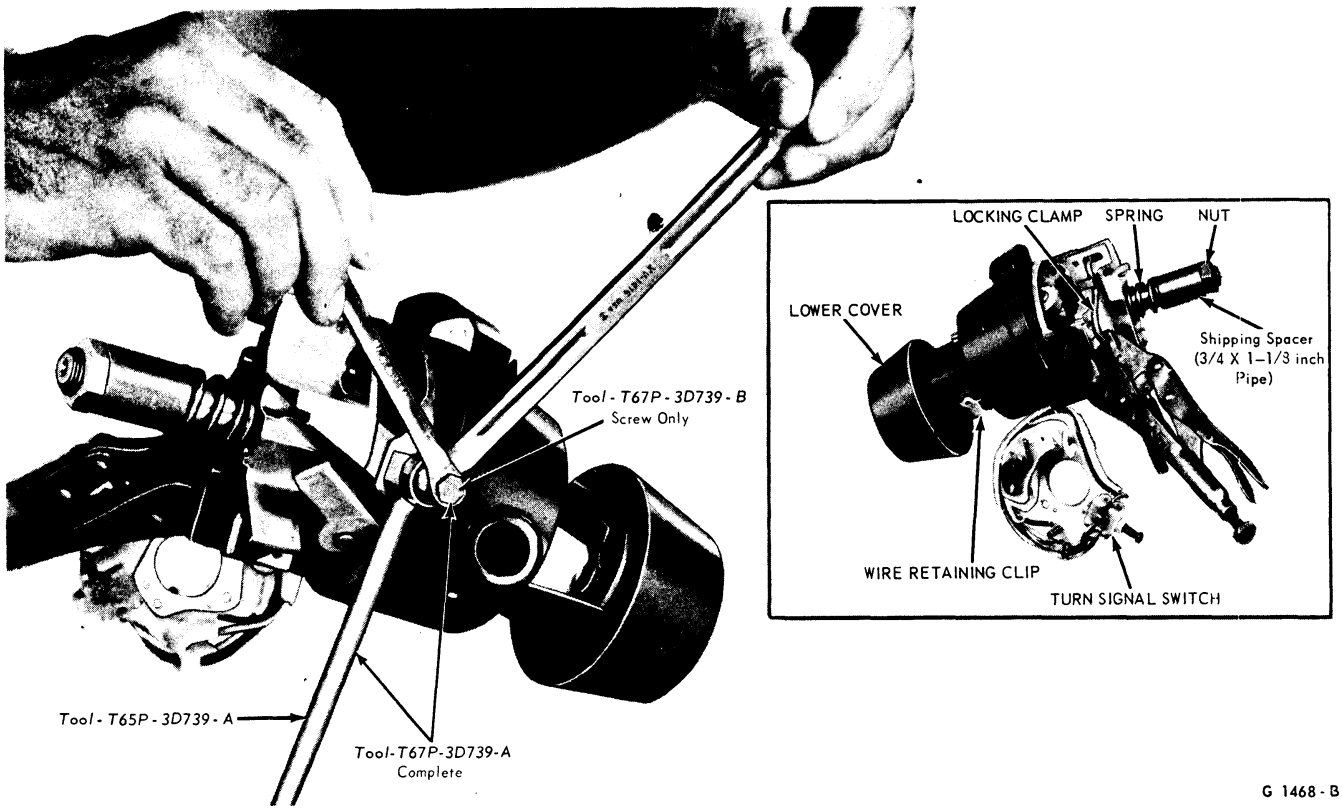


FIG. 4—Removing Pivot Pin

cer and spring from the steering shaft.

12. With the steering column locking clamp still compressed, lift the upper flange from the column by working against the lower bearing inner race.

13. Place the flange on the bench with the smaller bearing toward the bench (Fig. 5). Drive lightly on the outer race at each slot with a small pick. To remove the upper bearing invert the flange and remove the larger bearing in the same manner. **Never drive or apply pressure to the inner race.**

Installation

1. Select a socket wrench that is the same diameter of each bearing outer race. Position the bearing on the upper flange with the open side facing inward. Place the socket on the outer race and tap the bearing into place. **Be careful not to contact the bearing inner race as damage will result.**

2. Compress the column release lever with vise grips to place the locking levers in the release position.

3. Position the flange on the upper end of the shaft being careful to apply pressure only on the upper bearing inner race to prevent bearing damage.

4. Install new pivot pins to assure a satisfactory press-fit as shown in Fig. 6 with a C-clamp. The pivot pins should have a clearance of 0.005 inch between the shoulder and casting when properly installed. A clearance of less than 0.005 inch may create a bind in the tilt mechanism. If one pin presses in before the other, place a spacer washer over the head of the pin that has already positioned to prevent over pressing while still pressing the other one into position.

5. Move the tilt mechanism to the uppermost position and remove the vise grip pliers to lock it in place.

6. Position the release spring rod and hold it up as high as possible with vise grip pliers. Place the spring and cover in place on the upper flange. Compress the spring and install the retainer. Remove the vise grip pliers.

7. Depress the column release lever with pliers and place the tilt mechanism in the center position.

8. Position the turn signal switch and install the two attaching screws.

9. Pull the wires into place and install the plastic retaining clip.

10. Slide the lower cover into place. Tighten the screw attaching the lower cover to the column. Make sure the rotating socket casting does not rub on the lower cover. (On Ford and Mercury models, replace the shroud.)

11. Position the upper cover on the column and install the two attaching screws.

12. Install the combination turn signal and tilt mechanism lever.

13. Install the steering wheel and the crash pad.

14. Connect the negative cable to the battery. Check the turn signal and tilt mechanism for proper operation.

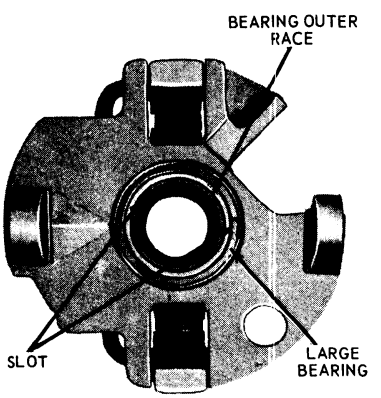


FIG. 5—Removing Ball Bearings

TILT-AWAY STEERING COLUMN REPAIRS

VACUUM RELEASE VALVE—COUGAR AND MUSTANG

Removal

1. Working from the underside of the instrument panel disconnect the hose from the valve.
2. Disconnect the wire from the connector on the valve and the connector from the relay.
3. Remove the bracket-to-instrument panel attaching bolt and let the bracket swing down.
4. Remove the two screws that secure the valve to the mounting bracket and remove the valve.

Installation

1. Secure the valve to the mounting bracket with the two attaching screws.
2. Position the bracket to the instrument panel and install the attaching bolt.
3. Connect the wire to the terminal on the valve.
4. Connect the hose from the vacuum motor to the horizontal connector on the valve and the hose from the reservoir to the vertical connector.

VACUUM RELEASE VALVE—THUNDERBIRD

Removal

1. Remove the lower finish panel.
2. Disconnect the vacuum hose from the vacuum release valve.
3. Disconnect the vacuum release valve electrical leads at the connector.
4. Loosen the two attaching screws holding the bracket to the dash. Lift up the bracket to clear the screws and swing it down below the panel.
5. Remove the screws attaching the valve to the panel and remove the valve.

Installation

1. Position the vacuum release valve on the bracket.
2. Install the two attaching screws and swing the bracket up and over the screws. Tighten the screws.
3. Connect the electrical leads to the wiring harness.
4. Connect the hose from the vacuum dash panel junction block to the connector on the vacuum release valve that points downward and forward. Connect the hose from the vacuum motor to the other connector on the release valve.
5. Install the lower finish panel.

VACUUM MOTOR—COUGAR AND MUSTANG

Removal

1. Working from the underside of the instrument panel, disconnect the hose to the valve and the wires to the relay and valve.
2. Remove the bracket-to-instrument panel attaching bolt and swing the bracket downward.
3. Remove the clevis pin that secures the cable to the vacuum motor rod.
4. Disconnect the starter safety switch wire at the connector.
5. Remove the two motor-to-bracket attaching screws and remove the motor, disconnecting the hose to the solenoid.

Installation

1. Position the motor on the mounting bracket and the attaching screws.
2. Connect the control cable to the vacuum motor rod with the clevis pin.
3. Position the bracket to the instrument panel and install the attaching bolt. Make all electrical and vacuum connections.
4. Readjust the cable bracket to assure full engagement of the locking pawl when in driving position.
5. Connect the hose to the vacuum motor.

VACUUM MOTOR—THUNDERBIRD

Removal

1. Remove the lower finish panel.
2. Disconnect the vacuum hose from the solenoid valve. Disconnect the electrical lead.
3. Loosen the screws that attach the bracket to the dash and lift the bracket up; then, swing it down.
4. Remove the clevis pin holding the motor to the cable.
5. Remove the two attaching screws, then lift the motor from the bracket.

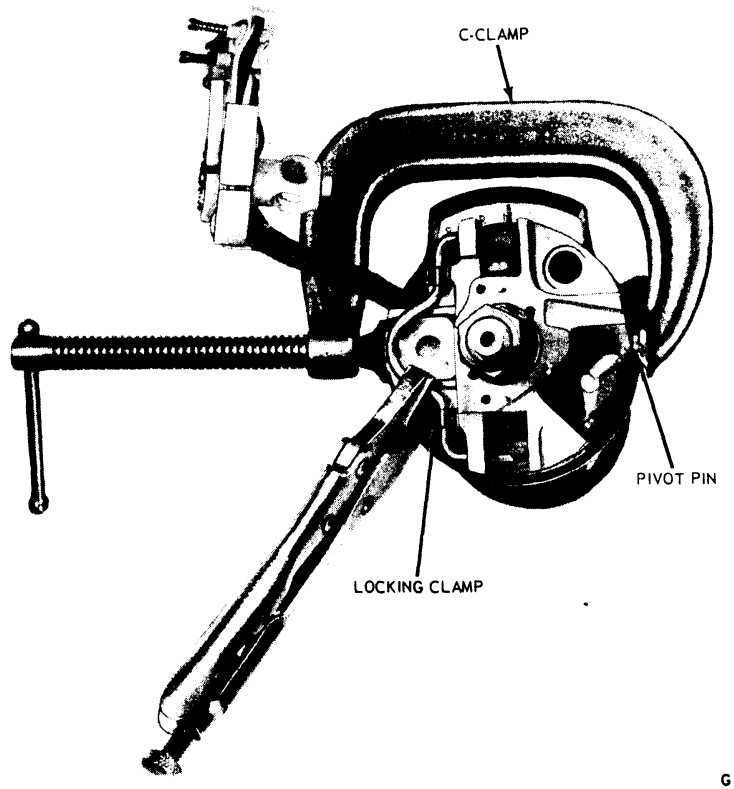


FIG. 6—Installing Pivot Pins

Installation.

1. Position the vacuum motor on the bracket. Tighten the two attaching screws.
2. Connect the cable to the motor with the clevis pin. Adjust the cable bracket so the motor rod is fully extended, but not tight.
3. Slide the vacuum motor as required to align the locking pawl rod and vacuum motor. Retighten the two vacuum motor attaching screws.
4. Connect the vacuum hose to the vacuum motor.
5. Install the lower finish panel.

LOCKING LEVER REPLACEMENT

Removal

1. Remove the upper flange and bearings from the column.
2. Insert a 3 1/8-inch bolt between the lower ends of the locking levers (Fig. 7) to relieve the tension from the column release lever.
3. Place the flange in a vise as shown (Fig. 7) and remove the two retainers with a screwdriver.
4. Lift the column release lever from the flange.
5. Drive the locking lever retaining pins from the flange with a small drift.
6. Release the vise slowly to prevent the levers from flying out.
7. Remove the levers, spring caps and springs from the flange.

Installation

1. Make sure that the rubber insulators are in place in the upper flange.
2. Position the springs, spring caps and locking levers in the upper flange.
3. Place the assembly in a vise and compress the springs. Install new lever retaining pins in the upper flange. The pins should protrude from the sides of the flange by .03 to .09 inch.
4. Install a 3 1/8-inch bolt between the lower ends of the locking levers as shown in Fig. 7.
5. Make sure that the column release lever stop and spring is in place in the upper flange, then position the column release lever on the flange. Install the two retainers.
6. Remove the 3 1/8-inch bolt from between the levers.
7. Install the upper flange and bearings in the steering column.

STEERING COLUMN ALIGNMENT

THUNDERBIRD AND CONTINENTAL MARK III

A condition of high shift or steering efforts may be experienced caused by improper alignment of the energy absorbing steering column. The following procedures outline the steps necessary to correctly re-align either fixed or tilt columns.

It is recommended that before attempting realignment, the toe plate (column retainer) to dash panel fastener holes be inspected for a binding or misaligned condition.

If the conditions described above could be attributed to this area, file or ream the **dash panel** holes for greater clearance.

The column alignment procedures:

1. Loosen the nuts retaining the toe plate (column retainer) to the dash panel (B in Fig. 8).
2. Loosen to fingertight the bolt and nut located on the toe plate retaining clamp (C in Fig. 8).
3. Remove trim at instrument panel to steering column mounting to expose retaining bolts.
4. Loosen to fingertight the bolts that support the column and bracket against the instrument panel (D in Fig. 8).
5. Loosen to fingertight the bolts or nuts which retain the column brackets to the brake pedal support bracket (E).
6. Loosen to fingertight the bolt which controls lateral adjustment of

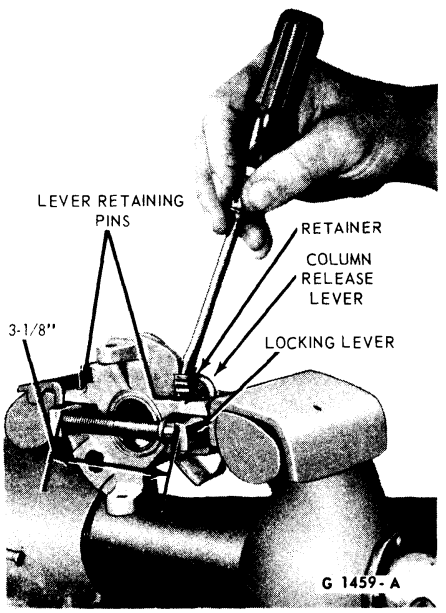
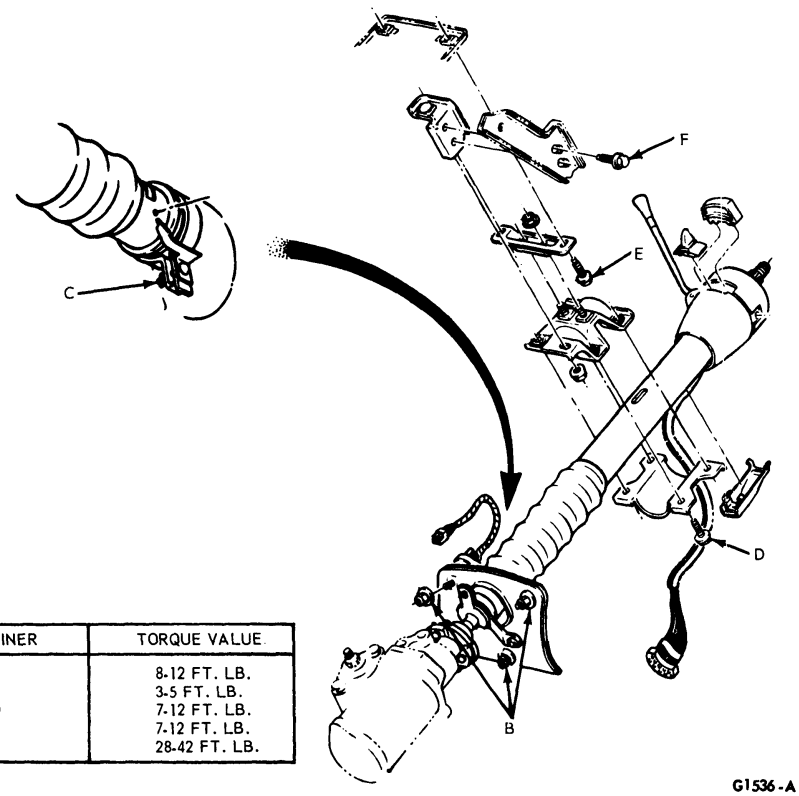


FIG. 7—Removing or Installing Locking Levers



RETAINER	TORQUE VALUE
B	8-12 FT. LB.
C	3-5 FT. LB.
D	7-12 FT. LB.
E	7-12 FT. LB.
F	28-42 FT. LB.

FIG. 8—Steering Column Alignment Locations and Torque Specifications

the steering column (F in Fig. 8).

7. Disconnect the transmission shift rod at the shift tube.

8. Working under the hood, install the aligning spacer (Fig. 9) around the visible portion of the steering shaft and slide it up the shaft into the steering column. It may be necessary to move the shaft back and forth to completely install the spacer.

9. At this point the steering column assembly, being loose, may have dropped toward the steering gear grounding the steering shaft on the steering gear input shaft. To properly establish the steering shaft to steering gear clearance, insert a 1/8 diameter rod or drill through the opening in the upper half of the flex coupling.

10. Tighten to a snug fit (approximately 2-3 ft-lb) the nuts retaining the toe plates to the dash panel (B in Fig. 8).

11. If the aligning spacer cannot be rotated freely, the **dash panel** holes must be filed or reamed for greater travel (as mentioned in the second paragraph at the beginning of this procedure).

12. Tighten all nuts and bolts (noted as C, D and E in Fig. 8) in the passenger compartment to a snug fit (approximately 2-3 ft-lb). Again check aligning spacer for looseness. Perform these tightening operations in **alphabetical** order.

13. Tighten the lateral adjustment bolt (F in Fig. 8) to snug fit. Again check the aligning spacer for looseness.

14. Tighten all bolts and nuts to the proper torque value (listed in Fig. 8) in **alphabetical** order.

15. Remove the steering shaft aligning spacer.

16. Remove the 1/8 diameter rod or drill previously inserted in the flex coupling.

17. Reinstall the trim at the instrument panel to steering column mounting.

LINCOLN CONTINENTAL

If a condition of high shift or steering effort is experienced it may be caused by improper alignment of the energy absorbing steering column. The following procedures outline the steps necessary to correctly realign either fixed or tilt columns:

1. Disconnect the battery.

2. Loosen four toe plate attaching nuts (Fig. 10).

3. Loosen one toe plate to steering column clamp bolt and nut. Check alignment of steering shaft to shift

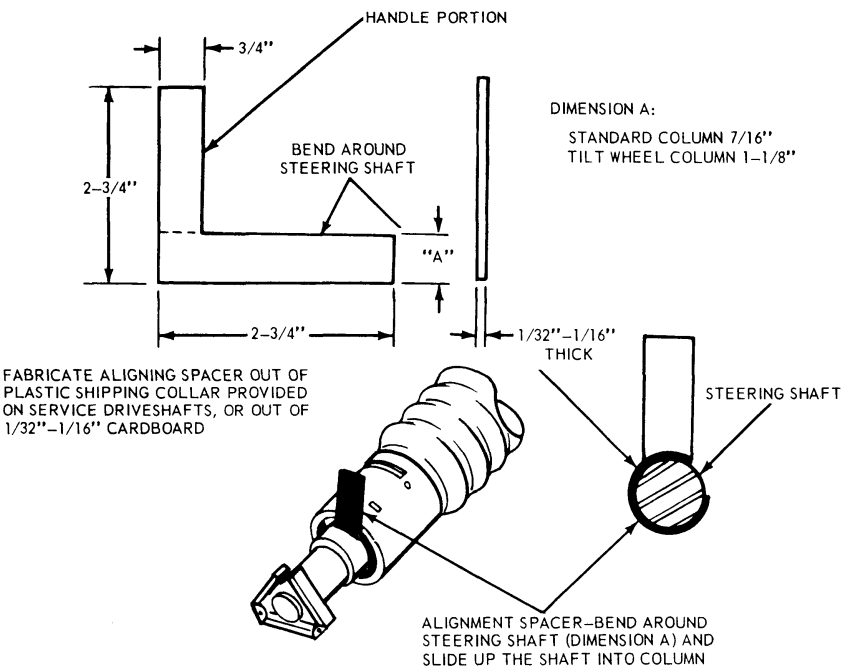


FIG. 9—Aligning Spacer Fabrication and Insertion

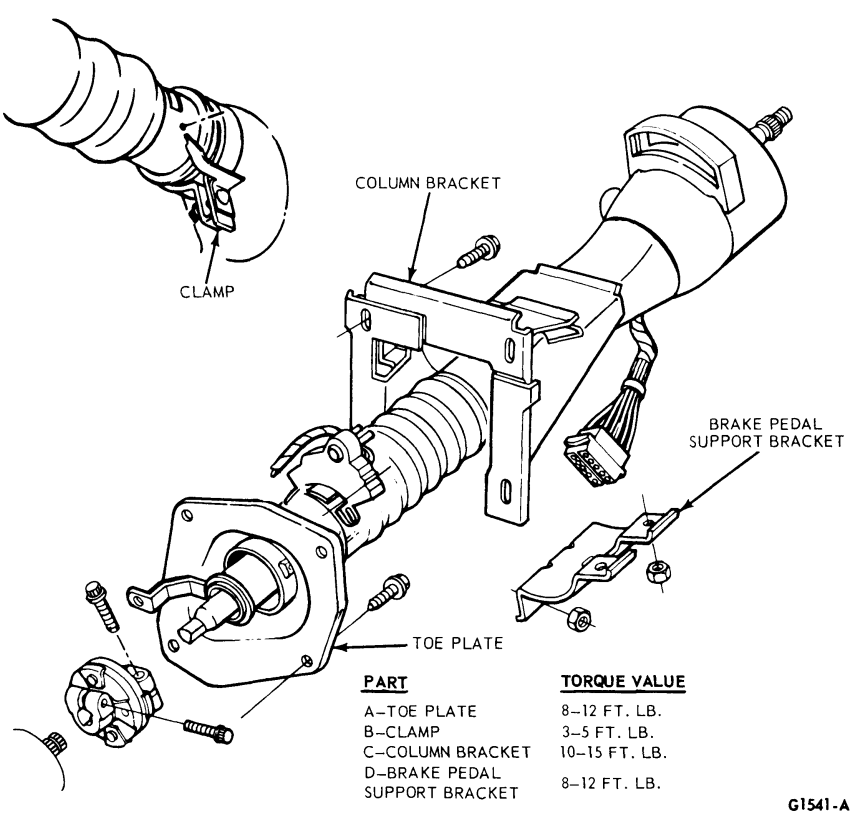


FIG. 10—Steering Column Alignment Locations and Torque Specifications—Lincoln Continental

tube. In some instances the column will shift into proper alignment when the toe plate attaching nuts are loosened. (Alignment is acceptable if a .010 inch feeler blade can be passed freely, completely around the area between the outer diameter of the steering shaft and the shift tube.) if the misalignment condition can be attributed to this area, file or ream the **dash panel** holes for greater clearance. If the alignment is maintained after the toe plate nuts and toe plate to column clamp bolt and nut are torqued to the 8-12 ft-lb specification, no further adjustment is necessary.

4. Remove instrument panel lower trim panel. Vehicles equipped with a combination radio stereo tape player will require removal of the radio and tape player assembly in order to gain access to the upper R.H. steering column support bracket bolt.

5. Loosen the seven bolts at the steering column support bracket and brake pedal support bracket.

6. Install a 3/16 inch diameter rod spacer in the flex coupling to assure proper clearance between upper and lower steering shaft.

7. Raise the vehicle, remove the transmission splash shield, and visually align the column to center the steering shaft in the column. Tighten two toe plate attaching nuts sufficiently to hold the column alignment (two persons may be required for this operation).

8. Lower the vehicle.

9. Check the clearance between the steering column support bracket and the instrument panel bracket. It may be necessary to add shims (Part Number MK-3054-A .060 inch thick, or C3AZ-3054-A, .113 inch thick) between the support bracket and the instrument panel bracket to prevent movement of the column when the support bracket bolts are tightened.

10. Loosen the two toe plate attaching nuts previously tightened. Recheck steering column alignment. In some instances it may be necessary to enlarge the holes in the **dash panel** in order to obtain proper column alignment.

11. With the column properly aligned, torque the four toe plate attaching nuts to 4-9 ft-lbs.

12. Torque the toe plate to steering column clamp bolt to 3-5 ft-lbs.

13. Recheck steering shaft to shift tube alignment. A 0.10 inch feeler blade should pass freely, completely around the area between the outer diameter of the steering shaft and shifter tube.

14. Raise the vehicle.

15. Adjust transmission shift linkage.

16. Install transmission splash shield.

17. Lower the vehicle.

18. Install the radio stereo tape player if so equipped.

19. Install instrument panel lower trim panel.

20. Connect the battery.

3 REMOVAL AND INSTALLATION

STEERING COLUMN

FORD, MERCURY, METEOR

Removal

1. Disconnect the battery cable from the negative post.

2. Disconnect the turn signal switch wires at the connector.

3. Disconnect the neutral start switch and back-up light switch wires from the switches.

4. Disconnect the transmission control rod(s) from the lever(s) at the lower end of the column.

5. Remove the bolt that secures the flex coupling to the steering gear.

6. Remove the nuts that secure the column retainer and seal at the toe plate (Fig. 11).

7. Ford, Meteor: Remove the two screws that secure the lower trim shroud to the upper trim shroud. Remove the two shrouds.

Mercury: Remove the two screws that secure the lower trim shroud to the upper trim shroud. Remove the top shroud Disconnect the ignition switch light bulb. Remove the ignition and light switch bezels and spring clip and remove the lower shroud. Disconnect the light switch electrical connector block.

8. Remove the two screws that secure the intermediate bracket to the column lower bracket.

9. While supporting the steering column, remove the two nuts that secure the column lower bracket to the instrument panel. Remove the brackets.

10. Lift the steering column and wheel from the vehicle.

Installation

1. Position the steering column in the vehicle. Index the block tooth on the steering gear shaft with the corresponding slot on the flex coupling. Install and tighten the flex coupling-to-steering gear attaching bolt.

2. Place the column upper bracket and column lower bracket in position on the column and install but do not tighten the four attaching nuts.

3. Install and tighten the two nuts that secure the column lower bracket to the instrument panel. Make certain the column is properly positioned relative to the flex coupling input shaft connection.

4. Install and tighten the screws that secure the intermediate bracket to the column lower bracket.

5. Tighten the four attaching nuts at the upper and lower brackets and the two nuts at the upper bracket to instrument panel. The dial pointer (if so equipped) should be adjusted to coincide with the selector lever.

6. Install and tighten the nuts and bolts that secure the column retainer and seal at the toe plate. Make sure the steering shaft is centered in the column before tightening the nuts.

7. Ford, Meteor: Install and tighten the two screws that secure the lower trim shroud to the upper trim shroud.

Mercury: Connect the light switch harness block. Install the ignition and light switch bezels. Connect the ignition switch light bulb. Install the top shroud and the two screws that secure the lower trim shroud to the upper shroud.

8. Connect the transmission control rod(s) to the lever(s) at the lower end of the column.

9. Connect the neutral start switch and back-up light switch to their respective terminals.

10. Connect the turn signal switch wires.

11. Connect the negative battery cable to the battery.

12. Check the operation of the steering tilt mechanism if so equipped and the switches.

FAIRLANE, FALCON AND MONTEGO

Removal

1. Disconnect the battery cable from the negative post.
2. Disconnect the turn signal switch wires at the connector.
3. Disconnect the neutral start siwtch (with automatic transmission) and back-up light switch wires from the switches.
4. Disconnect the transmission control rod(s) from the lever(s) at the lower end of the column.
5. Remove the bolt that secures the flex coupling to the steering gear (Fig. 12).
6. Remove the nuts and bolts that secure the column retainer and seal at the toe plate.
7. Disconnect the nuts that secure the column upper and lower brackets to the brake pedal support bracket and the dash panel.
8. Lift the column from the vehicle.

Installation

1. Position the steering column in the vehicle. Make sure that the wheels are in the straight ahead position and that the steering wheel spokes are in a horizontal position when the flex coupling engages the input shaft splines.
2. Install but do not tighten the nuts that secure the column upper and lower brackets to the brake pedal support bracket and the dash panel. Make certain the column is properly positioned relative to the flex coupling input shaft connection.
3. Install and tighten the flex coupling-to-steering gear attaching bolt.
4. Tighten the nuts at the brake pedal support bracket and the dash panel.
5. Install and tighten the nuts and bolts that secure the column retainer and seal at the toe plate.
6. Connect the transmission control rod(s) to the lever(s) at the lower end of the column.
7. Connect the neutral start switch (if so equipped) and back-up light switch to their respective terminals.
8. Connect the turn signal switch wires.

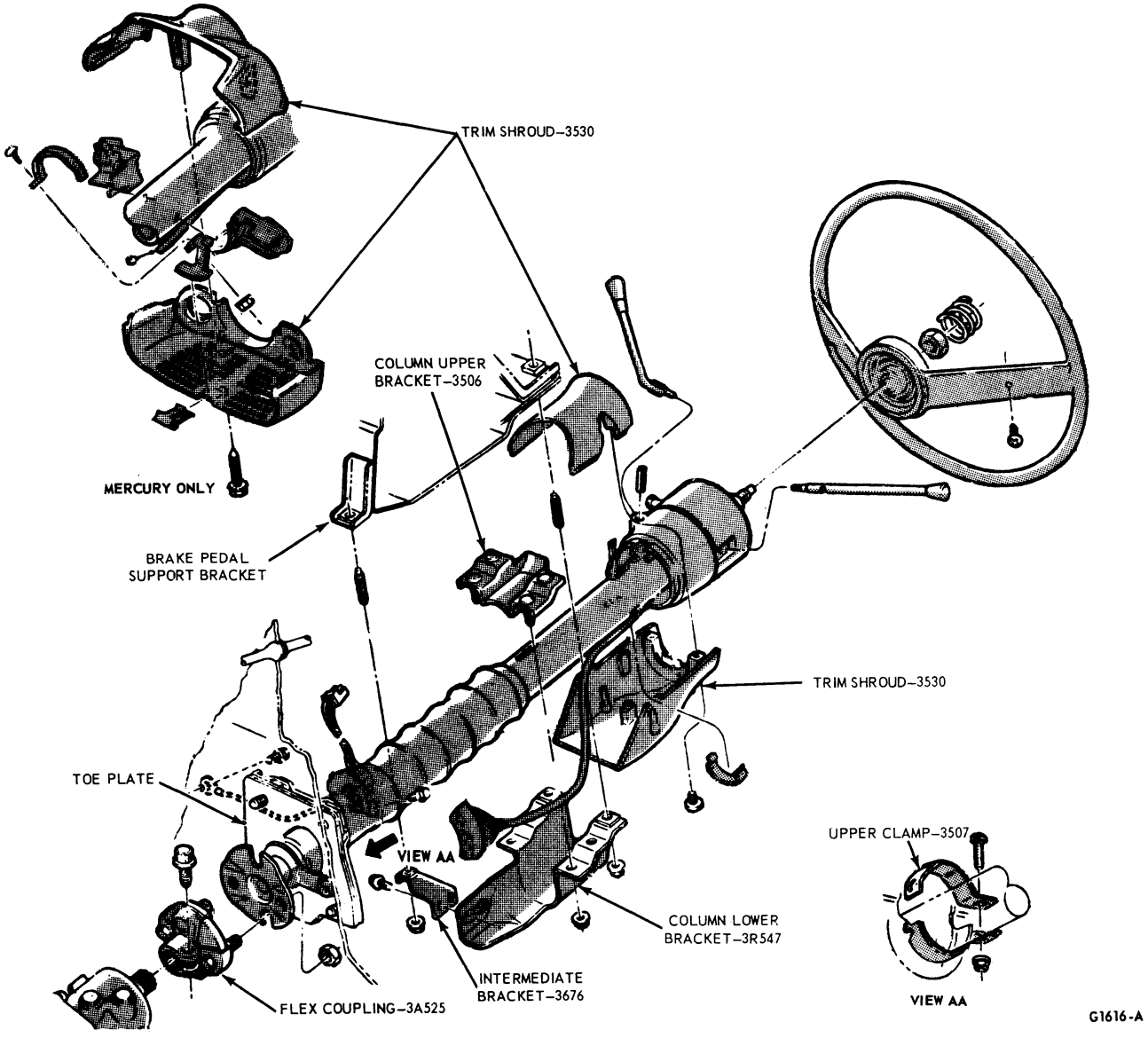


FIG. 11—Steering Column Installation—Ford, Mercury, Meteor

9. Connect the battery cable to the negative post.
10. Check the operation of the switches.

COUGAR, MUSTANG

Removal

1. Disconnect the battery cable from the negative post.
2. Disconnect the turn signal switch wires at the connector.
3. On tilt-away columns, disconnect the tilt-control cable from the vacuum motor and mounting bracket.
4. Remove the bolt that secures the flex coupling to the steering gear.
5. Remove the nuts and bolts that secure the column retainer and seal at the toe plate.
6. Remove the nuts that secure the column lower bracket to the brake pedal support (Fig. 13).
7. Lift the column from the vehicle.

Installation

1. Position the steering column in the vehicle. Make sure that the wheels are in the straight ahead position and that the steering wheel spokes are in a horizontal position when the flex coupling engages the input shaft splines.
2. Install but do not tighten the nuts that secure the column lower bracket to the brake pedal support. Make certain the column is properly positioned relative to the flex coupling input shaft connection.
3. Tighten the two rearward nuts at the brake pedal support bracket and column lower bracket to the brake pedal support.
4. Install and tighten the nuts and bolts that secure the column retainer and seal at the toe plate. Tighten the forward nuts securing the column to the brake pedal support.
5. Install and tighten the flex coupling-to-steering gear attaching bolt.
6. On tilt-away columns, connect the tilt-control cable to the vacuum motor and mounting bracket. Adjust the cable for proper operation.
7. Connect the turn signal switch wires.
8. Connect the battery cable to the negative post.

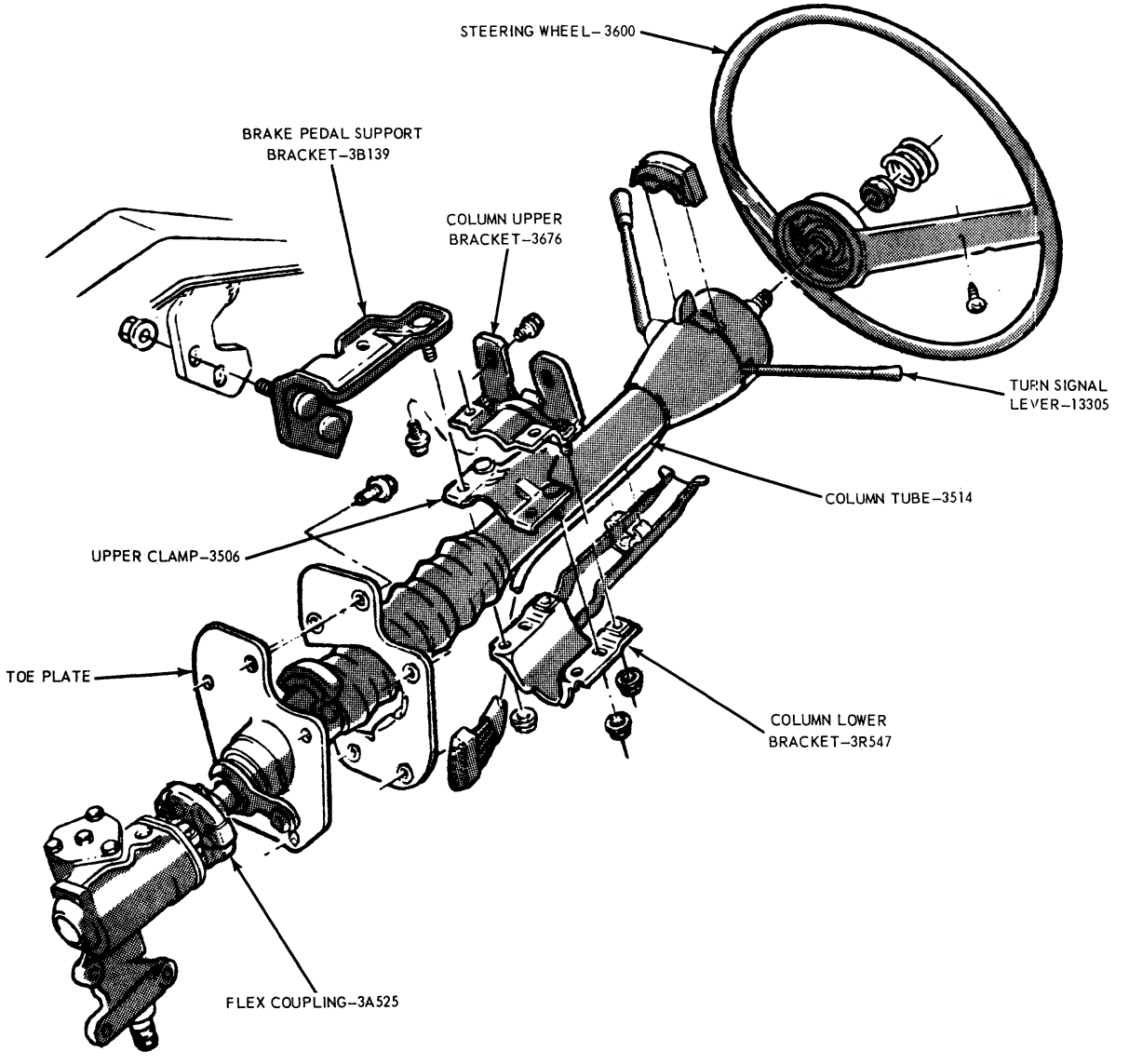


FIG. 12—Steering Column Installation—Fairlane, Falcon, Montego

9. Check the operation of the steering tilt mechanism (if so equipped) and the switches.

THUNDERBIRD AND CONTINENTAL MARK III

Removal

1. Remove the instrument panel lower outer finish panel, instrument panel steering column plate and cover.
2. Disconnect the negative cable from the battery.
3. Remove the bolt that attaches the flexible coupling to the steering shaft.
4. Disconnect the shift rod from the lever at the lower end of the column.
5. Remove the four screws that attach the column retainer to the dash panel.
6. Working from the underside of the instrument panel disconnect the steering column tilt-control cable from the vacuum motor and mounting bracket (if so equipped) (Fig. 14).
7. Disconnect the turn signal switch, and emergency flasher wires at the connectors. Disconnect the wires from the neutral start switch.
8. While supporting the steering column, remove the four bolts that attach the lower clamp to the upper clamp (Fig. 14). Lift the column from the vehicle.

Installation

1. Position the column in the vehicle making sure that the steering shaft engages the flex coupling.
1. Install the column retainer-to-dash panel attaching screws, but do not tighten them.
3. Install the lower clamp and the attaching nuts. Tighten the nuts fingertight.
4. Move the lower flange as required to center the steering shaft in the tube. Aligning procedures are detailed in Part 3-1. Tighten the lower flange attaching nuts when the shaft is centered.
5. Connect the shift rod to the shift lever at the lower end of the column.
6. Install and tighten the flex coupling attaching bolt.
7. Tighten the instrument panel-to-clamp attaching nuts.

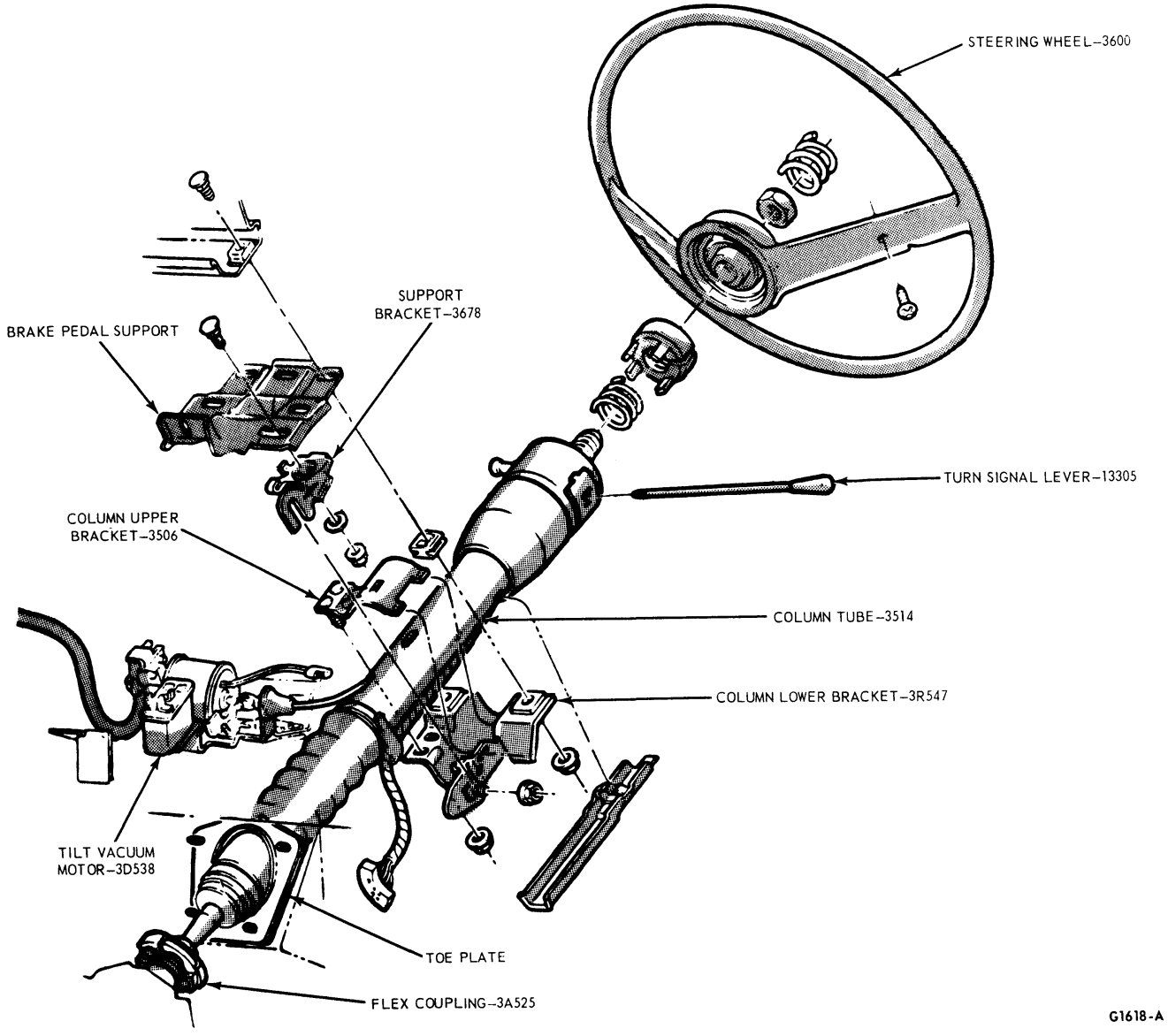


FIG. 13—Steering Column Installation—Cougar, Mustang

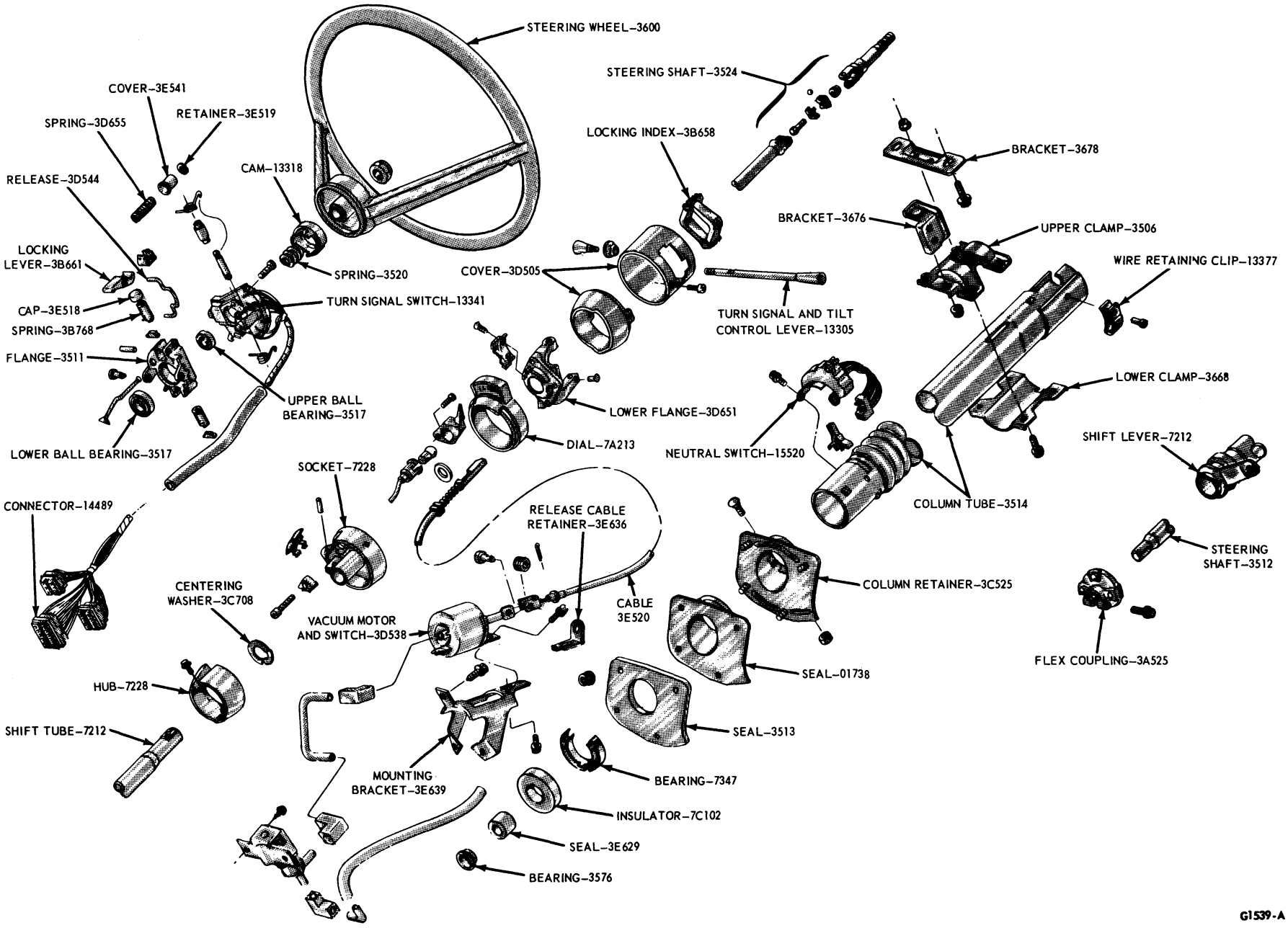


FIG. 14—Steering Column Installation—Thunderbird and Continental Mark III

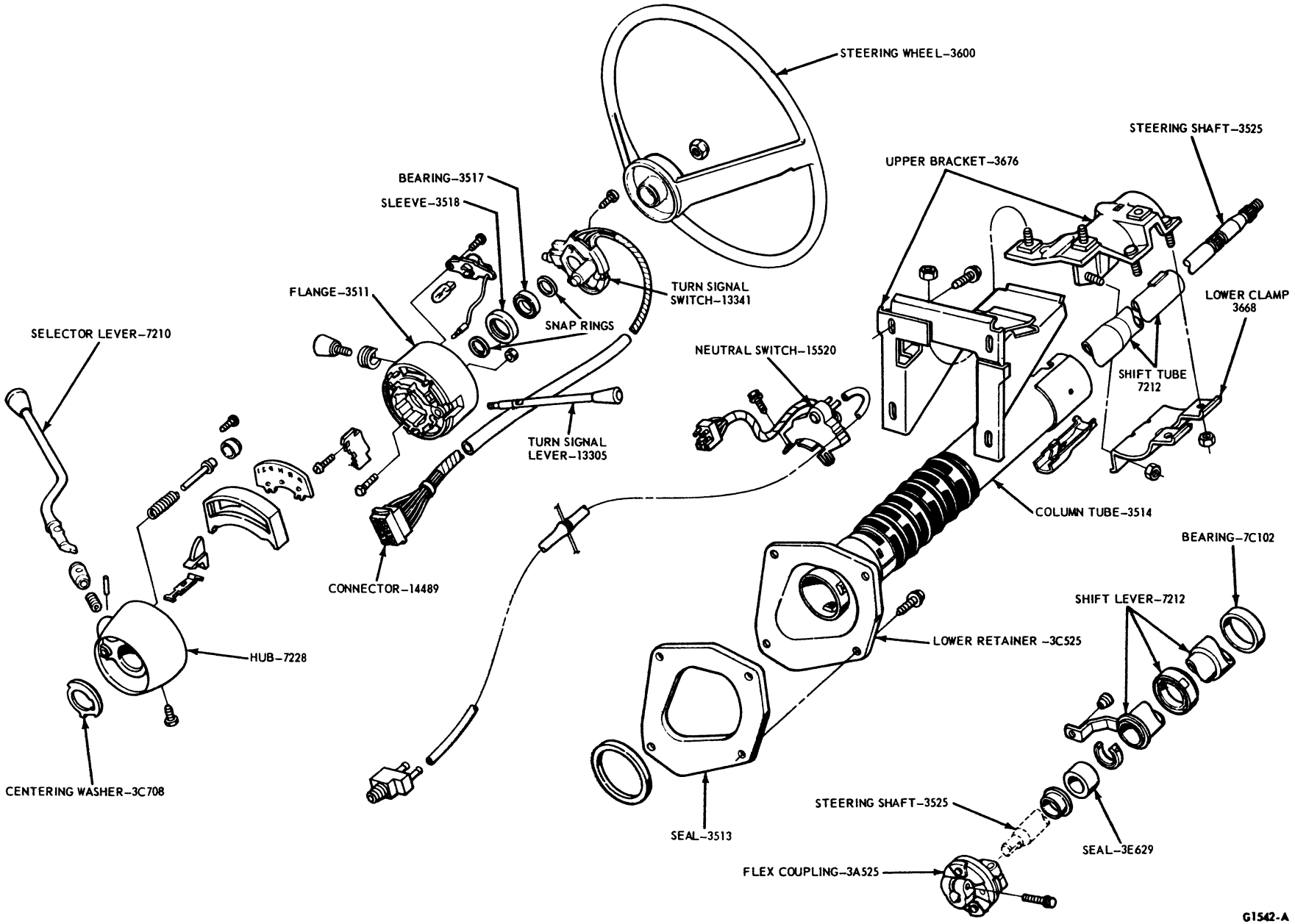


FIG. 15—Steering Column (Fixed)—Disassembled—Lincoln Continental

8. Connect the turn signal and emergency flasher switch wires at the multiple connectors. Connect the wires to the neutral start switch. Adjustments for the neutral start switch are detailed in Group 7 of this manual.

9. Connect the tilt-column control cable to the release cable retainer and vacuum motor (if so equipped). To remove cable slack, loosen the bracket attaching screw and pull it slightly toward the column, then tighten the screw. If difficulty in adjusting this control is experienced, the retainer slot may be filed to gain additional travel.

10. Install the instrument panel steering column plate and cover and the instrument panel lower outer finish panel.

11. Connect the negative cable to the battery.

12. Start the engine and check the operation of the steering column and switches.

LINCOLN CONTINENTAL

Removal

1. Disconnect the battery.
2. Disconnect the rod from the lever at the lower end of the selector tube.

Loosen the clamp bolt that locks the flexible coupling to the steering shaft.

3. Working from the underside of the steering wheel spoke, remove the two screws that secure the crash pad. Remove the pad. **Do not use a hammer or knock-off type wheel puller. Striking the puller or shaft may cause damage to the bearings and/or collapsible column.** Remove the steering wheel as shown in Fig. 15.
4. Remove the instrument panel steering column finish plate.
5. Remove the four screws that attach the lower retainer to the dash panel.
6. Disconnect the turn signal switch and emergency flasher wires at the connectors. Disconnect the wires from the neutral start switch.
7. While supporting the steering column, remove the bolts that attach the lower clamp to the upper bracket (Fig. 15). Lift the column from the vehicle.

Installation

1. Position the column in the vehicle, making sure that the steering shaft engages the flex coupling.
2. Install the column retainer-to-dash panel attaching screws, but do not tighten them.
3. Install the lower clamp and the attaching nuts. Tighten the nuts fingertight.
4. Move the lower flange as required to center the steering shaft in the tube. Aligning procedures are detailed in Part 3-1. Tighten the lower flange attaching nuts when the shaft is centered.
5. Connect the shift rod to the shift lever at the lower end of the column.
6. Install and tighten the flex coupling attaching bolt.
7. Tighten the instrument panel-to-clamp attaching nuts.
8. Connect the turn signal and emergency flasher switch wires at the multiple connectors. Connect the wires to the neutral start switch. Adjustments for the neutral start switch are detailed in Group 7 of this manual.
9. Install the instrument panel steering column finish plate.
10. Install the steering wheel and crash pad.

4 MAJOR REPAIR OPERATIONS

STEERING COLUMN SHIFT TUBE REPLACEMENT

STATIONARY COLUMN WITH STANDARD TRANSMISSION

Removal

1. Working from the underside of the steering wheel spoke, remove the two screws that secure the crash pad. Remove the pad. (On Continental Mark III models, pry out the crash pad insert and remove the two screws that secure the crash pad. Remove the crash pad. On models equipped with steering wheel mounted speed controls, refer to Group 16 for removal instructions).
2. Remove the steering wheel from the steering shaft with tool T67L-3600-A (Fig. 1). Then, remove the tool from the steering wheel. **Do not use a knock-off type steering wheel puller or strike the end of the steering shaft with a hammer. Striking the puller or shaft will damage the bearing or the collapsible column.**
3. Remove the steering column from the vehicle.
4. Remove the selector lever from the hub (Fig. 16).
5. Remove the bearing upper snap ring. It may be necessary to pull the turn signal switch out to remove the snap ring.
6. Remove the screws that attach the shift tube bearing, shift arms, and shift tube to the lower end of the steering column.
7. Slip the shift tube and steering shaft from the lower end of the steering column tube. The upper bearing has a slight press fit on the steering shaft.
8. Remove the C-washer from the upper end of the steering shaft, and pull the shift tube from the steering shaft.
9. Remove the shift tube bearing from the lower end of the tube

Installation

1. Position the shift tube bearing (Fig. 16) on the tube and insert the steering shaft in the shift tube.
2. Install the C-washer on the upper end of the steering shaft.
3. Insert the shift tube and steering shaft into the steerint column tube and install the three attaching screws at the lower end of the steering column tube.
4. Position the bearing and insulator on the shaft if it was disturbed during removal. Work it down onto the shaft as far as possible, then place a piece of 3/4 ID x 2 1/8 inch pipe over the end of shaft and install the steering wheel attaching nut (Fig. 2).
5. Tighten the nut until the bearing is seated in the flange, then remove the nut and pipe from the shaft.
6. Position the turn signal switch on the flange and install the three attaching screws. Install the upper snap ring.
7. Install the selector lever and the turn signal lever in the column.
8. Adjust and install the neutral start switch as detailed in Group 7.
9. Install the steering column in the vehicle.

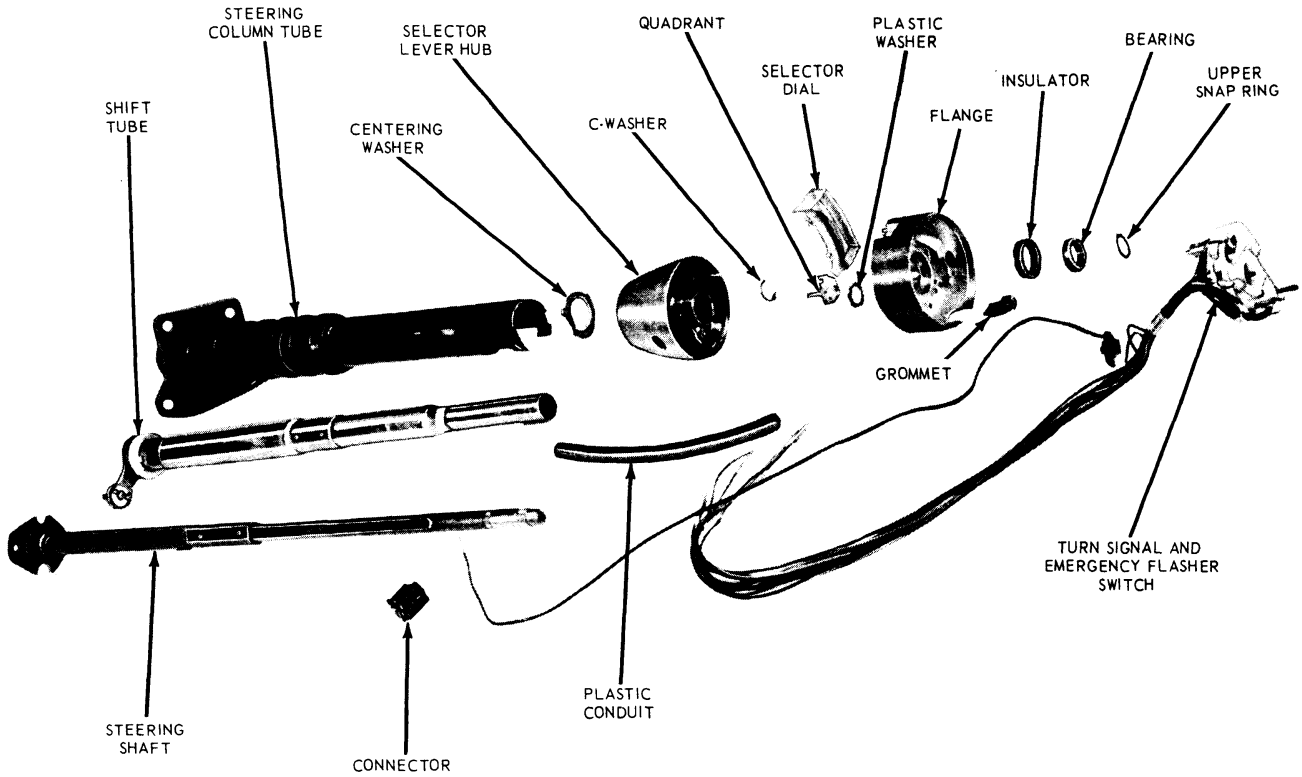


FIG. 16—Typical Stationary Steering Column Disassembled—Standard Transmission

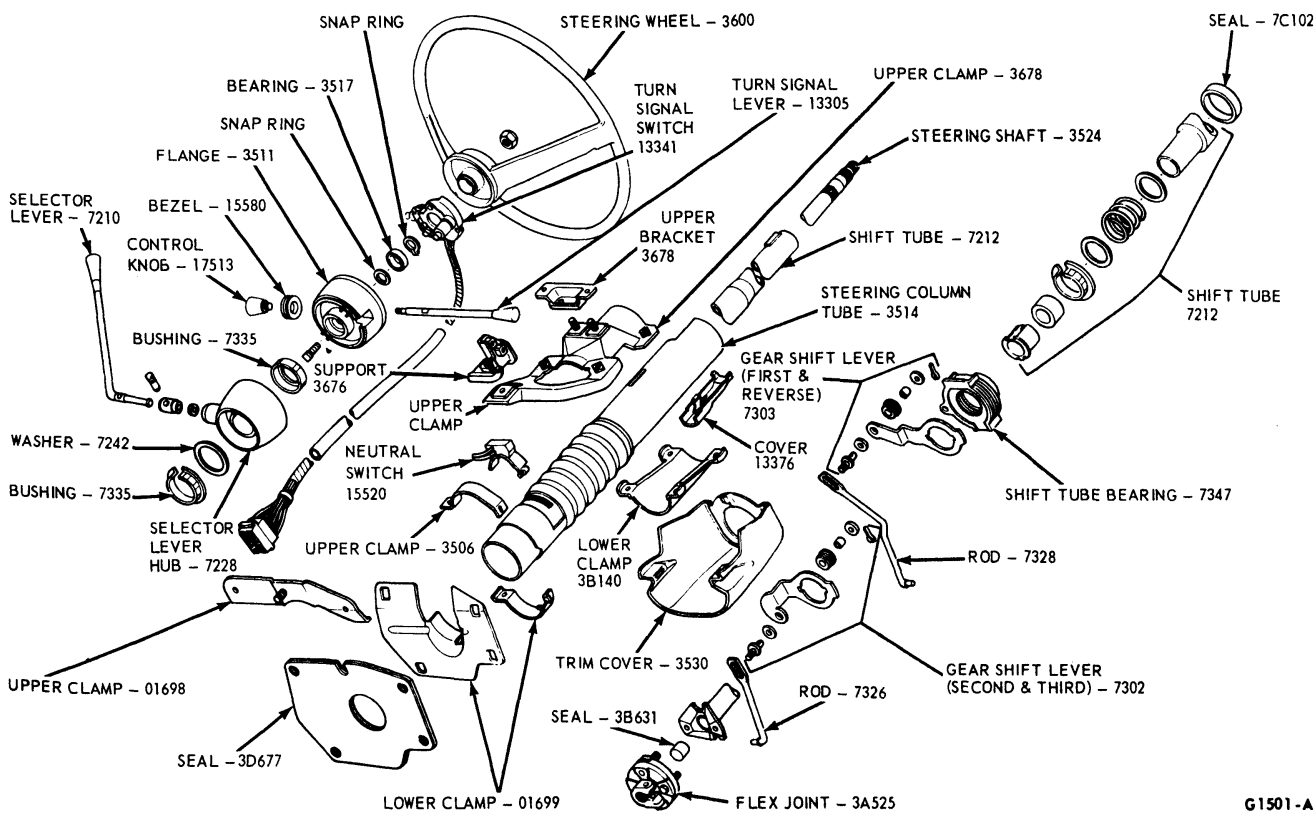


FIG. 17—Typical Stationary Steering Column Disassembled—Automatic Transmission

10. Install the steering wheel.
11. Install the steering wheel crash pad.

STATIONARY COLUMN WITH AUTOMATIC TRANSMISSION

Removal

1. Working from the underside of the steering wheel spokes, remove the two crash pad attaching screws. Remove the pad. (On Continental Mark III models, pry out the crash pad insert and remove the two screws that secure the crash pad. Remove the crash pad. On models equipped with steering wheel mounted speed controls, refer to Group 16 for removal instructions).
2. Remove the steering wheel attaching nut. Remove the steering wheel using tool T67L-3600-A (Fig. 4). **Do not use a knock-off type steering wheel puller or strike the end of the steering shaft with a hammer. Striking the puller or shaft will damage the bearing or the collapsible column.**
3. Remove the steering column from the vehicle.
4. Remove the turn indicator lever.
5. Remove the turn signal switch attaching screws. Lift the switch over the end of the steering shaft and place it to one side.
6. Remove the snap ring from the top of the steering shaft.
7. Loosen the two flange-to-steering column tube attaching bolts to disengage them from the tube.
8. Raise the flange upward while tapping the steering shaft lightly with a plastic hammer to free the bearing and flange from the shaft. **Just tap the shaft hard enough to free it from the bearing.**
9. Remove the roll pin from the selector lever and remove the lever.
10. Remove the neutral start switch and the actuator.
11. Remove one bolt attaching the shift tube to the column and remove the shift tube and steering shaft from the steering column (Fig. 17).
12. Remove the bushing from the shift tube.

Installation

1. Position the bushing on the shift tube and position the shift tube and shaft in the steering column (Fig. 16) and install the attaching bolt.
2. Slip the upper bearing into place if it was disturbed when installing the shaft.

Work it down onto the shaft as far as possible, then place a piece of 3/4 ID x 2 1/8 inch pipe over the end of shaft and install the steering wheel attaching nut (Fig. 2).

3. Tighten the nut until the bearing is seated in the flange, then remove the nut and pipe from the shaft.
4. Install the upper snap ring.
5. Adjust and install the neutral start switch as detailed in Group 7.
6. Position the shift lever in the shift lever hub and install the roll pin.
7. Install the steering wheel and the crash pad.
8. Install the steering column in the vehicle.

TILT COLUMN

Removal

1. Remove the steering wheel with tool T67L-3600-A. Install the spring, shipping spacer (3/4 x 1 1/8-inch pipe) and steering wheel attaching nut on the steering shaft. **Do not use a knock-off type steering wheel puller or strike the end of the steering shaft with a hammer. Striking the puller or shaft will damage the bearing or the collapsible column.**
2. Remove the steering column from the vehicle.
3. Remove the neutral start switch and actuator lever from the column.
4. Remove the combination turn signal and tilt mechanism control lever.
5. Remove the selector lever from the selector hub.
6. Slide the lower cover downward on the steering column tube.
7. Remove the turn signal wire retaining clip (Fig. 3). Remove the two upper cover attaching screws and the cover.
8. Remove the turn signal switch attaching screws. Work the wires upward just enough to left the turn signal switch off the shaft.
9. Remove the three lower flange attaching screws, retainers and lock washers. Lift the steering shaft and tilt mechanism from the steering column tube as an assembly.
10. Remove the screw that attaches the selector lever hub to the shift tube. Slide the selector lever hub and centering washer off the tube. Remove the shift tube from the lower end of the steering column tube (Fig. 3).

Installation

1. Slide the shift tube into the lower end of the steering column tube.
2. Install the centering washer and selector lever hub. Secure the hub to the tube with the attaching screw.
3. Install the steering shaft and tilt mechanism in the column. Secure the lower flange with the three retainers, 1/2 inch OD lockwashers and new Allen head screws.
4. Position the turn signal switch on the column and work the wires downward into place. Secure it with the two attaching screws.
5. Secure the wires to the column tube with the retaining clip.
6. Slide the lower cover into place making sure that the three spring clips engage the retaining slots.
7. Position the upper cover on the pivot cover and secure it with the two attaching screws.
8. Install the selector lever.
9. Install the combination turn signal switch and tilt mechanism control lever.
10. Install the neutral start switch actuator lever and switch on the column.
11. Install the steering column in the vehicle.
12. Install the steering wheel and crash pad.
13. Check the steering column operation.

TILT WHEEL STEERING COLUMN STEERING SHAFT REPLACEMENT

REMOVAL

1. Remove the steering column from the vehicle.
2. Remove the tapered plastic bushing and insulator from the lower end of the steering shaft.
3. Remove the combination turn signal and tilt mechanism lever.
4. Remove the upper cover attaching screws and remove the cover.
5. Remove the screw and slide the lower cover down on the steering column tube (except Ford, Meteor or Mercury).
6. Remove the turn signal switch wire plastic retaining clamp.
7. Remove the two turn signal switch attaching screws. Lift the switch and wires just high enough to clear the top of the steering shaft.
8. Remove the selector lever from the hub.

9. Working from the underside of the hub, remove the three Allen head screws, lock washers and retainers.

10. Lift the tilt mechanism and steering shaft from the steering column tube.

Remove the pivot pins as detailed under Upper Bearing Replacement. Remove the upper flange, lower flange, locking index and pivot cover from the shaft.

INSTALLATION

1. Position the locking index, lower flange and pivot cover on the steering shaft.

2. Install the upper flange as detailed under Upper Bearing Replacement. A vise can be used to install the pivot pins instead of a C-clamp since the steering shaft is removed from the column tube.

3. Install the steering shaft in the column tube.

4. Secure the lower flange to the tube with three new Allen head screws, retainers and 1/2 inch OD lock washers.

5. Install the insulator and the tapered plastic bushing on the lower end of the steering shaft.

6. Position the turn signal switch on the upper flange and install the two attaching screws.

7. Work the wires down into place and install the plastic retaining clamp.

8. Install the selector lever in the hub.

9. Slide the lower cover into place and install the attaching screw (except Ford, Meteor or Mercury).

10. Install the upper cover on the pivot cover and install the three attaching screws.

11. Install the steering column in the vehicle.

12. Install the steering wheel and crash pad.

13. Check the steering column for proper operation.

5 STEERING LINKAGE REPAIR

The manual and non-integral power steering linkage (Figs. 18 through 21) consists of the Pitman arm, the Pitman arm-to-idler arm (center link), the idler arm and bracket assembly and the spindle connecting sleeve and end assemblies (tie rods). **Do not attempt to straighten bent linkage; use new parts.**

HOISTING INSTRUCTIONS

Damage to suspension and/or steering linkage components may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the front suspension lower arms. **Do not allow the adapters to contact the steering linkage.**

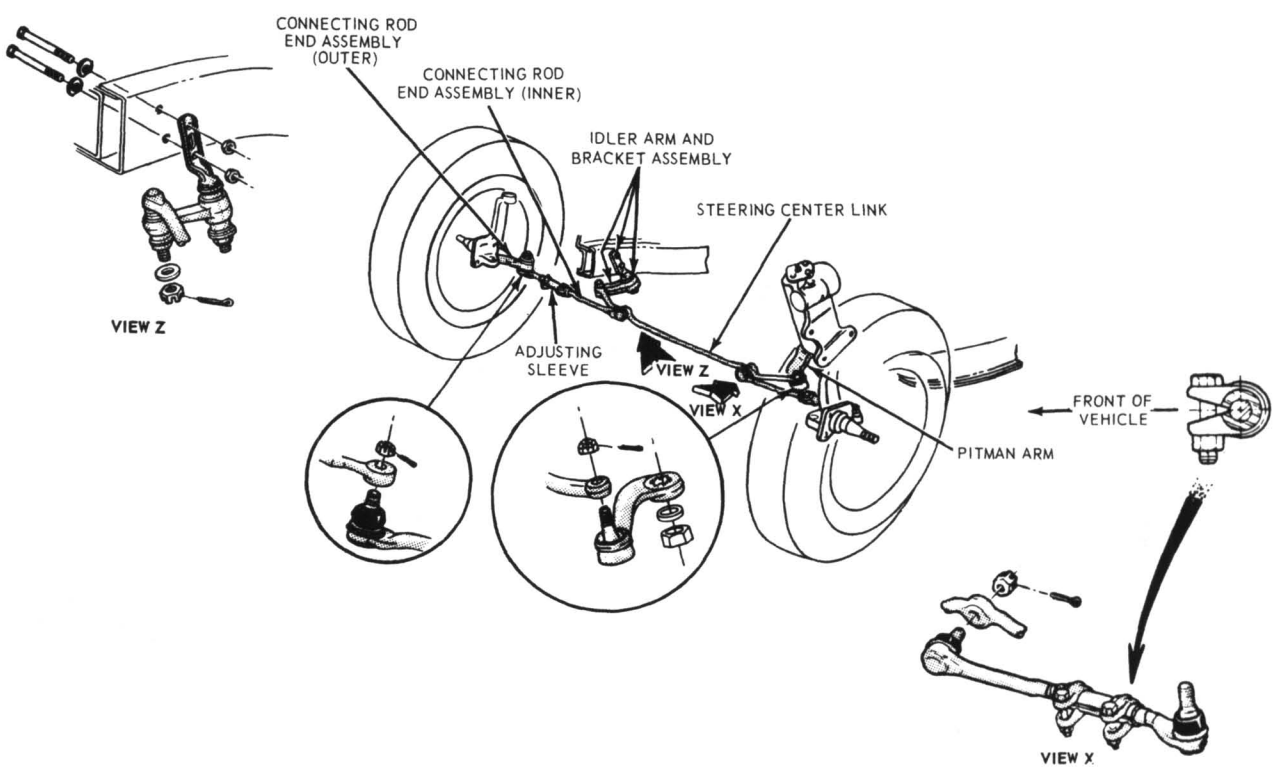


FIG. 18—Manual Steering Linkage—Cougar, Fairlane, Falcon, Montego, Mustang

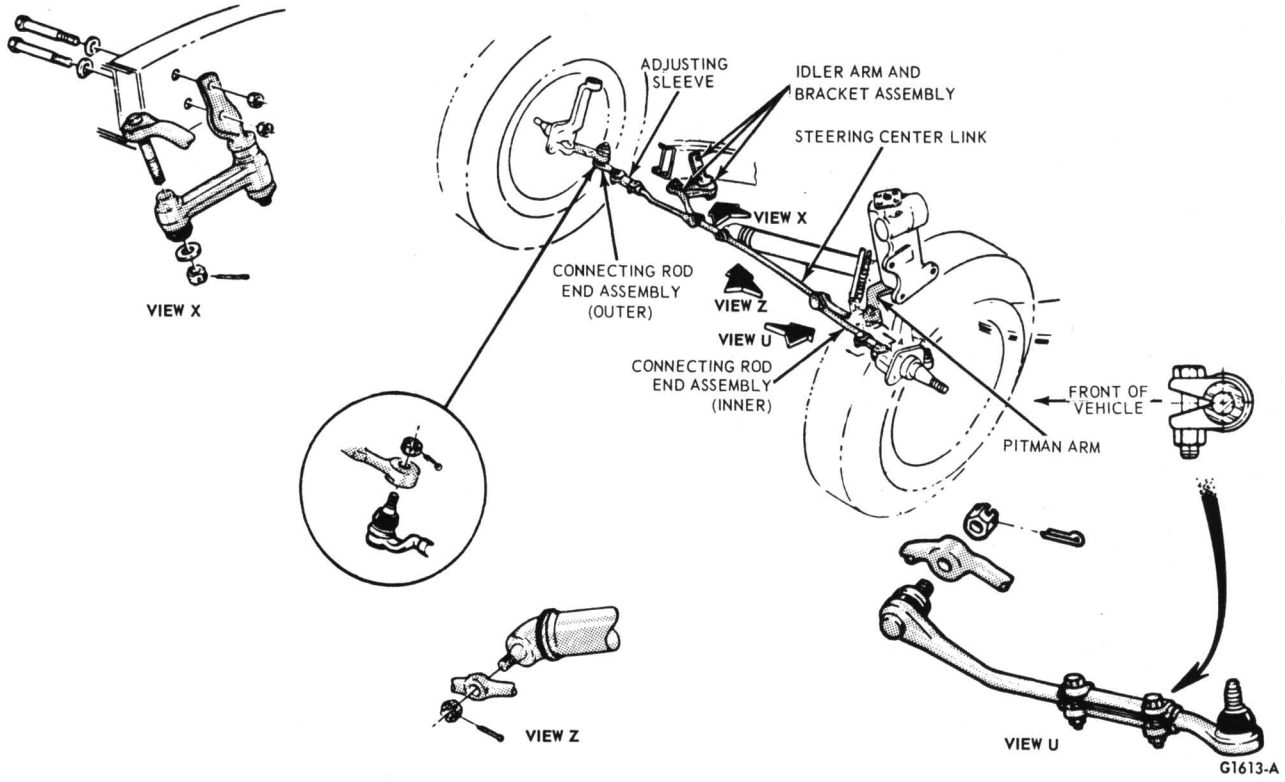


FIG. 19—Non-Integral Power Steering Linkage—Cougar, Fairlane, Falcon, Montego, Mustang

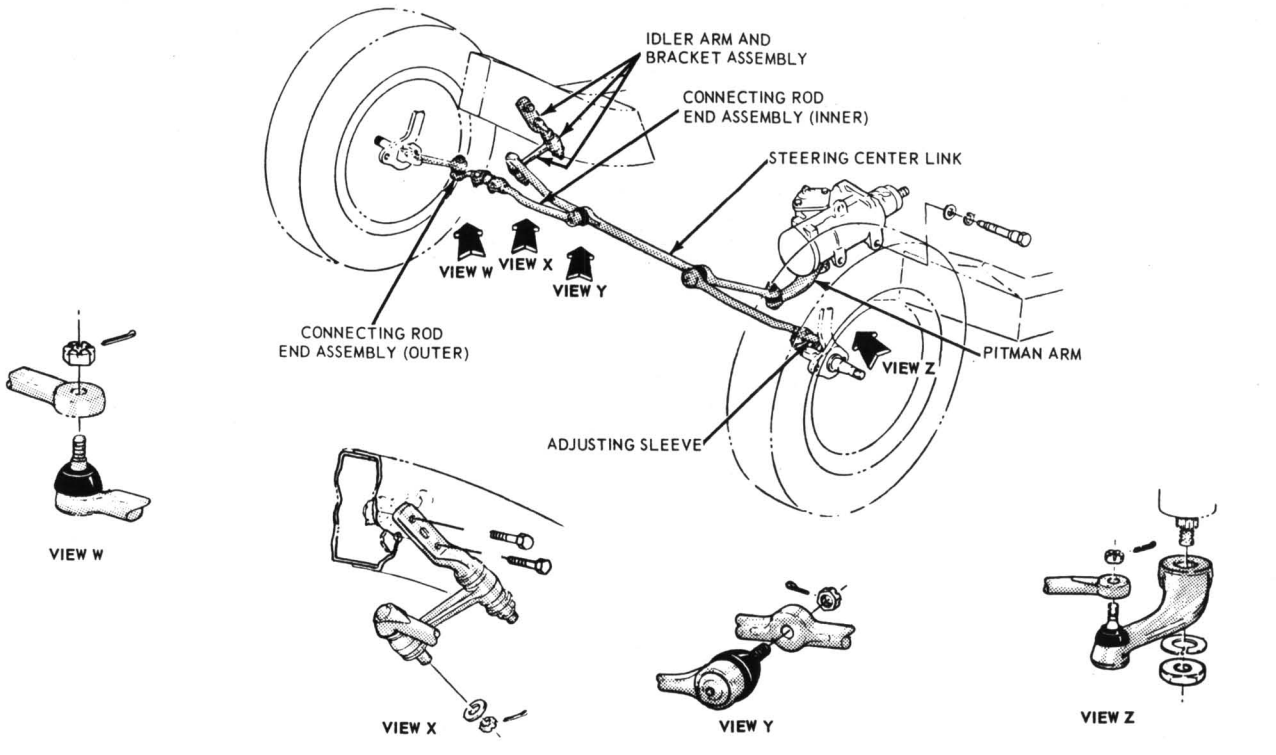


FIG. 20—Manual or Power Steering Linkage—Ford, Mercury, Meteor, Thunderbird, Continental Mark III

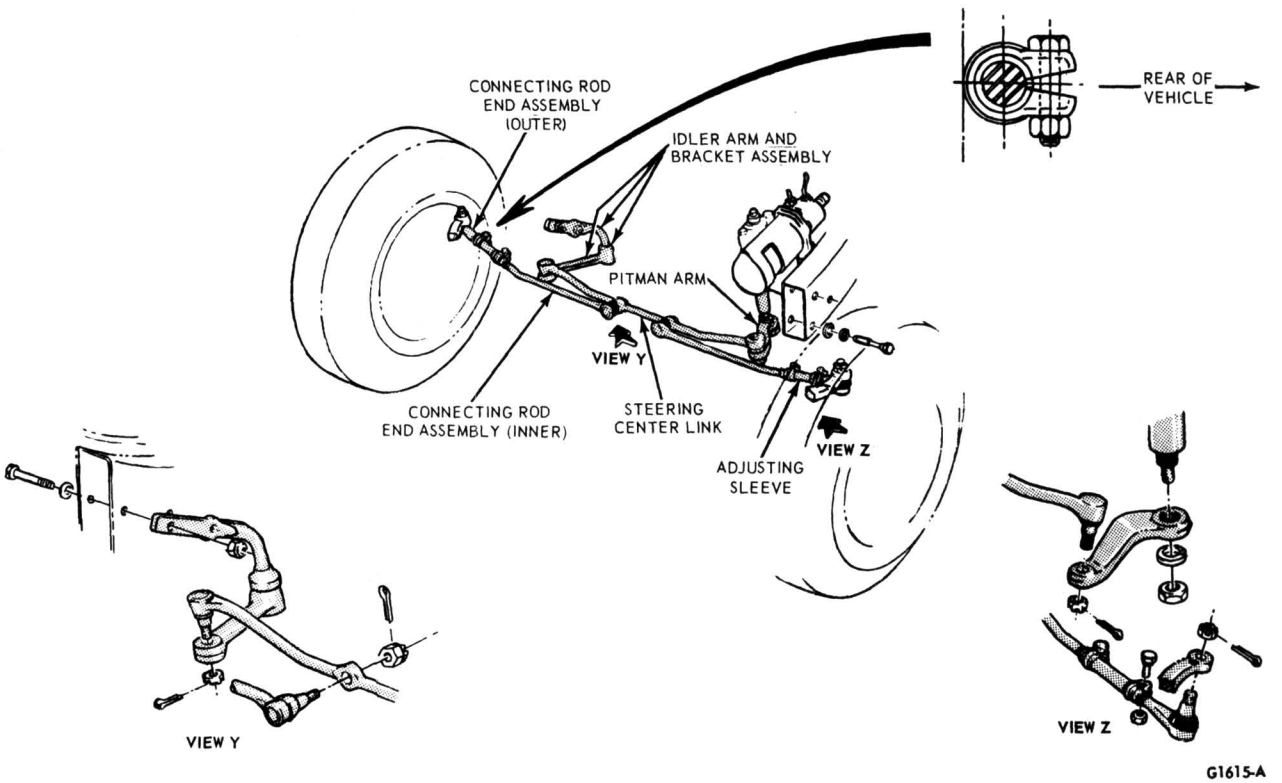


FIG. 21—Steering Linkage—Lincoln Continental

SPINDLE CONNECTING ROD ASSEMBLY (INNER AND OUTER ENDS) REPLACEMENT

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG LINCOLN CONTINENTAL

The spindle connecting rod ends, which are threaded into the adjusting sleeves, have non-adjustable, ball studs. These parts cannot be greased or service. A rod end assembly should be replaced when excessive looseness at the ball stud is noticed.

1. Remove the cotter pin and nut from the worn rod end ball stud.
2. Disconnect the end from the spindle arm or center link as shown in Figs. 18 through 21.
3. Loosen the connecting rod sleeve clamp bolts, and count the number of turns needed to remove the rod end from the sleeve. Discard all rod end parts that were removed from the sleeve. **All new parts should be used when a spindle connecting rod end is replaced.**
4. Thread a new rod end into the sleeve, but do not tighten the sleeve clamp bolts at this time.
5. Insert the stud in the part from which the old one was removed, and install the stud nut. Torque the nut to specification and install the cotter pin.
6. Check and, if necessary, adjust toe-in (Part 3-1). **After toe-in is checked and adjusted, loosen the clamps from the sleeve, oil the sleeve, clamps and bolts and torque the nuts to specification.** The tie rod sleeve clamps must be installed as shown in Fig. 16, Part 3-1, to prevent interference with the side rail.

FORD, MERCURY, METEOR, THUNDERBIRD, CONTINENTAL MARK III

1. Raise the end and install safety stands. Remove the cotter pin and nut from the worn rod end ball stud.
2. Loosen the connecting rod sleeve clamp bolts, and remove the rod end from the spindle arm center link using the tool shown in Fig. 22.
3. Remove the end assembly from the sleeve. Discard all end assembly parts that were removed from the sleeve. **All new parts should be used when a spindle connecting rod end is replaced.**
4. Thread a new end into the sleeve, but do not tighten the sleeve clamp bolts at this time.
5. Install the seal on the rod end ball stud, insert the stud in the hole from which the old stud was removed, and install the stud nut. Torque the nut to specification and install the cotter pin.
6. Check and, if necessary, adjust toe-in. Loosen the clamps from the sleeve. Oil the sleeve, clamps, bolts and nuts and position clamp openings over the slots in the sleeve. Tighten the clamp nuts to specification after toe-in is adjusted.

ADJUSTING SLEEVE REPLACEMENT

An adjusting sleeve should be re-

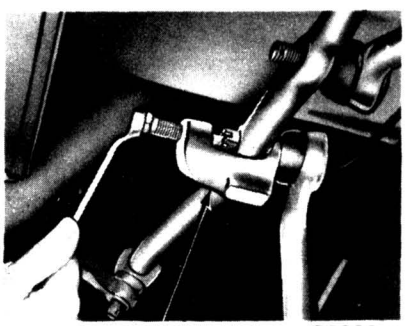


FIG. 22—Removing Ball Stud—Typical

placed if it becomes worn or damaged (Figs. 18 through 21). **Do not attempt to straighten the sleeve if damaged.**

1. Remove the spindle connecting rod end assemblies as described in the previous sub-section.
2. Screw the spindle rod end assemblies into the new sleeve the same number of turns as the ends that were removed. Do not tighten the clamp bolts at this time.
3. Position the sleeve and end assembly on the center link and the spindle arm. Install the attaching nut, torque it to specification, and install the cotter pin.
4. Check and, if necessary, adjust toe-in (Part 3-1). After toe-in is checked and adjusted, oil the sleeve clamp bolts then torque them to specification. The sleeve clamp must be installed as shown in Figs. 18 through 21.

CENTER LINK REPLACEMENT

The center link connecting the Pitman arm and the idler arm is non-adjustable and is provided with tapered holes to accommodate the ball studs (Figs. 18 through 21). The link should be replaced when damaged or when worn at the ball studs. On Lincoln Continental models, the link should be replaced if excessive looseness is noticed in either ball stud socket.

REMOVAL

1. Raise the vehicle on a hoist and position safety stands.
2. Remove the cotter pins and nuts that attach both inner connecting rod ends to the center link (Figs. 18 through 21).
3. Disconnect the inner connecting rod ends from the center link using Tool 3290-C (Fig. 22).
4. Remove the cotter pin and nut attaching the idler arm to the center link. Disconnect the idler arm from the center link using Tool 3290-C for Lincoln Continental models only.
5. Remove the cotter pin and nut attaching the Pitman arm to the center link. Disconnect the Pitman arm from the center link (use Tool 3290-C) and remove the center link. On vehicles equipped with the non-integral power steering system, remove the center link from the control valve as detailed in Part 3-7.

INSTALLATION

1. Replace the rubber seals on the spindle connecting rod ends, if required.
2. Position the center link to the Pitman arm and idler arm and install the attaching nuts loosely. On all vehicles except Lincoln Continental models, place the idler arm and the front wheels in the straight ahead position to insure keeping the steering wheel aligned and to prevent bushing damage after the attaching nuts have been torqued. On Lincoln Continental models, insure that the seal is properly installed on the center link. Torque the nuts to the low end of the specification. Continue to tighten each nut until the slots in the nut align with the hole in the stud. Then install a new cotter pin.
3. Position the spindle connecting rod ends to the center link and install the attaching nuts. Torque the nuts to the low end of the specification. Continue to tighten each nut until the slots in the nut align with the hole in the stud. Then, install a new cotter pin.
4. Remove the safety stands, lower the vehicle, check and adjust toe-in to specification (Part 3-1).

STEERING IDLER ARM AND BRACKET ASSEMBLY REPLACEMENT

REMOVAL

If the idler arm bushings are worn the complete idler arm assembly must be replaced. In Lincoln Continental models, if the socket at the idler bracket is excessively loose, replace the complet assembly.

1. Remove the cotter pin and nut attaching the steering center link at the idler arm (Figs. 18 through 21).
2. Disconnect the center link from the idler arm (on Lincoln Continental models, use Tool 3290-C).
3. Remove the two bolts that attach the idler arm and bracket assembly to the frame.

INSTALLATION

1. Secure the new idler arm and bracket assembly to the frame with the two attaching bolts (nuts and flat washers as shown in Figs. 18, 19 and 21).
2. On all vehicles except Lincoln Continental models, place the idler arm and the front wheels in the straight ahead position to insure keeping the steering wheel aligned and to prevent bushing damage after the attaching nut has been torqued. Insert the center link stud through the hole in the end of the idler arm and install the nut and washer.

On Lincoln Continental models, insert the center link stud through the hole in the end of the idler arm insuring that the seal is properly installed on the center link.

3. Torque the idler arm rod nut to specification and install a new cotter pin.

PITMAN ARM REPLACEMENT

REMOVAL

1. Remove the cotter pin from the castellated nut that attaches the steering center link to the Pitman arm. Remove the castellated nut.
2. Disconnect the steering center link from the Pitman arm with tool 3290-C.
3. Remove the Pitman arm attaching nut and lock washer.
4. Position the front wheels in the straight ahead position. Remove the Pitman arm with tool T64P-3590-F (Fig. 23).

INSTALLATION

1. With the front wheels in the straight ahead position, place the Pitman arm on the sector shaft making sure it is pointing forward.
2. Install the nut and lock washer. Torque the nut to specification.

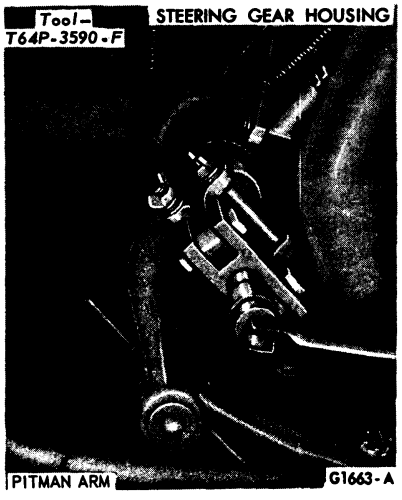


FIG. 23—Removing Pitman Arm—Typical

3. Secure the steering center link to the Pitman arm with the castellated nut. On Lincoln Continental models, insure that the seal is properly installed. Torque the nut to specification and install the cotter pin. **Always tighten the nut to the next castellation if necessary to install the cotter pin.**

PART 3-6 *Manual Steering*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
STEERING GEAR Cleaning and Inspection (See Part 03-01)												
Description		06-01	06-01	06-01	06-01	06-01	06-01	06-01	06-01	N/A	N/A	N/A
Disassembly and Overhaul		06-03	06-03	06-03	06-03	06-03	06-03	06-03	06-03	N/A	N/A	N/A
Removal and Installation		06-02	06-02	06-02	06-02	06-02	06-02	06-02	06-02	N/A	N/A	N/A
STEERING WORM AND SECTOR Adjustment and Repair		06-02	06-02	06-02	06-02	06-02	06-02	06-02	06-02	N/A	N/A	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

STEERING GEAR

The steering gear (Fig. 1) is of the worm and recirculating ball type. The sector shaft is straddle mounted having a bushing located in the cover above the gear and a roller bearing in the housing below the gear.

The worm bearing preload is controlled by the large adjusting nut which is threaded into the housing. The sector shaft mesh load is controlled by an adjusting screw located in the housing cover.

The steering linkage consists of the Pitman arm, steering-arm-to-idler arm rod, idler arm and the spindle connecting rods (tie rods).

A steering gear identification tag is provided under one of the cover attaching bolts (Fig. 2).

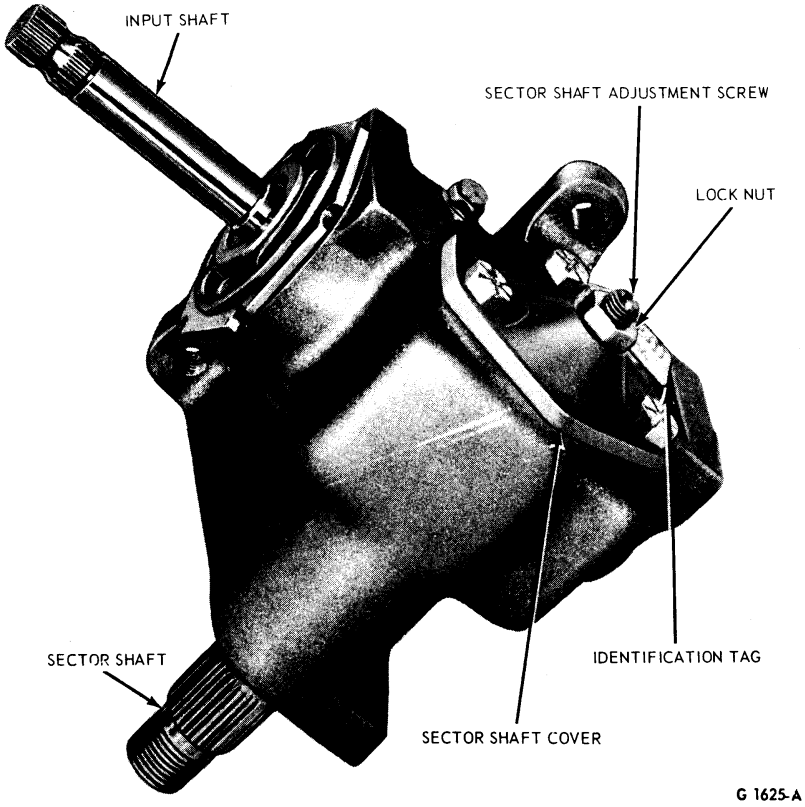


FIG. 1—Manual Steering Gear

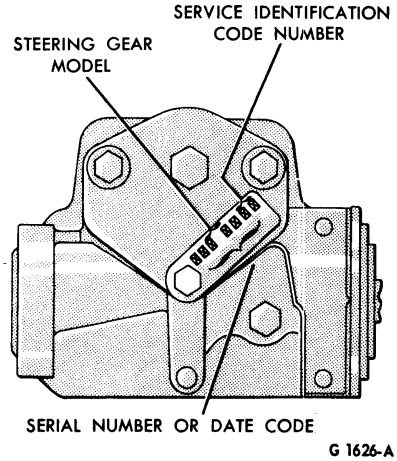


FIG. 2—Steering Gear Identification

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

STEERING WORM AND SECTOR

GEAR ADJUSTMENTS

The ball nut assembly and the sector gear must be adjusted properly to maintain minimum steering shaft end play (a factor of preload adjustment) and minimum backlash between sector gear and ball nut. There are only two possible adjustments within the recirculating ball-type steering gear, and **these should be made in the following order to avoid damage or gear failure.**

1. Disconnect the Pitman arm from the steering Pitman-to-idler arm rod.
2. Loosen the nut which locks the sector adjusting screw (Fig. 3), and turn the adjusting screw counterclockwise. (On models equipped with the Cobra Jet engine, it may be necessary to use a suitable holding tool with an extension and a long screwdriver to make the gear adjustment).
3. Measure the worm bearing preload by attaching an in-lb torque wrench to the steering wheel nut (Fig. 4). With the steering wheel off center, read the pull required to rotate the input shaft approximately 1 1/2 turns either side of center. If the torque or preload is not within specification (Part 3-1), adjust as explained in the next step.

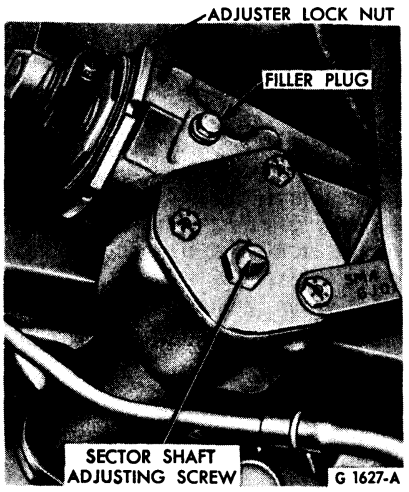


FIG. 3—Steering Gear Adjustments—Typical

4. Loosen the steering shaft bearing adjuster lock nut, and tighten or back off the bearing adjuster (Fig. 1) to bring the preload within the specified limits.
5. Tighten the steering shaft bearing adjuster lock nut, and recheck the preload.
6. Turn the steering wheel slowly to either stop. **Turn gently against the stop to avoid possible damage to the ball return guides. Then rotate the wheel 2-3/4 turns to center the ball nut.**
7. Turn the sector adjusting screw clockwise until the specified torque (Part 3-13) is necessary to rotate the worm past its center (high spot) (Fig. 1).
8. While holding the sector adjusting screw, tighten the sector adjusting screw locknut to specification, and recheck the backlash adjustment.
9. Connect the Pitman arm to the steering arm-to-idler arm rod.

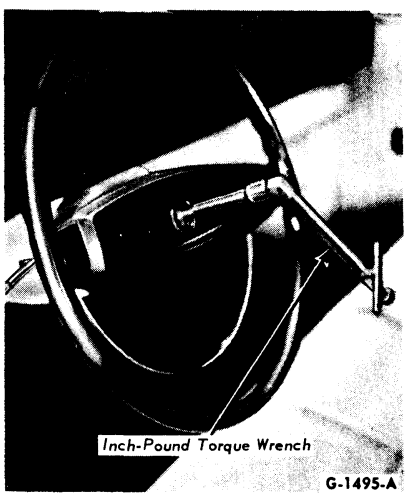


FIG. 4—Checking Steering Gear Preload—Typical

3 REMOVAL AND INSTALLATION

STEERING GEAR

REMOVAL

1. Remove the bolt(s) that retains the flex coupling to the steering shaft.
2. Remove the nut and lock washer that secures the Pitman arm to the sector shaft using Tool T64P-3590-F (Fig. 5).
3. To obtain clearance on some models equipped with standard transmission, it may be necessary to disconnect the clutch linkage. On some 8-cylinder models, it may be necessary to lower the exhaust system.
4. Remove the steering gear-to-side rail bolts and remove the gear.

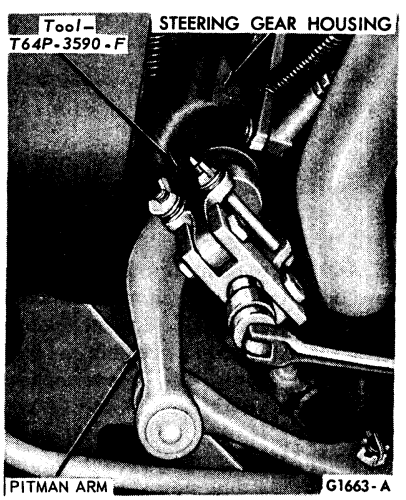


FIG. 5—Removing Pitman Arm

INSTALLATION

1. Position the steering gear and flex coupling in place; then, install and torque the steering gear-to-side rail bolts to specification (Part 3-13).
2. If the clutch linkage has been disconnected, reposition, install and adjust it. If the exhaust system has been lowered, reinstall it to its proper position.
3. Position the Pitman arm and the sector shaft and install the attaching nut and lock washer. Torque the nut to specification.
4. Install and connect the flex coupling attaching nut(s) and torque it to specification (Part 3-13).

4 MAJOR REPAIR OPERATIONS

STEERING GEAR

DISASSEMBLY

1. Rotate the steering shaft 3 turns from either stop.

2. After removing the sector adjusting screw locknut and the housing cover bolts (Fig. 6), remove the sector shaft with the cover. Remove the cover from the shaft by turning the screw clockwise. **Keep the shim with the screw.**

6. Turn the ball nut over, and rotate the worm shaft from side to side until all 50 balls have dropped out of the nut into a clean pan. With the balls removed, the ball nut will slide off the worm.

7. Remove the upper bearing cup from the bearing adjuster and the lower cup from the housing. It may be necessary to tap the housing or the adjuster on a block of wood to jar the bearing cups loose.

8. If the preliminary inspection shows damage, press the sector shaft bearing and the oil seal from the housing (Fig. 8).

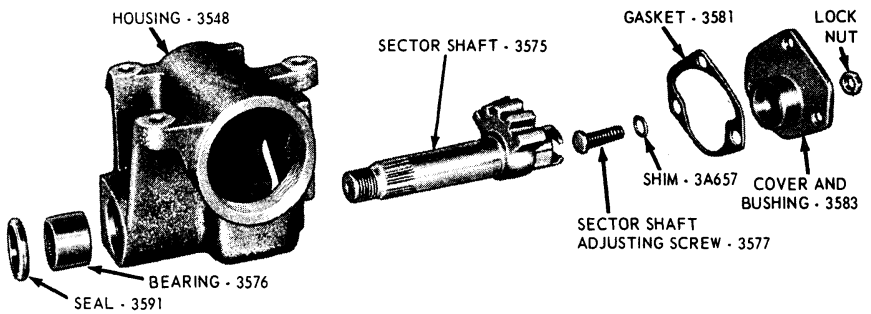


FIG. 6—Sector Shaft and Housing Disassembled

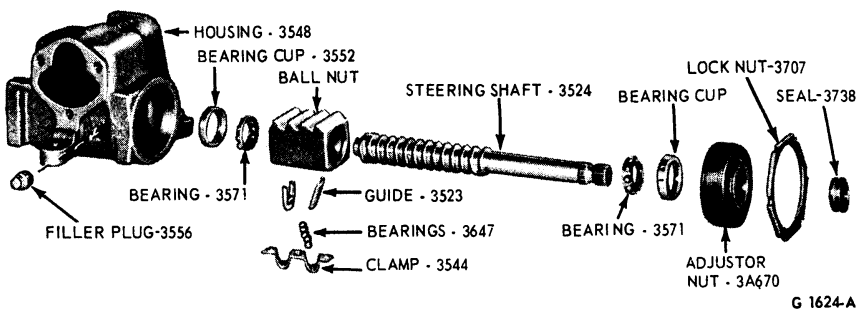


FIG. 7—Steering Shaft and Related Parts Disassembled

3. Loosen the worm bearing adjuster nut, and remove the adjuster assembly and the steering shaft upper bearing (Fig. 7).

4. Carefully pull the steering shaft and ball nut from the housing, and remove the steering shaft lower bearing. **To avoid possible damage to the ball return guides, keep the ball nut from running down to either end of the worm.**

Disassemble the ball only if there is indication of binding or tightness.

5. Remove the ball return guide clamp and the ball return guides from the ball nut. **Keep the ball nut clamp-side up until ready to remove the balls.**

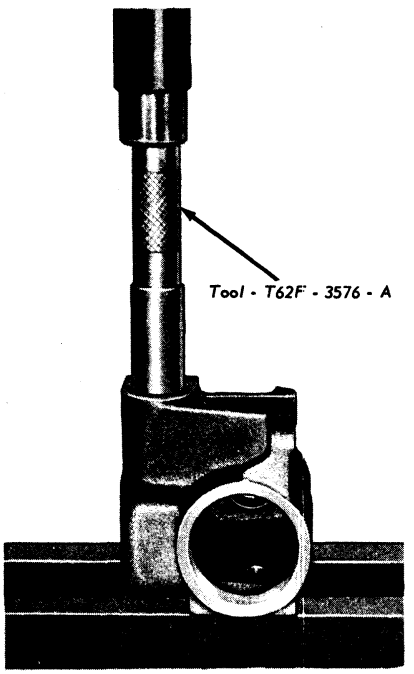


FIG. 8—Removing Oil Seal and Bearing

ASSEMBLY

1. If the sector shaft bearing and oil seal have been removed, press a new bearing into the housing and install a new oil seal. Do not clean, wash or soak seals in cleaning solvent (Fig. 7). **Apply the recommended steering gear lubricant to the bearing and seals.**

2. Install a bearing cup in the lower end of the housing and in the adjuster.

3. If the seal in the bearing adjuster was removed, install a new seal.

4. Insert the ball guides into the holes of the ball nut, tapping them lightly with a wood handle of a screw driver if necessary to seat them.

5. Insert 25 balls into the hole in the top of each ball guide. It may be necessary to rotate the shaft slightly one way, then in the opposite direction to distribute the balls in the circuit.

6. After the 50 balls are installed, install the ball guide clamp. Torque the screws to specification. Check the worm shaft to make sure that it rotates freely.

7. Coat the threads of the steering shaft bearing adjuster, the housing cover bolts, and the sector adjusting screw with a suitable oil-resistant sealing compound. **Do not apply sealer to female threads and especially avoid getting any sealer on the steering shaft bearings.**

8. Coat the worm bearings, sector shaft bearings, and gear teeth with steering gear lubricant.

9. Clamp the housing in a vise, with the sector shaft axis horizontal, and position the steering shaft lower bearing in its cup.

10. Position the steering shaft and ball nut assemblies in the housing.

11. Position the steering shaft upper bearing on the top of the worm, and install the steering shaft bearing

adjuster and the adjuster nut and bearing cup. Leave the nut loose.

12. Adjust the worm bearing preload, using an in-lb torque wrench (Fig. 9). See Part 3-13 for the specified preload.

13. Position the sector adjusting screw and adjuster shim, and check the end clearance which should not exceed 0.002 inch between the screw head and the end of the sector shaft. If clearance is greater than 0.002 inch, add enough shims to reduce the end play to within the 0.002 inch tolerance.

14. Start the sector shaft adjusting screw into the housing cover.

15. Install a new gasket on the housing cover.

16. Rotate the steering shaft until the ball nut teeth are in position to mesh with the sector gear, tilting the housing so that the ball will tip toward the housing cover opening.

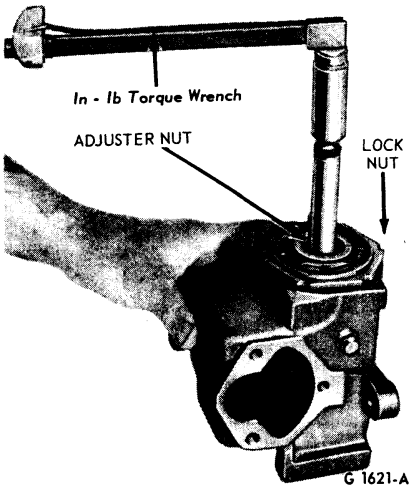


FIG. 9—Checking Steering Shaft Bearing Preload

17. Lubricate the sector shaft journal and install the sector shaft and cover.

18. With the housing cover turned out of the way fill the gear with 0.97 lbs of gear lubricant. Push the housing cover and sector shaft assemblies into place, and install the two top housing cover bolts. **Do not tighten the cover bolts until it is certain that there is some lash between ball nut and sector gear teeth.** Hold or push the cover away from the ball nut, then torque the bolts to specification.

19. After loosely installing the sector shaft adjusting screw lock nut, adjust the sector shaft mesh load. See Part 3-13 for the specified mesh load; then, tighten the adjusting screw lock nut.

PART 3-7 *Ford Design Non-Integral Power Steering System*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
CONTROL VALVE												
Disassembly and Overhaul		N/A	N/A	N/A	N/A	07-04	07-04	07-04	07-04	07-04	N/A	N/A
Removal and Installation		N/A	N/A	N/A	N/A	07-03	07-03	07-03	07-03	07-03	N/A	N/A
CONTROL VALVE CENTERING SPRING												
Adjustment		N/A	N/A	N/A	N/A	07-02	07-02	07-02	07-02	07-02	N/A	N/A
CONTROL VALVE TO POWER STEERING CYLINDER HOSE												
Removal and Installation		N/A	N/A	N/A	N/A	07-02	07-02	07-02	07-02	07-02	N/A	N/A
HOISTING INSTRUCTIONS		N/A	N/A	N/A	N/A	07-02	07-02	07-02	07-02	07-02	N/A	N/A
POWER CYLINDER												
Removal and Installation		N/A	N/A	N/A	N/A	07-04	07-04	07-04	07-04	07-04	N/A	N/A
POWER CYLINDER SEAL												
Removal and Installation		N/A	N/A	N/A	N/A	07-06	07-06	07-06	07-06	07-06	N/A	N/A
POWER STEERING PUMP CLEANING AND INSPECTION (See Part 03-01)												
Removal and Installation		N/A	N/A	N/A	N/A	07-03	07-03	07-03	07-03	07-03	N/A	N/A
POWER STEERING PUMP TO CONTROL VALVE HOSE												
Removal and Installation		N/A	N/A	N/A	N/A	07-02	07-02	07-02	07-02	07-02	N/A	N/A
STEERING GEAR												
Cleaning and Inspection (See Part 03-01)												

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

The Ford Non-Integral Power Steering System (Fig. 1) is a hydraulically controlled linkage-type steering system which includes an integral pump and fluid reservoir, a control valve, a power cylinder, the connecting fluid lines, and the steering linkage. The hydraulic pump and belt, driven from the engine crankshaft, draws fluid from the reservoir and provides fluid pressure for the system. Within the pump itself is a pressure-relief valve which governs the pressures within the steering system according to the varying conditions of operation. After fluid has passed from the pump to the control valve and the power cylinder, it returns to the reservoir.

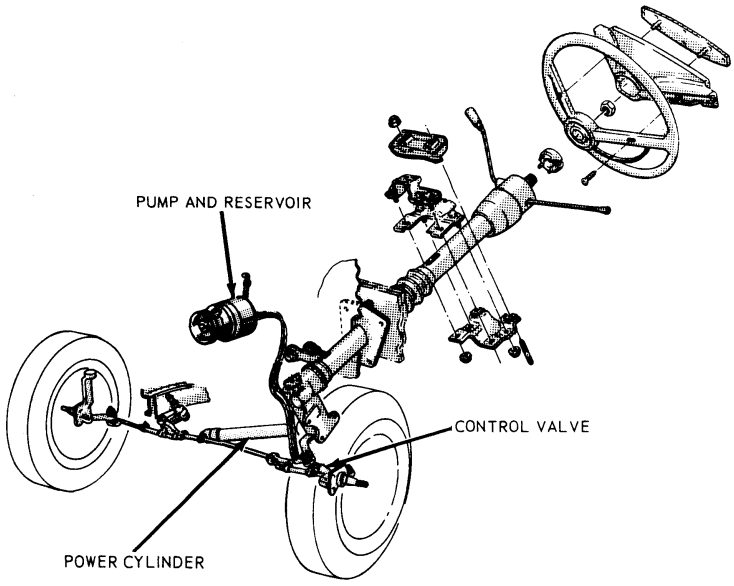


FIG. 1—Non-Integral Power Steering System

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

HOISTING INSTRUCTIONS

Damage to suspension and/or steering linkage components may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the front suspension lower arms. **Do not allow the adapters to contact the steering linkage.**

CONTROL VALVE CENTERING SPRING ADJUSTMENT

1. Raise the vehicle and remove 2 spring cap attaching screws and lock washers and remove the spring cap.

2. Tighten the adjusting nut snug (90-100 in-lbs); then, loosen the nut 1/4 turn. Make sure that the nut rotates 1/4 turn (90 degrees) on the threads of the bolt. Do not tighten the adjusting nut too tight.

3. Position the spring cap to the valve housing. Lubricate and install the two attaching screws and washers. Torque the screws to 72-100 in-lbs.

4. Lower the vehicle.

5. Start the engine and check the turning effort with a spring scale. With the spring scale attached to the rim of the steering wheel, the effort to turn the wheel in both directions should not exceed 12 pounds.

CONTROL VALVE TO POWER STEERING CYLINDER HOSE

1. Raise the vehicle on a hoist and place a drain pan under the power cylinder.

2. Disconnect the hose from the power cylinder and allow the fluid to drain from the hose. Then, disconnect the hose from the control valve.

3. Connect the unmarked end of the shorter tube (9 7/16 in long) to valve port C (Fig. 2). Hold the tube so that the bend parallels the surface of valve shown in Fig. 2, tighten the nut.

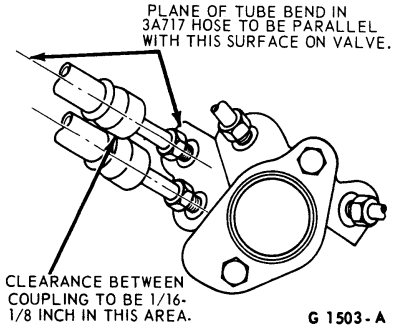


FIG. 2—Power Steering Hose Installation

Connect the opposite end to the lower port in the cylinder. Hold the tube securely while tightening the nut to prevent twisting the tube. Connect the other tube (9 5/8 in long) to port A, making sure that tube is parallel with the other tube.

4. Remove the drain pan and lower the vehicle.

5. Fill the power steering pump reservoir with fluid to the proper level (Part 3-1).

6. Start the engine and turn the steering wheel to each end of its travel several times to cycle the system. Then, check for leaks.

7. Stop the engine and again check the power steering fluid level. Add fluid as required.

POWER STEERING PUMP TO CONTROL VALVE HOSE

REMOVAL

1. Remove the fluid from the pump reservoir with a suction gun.

2. Raise the vehicle on a hoist.

3. Remove the clamp retaining the hose tubes to the control valve.

4. Disconnect the fluid return and pressure hoses from the control valve and allow the fluid to drain into a pan.

5. Lower the vehicle and disconnect the fluid return hose from the reservoir.
6. Disconnect the fluid pressure hose from the pump outlet fitting.
7. Remove 1 bolt attaching the hoses, insulator, and the retainer to the frame side rail and remove the hoses, and the insulator and retainer as an assembly from the vehicle.
8. Remove the pressure and return hoses from the retainer and insulator.

INSTALLATION

1. Install the pressure and return hoses in the insulator and retainer. Paint stripe on pressure hose must be aligned with slot in insulator. Paint or tape band on return hose must be centered in insulator. Position the assembly to the frame side rail and install the attaching bolt.
2. Place a hose clamp on the fluid return hose and install the hose on the power steering pump reservoir return fitting.
3. Torque the pump outlet fitting to specification (Part 3-13). Then, connect the pressure hose to the outlet fitting and torque the fitting to specification.
4. Raise the vehicle and connect the pressure and return lines to the control valve.
5. Install the clamp to retain the hose tubes to the control valve.
6. Lower the vehicle and fill the power steering pump reservoir with fluid, C1AZ-19582-A, to the proper level (Part 3-1).
7. Start the engine and turn the steering wheel to each end of its travel several times to cycle the system. Then, check for fluid leaks.
8. Stop the engine and again check the power steering fluid level (Part 3-1). Add fluid as required.

3 REMOVAL AND INSTALLATION

HOISTING INSTRUCTIONS

Damage to suspension and/or steering linkage components may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the front suspension lower arms. **Do not allow the adapters to contact the steering linkage.**

STEERING GEAR

Refer to Group 3-6, Section 3 for detailed instructions.

POWER STEERING PUMP

Refer to Group 3-10, Section 3 for detailed instructions.

POWER STEERING CONTROL VALVE

REMOVAL

1. Disconnect the 4 fluid line fittings at the control valve, and drain the fluid from the lines. Turn the front wheels to the left and right several times to force all the fluid from the system.
2. Loosen the clamping nut and bolt at the right end of the sleeve.
3. Remove the roll pin from the steering arm-to-idler arm rod through the slot in the sleeve.
4. Remove the control valve ball stud nut.
5. Using the tool shown in Fig. 3, remove the ball stud from the sector shaft arm.

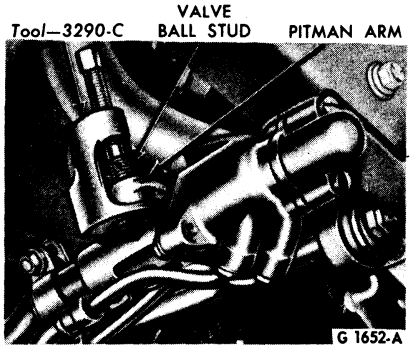


FIG. 3—Removing Control Valve Ball Stud

6. After turning the front wheels fully to the left, unthread the control valve from the center link steering arm-to-idler arm rod.

INSTALLATION

1. Thread the valve onto the center link until about four threads are still visible on the link.
2. Position the ball stud in the sector shaft arm.
3. Measure the distance between the center of the grease plug in the sleeve and the center of the stud at the inner end of the left spindle connecting rod (Fig. 4). The distance should be 5 5/8 inches for Montego, Falcon and Fairlane vehicles. The distance should be 4 7/8 inches for Mustang and Cougar models. If the distance is not correct, disconnect the ball stud from the sector shaft arm and turn the valve on the center link to increase or decrease the distance.
4. When the correct distance is obtained and the ball stud is positioned in the sector shaft arm, align the hole in the steering arm-to-idler arm rod with the slot near the end of the valve sleeve. Install the roll pin in the rod hole to lock the valve in position on the rod.
5. Torque the valve sleeve clamp bolt to specification.
6. Install the nut on the ball stud, and torque the nut to specification. Install a new cotter pin.
7. Connect the fluid lines to the control valve, and tighten all fittings securely. **Do not over-tighten.**
8. Fill the fluid reservoir with the specified fluid to the cross hatched area on the dip stick.
9. Start the engine and run it at idle speed for about two minutes to warm the fluid in the power steering system.
10. Turn the steering wheel all the way to the left and right several times, and check the system for fluid leaks.
11. Increase the engine speed to about 1000 rpm, and turn the steering wheel all the way to the left and right several times.



FIG. 4—Control Valve Installation Measurements—All Models

12. Stop the engine, and check the control valve and hose connections for fluid leaks. Correct the cause of any leaks.

13. Check the fluid level, and refill the reservoir if necessary.

14. With the engine running check the position of the steering wheel when the front wheels are in the straight-ahead position.**Do not make any adjustments until toe-in is checked.**

15. Keep the engine running, and check toe-in. If either toe-in or steering wheel position is not correct make all necessary adjustments (Part 3-1) at the spindle connecting rod sleeves.

16. Check the effort to turn the wheels in both directions. The effort should be about equal in both directions.

POWER CYLINDER

REMOVAL

1. Disconnect the two fluid lines from the power cylinder and allow them to drain into a container.

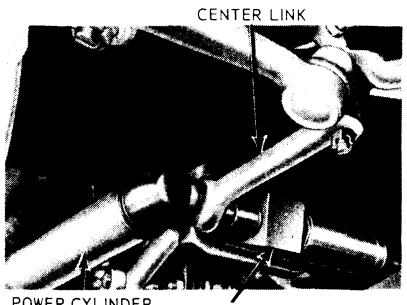


FIG. 5—Disconnecting Power Cylinder Stud

2. Remove the pal nut, attaching nut, washer and the insulator from the end of the power cylinder rod.

3. Remove the cotter pin and castellated nut that secures the power cylinder stud to the center link.

4. Disconnect the power cylinder stud from the center link as shown in Fig. 5.

5. Remove the insulator sleeve and washer from the end of the power cylinder rod.

6. Inspect the tube fittings and the seats in the power cylinder for nicks, burrs or damage. Replace the seats in the cylinder or the tubes as required.

INSTALLATION

1. Install the washer, sleeve and the insulator on the end of the power cylinder rod.

2. Extend the rod as far as possible. Insert the rod in the bracket on the frame and compress the rod as necessary to insert the stud in the center link. Secure the stud with a castellated. nut and a cotter pin.

3. Secure the power cylinder rod with an insulator, washer, nut and a pal nut.

4. Connect each of the two fluid lines to its respective port in the cylinder.

5. Fill the reservoir to the correct level.

6. Start the engine and turn the steering wheel to each end of its travel several times to cycle the system. Stop the engine.

7. Check the fluid level and fill as necessary. Install the dipstick and cap.

8. Start the engine and check for leaks.

4 MAJOR REPAIR OPERATIONS

CONTROL VALVE

DISASSEMBLY

1. Wipe all fluid and loose dirt from the outside of the control valve.

2. Remove the centering spring cap from the valve housing (Fig. 6).

When holding the control valve for disassembly, use a soft-jawed vise, and clamp the valve only around the sleeve flange to prevent damage to the housing, spool, or sleeve.

3. Remove the nut from the end of the valve spool bolt. Remove the washers, spacer, centering spring, adapter, and bushing from the bolt and the valve housing.

4. Remove the two bolts that hold the valve housing and the sleeve together, and separate the housing from the sleeve.

5. Remove the plug from the valve sleeve.

6. Push the valve spool out of the centering spring end of the valve housing, and remove the seal from the spool.

7. Remove the spacer, bushing, and seal from the sleeve end of the valve housing.

8. Drive the stop pin out of the travel regulator stop with a punch and hammer (Fig. 7). **Pull the head of the valve spool bolt tightly against the travel regulator stop before driving the pin out of the stop.**

9. Turn the travel regulator stop counterclockwise in the valve sleeve to remove the stop from the sleeve.

10. Remove the valve spool bolt, spacer, and rubber washer from the travel regulator stop.

11. Remove the rubber boot and clamp from the valve sleeve.

12. Slide the bumper, spring, and ball stud seat out of the valve sleeve, and remove the ball stud socket from the sleeve.

13. After removing the return port hose seat, remove the return port relief valve.

14. After removing the spring plug and O-ring, remove the reaction limiting valve (Fig. 8).

Tube Seat Replacement

If a hose seat is worn or damaged it should be replaced. It can be removed with an Easy-Out tool, or by using a bolt of appropriate size as a puller.

1. Tap the existing hole in the hose seat, using a starting tap of suitable size. **Be sure to remove all metal chips from the hose seat port after tapping.**

2. Place a nut and large flat washer on a bolt of the same size as the tapped hole. The washer must be large enough to cover the hose seat port.

3. Insert the bolt in the tapped hole, and using the nut as a puller, remove the hose seat.

4. Place a new hose seat in the port, and thread a bolt of suitable size into the port. Tighten the bolt enough to bottom the seat in the port.

ASSEMBLY

Before assembling the control valve, coat all parts except the seals with Automatic Transmission Fluid. Coat the seals with lubricant COAZ-19553-A.

1. Install the reaction limiting valve, the spring, and the plug.

2. Install the return port relief valve and the hose seat.

3. Insert one of the ball stud seats (flat end first) into the ball stud socket, and insert the threaded end of the ball stud into the socket.

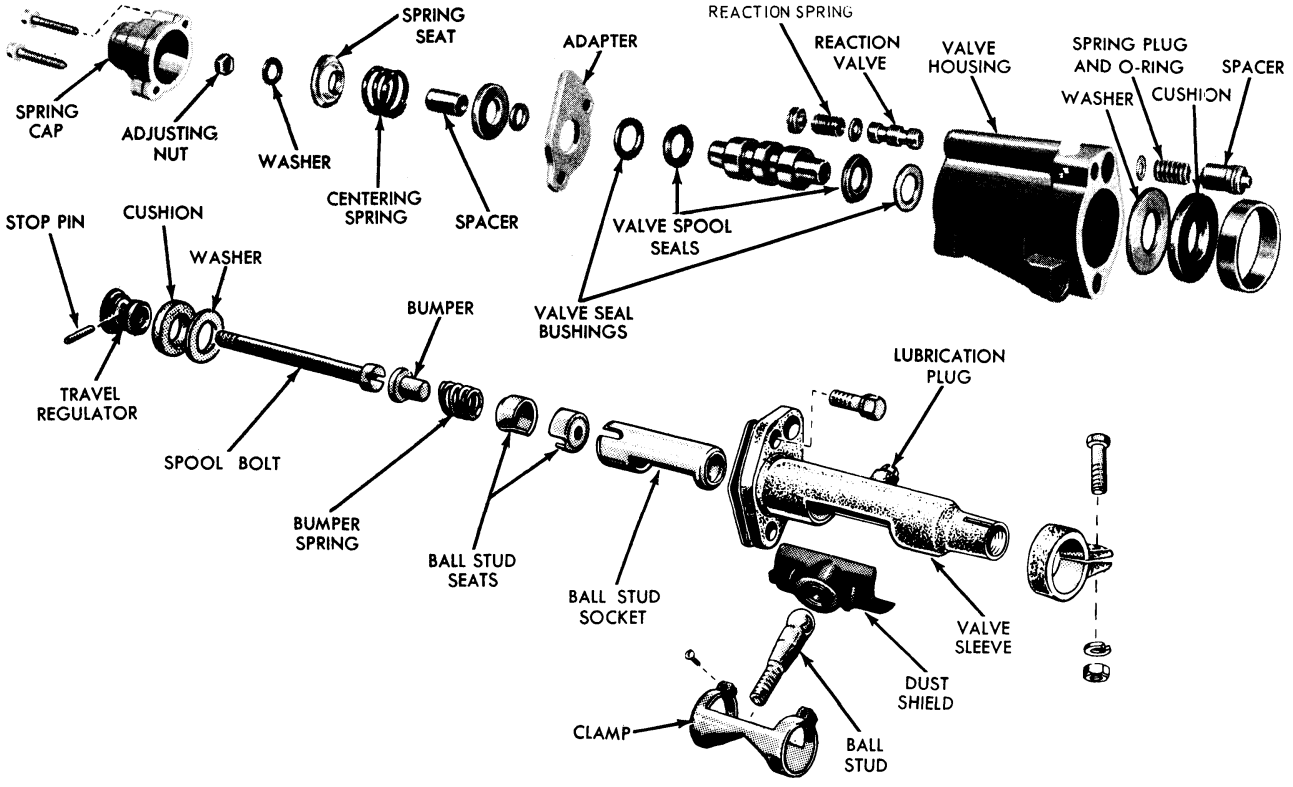


FIG. 6—Control Valve Disassembled—Typical

4. Place the socket in the control valve sleeve so that the threaded end of the ball stud can be pulled out through the slot in the sleeve (Fig. 9).

5. Place the other ball stud seat, and spring, and the bumper (Fig. 6) in the socket, and install and securely tighten the travel regulator stop.

6. Loosen the stop just enough to align the nearest hole in the stop with the slot in the ball stud socket, and install the stop pin in the ball stud socket, travel regulator stop, and valve spool bolt (Fig. 7).

7. Install the rubber boot, clamp, and the plug on the control valve sleeve. **Make sure that the lubrication fitting is turned on tightly and does not bind on the ball stud socket.**

8. Insert the valve spool in the valve housing. **Rotate the spool while inserting it in the housing (Fig. 10).**

9. Move the spool toward the centering spring end of the housing, and place the small seal bushing, and spacer in the sleeve end of the housing.

10. Press the valve spool against the inner lip of the seal and, at the same time, guide the lip of the seal over the spool with a small screwdriver. **Do not nick or scratch the seal or the spool during installation.**

11. Place the sleeve end of the housing on a flat surface so that the seal, bushing, and spacer are at the bottom end and push down the valve spool until it stops.

12. Carefully install the spool seal and bushing in the centering spring end of the housing. Press the seal against the end of the spool, guiding the seal over the spool with a small screwdriver. **Do not nick or scratch the seal or the spool during installation.**

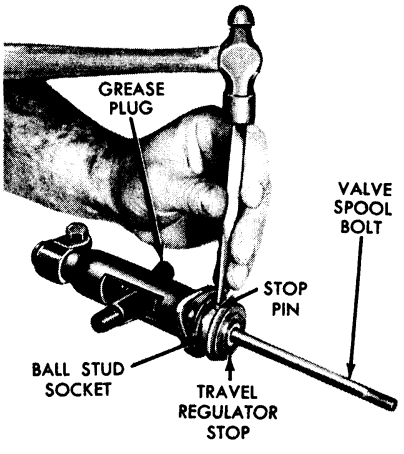


FIG. 7—Removing Stop Pin

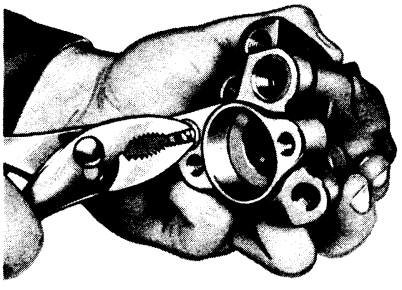


FIG. 8—Removing Reaction Valve Plug

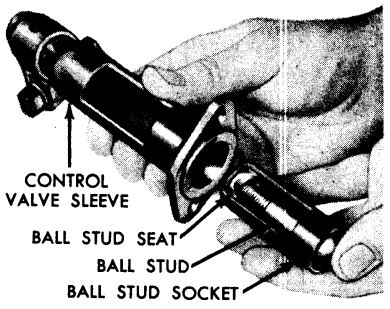


FIG. 9—Installing Ball Socket, Seal and Bracket

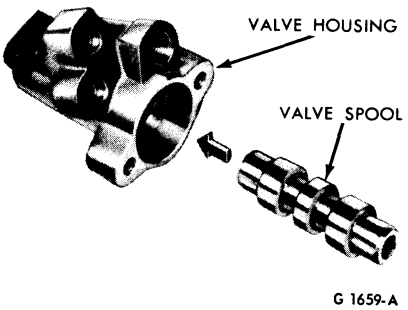


FIG. 10—Inserting Valve Spool

13. Pick up the housing, and slide the spool back and forth in the housing to check for free movement.

14. Place the valve sleeve on the housing so that the ball stud is on the same side of the housing as the ports for the two power cylinder lines. Install the two bolts in the sleeve, and torque them to specifications.

15. Place the adapter on the centering spring end of the housing, and install the bushing, washers, spacers, and centering spring on the valve spool bolt.

16. Compress the centering spring, and install the nut on the bolt. Tighten the nut snug (90-100 in-lbs); then loosen it not more than 1/4 turn (Fig. 11). Make sure that the nut turns (90 degrees) on the threads of bolt. **Excessive tightening of the nut may break the stop pin at the travel regulator stop.**

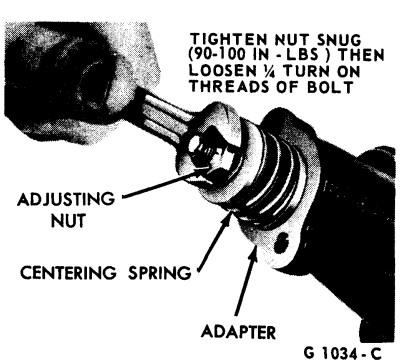


FIG. 11—Adjusting Centering Spring

17. Move the ball stud back and forth in the sleeve slot to check the spool for free movement. See Part 3-13 for the specified travel. Apply COAZ-19553-A (silicone) grease at the sealing areas.

18. Lubricate the two cap attaching bolts. Install the centering spring cap on the valve housing, and torque the two cap bolts to specification.

19. Install the nut on the ball stud so that the valve can be positioned in a vise as shown in Fig. 12. Then push forward on the cap end of the valve to check the valve spool for free movement.

20. Turn the valve around in the vise, and push forward on the sleeve end to check the spool for free movement.

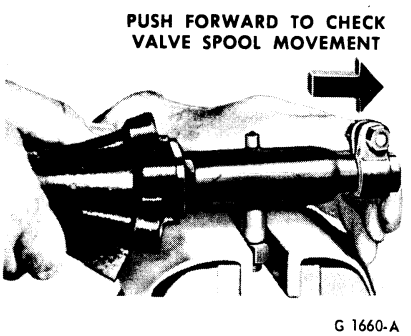


FIG. 12—Inspecting Valve Spool Movement

POWER CYLINDER SEAL

REMOVAL

1. Clamp the power cylinder in a vise, and remove the snap ring from the end of the cylinder. **Be careful not to distort or crack the cylinder in the vise.**

2. Pull the piston rod out all the way to remove the scraper, bushing, and seals. If the seals cannot be removed in this manner, remove them from the cylinder with a sharp pick. Take care, when using a pick, not to damage the shaft or seal seat.

INSTALLATION

When replacing the power cylinder seals, install all of the parts supplied in the repair kit for the cylinder being repaired.

1. Coat the new seals with lubricant COAZ-19553-A and place the parts (Fig. 13) on the piston rod which has been coated with the same grease.

2. Push the rod in all the way, and install the parts in the cylinder with a deep socket slightly smaller than the cylinder opening (Fig. 14).

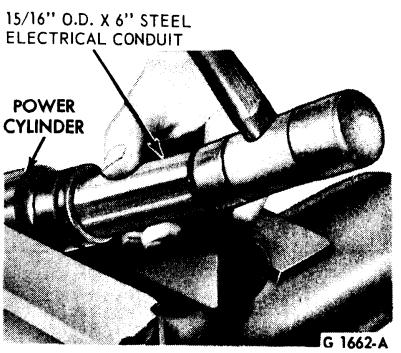


FIG. 14—Installing Power Cylinder Seals

POWER STEERING PUMP RESERVOIR REPLACEMENT

Refer to Group 3-10, Section 3 for detailed instructions.

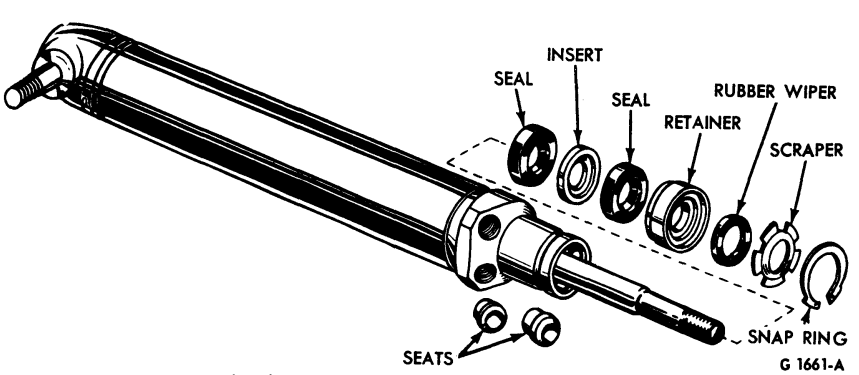


FIG. 13—Power Cylinder

PART 3-8 *Ford Design Integral Power Steering Gear*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
STEERING GEAR												
Adjustments		08-02	08-02	08-02	N/A	N/A	N/A	N/A	N/A	08-02	08-02	08-02
Cleaning and Inspection (See Part 03-01)												
Description		08-01	08-01	08-01	N/A	N/A	N/A	N/A	N/A	08-01	08-01	08-01
Disassembly and Assembly		08-05	08-05	08-05	N/A	N/A	N/A	N/A	N/A	08-05	08-05	08-05
Overhaul		08-06	08-06	08-06	N/A	N/A	N/A	N/A	N/A	08-06	08-06	08-06
Removal and Installation		08-03	08-03	08-03	N/A	N/A	N/A	N/A	N/A	08-03	08-03	08-03
VALVE CENTERING SHIM												
Removal and Installation		08-03	08-03	08-03	N/A	N/A	N/A	N/A	N/A	08-03	08-03	08-03
VALVE SPOOL CENTERING CHECK		08-02	08-02	08-02	N/A	N/A	N/A	N/A	N/A	08-02	08-02	08-02

1 DESCRIPTION

The Ford integral power steering unit (Fig. 1) is a torsion-bar type of hydraulic assisted system. This system furnishes power to reduce the amount of turning effort required at the steering wheel. It also reduces road shock and vibrations.

The torsion bar power steering unit includes a worm and one-piece rack piston, which is meshed to the gear teeth on the steering sector shaft. The unit also includes a hydraulic valve, valve actuator, input shaft and torsion bar assembly which are mounted on the end of the worm shaft and operated by the twisting action of the torsion bar.

The torsion-bar type of power steering gear is designed with the one piece rack-piston, worm and sector shaft in one housing and the valve spool in an attaching housing (Fig. 1). This makes possible internal fluid passages between the valve and cylinder, thus eliminating all external lines and hoses, except the pressure and return hoses between the pump and gear assembly.

The power cylinder is an integral part of the gear housing. The piston is double acting, in that fluid pressure may be applied to either side of the piston.

A selective metal shim located in the valve housing of the gear is for the purpose of tailoring steering gear efforts. If efforts are not within specifications they can be changed by increasing or decreasing shim thickness as follows:

Efforts heavy to the left—Increase shim thickness.

Efforts light to the left—Decrease shim thickness.

A change of one shim size will increase or decrease steering efforts approximately 1 1/2 in-lbs.

Shims are available in the following thicknesses and are notched on the outside diameter for identification:

0.0057-0.0063 inch—0 notch
0.0077-0.0083 inch—1 notch
0.0097-0.0103 inch—2 notches
0.0117-0.0123 inch—3 notches
0.0137-0.0143 inch—4 notches

Do not use more than one shim.

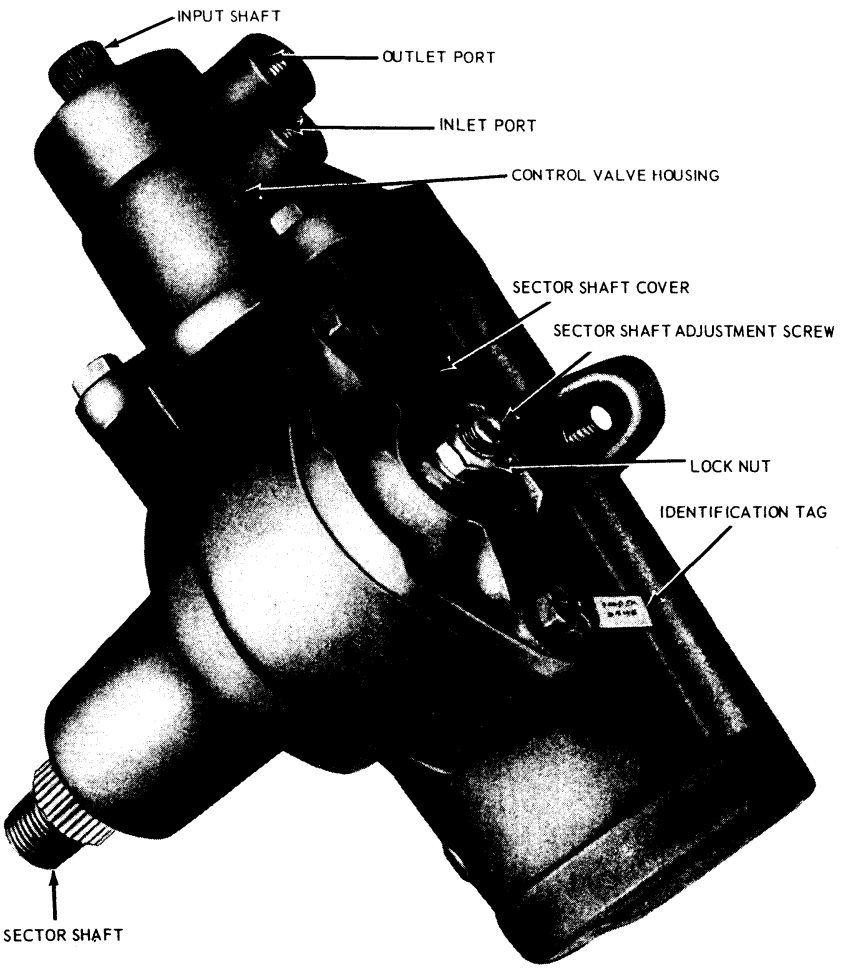


FIG. 1—Power Steering Gear

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

VALVE SPOOL CENTERING CHECK

1. Install a 0-2000 psi pressure gauge Tool T56L-33610-D in the pressure line between the power steering pump outlet port and the integral steering gear inlet port.
2. **Make sure that the valve on the gauge is in the fully open position.**
3. Check the fluid level in the reservoir and fill it to proper level with the specified fluid.
4. Start the engine and cycle the steering wheel from stop-to-stop, to bring the steering lubricant up to normal operating temperature. Stop the engine and recheck the reservoir. Add fluid if necessary.
5. With the engine running at approximately 1000 rpm and the steering wheel centered, attach an inch-pound torque wrench to the steering wheel retaining nut. Apply sufficient torque to the torque wrench in each direction, either side of center, to get a gauge reading of 250 psi.
6. The torque reading should be the same in both directions when 250 psi is reached. If the difference between the readings exceeds 4 in-lbs, the steering gear must be removed and the valve centering shim removed from the valve housing and a thicker or thinner shim installed. Only one shim is to be used. If the steering effort is heavy, the shim thickness should be increased. Shim thickness should be decreased if the steering effort is light to the left.

The **out of vehicle** procedure for valve centering check is the same as for the in vehicle except the torque and simultaneous pressure reading must be made at the right and left stops instead of either side of center.

STEERING GEAR ADJUSTMENTS

During the vehicle breaking-in period, it is probable that some of the

factory adjustments will change. These changes in adjustment do not necessarily affect the satisfactory operation of the steering gear assembly, and therefore ordinarily do not require readjustment unless there is excessive lash or other malfunctioning.

ADJUSTMENT IN VEHICLE

The only adjustment which can be performed is the total over center position load, to eliminate excessive lash between the sector and rack teeth.

1. Disconnect the pitman arm from the sector shaft.
2. Disconnect the fluid return line at the reservoir, at the same time cap the reservoir return line pipe.
3. Place the end of the return line in a clean container and cycle the steering wheel in both directions as required, to discharge the fluid from the gear.

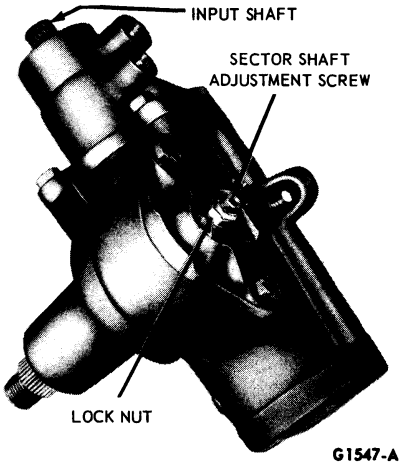


FIG. 2—Adjusting Mesh Load

4. Remove the ornamental cover from the steering wheel hub and turn the steering wheel to 45 degrees from the left stop.
5. Using an in-lb torque wrench on the steering wheel nut, determine the torque required to rotate the shaft slowly through an approximately 1/8 turn from the 45 degree position.
6. Turn the steering gear back to center, then determine the torque required to rotate the shaft back and forth across the center position. Loosen the adjuster nut, and turn the adjuster screw in (Fig. 2) until the reading is 8-9 in-lb greater than the torque 45 degrees from the stop.

Tighten the lock nut while holding the screw in place.

7. Recheck the readings and replace pitman arm and steering wheel hub cover.
8. Connect the fluid return line to the reservoir and fill the reservoir with specified lubricant to the proper level.

3 REMOVAL AND INSTALLATION

REMOVAL

1. Disconnect the pressure and the return lines from the steering gear. Plug the lines and the ports in the gear to prevent entry of dirt.
2. Remove the two bolts that secure the flex coupling to the steering gear and to the column.
3. Raise the vehicle and remove the sector shaft attaching nut.
4. Remove the Pitman arm from the sector shaft with Tool T64P-3590-F. Remove the tool from the Pitman arm. Do not damage the seals.
5. If working on a vehicle equipped with a standard transmission, remove the clutch release lever retracting spring to provide clearance for removing the steering gear.
6. Support the steering gear then remove the three steering gear attaching bolts.
7. Work steering gear free of the flex coupling and remove it from the vehicle.
8. If the flex coupling stayed on the input shaft, lift if off the shaft at this time.

INSTALLATION

1. Slide the flex coupling into place on the steering shaft. Turn the steering wheel so that the spokes are in the horizontal position.
2. Center the steering gear input shaft.
3. Slide the steering gear input shaft into the flex coupling and into place on the frame side rail. Install the three attaching bolts and torque them to specification.
4. Make sure that the wheels are in the straight ahead position, then install the Pitman arm on the sector shaft. Install and tighten the sector shaft and install and tighten the attaching bolts to specification.
5. Move the flex coupling into place on the input and steering column shaft and install and tighten the attaching bolts to specification.
6. Connect and tighten the fluid pressure and the return line to the steering gear.
7. Fill the power steering pump and cycle the steering gear. Check for leaks and again check the fluid level. Add fluid as required.

4 MAJOR REPAIR OPERATIONS

In most cases, complete disassembly of the power steering gear will not be necessary. It is suggested that only those assemblies that are faulty be disassembled. Disassembly and reassembly of the unit and the subassemblies must be made on a clean workbench. As in repairing any hydraulically operated unit, cleanliness is of utmost importance. Therefore, the bench, tools, and parts must be kept clean at all times. Thoroughly clean the exterior of the unit with a suitable solvent and when necessary, drain as much of the hydraulic oil as possible. Handle all parts very carefully to avoid nicks, burrs, scratches and dirt, which could make the parts unfit for use. Do not clean, wash or soak seals in cleaning solvent.

VALVE CENTERING SHIM REPLACEMENT

1. Hold the steering gear over a drain pan in an inverted position and cycle the input shaft several times to drain the remaining fluid from the gear.
2. Mount the gear in a soft-jawed vise.

3. Turn the input shaft to either stop then, turn it back approximately 1 3/4 turns to center the gear.
4. Remove the two sector shaft cover attaching screws and the identification tag.
5. Tap the lower end of the sector shaft with a soft-faced hammer to loosen it, then lift the cover and shaft from the housing as an assembly. Discard the O-ring.
6. Remove the four valve housing attaching bolts. Lift the valve housing from the steering gear housing while holding the piston to prevent it from rotating off the worm shaft.
7. Remove the valve housing and the lube passage O-ring and discard them.
8. Place the valve housing, worm and piston assembly in the bench mounted holding fixture Tool T57L-500-A with the piston on the top.
9. Rotate the piston upward (back off) 3 1/2 turns.
10. Insert Tool T66P-3553-C (with the arm facing away from the piston) into a bolt hole in the valve housing. Rotate the arm into position under the piston (Fig. 3).
11. Using Tool T66P-3553-B, loosen the worm bearing lock nut.
12. Hold the lock nut up out of the way and loosen the attaching nut (Fig. 4).
13. Lift the piston-worm assembly from the valve housing. **During removal hold the piston to prevent it from spinning off of the shaft.**
14. Change the power steering valve centering shim.
15. Install the piston-worm assembly into the valve housing. **Hold the piston worm to prevent it from spinning off of the shaft.**
16. Install the valve housing attaching nut and torque to specification (Fig. 5).
17. Install the power steering worm bearing lock nut with Tool T66P-3553-B and torque to specifications.
18. Rotate the piston upward (back off) 1/2 turn and remove Tool T66P-3553-C.
19. Remove the valve housing, worm, and piston assembly from the holding fixture.
20. Position a new lube passage O-ring in the counterbore of the gear housing.
21. Apply vaseline to the teflon seal on the piston.
22. Place a new O-ring on the valve housing.
23. Slide the piston and valve into the gear housing being careful not to damage the teflon seal.

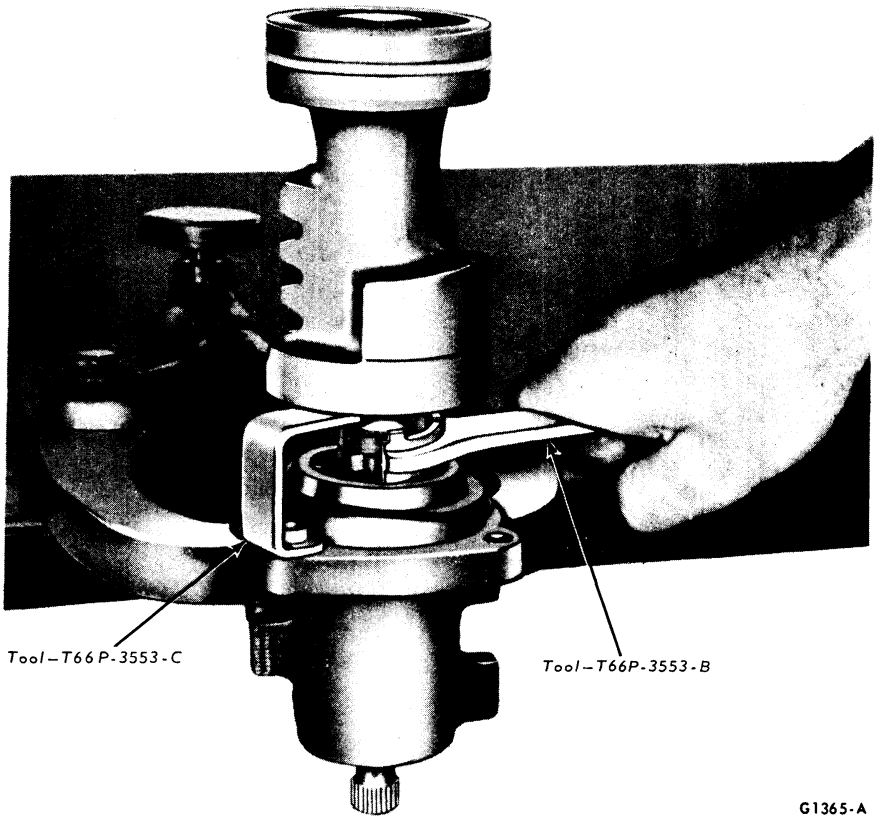


FIG. 3—Removing Worm Bearing Lock Nut

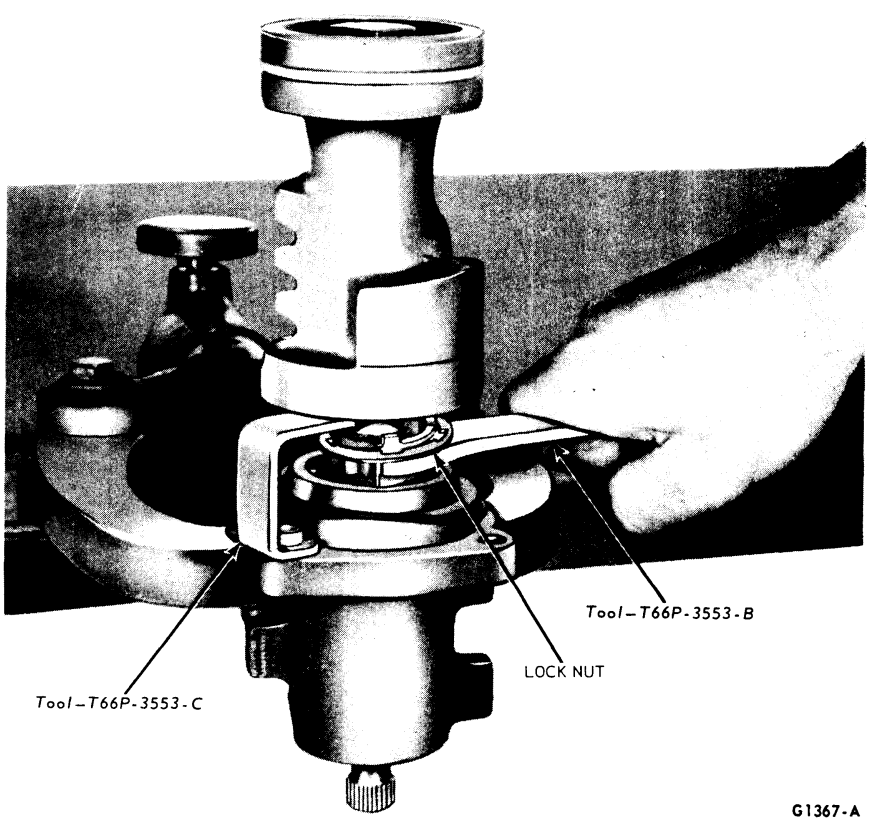


FIG. 4—Removing Valve Housing Attaching Nut

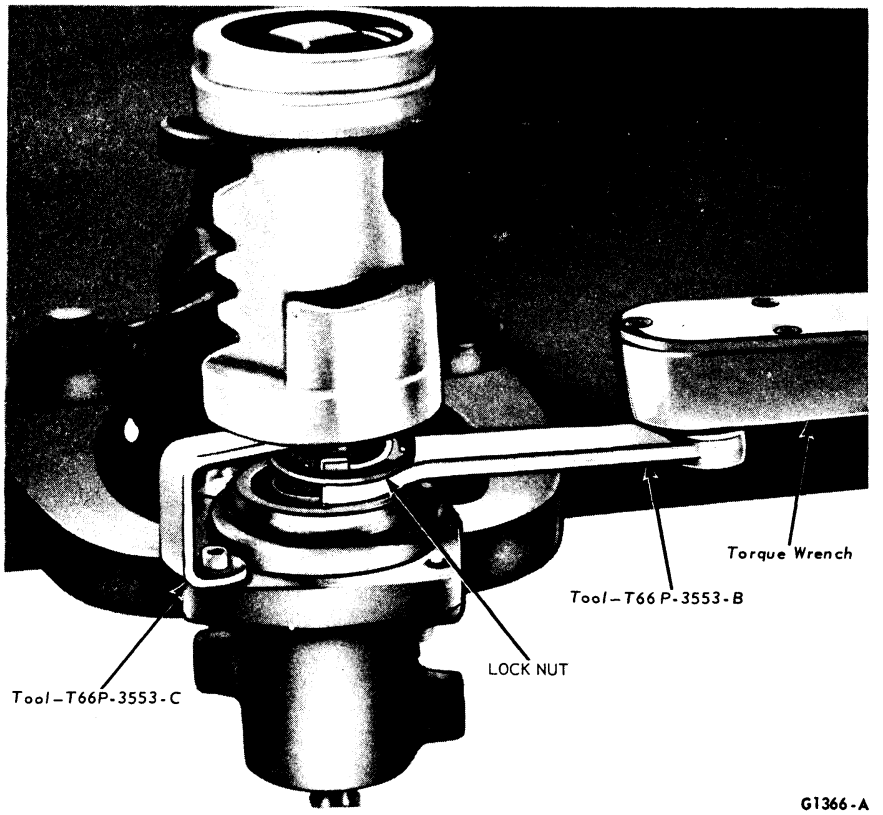


FIG. 5—Installing Valve Housing Attaching Nut

24. Align the lube passage in the valve housing with the one in the gear housing, and install but do not tighten the attaching bolts.

25. Rotate the ball nut so that the teeth are in the same place as the sector teeth. Tighten the four valve housing attaching bolts to specification.

26. Position the sector shaft cover O-ring in the steering gear housing. Turn the input shaft as required to center the piston.

27. Apply vaseline to the sector shaft journal; then, position the sector shaft and cover assembly in the gear housing. Install the steering gear identification tag and the two sector shaft cover attaching bolts.

28. Position an in-lb torque wrench on the gear input shaft and adjust the meshload to approximately 4 in-lbs. Then, torque the sector shaft cover attaching bolts to specification (Part 3-13).

29. After the cover attaching bolts have been tightened to specification, adjust the meshload to specification with an in-lb torque wrench.

STEERING GEAR DISASSEMBLY

1. Hold the steering gear over a drain pan in an inverted position and cycle the input shaft several times to

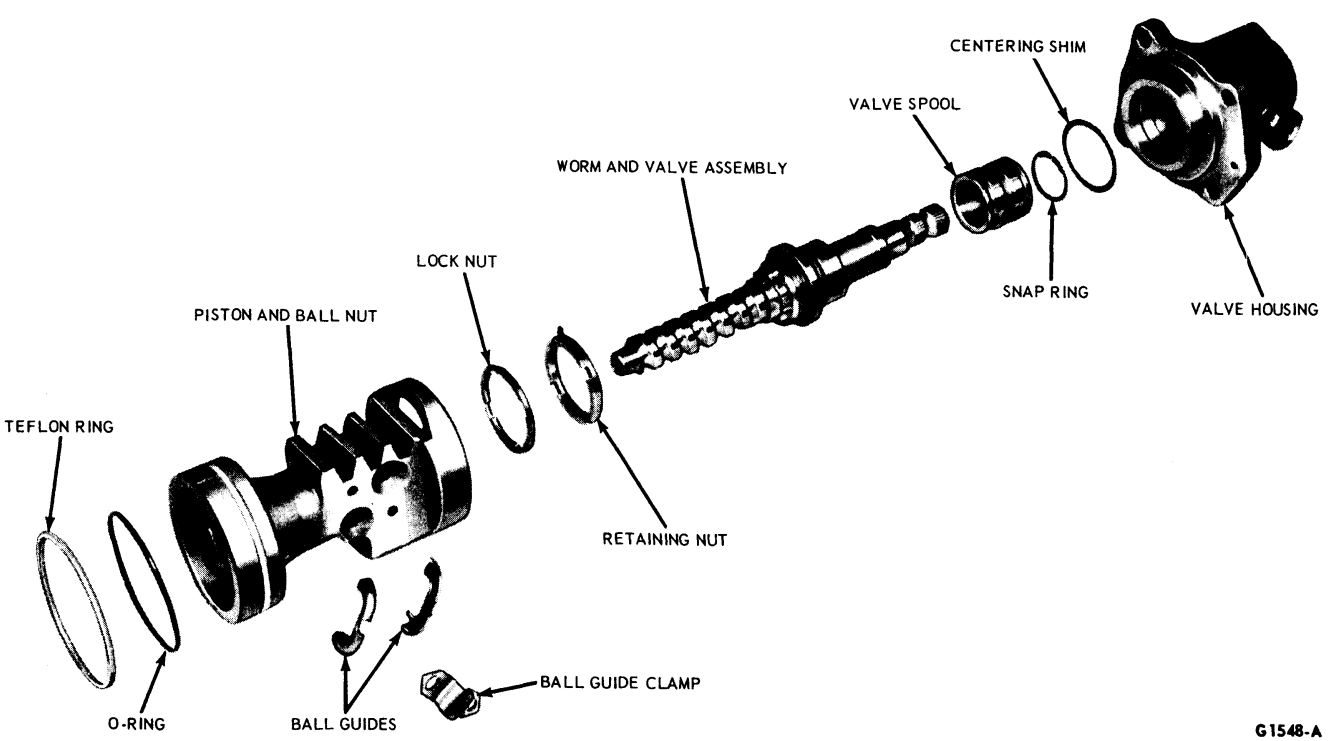


FIG. 6 — Ball Nut and Valve Housing Disassembled

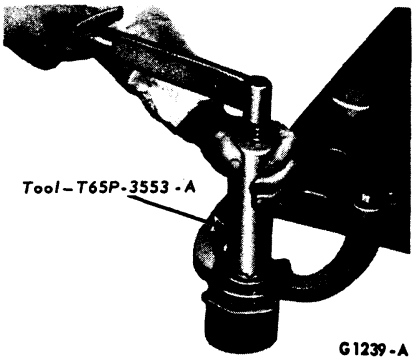


FIG. 7—Removing or Installing Lock Nut

drain the remaining fluid from the gear.

2. Mount the gear in a soft-jawed vise.

3. Remove the lock nut and the brass washer from the adjusting screw.

4. Turn the input shaft to either stop then, turn it back approximately 1 3/4 turns to center the gear.

5. Remove the two sector shaft cover attaching screws and the identification tag.

6. Tap the lower end of the sector shaft with a soft-hammer to loosen it, then lift the cover and shaft from the housing as an assembly. Discard the O-ring.

7. Turn the sector shaft cover counterclockwise off the adjuster screw.

8. Remove the four valve housing attaching bolts. Lift the valve housing from the steering gear housing while holding the piston to prevent it from rotating off the worm shaft. Remove the valve housing and the lube passage O-rings and discard them.

9. Stand the valve body and piston on end with the piston end down. Rotate the input shaft counterclockwise out of the piston allowing the ball bearings to drop into the piston.

10. Place a cloth over the open end of the piston and turn it upside down to remove the balls.

11. Remove the two screws that attach the ball guide clamp (Fig. 6) to the ball nut and remove the clamp and the guides.

12. Install the valve body assembly in the holding fixture (do not clamp in a vise) and remove the lock nut and the attaching nut as shown in Fig. 7.

13. Carefully slide the input shaft, worm and valve assembly out of the valve housing. Due to the close diametrical clearance between the spool and housing, the slightest cocking of the spool may cause it to jam in the housing.

14. Remove the shim from the valve housing bore.

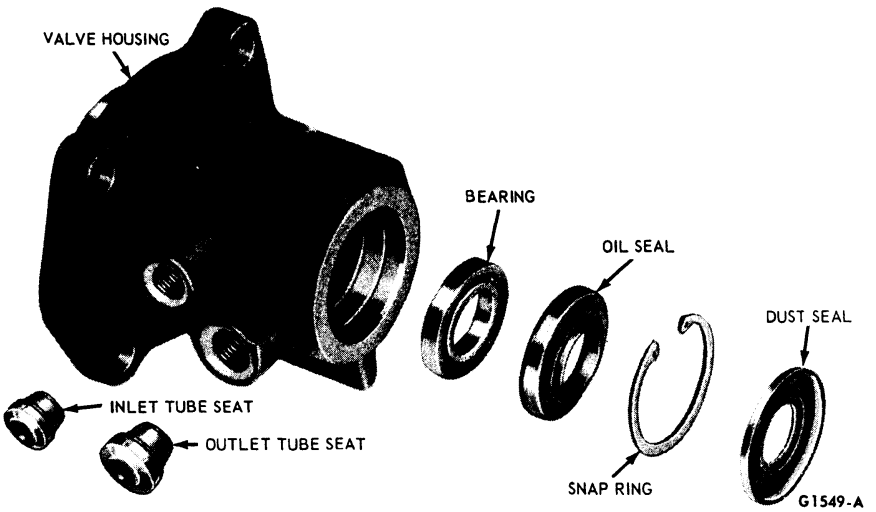


FIG. 8—Valve Housing Disassembled

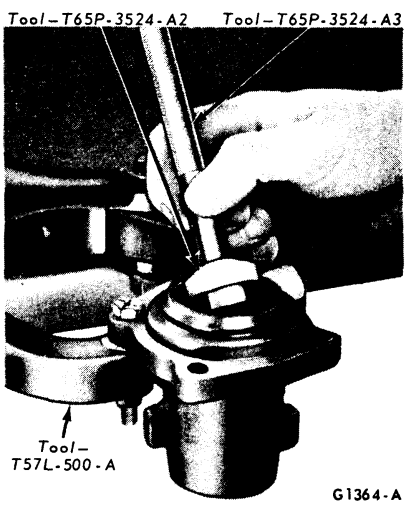


FIG. 9—Removing Bearing and Oil Seal

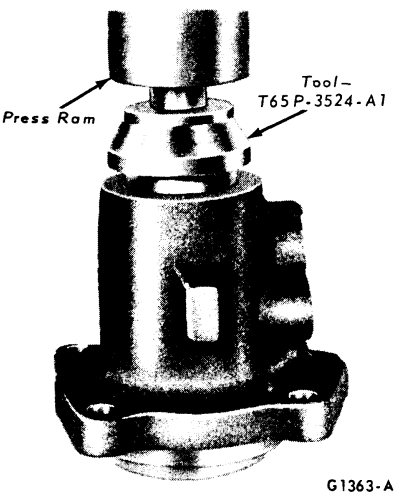


FIG. 10—Installing Valve Housing Bearing

PARTS REPAIR OR REPLACEMENT

Valve Housing

1. Remove the dust seal (Fig. 8) from the rear of the valve housing with Tools T59L-100-B and T58L-101-A and discard the seal.

2. Remove the snap ring from the valve housing.

3. Turn the fixture to place the valve housing in an inverted position.

4. Insert special tool in the valve body assembly opposite the seal end and gently tap the bearing and seal out of the housing as shown in Fig. 9. Discard the seal. **Caution must be exercised when inserting and removing the tool to prevent damage to the valve bore in the housing.**

5. Remove the fluid inlet and outlet tube seats with an EZ-out if they are damaged.

6. Coat the fluid inlet and outlet tube seats with vaseline and position them in the housing. Install and tighten the tube nuts to press the seats to the proper location.

7. Coat the bearing and seal surface of the housing with a film of vaseline.

8. Position the bearing in the valve housing. Seat the bearing in the valve housing with the tool shown in Fig. 10. Make sure that the bearing is free to rotate.

9. **Dip the new oil seal in gear lubricant;** then, place it in the housing with the metal side of the seal facing outward. Drive the seal into the housing until the outer edge of seal does not quite clear the snap ring groove (Fig. 11).

10. Place the snap ring in the housing; then, drive on the ring with the tool shown in Fig. 11 until the snap ring seats in its groove to properly locate the seal.

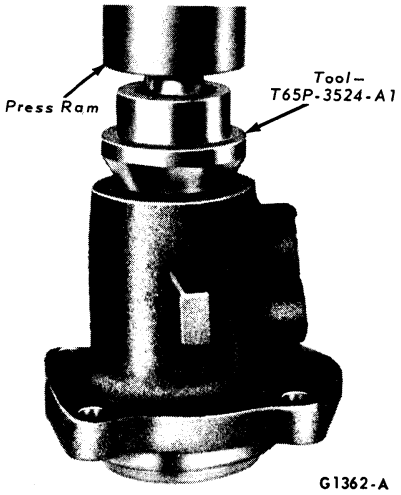


FIG. 11—Installing Oil Seal in Valve Housing

11. Place the dust seal in the housing with the dished side (**rubber side**) **facing out.** Drive the dust seal into place with the tool shown in Fig. 11. The seal must be located behind the undercut in the input shaft when it is installed.

Worm and Valve

1. Remove the snap ring from the end of the actuator.

2. Slide the control valve spool (Fig. 6) off the actuator.

3. Install the valve spool evenly and slowly with a slight oscillating motion into the flanged end of valve housing with the valve identification groove between the valve spool lands outward, checking for freedom of valve movement within the housing working area. The valve spool should enter the housing bore freely and fall by its own weight.

4. If the valve spool is not free, check for burrs at the outward edges of the working lands in the housing and remove with a hard stone.

5. Check the valve for burrs and if burrs are found, stone the valve in a **radial direction only.** Check for freedom of the valve again.

6. Remove the valve spool from the housing.

7. Slide the spool onto the actuator making sure that the groove in the spool annulus is toward the worm.

8. Install the snap ring to retain the spool.

9. Check the clearance between the spool and the snap ring. The clearance should be between 0.002-0.005 inch. If the clearance is not within these limits, select a snap ring that will allow a clearance of 0.003 inch.

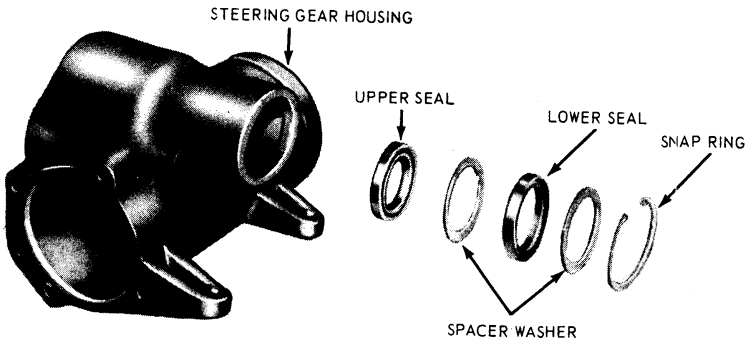


FIG. 12—Steering Gear Housing Disassembled

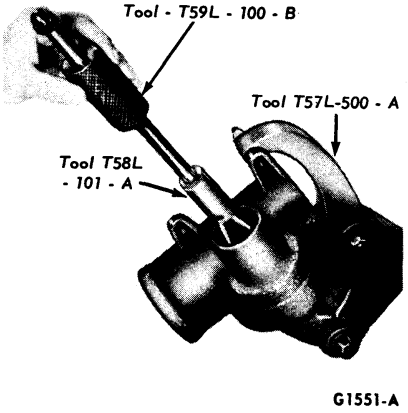


FIG. 13—Removing Lower Seal

Piston and Ball Nut

1. Remove the teflon ring and the O-ring (Fig. 7) from the piston and ball nut.

2. Dip a new O-ring in gear lubricant and install it on the piston and ball nut.

3. Install a new teflon ring on the piston and ball nut being careful not to stretch it any more than necessary.

Steering Gear Housing

1. Remove the snap ring and the spacer washer (Fig. 12) from the lower end of the steering gear housing.

2. Remove the lower seal from the housing as shown in Fig. 13. Lift the spacer washer from the housing.

3. Remove the upper seal in the same manner as the lower seal.

4. Dip both sector shaft seals in gear lubricant.

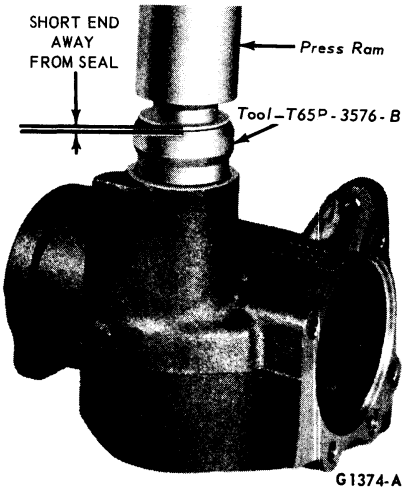


FIG. 14—Installing Sector Shaft Inner Seal

5. Apply Lubricant to the sector shaft seal bore of the housing and position the sector shaft inner seal into the housing with the lip facing inward. Press the seal into place with the tool shown in Fig. 14. Place a spacer washer (0.090 inch) on top of the seal and apply more Lubricant to the housing bore.

6. Place the outer seal in the housing with the lip facing inward and press it into place as shown in Fig. 15. Then, place a 0.090 inch spacer washer on top of the seal.

7. Position the snap ring in the housing. Press the snap ring into the housing with the tool shown in Fig. 15 to properly locate the seals and engage the snap ring in the groove.

STEERING GEAR ASSEMBLY

Do not clean, wash, or soak seals in cleaning solvent.

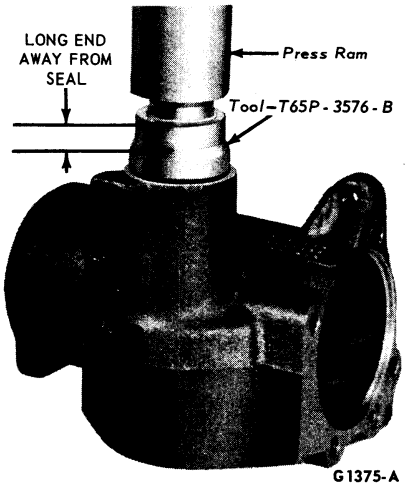


FIG. 15—Installing Sector Shaft Outer Seal

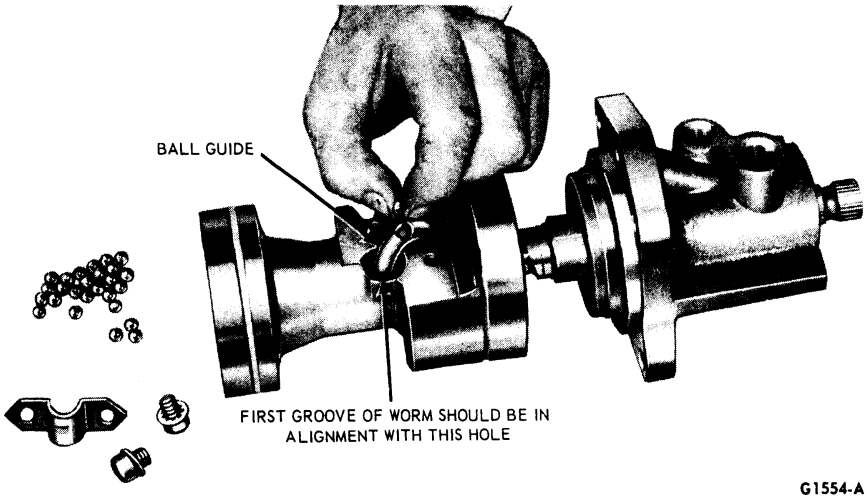


FIG. 16—Assembling Piston on Worm Shaft

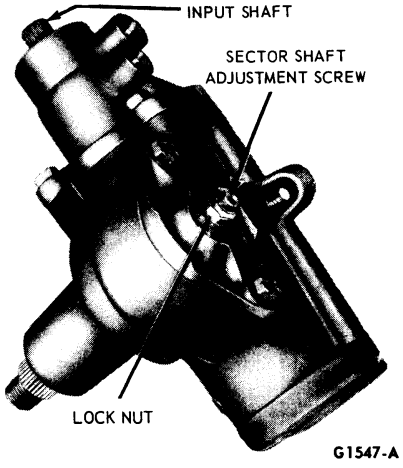


FIG. 17—Adjusting Mesh

1. Mount the valve housing in the holding fixture with the flanged end up.

2. Place the required thickness valve spool centering shim (Fig. 6) in the housing. **Use one shim only.**

3. Carefully install the worm and valve in the housing.

4. Install the attaching nut in the housing and torque it to specification (Part 3-13).

5. Install the lock nut (Fig. 7) and torque it to specification (Part 3-13).

6. Place the piston on the bench with the ball guide holes facing up. Insert the worm shaft into the piston so that the first groove is in alignment with the hole nearest to the center of the piston (Fig. 16).

7. Place the ball guide in the piston. Place the 27 balls in the ball guide (Fig. 16) turning the worm in a clockwise direction as viewed from the input end of the shaft. If all of the balls have not been fed into the guide upon reaching the right stop, rotate the input shaft in one direction and then in the other while installing the balls. After the balls have been installed, do not rotate the input shaft or the piston more than 3 1/2 turns off the right stop to prevent the balls from falling out of the circuit.

8. Secure the guides in the ball nut with the clamp (Fig. 6).

9. Position a new lube passage O-ring in the counterbore of the gear housing.

10. Apply vaseline to the teflon seal on the piston.

11. Place a new O-ring on the valve housing.

12. Slide the piston and valve into the gear housing being careful not to damage the teflon seal.

13. Align the lube passage in the valve housing with the one in the gear housing, and install but do not tighten the attaching bolts.

14. Rotate the ball nut so that the teeth are in the same plane as the sector teeth. Tighten the four valve housing attaching bolts to specifications.

15. Position the sector shaft cover O-ring in the steering gear housing. Turn the input shaft as required to center the piston.

16. Apply vaseline to the sector shaft journal then position the sector shaft and cover assembly in the gear housing. Install the steering identification tag and two sector shaft cover attaching bolts. Torque the bolts to specifications.

17. Attach an in-lb torque wrench to the input shaft. Adjust the mesh load to specifications as shown in Fig. 17.

PART 3-9 *Saginaw Design Integral Power Steering Gear*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
STEERING GEAR												
Cleaning and Inspection (See Page 03-01)			N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Description		09-01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Disassembly and Assembly		09-03	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mesh Load Adjustment		09-01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Removal and Installation		09-02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overhaul		09-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

The Rotary Valve Safety power steering gear operates entirely on displacing fluid to provide hydraulic fluid pressure assists only when turning. As the entire gear assembly is always full of fluid, all internal components of the gear are immersed in fluid making periodic lubrication unnecessary. In addition, this fluid acts as a cushion to absorb road shocks that may be transmitted to the driver. All fluid passages are internal except the pressure and return hoses between the gear and pump.

The rotary valve provides a smooth transmission through the driving range of steering wheel effort. A torsion bar transmits the road feel to the driver. Response of the steering gear to effort applied to the steering wheel has been greatly increased.

The rack-piston nut is one piece and is geared to the sector shaft. Lash between the sector shaft and rack-piston nut is maintained by an adjusting screw which is retained in the end of the shaft gear (Fig.1).

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

During the breaking in period of the vehicle, it is probable that some of the factory adjustments will change. These changes in adjustment do not necessarily affect the satisfactory operation of the steering gear assembly and ordinarily do not require re-adjustment unless there is excessive lash or other malfunctioning. The only adjustment that should be performed in the vehicle is the total over center position load (mesh load) to eliminate excessive lash between the sector shaft and rack teeth.

MESH LOAD ADJUSTMENT

1. Disconnect the Pitman arm from the sector shaft and remove the steering wheel hub.
2. Disconnect the fluid return line at the reservoir; at the same time cap the reservoir return line pipe.
3. Place the end of the return line in a clean container and cycle the steering wheel in both directions as required, to discharge the fluid from the gear.
4. Turn the gear 1/2 turn off center (either direction). Using a 24 in-lb torque wrench on the steering wheel nut, determine the torque required to rotate the shaft slowly through a 20 degree arc.
5. Turn the gear back to center and repeating the method of reading torque as in Step 4, above, loosen the adjuster lock nut, turn the screw inward with a 7/32-inch Allen wrench until the reading is equal to 6 in-lbs in excess of Step 4 above, and retighten the lock nut while holding the screw in place.
6. Recheck the readings and replace the Pitman arm and the steering wheel hub.
7. Connect the fluid return line to the reservoir and fill the reservoir with C1AZ-19582-A Fluid to the proper level.

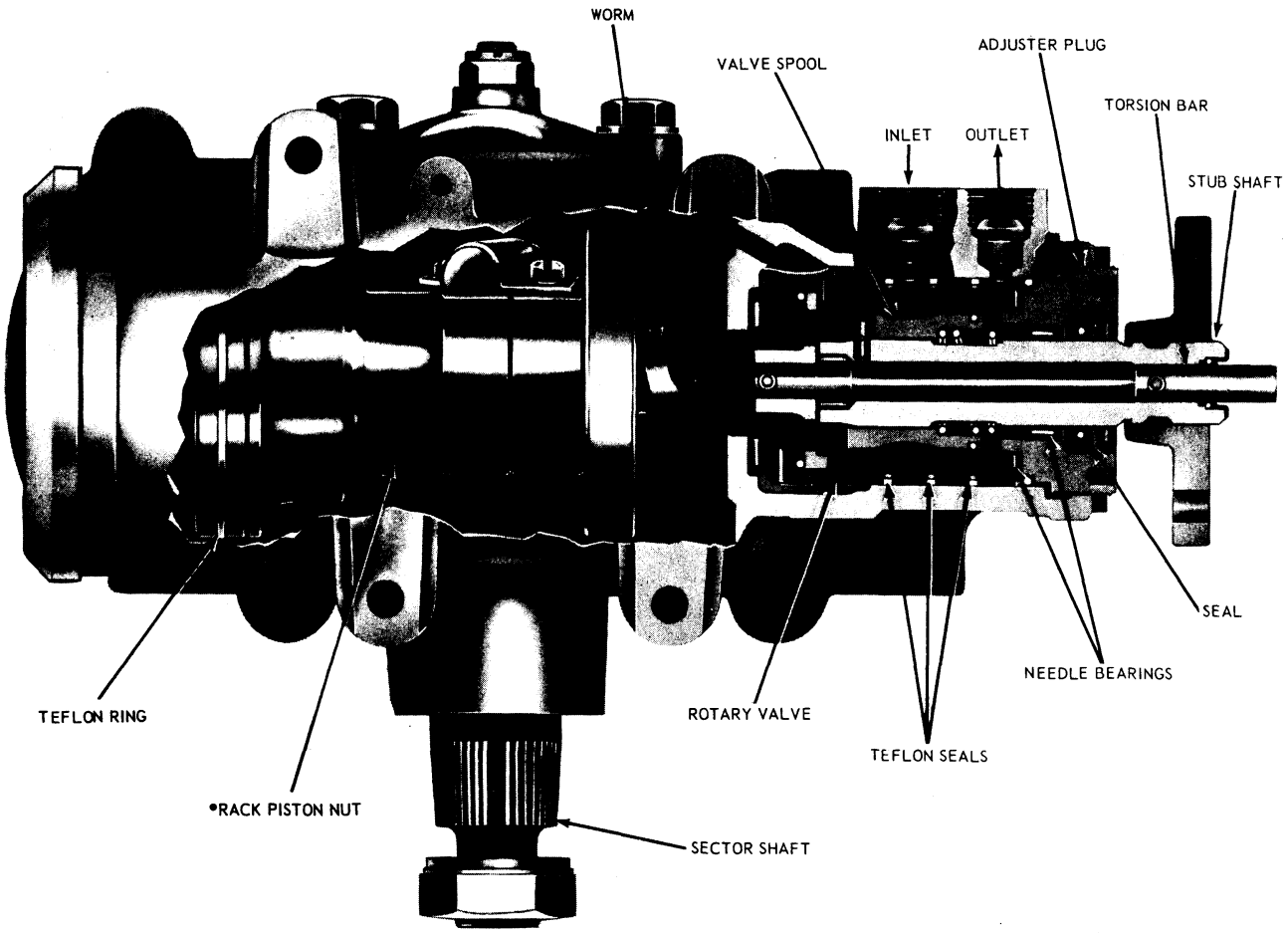


FIG.1—Power Steering Gear—Sectional View

3 REMOVAL AND INSTALLATION

REMOVAL

1. Disconnect the pressure and the return line from the steering gear. Plug the lines and the ports in the gear to prevent entry of dirt.
2. Remove the two bolts that secure the flex coupling to the steering gear and to the column.
3. Raise the vehicle and remove the Pitman arm attaching nut.
4. Remove the Pitman arm from the sector shaft with Tool T64P-3590-F. Remove the tool from the Pitman arm.
5. If working on a vehicle equipped with a standard transmission, remove the clutch release lever retracting spring to provide clearance for removing the steering gear.
6. Support the steering gear then remove the three steering gear attaching bolts.
7. Work the steering gear free of the flex coupling and remove it from the vehicle.
8. If the flex coupling stayed on the input shaft, lift it off the shaft at this time.

INSTALLATION

1. Slide the flex coupling into place on the steering shaft. Turn the steering wheel so that the spokes are in the horizontal position.
2. Center the steering gear input shaft.
3. Slide the steering gear input shaft into the flex coupling and into place on the frame side rail. Install the three attaching bolts and torque them to specification.
4. Make sure that the wheels are in the straight-ahead position, then install the Pitman arm on the sector shaft. Install and tighten the sector shaft attaching nut to specification.
5. Move the flex coupling into place on the input shaft and steering column

shaft and install and tighten the attaching bolts to specification.

6. Connect and tighten the fluid pressure and the return line to the steering gear.

7. Fill the power steering pump and cycle the steering gear. Check for leaks. Check the reservoir fluid level again and add as required.

4 MAJOR REPAIR OPERATIONS

Disassembly and reassembly of the unit and the subassemblies must be made on a clean workbench. As in repairing any hydraulically operated unit, cleanliness is of utmost importance. Therefore, the bench, tools, and parts must be kept clean at all times. Thoroughly clean the exterior of the gear with a suitable solvent and, when necessary, drain as much of the hydraulic fluid from the gear as possible.

DISASSEMBLY INTO SUB-ASSEMBLIES

1. Mount the steering gear in a vise. (Fig. 2).
2. Rotate the end plug retaining ring to place one end of the ring opposite the hole in the housing.
3. Working through the hole in the housing (Fig. 3), unseat the retaining ring then work it out of the groove with a screwdriver.
4. Rotate the input shaft in a counterclockwise direction using a 3/4 inch, 12-point socket wrench to force the end plug out of the housing. Do not rotate the shaft any more than necessary to remove the plug. Further rotation will allow the balls to fall from their circuit and allow the rack-piston to become disengaged from the sector shaft. Remove the O-ring from the housing and discard it.
5. Rotate the input shaft 1/2 turn in a clockwise direction to draw the piston inward.
6. Turn the end plug (Fig. 4) counterclockwise out of the piston with a 1/2 inch drive extension.
7. Remove the lock nut from the sector shaft adjustment screw. Discard the nut.
8. Remove the four cover attaching screws. Rotate the sector shaft adjustment screw with an Allen wrench until the cover is free of the housing. Remove the cover and the O-ring. Discard the O-ring.
9. Turn the input shaft as required to center the sector shaft teeth in the housing.
10. Tap the end of the sector shaft with a soft-faced hammer to free it from the housing.
11. Remove the adjuster plug lock nut.
12. Remove the adjuster plug with spanner wrench T65P-3A537-A (Fig. 15).
13. Insert the tool shown in Fig. 6

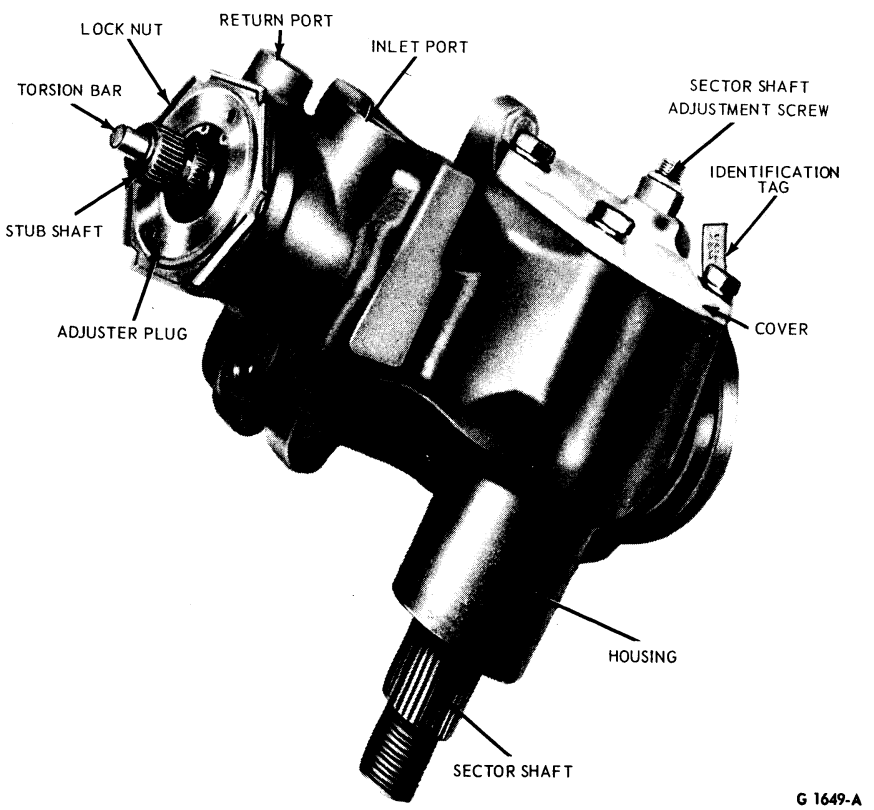


FIG. 2—Steering Gear

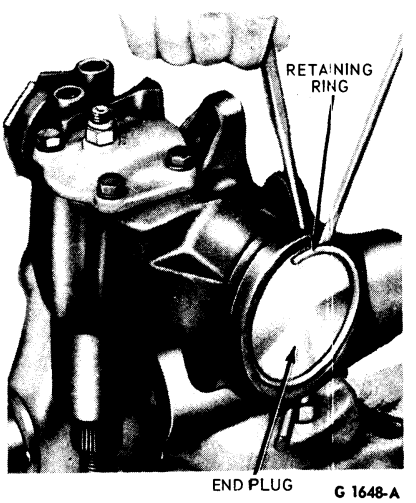


FIG. 3—Removing End Plug Retaining Ring

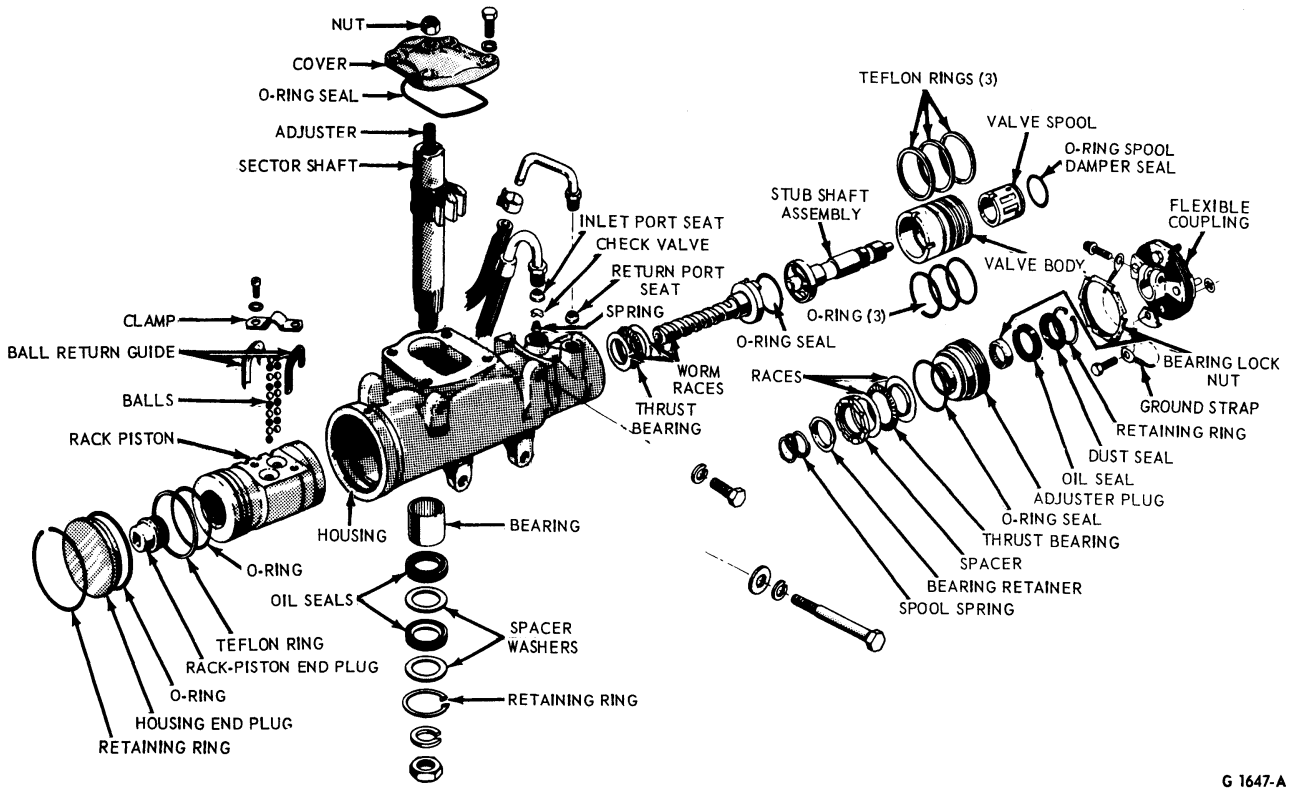


FIG. 4—Steering Gear Disassembled

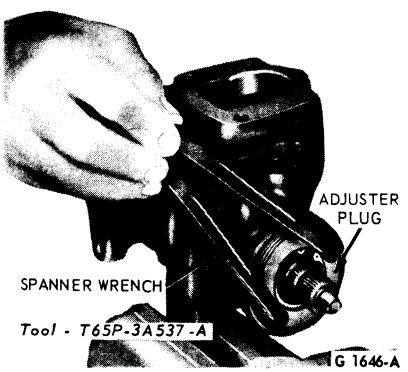


FIG. 5—Removing Adjuster Plug

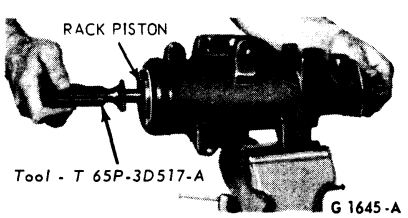


FIG. 6—Removing Rack Piston

into the end of the rack-piston until it contacts the worm shaft. Rotate the stub shaft in a counterclockwise direction until the worm is free of the rack-piston. Withdraw the rack-piston from the housing making sure that the tool is held all the way in the piston to prevent dropping the balls. Do not disassemble the rack-piston at this time.

14. Pull the stub shaft and valve assembly from the housing.

15. Lift the worm, lower thrust bearing and the races from the housing.

REPAIR OF SUB—ASSEMBLIES

Do not clean, wash, or soak seals in cleaning solvent.

STEERING GEAR HOUSING

1. Remove the snap ring (Fig. 7) that secures the sector shaft seals in the lower end of the housing. Remove the lower spacer washer.

2. Remove the lower seal (double lip), spacer washer, upper seal (single lip) with Tools T85L-101-A and T59L-100-B (Fig. 8).

3. Check the housing bearing for wear and remove the bearing only if worn or damaged. Working from the lower end of the housing (Fig. 9) press the bearing out of the housing. Discard the bearing.

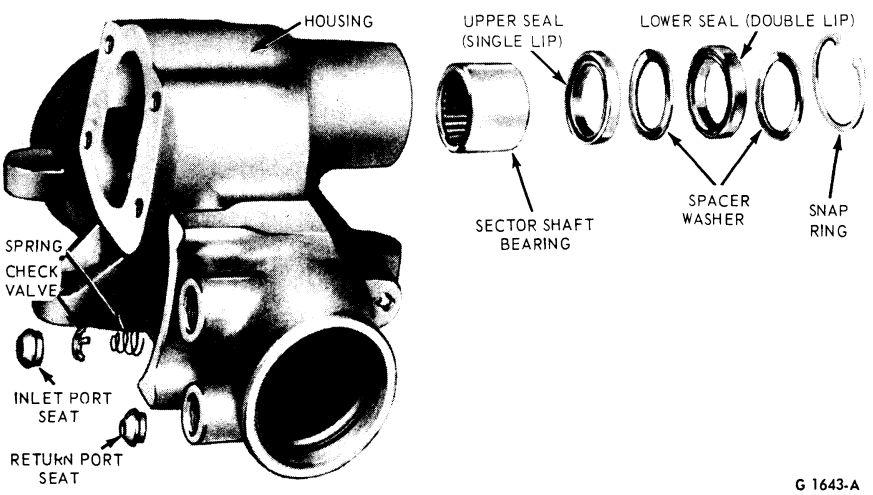


FIG. 7—Steering Gear Housing Disassembled

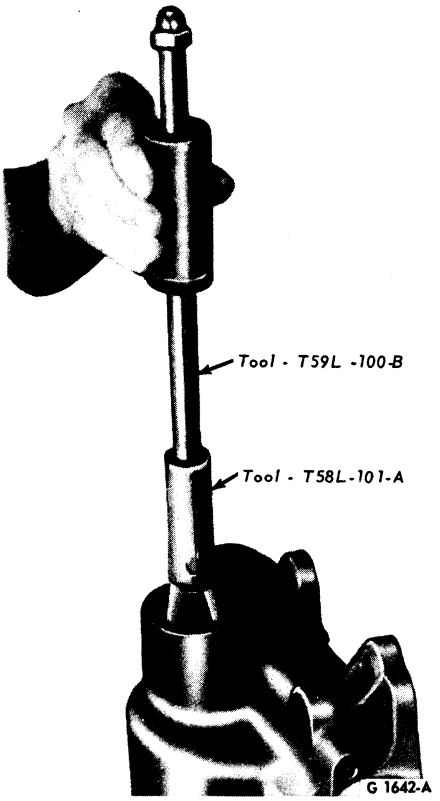


FIG. 8—Removing Sector Shaft Seals

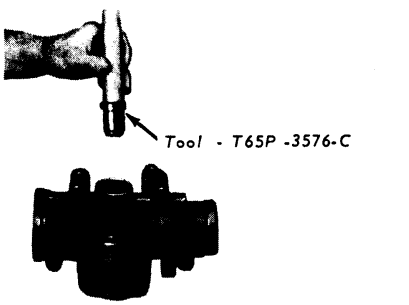


FIG. 9—Removing Sector Shaft Bearings

4. Working from the upper end of the housing, press in a new bearing until the upper end is 0.030 inch below the housing bore. When installing the bearing, make sure it is pressed in from the identification end (stamped end).

5. Lubricate new sector shaft seals (Fig. 7) in C1AZ-19582-A hydraulic fluid. Install the single lip seal first, then a back-up washer. Using special tool (Fig. 10), drive the seal and washer in far enough to provide clearance for the other seal and back-up washer and the retaining ring. The seal must not bottom on the end of the counterbore. Install the **double** lip seal and the second back-up washer. Again using the special tool, drive the seal and back-up washer in only far enough to provide clearance for the retaining ring. Install the sector shaft seal retaining ring with snap ring pliers, making certian that the ring is seated properly.

6. To remove a damaged port seat, use a 5/16-18 inch U.S. thread (coarse) tap and turn it two turns into the seat.

7. Thread a bolt and nut with a flat washer into the tapped hole (Fig. 11).

8. Hold the bolt from turning and tighten the nut to extract the seat. Discard the seat.

9. Remove the check valve and spring from the inlet port.

10. Blow all chips from the housing.

11. Position the spring, check valve and new seat in the inlet port.

12. Use the tool shown in Fig. 12 and drive the seat into place.

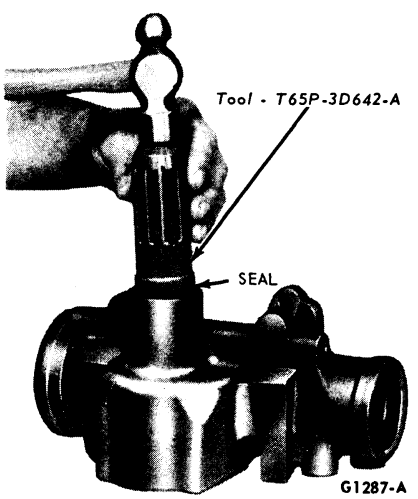


FIG. 10 —Installing Sector Shaft Seal

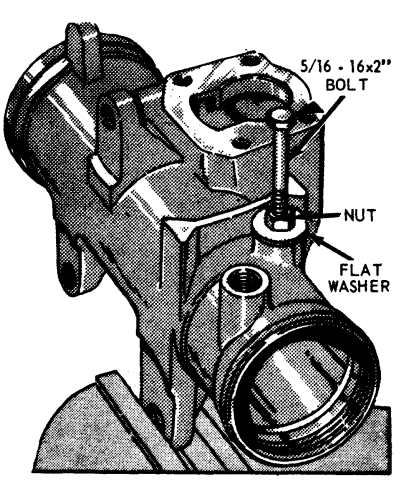


FIG. 11 —Removing Port Seat

13. Install the outlet port seat in the same manner.

ADJUSTER PLUG

1. Lift the adjuster plug off the stub shaft (Fig. 4).

2. Pry the thrust bearing retainer off the adjuster plug as shown in Fig. 13. Be careful not to score the needle bearing bore. Discard the retainer.

3. Lift the spacer, thrust bearing, races and the O-ring, from the plug (Fig. 14). Discard the O-ring.

4. If necessary to replace the roller bearing, remove the dust seal retaining ring. Working from the spacer end of the adjuster plug, remove the roller bearing, oil seal and the dust seal as shown in Fig. 15.

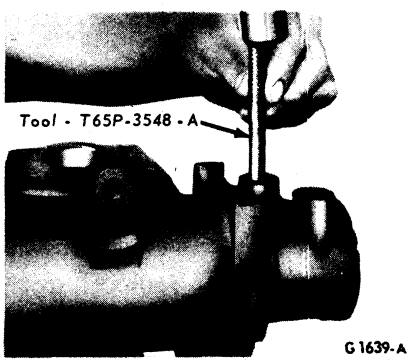


FIG. 12 —Installing Inlet Port

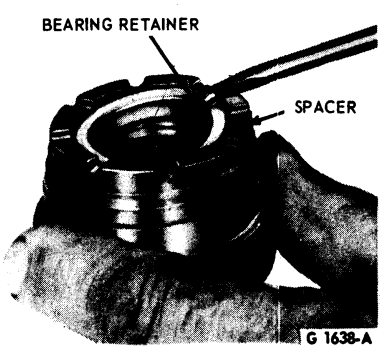


FIG. 13—Removing Thrust Bearing Retainer

If the roller bearing does not need replacing do not remove it. Pry the dust seal and the oil seal from the adjuster plug with a screwdriver.

5. Place a new roller bearing on the tool shown in Fig. 15 with the bearing manufacturer's identification facing toward the tool.

6. Position the bearing and tool in the bore. Drive the bearing into the plug until it is flush with the bottom surface of the stub shaft seal bore.

7. Lubricate a new oil seal with C1AZ-19582-A. Install the seal with Tool T65P-3D536-A pressing it into

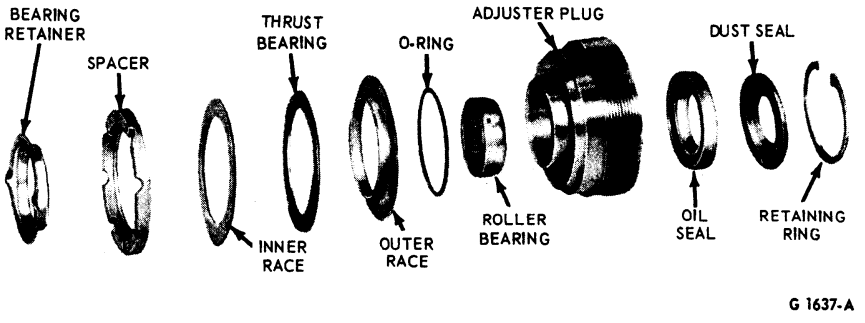


FIG. 14 —Adjuster Plug Disassembled

the plug far enough to provide clearance for the dust seal and the snap ring.

8. Lubricate a new dust seal C1AZ-19582-A and install it with smooth rubber surface facing outward.

9. Secure the dust seal with the ring, making sure that the ring is properly seated.

10. Lubricate a new O-ring seal with vaseline and install it on the adjuster plug.

11. Assemble the thrust bearing outer race, thrust bearing, inner race, and the thrust bearing spacer on the adjuster plug (Fig. 16).

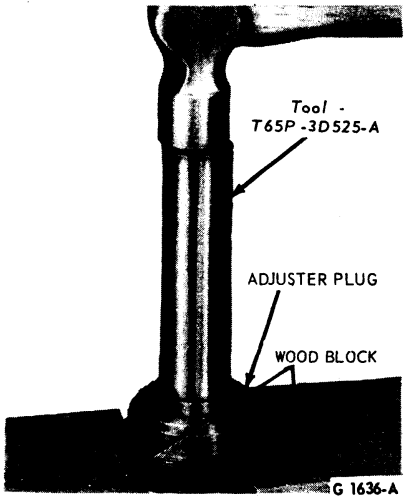


FIG. 15 —Removing or Installing Roller Bearing from Adjuster Plug

12. Press a new bearing retainer into the bearing bore. The radial location of the dimples is not important.

STUB SHAFT AND VALVE ASSEMBLY

The control valve and spool is a select fit and cannot be serviced other than removing the spool to replace the dampener O-ring or replace the three teflon seals or O-rings under the teflon seals.

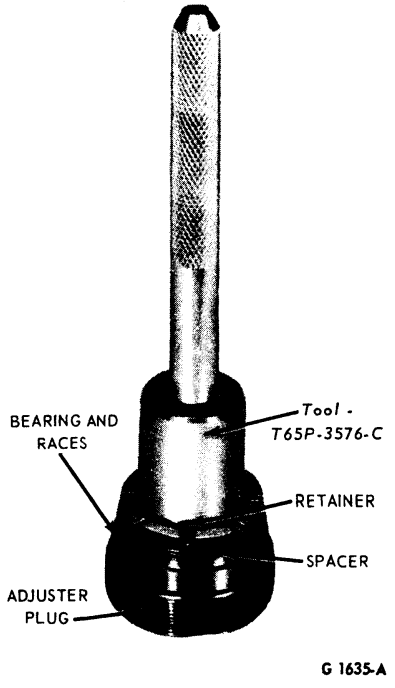


FIG. 16 —Installing Thrust Bearing Retainer

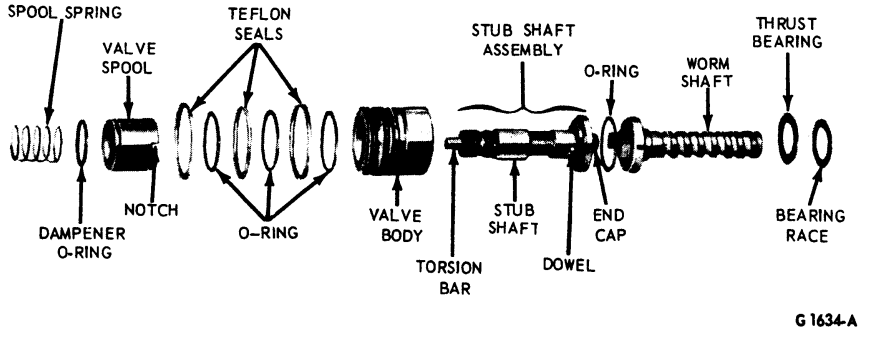


FIG. 17 —Control Valve Disassembled

1. Remove the cap to worm O-ring and discard it (Fig. 17).

2. Work the rear coil of spool spring onto the stub shaft bearing surface. Do not pry on the valve body. Slide the spring off the shaft.

3. Extreme care must be used when removing the valve spool. The diametral clearance between the valve body and the spool may be as low as 0.0004 inch. The slightest cocking of the spool may jam it in the valve body.

a. To remove the valve spool, hold the valve assembly in both hands with the stub shaft pointing downward. Push lightly on the valve spool with a small rod by inserting the rod through the openings in the end cap (Fig. 18) until the spool is far enough out of the valve so that it may be grasped by the hand. Withdraw the spool with a steady oscillating pull to prevent jamming. If slight sticking occurs, make a gentle attempt to reverse the withdrawal procedure. If this does not free the spool, it has become cocked in the valve body bore. Do not attempt to force the spool in or out if it becomes cocked. In this case, continue to disassemble the valve assembly as follows and return to the spool as described later. Remove the stub shaft, torsion bar, and end cap assembly by holding the thumbs on the valve body as shown in Fig. 18. Tap the torsion bar lightly against the workbench. This will dislodge the cap from the valve body to cap pin. The stub shaft, torsion bar and end cap assembly can now be removed from the valve body.

b. If the valve spool has become cocked as described in step 3 above, it can now be freed. By visual inspection on a flat surface it can be determined in which direction the spool is cocked. A few very light taps with a light soft plastic or raw-hide mallet should align the spool in the bore and free it. **Do not tap with anything metallic. If spool can be rotated, it can be removed.**

4. Remove O-ring dampener seal from the spool and discard it.

5. Carefully cut the valve rings and the ring back-up seals, remove and discard them, providing the rings show evidence of excessive wear. The valve rings are made of filled teflon and it is very unusual that replacement is required.

6. Remove the dampener O-ring from the valve spool and discard it.

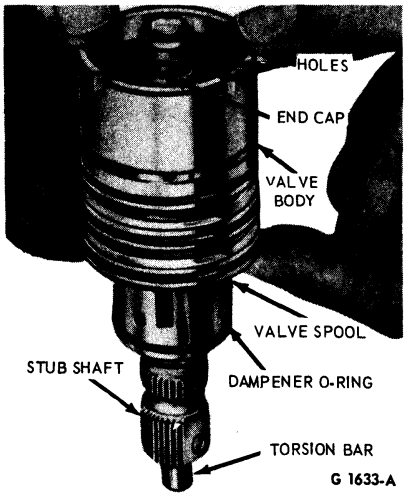


FIG. 18 —Removing Spool from Valve Body

7. Dip three new valve body O-rings and teflon rings in C1AZ-19582-A lubricant. Install the O-rings on the valve body being careful not to twist them. Slide the three teflon rings into place over the O-rings being careful not to stretch them any more than necessary.

8. Lubricate a new dampener O-ring and install it in the spool groove.

9. Assemble the stub shaft in the valve body making sure that the groove in the cap engages the pin in the body. Tap the cap lightly with a soft-faced hammer to seat it in the valve body.

10. Dip the valve spool in C1AZ-19582-A. With the notch of the spool toward the valve body, carefully slide the spool over the shaft and into the body rotating it slightly to permit easy entry. Make sure that the dampener O-ring is distributed evenly to prevent damage. Guide the spool to engage the notch with the dowel in the body.

11. Place the spool spring on the stub shaft with the larger diameter toward the spool. Work the small end of the spring down over the shaft until the small end is seated in the groove of the stub shaft.

12. If, during the assembly of the valve, the stub shaft and end cap assembly is allowed to slip out of engagement with the valve body pin, the spool will be permitted to enter the valve body too far. The dampener O-ring seal will expand into the valve body fluid grooves preventing withdrawal of the spool. Attempt to withdraw the spool with a slight pull and much rotary motion. If this does not free the spool after several tries, make sure that the spool is free to rotate; place the valve body on a flat surface with the notched end up, and tap the spool with a wooden or plastic rod until the O-ring seal is cut and the spool can be removed. Replace the dampener O-ring seal and proceed with the assembly procedure as before.

RACK-PISTON

1. Cut the teflon ring and the O-ring from the piston.

2. Place the assembly on a clean lint-free cloth and remove the screws that attach the ball return guide clamp to the rack piston and remove the clamp (Fig. 19).

3. Lift the ball return guides from the rack-piston.

4. Remove Tool T65P-3D517-A from the piston and remove the remaining balls.

5. Thoroughly clean all parts.

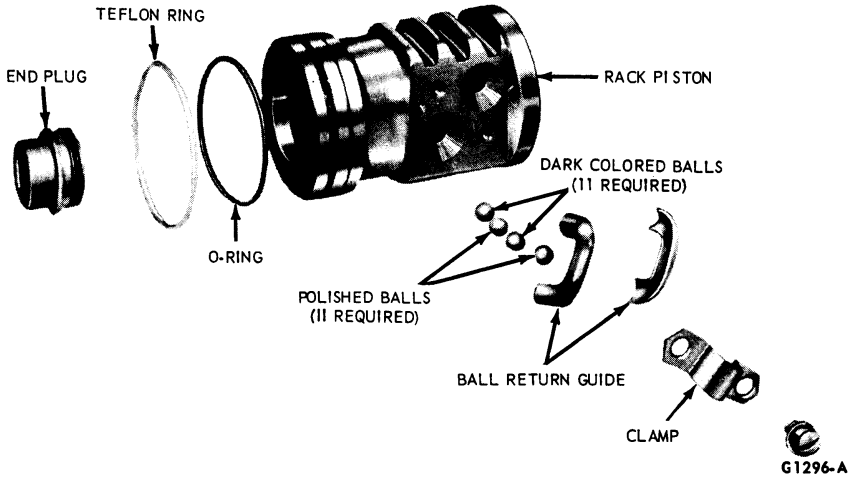


FIG. 19—Rack-Piston Disassembled

6. Lubricate a new O-ring and teflon ring. Install the O-ring on the piston being careful not to twist it. Slide the teflon ring into place being careful not to stretch it any more than necessary.

7. Slide worm (Fig. 20) fully into the rack-piston. Load 16 balls into the guide hole nearest the teflon ring while slowly rotating the worm counterclockwise to feed the balls through circuit. Alternate the dark colored balls with the polished balls through the circuit.

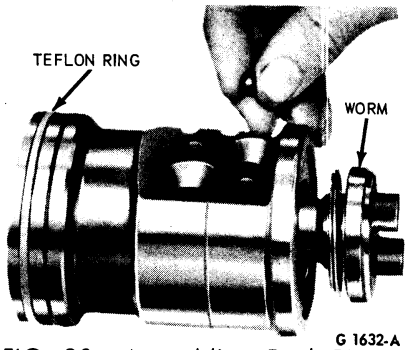


FIG. 20 —Assembling Rack Piston

Apply Lubriplate liberally to one of the ball return guides and install the six remaining balls in the guide. Place the other half of the guide in position and insert them into holes in the rack-piston. Be sure that the dark ball in the guide is installed next to the polished ball in the rack-piston. Install the ball return guide clamp with screws and lock washers. Tighten the screws to 8-12 ft-lbs.

8. The worm groove is ground with a high point in the center. When the rack-piston passes over this high point there should be a preload of 1-4 in-lbs. Clamp the rack-piston in a vise with soft jaws with the worm shaft pointing up. To avoid distortion, do not tighten the vise too tight.

9. Place the valve assembly on the worm, engaging the worm drive pins. Rotate the worm until it extends 1 1/4 inch from the rack-piston to the thrust bearing face. This is the center position.

10. Place an in-lb torque wrench with a 3/4-inch-deep wall 12-point socket on the stub shaft, and rotate the wrench through an arc of approximately 60 degrees in both directions several times, then take a torque reading. The highest average reading obtained with the worm rotating should be between 1-4 in-lbs.

11. If this reading is too high or too low a new set of balls should be

Code Size	Diameter Mean	Size Range of Ball (Inch)
6	0.28117	0.28112-0.28122
7	0.28125	0.28120-0.28130
8	0.28133	0.28128-0.28138
9	0.28141	0.28136-0.28146
10	0.28149	0.28144-0.28154
11	0.28157	0.28152-0.28162

FIG. 21 —Worm Ball Sizes

installed. Service replacement balls are available in the sizes shown in (Fig. 21).

12. Note the ball size stamped on the rack-piston and install the next size larger balls to increase the preload. If no number is stamped on the rack-piston, the original ball code size was No. 7.

A change of one ball size larger will increase the preload approximately one in-lb. Final preload on replacement balls should be 2-3 in-lbs.

Remove the valve assembly from the worm and the rack-piston from the vise.

13. Insert Tool T65P-3D517-A into the plug end of the rack and piston to contact the worm shaft (Fig. 22). Apply pressure on the tool while rotating the worm shaft out of the piston and rack. Leave the tool in place until the piston is installed in the housing.

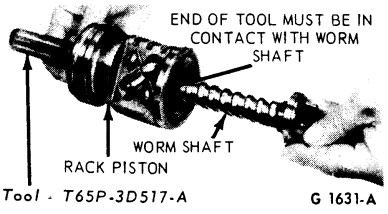


FIG. 22 —Installing Tool in Rack-Piston

ASSEMBLY OF STEERING GEAR

1. Secure the steering gear housing in a vise.

2. Lubricate the worm shaft, lower thrust bearing, and races; then position the thrust bearing and races on the worm.

Align the valve body drive pin on the worm, with the narrow pin slot in the valve body. Be sure O-Ring seal between the valve body and the worm head is installed.

3. Position the valve assembly and the worm shaft in the housing as a unit (Fig. 23). Do not push against the stub shaft as this could cause the stub shaft and cap to pull out of the valve body, allowing the spool seal to slip into valve body fluid grooves. Install the valve assembly by pushing on the outer diameter of the valve body housing with the finger tips. Be sure that the teflon rings are not binding inside the housing. The valve assembly is correctly seated when the fluid return hole in the gear housing is fully visible.

4. Place the tool shown in Fig. 24 over the end of the stub shaft.

5. Lubricate a new adjuster plug O-ring and install it in the adjuster plug groove.

6. Install the adjuster plug over the end of the stub shaft and tighten it just enough to be sure all parts are properly seated. Remove Tool T65P-3A537-B.

7. Install the adjuster plug locknut loosely on the plug.

8. Tighten the adjuster plug with wrench J7624 while rotating the input shaft. As soon as additional drag is noted, back the adjuster plug off 1/8 turn. Measure the input shaft drag with an in-lb torque wrench.

9. Tighten the adjuster plug (Fig. 25) to obtain a 1-3 in-lb preload in excess of the drag that was measured previously. Tighten the adjuster plug lock nut and recheck the thrust bearing preload. Total preload must not exceed 8 in-lbs.

10. Install Tool T65P-3805-A in the steering gear housing. Position the rack-piston as shown in Fig. 26. Be sure that Tool T65P-3D517-A is contacting the worm shaft. Push the rack-piston inward until it contacts the worm shaft while keeping pressure applied to Tool T65P-3D517-A. Turn the stub shaft clockwise until the middle rack groove in the rack-piston is aligned with the center of sector shaft roller bearing. Remove the tool from the housing.

11. Lubricate a new O-ring with C1AZ-19582-A and position it in the sector shaft cover.

12. Thread the sector shaft cover on the adjusting screw until it bottoms then back it off 1 1/2 turns.

13. Install the sector shaft so that the center gear tooth meshes with the center groove in the rack-piston. Be sure that the cover O-ring is in place before pushing the cover down on the housing.

14. Install the cover screws and lock washers. Tighten to 30-35 ft-lbs.

15. Install a new adjuster lock nut halfway on the adjuster screw.

16. Install the end plug in the rack-piston. Tighten the plug to 50-100 ft-lbs torque.

17. Lubricate a new housing end plug O-ring and install it in the housing.

18. Place the end plug in the gear housing and seat it against the O-ring seal. It may be necessary to tap the

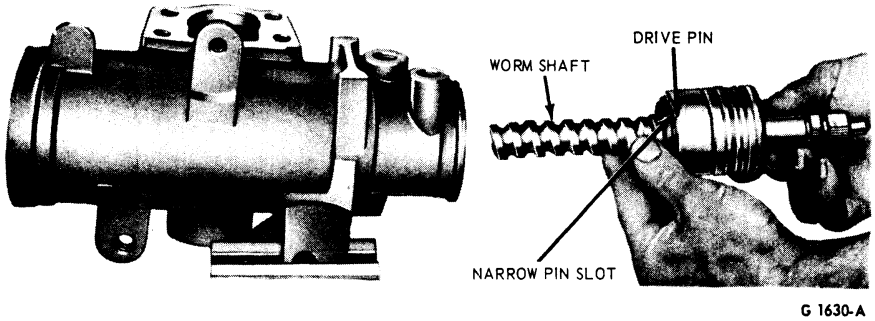


FIG. 23—Installing Valve and Worm Shaft in Housing

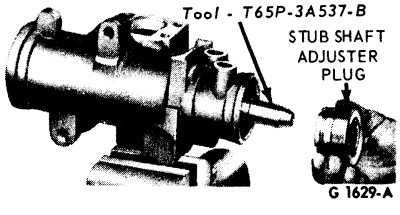


FIG. 24 —Installing Adjuster Plug

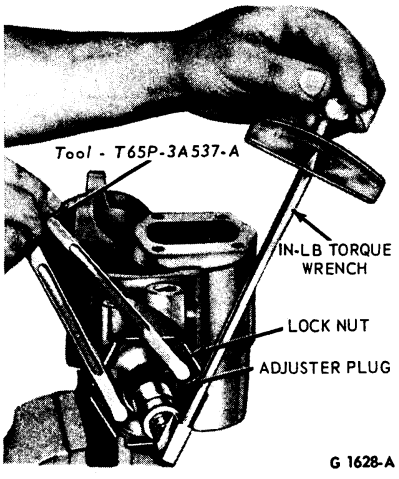


FIG. 25—Adjusting Thrust Preload

end plug lightly with a soft-faced mallet to seat it properly.

19. Snap the retainer ring in place with the fingers. Tap lightly on the ring to be sure the ring is bottomed securely in the housing.

20. Turn the input shaft to the full left or right position then turn it back approximately 1 3/4 turns to center the worm.

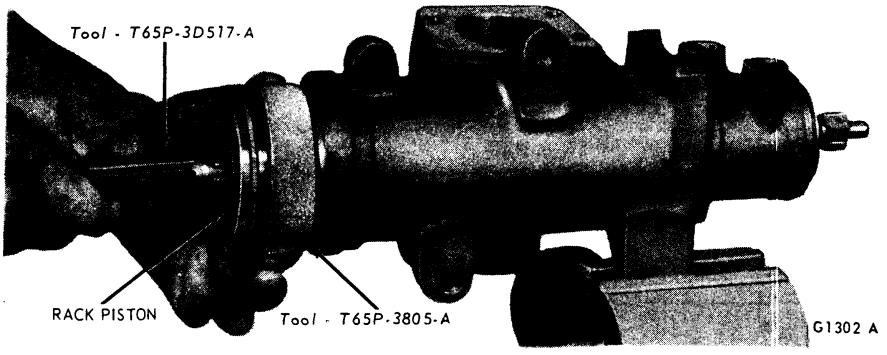


FIG. 26—Installing Rack-Piston

21. Place an in-lb torque wrench on the input shaft as shown in Fig. 27.

22. With the gear on center and the sector shaft adjuster backed off, measure the total drag. With the gear on center, adjust the sector shaft thrust screw so that preload is 4-8 in-lbs in excess of total preload and drag. Readings are to be made through an arc not exceeding 20 degrees with the gear on center. Tighten the lock nut.

23. After obtaining the proper mesh load, tighten the sector shaft adjustment screw lock nut to 20-30 ft-lbs.

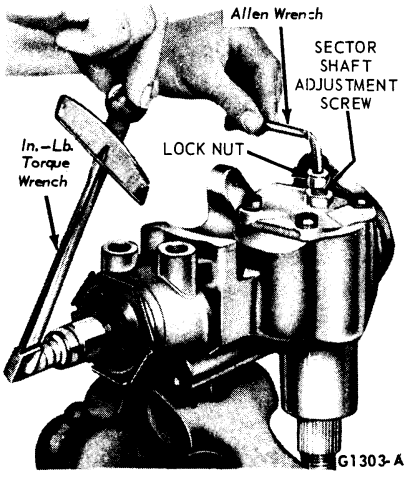


FIG. 27—Adjusting Sector Shaft Mesh Load

PART 3-10 Ford-Thompson Power Steering Pump

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
PUMP BELT TENSION ADJUSTMENT		10-01	10-01	10-01	10-01	10-01	10-01	10-01	10-01	N/A	10-01	N/A
PUMP DRIVE BELT Removal and Installation		10-02	10-02	10-02	10-02	10-02	10-02	10-02	10-02	N/A	10-02	N/A
POWER STEERING PUMP Cleaning and Inspection (See Part 03-01)												
Description		10-01	10-01	10-01	10-01	10-01	10-01	10-01	10-01	N/A	10-01	N/A
Disassembly and Assembly		10-04	10-04	10-04	10-04	10-04	10-04	10-04	10-04	N/A	10-04	N/A
Removal and Installation		10-02	10-02	10-02	10-02	10-02	10-02	10-02	10-02	N/A	10-02	N/A
POWER STEERING PUMP PULLEY Removal and Installation		10-03	10-03	10-03	10-03	10-03	10-03	10-03	10-03	N/A	10-03	N/A
POWER STEERING PUMP RESERVOIR Removal and Installation		10-03	10-03	10-03	10-03	10-03	10-03	10-03	10-03	N/A	10-03	N/A
ROTOR SHAFT SEAL Removal and Installation		10-04	10-04	10-04	10-04	10-04	10-04	10-04	10-04	N/A	10-04	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

The Ford-Thompson power steering pump is a belt driven slipper type pump which is integral with the reservoir (Fig. 1). It is constructed so that the reservoir is attached to the rear side of the pump housing front plate and the pump body is encased within the reservoir (Fig. 2).

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

PUMP BELT TENSION ADJUSTMENT

Pump drive belt tension cannot be checked accurately using the thumb pressure or belt deflection methods. Correct belt adjustment is assured only with the use of a belt tension gauge.

1. Check the belt tension with a belt tension gauge tool T63L-8620-A. With a new belt, or one that has been run for less than 15 minutes, the tension should be within 120-150 lbs. With a belt that has been run for more than 15 minutes, the tension should be within 90-120 lbs.

2. To adjust the belt, loosen the mounting bolts incorporated on the front face of the pump cover plate (hub side) and one nut at the rear of the reservoir. Fix a 9/16 inch open end wrench on the projecting 1/2 inch boss on the cover plate and pry upward to correct tension on 6 cyl. engines.

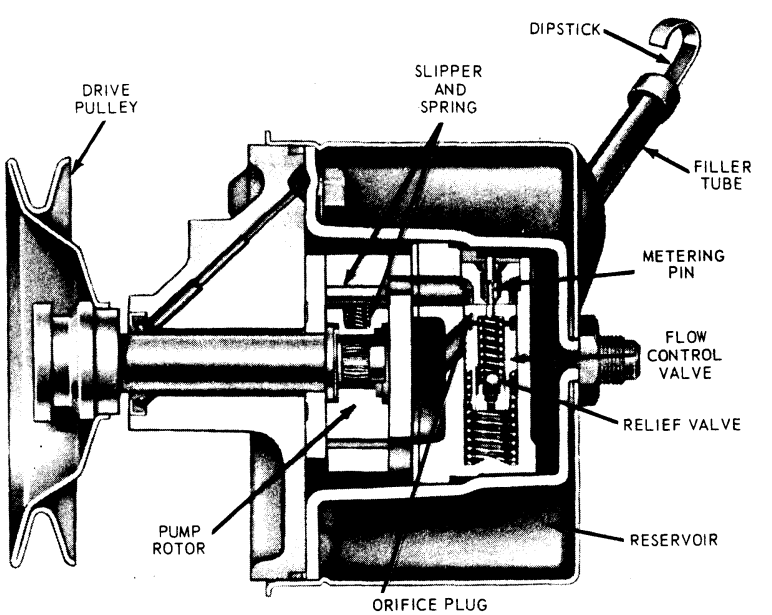


FIG. 1—Power Steering Pump—Sectional View

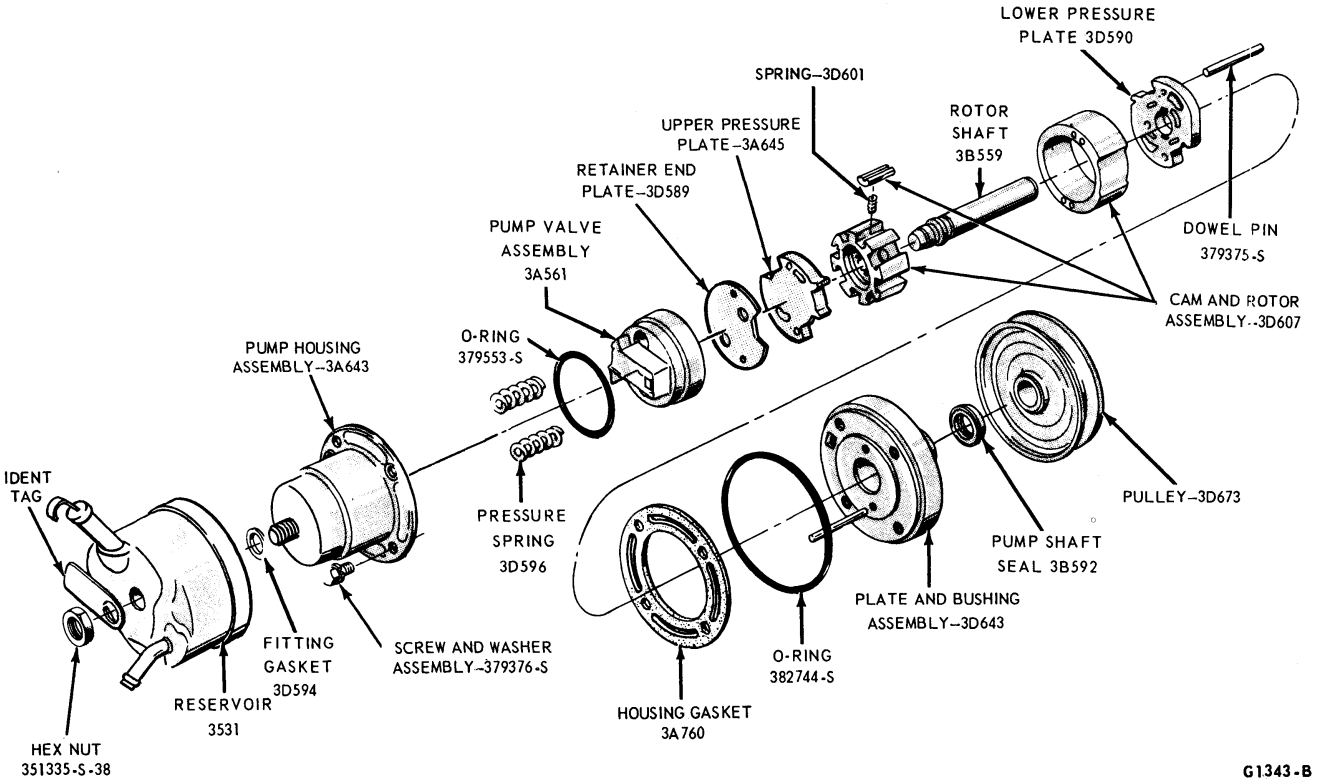


FIG. 2—Power Steering Pump Disassembled

To adjust the belt on 8 cyl. engines loosen the mounting bolt in the adjusting slot and the nut directly above the adjusting slot. Place a suitable pry bar between the cast boss on the pump mounting bracket and the cast boss on the pump cover plate and pry upward to correct tension.

Do not pry against the reservoir to obtain proper belt load as it can be deformed and cause a leak.

3. Recheck the belt tension. When the tension has been correctly adjusted, tighten the bolts and the nut to specification (Part 3-13).

POWER STEERING PUMP DRIVE BELT REPLACEMENT

1. Loosen the idler pulley attaching bolts and remove the compressor drive belt if equipped with an air conditioner.
2. Loosen 3 bolts and one nut attaching the power steering pump to the pump bracket, and remove the pump drive belt.
3. **Position the power steering pump drive belt on the pulleys.**
4. Adjust the drive belt tension as outlined in Section 2 to specification (Part 3-13) and tighten the pump attaching bolts and one nut to specification.
5. Install the compressor drive belt if equipped with an air conditioner and adjust to specification (Part 16).

3 REMOVAL AND INSTALLATION

POWER STEERING PUMP REPLACEMENT

EIGHT CYLINDER WITHOUT AIR CONDITIONER AND ALL SIX CYLINDER

1. Remove the power steering fluid from the pump reservoir by disconnecting the fluid return hose at the reservoir, and allow the fluid to drain into a suitable container.
2. Disconnect the pressure hose from the pump.
3. Remove 3 bolts from the front of the pump and the one nut at the rear (rear nut on 8 cyl. engines only) that attach the pump to the mounting bracket; disconnect the belt from the pulley and remove the pump from the vehicle.
4. Position the pump to the mounting bracket and install the 3 bolts at the front of pump and (rear nut on 8 cyl. engines only) the 1 nut at the rear. Torque to specification.
5. Place the belt on the pulley and adjust the belt tension (Section 2) with Tool T63L-8620-A and tighten the bolts and nut to specifications.
6. Torque the pressure hose fitting hex nut to specification. Then, connect the pressure hose to the fitting and torque the hose nut to specification.
7. Connect the hose to the pump. Then, tighten the clamp.
8. Fill the power steering pump reservoir with transmission fluid C1AZ-19582-A and cycle the system to remove air from the steering gear system.
9. Check for leaks and again check the fluid level. Add fluid as necessary.

EIGHT CYLINDER WITH AIR CONDITIONER

1. Remove the power steering fluid from the pump reservoir by disconnecting the fluid return hose from the reservoir and allow the fluid to drain in a suitable container.
2. Disconnect the pressure hose from the pump.
3. Remove 3 bolts from the front of the pump and the one nut at the rear that attach the pump to the mounting bracket and remove the drive belt from the pump pulley.
4. Loosen the upper pump bracket-to-engine attaching bolt and remove the bolt in the belt adjusting slot. Remove the pump.
5. Position the pump to the bracket and install the bracket-to-pump attaching bolts and nuts. Tighten to specifications.
6. Place the belt on the pump pulley. Adjust the belt tension as outlined in Section 2 and tighten the bolts and nut to specification.
7. Torque the pressure hose fitting hex nut to specification. Then, connect the pressure hose to the fitting and torque the hose nut to specification.
8. Connect the return hose to the power steering pump and tighten the clamp.
9. Fill the pump with automatic transmission fluid C1AZ-19582-A. Bleed the air from the system (Part 3-1) and check for leaks and again check the fluid level. Add fluid as required.

POWER STEERING PUMP PULLEY REPLACEMENT

REMOVAL

1. Drain as much of the fluid as possible from the pump through filler pipe.
2. Install a 3/8-16 inch capscrew in the end of the pump shaft to prevent damage to the shaft end by the tool screw.
3. Install the pulley remover, Tool T63L-10300-B, on pulley hub, and place the tool and pump in a vise as shown in Fig. 3.
4. Hold the pump and rotate the tool nut counterclockwise to remove the pulley (Fig. 3). **The pulley must be removed without in and out pressure on the pump shaft to prevent damage to internal thrust areas.**

INSTALLATION

1. Position the pulley to the pump shaft and install Tool T65P-3A733-A as shown in Fig. 4.
2. Hold the pump and rotate the tool nut clockwise to install the pulley on the shaft. The pulley face will be flush with end of pump shaft. **Install the pulley without in and out pressure on the shaft to prevent damage to internal thrust areas.**
3. Remove the tool.

POWER STEERING PUMP RESERVOIR REPLACEMENT

Reservoir replacement must be done on a clean workbench. Cleanliness of work area and tools is extremely important when repairing any hydraulic unit. Thoroughly clean the exterior of the pump with a suitable cleaning solvent. **Do not clean, wash or soak the shaft oil seal in solvent.** Plug the inlet and outlet openings with plugs or masking tape before cleaning the pump exterior or removing the reservoir.

REMOVAL

1. Assemble the adapter plate (Tool T69P-3A674-A) to the bench mounted fixture tool (T57L-500-A). Position the pump and pulley on the adapter plate, pulley facing down.
2. Remove the outlet fitting hex nut and the service identification tag.
3. Invert the pump so the pulley is facing up and remove the reservoir by tapping around the flange with a wood block (Fig. 5).
4. Remove the reservoir O-ring seal and the outlet fitting gasket from the pump.

INSTALLATION

1. Install a new gasket on the outlet fitting and a new reservoir O-ring seal on the pump housing plate (Fig. 6). **The old gasket and seal should never be re-used.**

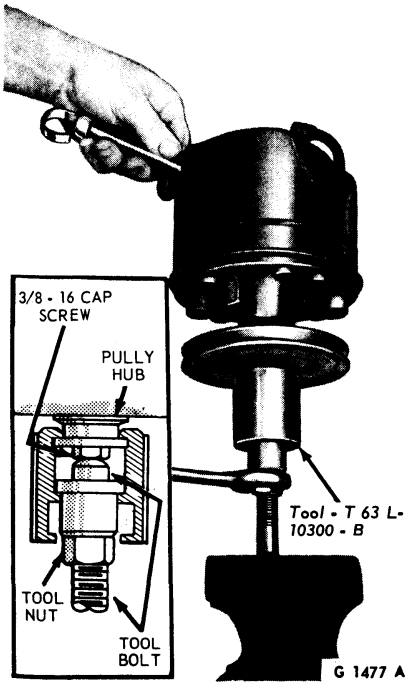


FIG. 3—Removing Power Steering Pump Pulley

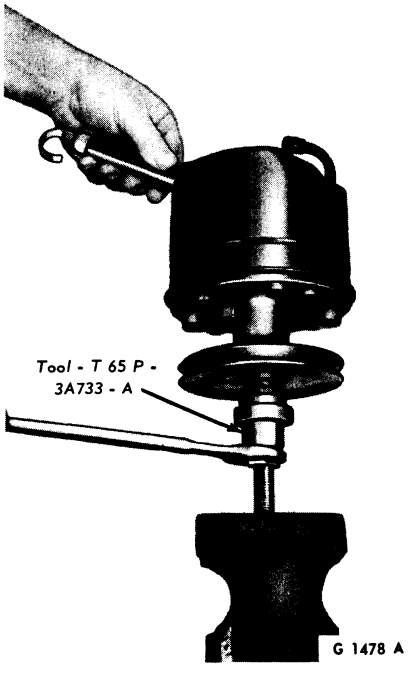


FIG. 4—Installing Power Steering Pump Pulley

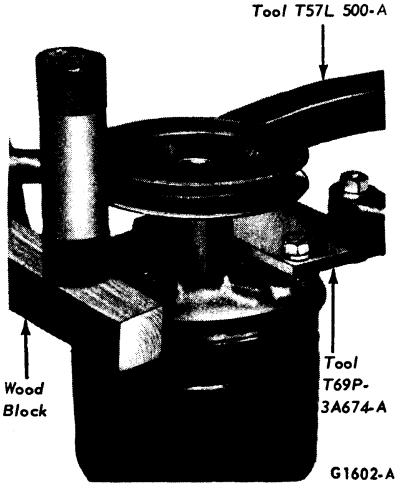


FIG. 5—Removing Pump Reservoir

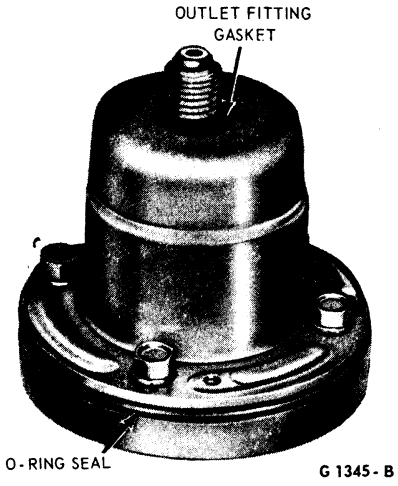


FIG. 6—Gasket Locations

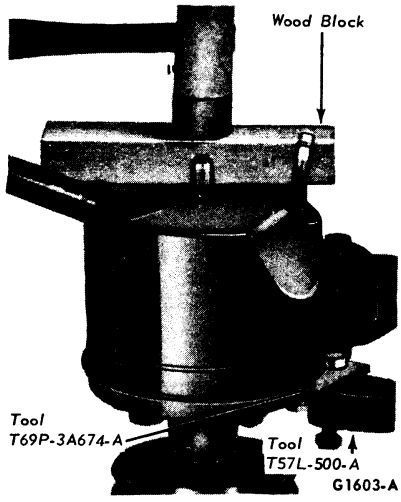


FIG. 7—Installing Reservoir on Pump—Typical

2. Apply vaseline to the reservoir O-ring seal and to the inside edge of the new reservoir flange. **Do not twist the O-ring seal.**

3. Position the reservoir over the pump and align the notch in the reservoir flange with the notch in the outer diameter of the plate and bushing assembly.

4. Install the reservoir on the pump and O-ring seal with a plastic or rubber hammer and a block of wood as shown in Fig. 7. **Tap at the rear of the reservoir and on the outer edges only.**

5. Inspect the assembly to be sure the reservoir is evenly seated on the pump housing plate.

6. Position the service identification tag on the outlet fitting and install the outlet fitting hex nut. Torque the nut to specification (Part 3-13). **Do not exceed specification.**

4 MAJOR REPAIR OPERATIONS

DISASSEMBLY

Disassembly of the pump and its subassemblies must be made on a clean work bench. In repairing any hydraulically operated unit, cleanliness is of utmost importance. Clean the exterior of the unit with a suitable solvent and drain as much of the fluid as possible.

If only the reservoir is to be removed, plug the inlet and outlet openings with masking tape or plugs. Do not immerse the shaft oil seal in solvent. If only the rotor shaft seal is to be replace, see Rotor Shaft Seal Replacement outlined in this section.

1. Assemble the adapter plate (Tool T69P-3A674-A) to the bench mounted holding fixture Tool T57L-500-A (Fig. 8).

2. Position the pump assembly, with pulley assembled, on the adapter plate, pulley facing down.

3. Remove the outlet fitting nut and the service identification tag.

4. Invert the pump assembly and, using a block of wood and a rubber or plastic hammer, remove the pump reservoir and seal by tapping around the flange of the reservoir and on the underside of the filler neck.

5. Again invert the pump assembly, loosen and remove the pump housing retention bolts and remove the pump housing.

6. If necessary, remove the following components from the pump housing: the housing cover, the O-ring seal and the pressure springs. These components normally will remain in the pump housing when it is removed.

7. Remove and discard the pump cover gasket.

8. Remove the retainer end plate and upper pressure plate (in some pumps, the end plate and upper pressure plate are integral).

9. Remove the loose fitting dowel pin. Be careful not to bend the fixed dowel pin which remains in the housing plate assembly.

10. Remove the rotor assembly being careful to prevent the springs and slippers from falling out and becoming lost. Do not disassemble further unless the lower pressure plate, housing plate, rotor shaft and/or seal is to be replaced.

11. Invert the pump assembly and, using Tool T63L-10300-B, remove the pulley.

12. Clean any rust, road dirt, burrs, scoring, etc. from the pulley end of the rotor shaft prior to removal of the shaft from the housing plate. The shaft must come out without restrictions to prevent scoring or damage to the bushing. Remove the pump rotor shaft.

13. Remove the lower pressure plate.

PARTS REPAIR OR REPLACEMENT

ROTOR SHAFT SEAL REPLACEMENT

Removal

1. Remove the pulley from the rotor shaft as described under Power Steering Pump Pulley Removal.

2. Position the pump assembly in

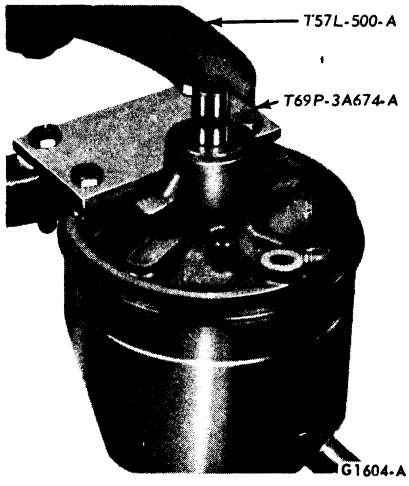


FIG. 8—Adapter Plate Installation

the bench mounted holding fixture, T57L-500-A or on the assembled adapter plate, T69P-3A674-A, pulley end of the shaft up.

3. Clean any rust or road dirt from the pulley end of the rotor shaft.

4. To prevent scoring of the shaft, wrap .005 shim stock (free of burrs) around the rotor shaft and push it into the ID of the seal until it is against the bushing.

5. Using a sharp tool such as a sheet metal punch, carefully pierce the metal seal body face and pry the old seal out (Fig. 9). **Do not damage the bushing, the housing or the rotor shaft.**

Installation

1. Remove the shim stock.
2. Position the new rotor shaft seal on the shaft seal protector, Tool T68P-3B592-B.
3. Insert the seal protector tool and the rotor shaft seal onto the shaft (Fig. 10).
4. Using the seal installation Tool T68P-3B592-A and a rubber or plastic hammer, tap gently on the end of the tool until the seal is completely installed (flush with the end of the seal bore).
5. Remove the tools.
6. Install the pulley on the rotor shaft as described under Power Steering Pump Pulley Installation.

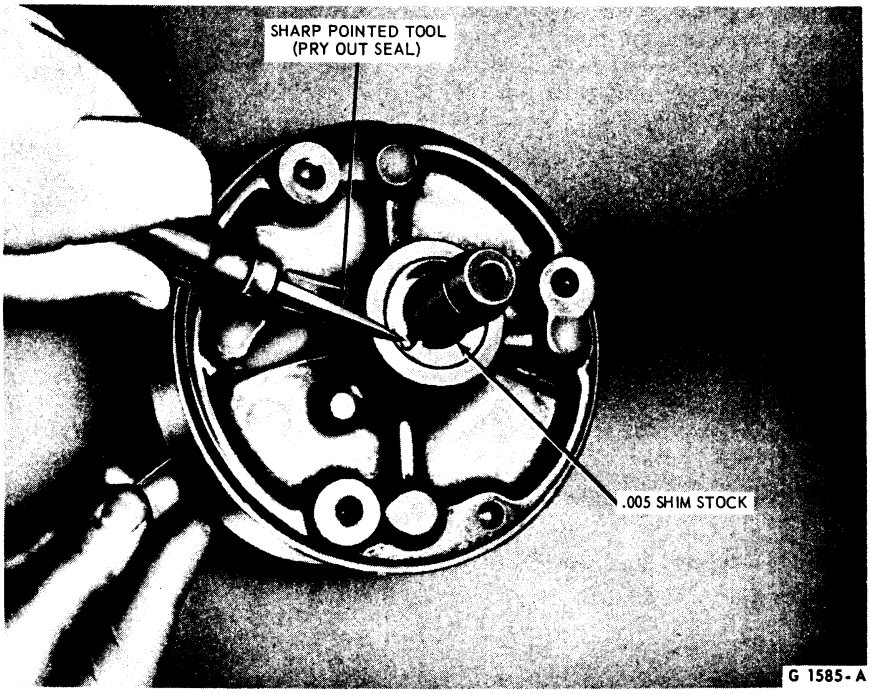


FIG. 9—Rotor Shaft Seal Removal

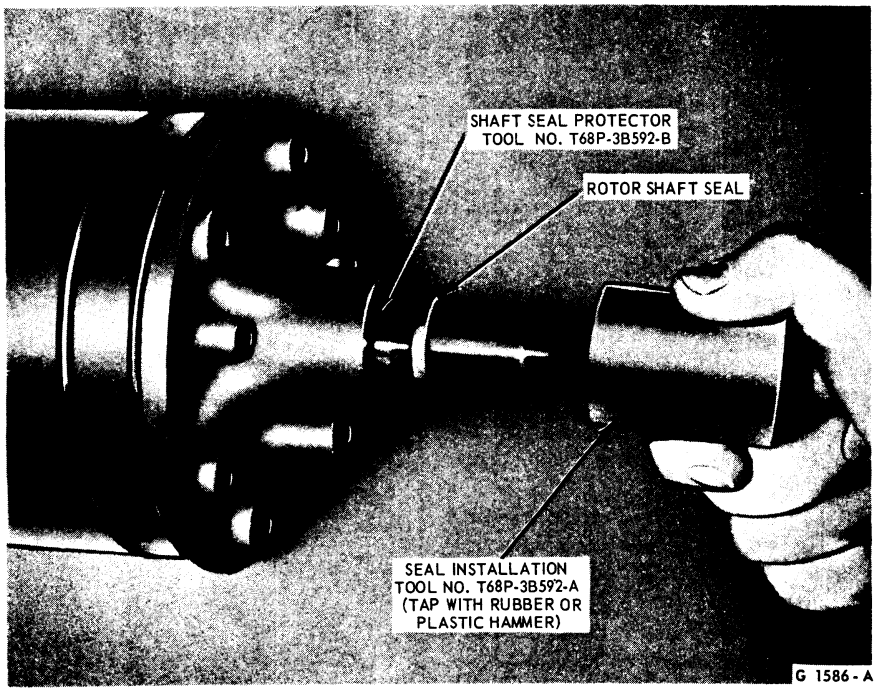


FIG. 10—Rotor Shaft Seal Installation

ASSEMBLY

1. Assemble adapter plate (Tool T69P-3A674-A) to the bench mounted holding fixture Tool T57L-500-A. Position the pump assembly on the adapter plate, pulley side facing down. (If the lower pressure plate and rotor shaft have not been disassembled, omit Steps 2 and 3).
2. Insert the lower pressure plate on the anchor pin with the wide chamfered slots at the center hole facing up (Fig. 11).

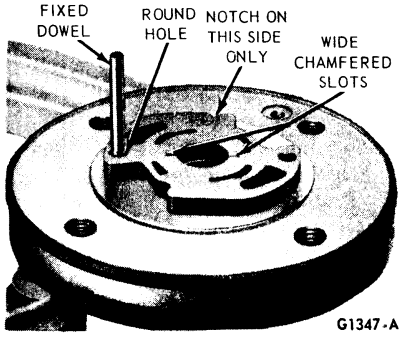


FIG. 11—Lower Pressure Plate Installed

3. Dip the rotor shaft in specified steering gear lubricant (C1AZ-19582A); then insert the rotor shaft into the lower pressure plate and housing plate.
4. If the rotor assembly is disassembled, hold the cam insert with the notch on the OD of the cam at the top and the arrow on the OD of the cam pointing downward.
5. Insert the rotor in the cam with the double step in the ID of the rotor facing upward.
6. With the rotor extended upward approximately one half way out of the cam, insert a spring into a rotor spring pocket working in the rotor cavity directly beneath the cam notch.

7. Use one of the slippers to compress the spring and install the slipper with the groove in the slipper facing upward (toward the cam notch). The flats on the side of the slipper should be on the left (Fig. 12).

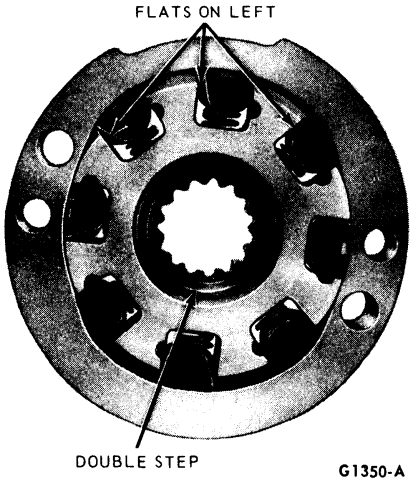


FIG. 12—Correct Slipper Installation

8. Hold the cam stationary and turn the rotor either to the right or left, one space at a time. Repeat Step 7 until all the rotor cavities have been filled. Be careful when turning the rotor that the springs and slippers already inserted do not fall out.

9. Install the cam and rotor assembly onto the pump housing plate with the fixed dowel passing through the first hole to the left of the cam notch when the arrow on the cam OD is pointing toward the lower pressure plate (Fig. 13). If the cam and rotor assembly will not seat, turn the rotor shaft slightly until the spline teeth mesh, allowing the cam and rotor to drop down into position.

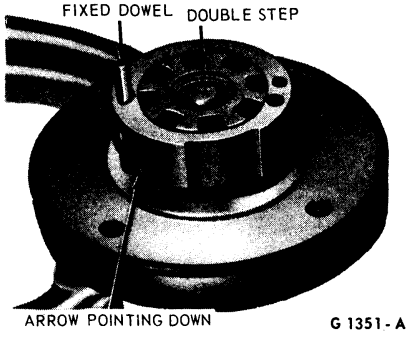


FIG. 13—Cam and Rotor Installation

10. Insert the loose fitting dowel through the cam insert and lower plate into the hole in the housing plate assembly. When the loose dowel is properly installed the heights of the two dowels must be equal. Squirt the rotor, springs, slippers and cam insert with C1AZ-19582-A lubricant.

11. Place the upper pressure plate with the face having the tapered notch down against the cam insert. The fixed dowel should pass through the round dowel hole and the loose dowel through the elongated hole. The slot between the ears on the pressure plate OD should match the notch on the cam insert OD (Fig. 14).

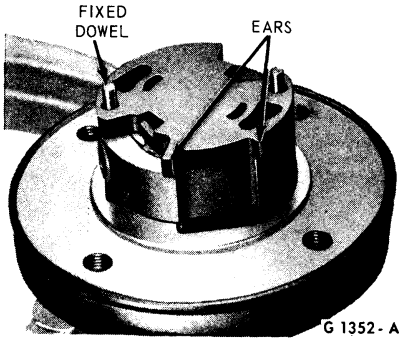


FIG. 14—Upper Pressure Plate Installation

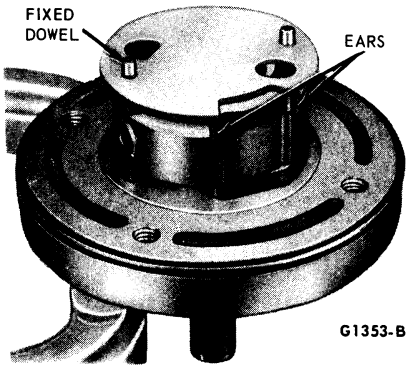


FIG. 15—Retainer End Plate Installation

12. Install the retainer end plate so the slot on the end plate OD matches the corresponding notches of the upper pressure plate and cam (Fig 15).

13. Install the pump valve assembly O-ring seal onto the pump valve assembly being careful not to twist the seal (Fig. 16).

14. Place the pump valve assembly on top of the retainer end plate with the large exhaust slot on the pump valve in line with the OD notches of the previously assembled parts. The stack of parts must be fully seated. If the pump valve has been installed correctly, the relief valve stem will be in line with the lube return hole in the pump housing plate (Fig. 16).

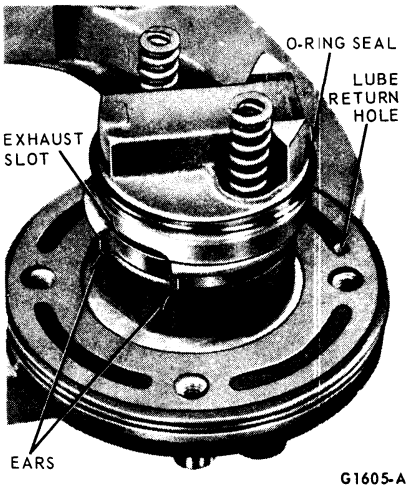


FIG. 16—Valve and Pressure Spring Installation

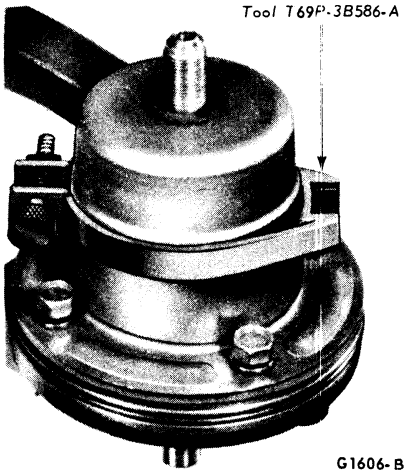


FIG. 17—Pump Housing Installation

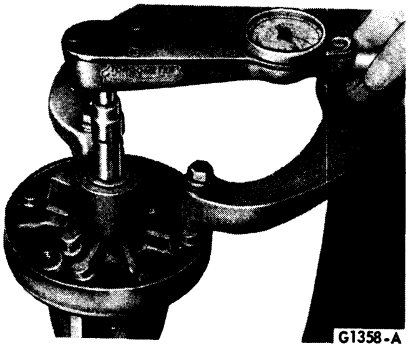


FIG. 18—Checking Pump Rotational Torque

15. Place small amounts of vaseline on the pump housing plate to hold the cover gasket in place. Install the gasket on the pump housing plate.

16. Insert the pressure plate springs into the pockets in the pump valve assembly. Vaseline may be placed in the spring pockets to hold the springs in position (Fig. 17).

17. Using Tool T69P-3B586-A, plug the intake hole in the housing (Fig. 17).

18. Lubricate the inside of the housing and the housing cover seal with C1AZ-19582-A lubricant. Fabricate two studs (3/8-16x1.55) to be used as positioning guides. Install one in the housing plate bolt hole closest to the drain hole and one in the bolt hole diametrically opposite.

19. Align the small diameter lube hole in the housing rim with the lube hole in the housing plate.

20. Install the housing, applying an **even,** downward pressure. The pressure plate springs **must not** be jarred and moved out of position. Remove the guide studs.

21. Install the housing retaining bolts finger tight.

22. Remove Tool T69P-3B586-A.

23. Torque the retaining bolts **evenly** to 28-32 ft-lbs until the housing flange contacts the gasket.

24. Install a 3/8x16 hex head screw, finger tight, into the end of the rotor shaft. Using a torque wrench, check the input torque of the shaft (Fig. 18). The torque should not exceed 15 in-lbs. If it does, loosen the retaining bolts slightly, rotate the rotor shaft, retorque the bolts evenly and again check the shaft torque. **The pump must not be used if the shaft torque exceeds 15 in-lbs.**

25. Release the pin in the bench holding fixture and agitate the pump assembly back and forth. If there is a rattle, the pressure plate springs have fallen out of their seats and must be reinstalled.

26. Install the reservoir O-ring on the housing plate being careful not to twist the O-ring. Apply vaseline to the seal and to the ID of the reservoir flange.

27. Install the reservoir, aligning the notch in the reservoir flange with the notch in the OD of the pump housing plate and bushing assembly. Using only a plastic or rubber hammer, tap at the **rear on the outer corners** of the reservoir to avoid damage.

28. Inspect the assembly to determine if the reservoir is seated on the housing plate.

29. Install the service identification tag on the outlet valve fitting.

30. Install the outlet valve fitting nut and torque to 43-47 ft-lbs.

31. Invert the pump assembly.

32. If the pulley was removed, install the correct pulley using Tool T65P-3A733-A.

PART 3-11 *Eaton Power Steering Pump*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
POWER STEERING PUMP												
Cleaning and Inspection (See Part 03-01)												
Description		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11-01	N/A	11-01
Disassembly and Overhaul		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11-03	N/A	11-03
Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11-01	N/A	11-01
POWER STEERING PUMP RESERVOIR												
Removal and Installation		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11-01	N/A	11-01

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

The roller-type hydraulic pump, driven by the crankshaft, draws automatic transmission fluid down the reservoir and provides fluid pressure for the system. Steering gear lubrication is also provided by the same fluid from the reservoir. Within the pump itself is a flow-control and pressure-relief valve which governs the pressures within the steering system according to the varying conditions of operation. After fluid has passed from the gear, it returns to the reservoir.

2 REMOVAL AND INSTALLATION

POWER STEERING PUMP

REMOVAL

1. Open the hood, and install fender covers.
2. If the vehicle is equipped with air conditioning, loosen the compressor adjusting and support bracket bolts and remove the drive belt.
3. Loosen the generator adjusting and support bracket bolts, and remove the drive belts.
4. Remove the fan, pulley, and spacer.
5. Raise the vehicle.
6. Remove the crankshaft damper bolt and washer. Remove the damper with Tool 6306-AG. Remove the drive key.
7. Disconnect the pump inlet line at the pump, and plug the end of the line to prevent the loss of fluid. Disconnect the pump pressure line at the pump.
8. Remove the pump-to-engine front cover cap screws, and remove the pump. Remove the seal from the front cover.

INSTALLATION

1. Install a new seal on the engine front cover.
2. Align the slot in the pump rotor shaft with the drive key in the crankshaft, and slide the pump onto the shaft. Install the pump-to-engine front cover cap screws. Torque the cap screws to specification.
3. Connect the pump inlet line and the pressure line.
4. Install the damper drive key, damper, washer and bolt. Torque the bolt to specification.
5. Install the fan, pulley, and spacer. Install the generator drive belts. Adjust the belt tension, and tighten the adjusting and support bracket bolts.
6. If the vehicle is equipped with air conditioning, install the compressor drive belt. Adjust the belt tension, and tighten the adjusting and support bracket bolts.
7. Run the engine at idle speed, and check the fluid level in the reservoir. If required, add the specified automatic transmission fluid. Turn on the windshield wipers. Rotate the steering wheel from stop to stop several times to bleed the air from the system. **Recheck** the fluid level.

POWER STEERING PUMP RESERVOIR

WITHOUT AIR CONDITIONING

Removal

1. Remove the reservoir cover and

gasket. Withdraw the fluid with a suction gun.

2. Remove the reservoir bracket-to-cylinder block upper cap screw and the lower cap screw and spacer.

3. Disconnect the reservoir inlet line and the outlet line at the reservoir, and remove the reservoir.

Installation

1. Connect the reservoir-to-pump line (outlet line) at the reservoir, but do not tighten the clamp.

2. Attach the reservoir and bracket to the cylinder block with the upper cap screw and the lower cap screw and spacer. Tighten the cap screws.

3. Tighten the outlet line clamp at the reservoir. Connect the reservoir inlet line to the reservoir.

4. Fill the reservoir with the specified automatic transmission fluid. Run the engine, and bleed the system by cycling the steering gear with the windshield wipers turned on. Check for leaks, and recheck the fluid level.

WITH AIR CONDITIONING

Removal

1. Raise the front of the vehicle. Remove the reservoir-to-pump line (outlet line) clamp at the reservoir, but do not disconnect the line at this time.

2. Disconnect the reservoir inlet line at the reservoir.

3. Remove the reservoir bracket to the cylinder block upper cap screw. Support the reservoir and remove the lower cap screw and spacer.

4. With a drain pan under the reservoir, disconnect the outlet line hose from the reservoir tube and allow the fluid to drain.

5. Remove the reservoir cover retaining nut and the cover. Position the cover and the reservoir out of the way and allow them to rest in the engine compartment.

6. Lower the front of the vehicle. Remove the fan shroud.

7. Remove the reservoir and the cover by manipulating them through the opening between the radiator and the compressor drive belt.

Installation

1. Position the reservoir in the engine compartment. Loosely attach the reservoir and bracket to the cylinder block with the upper cap screw.

2. Install the fan shroud, then raise the front of the vehicle.

3. Connect the reservoir-to-pump line (outlet line) at the reservoir.

4. Install the reservoir bracket-to-cylinder block lower cap screw and spacer. Tighten both the upper and the lower cap screws.

5. Connect the reservoir inlet line at the reservoir. Install the clamps on both lines. Lower the car, and install the reservoir cover and attaching nut.

6. Fill the reservoir with the specified automatic transmission fluid. Run the engine, and bleed the system by cycling the steering gear with the windshield wipers turned on. **Check for leaks, and recheck the fluid level.**

3 MAJOR REPAIR OPERATIONS

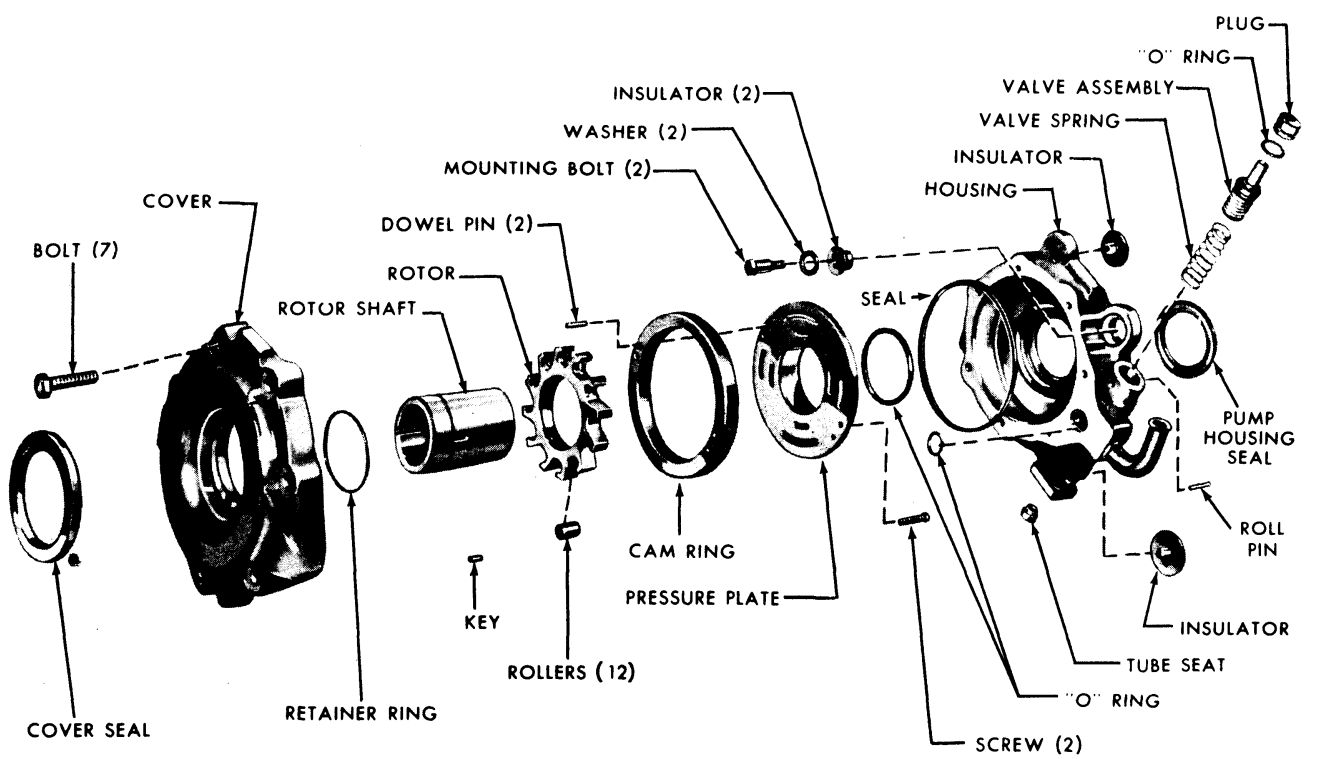


FIG. 1—Power Steering Pump

POWER STEERING PUMP

DISASSEMBLY

A clean working area should be used when overhauling the power steering pump. Foreign matter picked up on working parts may cause damage or failure of the unit. Clean containers should be used for parts.

1. Drain the fluid from the pump. Remove the pump cover-to-housing cap screws (Fig. 1). Place the pump on the bench, cover side down. Lift the housing from the cover.
2. Remove the large and the small O-rings from the pump cover. Remove the O-ring from the pressure plate hub.
3. Remove the pressure plate-to-cover screws, and remove the plate. Lift the cam ring off the dowel pins.
4. Remove the rollers. Lift the rotor off the shaft, and remove the drive key from the shaft. Remove the dowel pins from the cover.
5. Remove the rotor shaft from the cover. **Do not remove the snap ring from the shaft unless it, or the shaft, is damaged.**
6. Pry the rotor shaft seals out of the cover and the housing.
7. **Do not disturb the control valve unless diagnosis indicated a control valve problem or foreign matter in the valve.** To remove the valve, drive the roll pin out of the housing. Remove the plug and O-ring, control valve, and the spring. If the plug or valve is stuck, tap the end of the housing on a piece of wood or tap it with a soft-faced hammer. Remove the O-ring from the plug.

ASSEMBLY

Apply automatic transmission fluid to all parts as they are assembled. Always use new seals and O-rings.

1. Install the control valve spring in the housing. Install the valve with the small sensing hole in the end of the valve toward the spring. Install a new O-ring on the plug. **The plug O-ring is 1/8 inch smaller in diameter than the bypass O-ring. Make sure the proper O-ring is used.** Install the plug and a new roll pin (Fig. 1).
2. The rotor shaft oil seals are installed in the cover and the housing with Tool 3583-J, which consists of a driver and an adapter. The procedure is as follows:

a. Support the cover on wood blocks (Fig. 2) to provide tool clearance. **Use clean blocks that will not nick or damage the inner face of the cover.**

b. Start the seal (metal shell upward) squarely into the bore with finger pressure. Place the adapter on the driver with the square corner of the

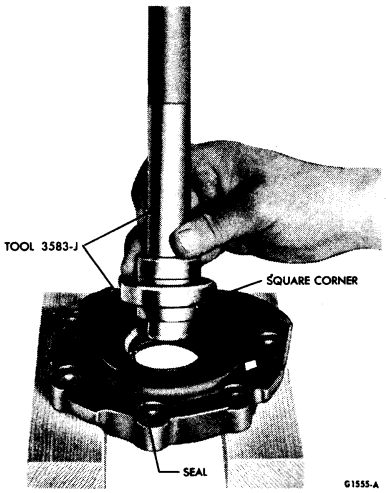


FIG. 2—Preparation for Installing Rotor Shaft Seals

adapter toward the seal (Fig. 2). Drive the seal into the cover, as shown in Fig. 3, until it bottoms.

Driving the seal beyond this point can damage it. Install the seal in the pump housing in the same manner.

3. Install the rotor shaft in the

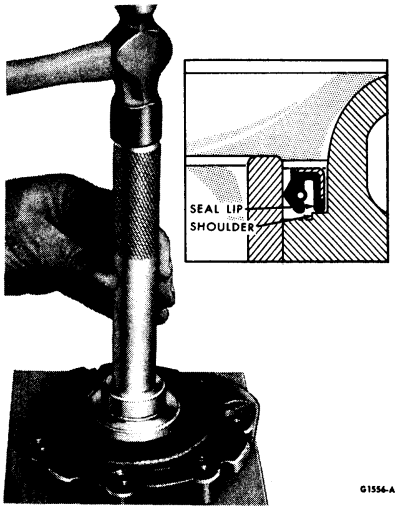


FIG. 3—Installing Rotor Shaft Seals

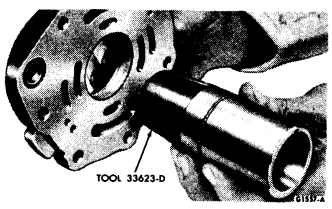


FIG. 4—Installing Rotor Shaft in Cover

cover as shown in Fig. 4 to prevent damage to the seal.

4. Install the dowel pins in the cover. Place the rotor drive key in the shaft. Install the rotor on the shaft with the drive key groove aligned with the key and the counterbored side of the rotor toward the cover so that it goes over the snap ring.
5. Place the cam ring on the dowel pins with the chamfered edge upward (Fig. 5). Place the rollers in the rotor.
6. Place the pressure plate on the dowel pins. Install and tighten the screws to 20 in-lbs torque. Install the O-ring on the pressure plate hub. Install O-rings in the groove at the fluid bypass hole and around the cam ring (Fig. 6).
7. Place the tool shown in Fig. 6 in the rotor shaft to prevent damage to the oil seal, then install the housing on the cover. Install and torque the cap screws to 15-20 ft-lbs.

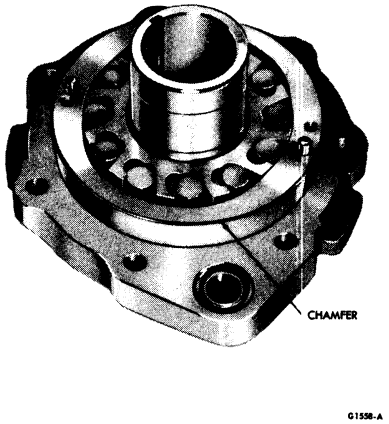


FIG. 5—Cam Ring Installation

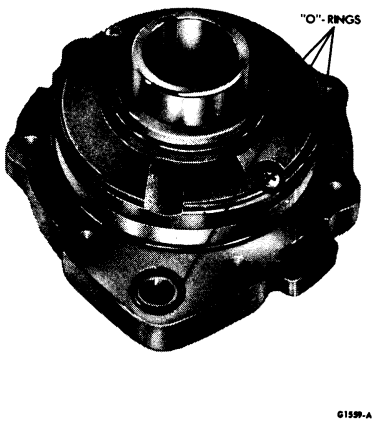


FIG. 6—O-Ring Installation

PART 3-12 *Wheels And Tires*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
FRONT HUB AND DRUM ASSEMBLY Removal and Installation	12-07											
FRONT HUB AND ROTOR ASSEMBLY Removal and Installation	12-07											
FRONT WHEEL ASSEMBLY DESCRIPTION	12-01											
FRONT WHEEL BEARING ADJUSTMENT	12-02											
FRONT WHEEL GREASE SEAL AND BEARING Removal, Installation, Repacking	12-05											
HOISTING INSTRUCTIONS	12-02											
LIFE GUARD TIRE												
Balancing		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12-03	12-03	12-03
Correcting Vibration and Shake		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12-03	12-03	12-03
Description		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12-02	12-02	12-02
Repairs		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12-08	12-08	12-08
REAR WHEEL ASSEMBLY DESCRIPTION	12-01											
WHEELS AND TIRES (Conventional) Removal and Installation	12-03											

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

FRONT WHEEL ASSEMBLY

Each front wheel and tire is bolted to its respective front hub and brake drum or rotor assembly. Two opposed tapered roller bearings are installed in each hub. A grease retainer is installed at the inner end of the hub to prevent lubricant from leaking into the drum or on the rotor. The entire assembly is retained to its spindle by the adjusting nut, nut lock and cotter pin (Figs. 1 and 2).

REAR WHEEL ASSEMBLY

The rear wheel hub and brake drum assembly is attached to studs on the rear axle shaft flange by three speed nuts. The wheel and tire mounts on the same rear axle shaft flange studs and is held against the hub and drum by the wheel nuts. The rear wheel bearing is pressed onto the axle shaft just inside the shaft flange, and the entire assembly is retained to the rear axle housing by the bearing retainer plate which is bolted to the housing flange.

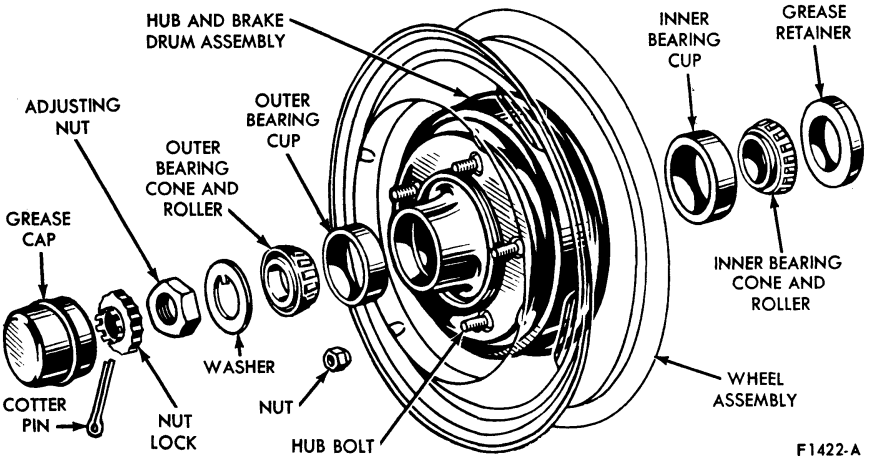


FIG. 1—Front Hub, Bearing and Grease Retainer Drum Brakes

LIFE GUARD TIRE

The Goodyear Power Cushion Tire (available on Thunderbird, Lincoln and Continental Mark III models) fitted with the Life Guard Safety Spare provides a tire within a tire with two separate air chambers (Fig. 3). If the outer tire casing should be punctured or otherwise damaged causing it to go flat, the Life Guard Safety Spare will carry the load of the vehicle and will allow driving at speeds up to 40 mph with good control up to a distance of 40 miles. A Safety-Signal built into the Life Guard tread produces a lope or vibration indicating the outer tire has lost pressure.

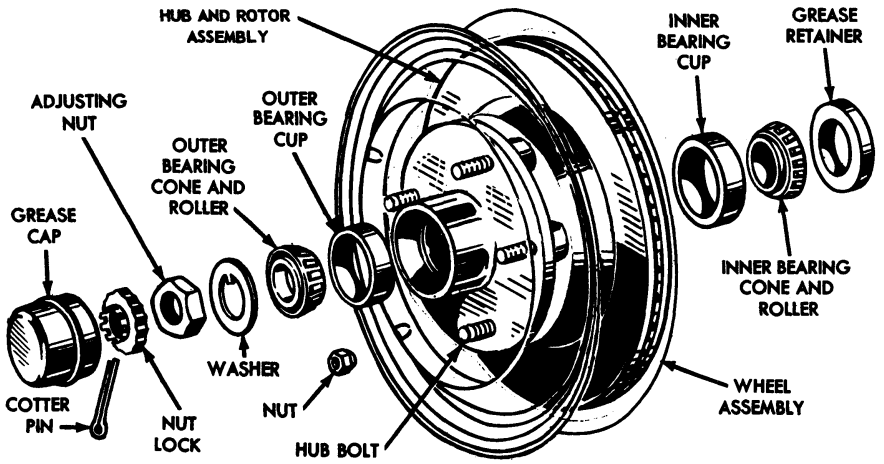


FIG. 2—Front Hub and Rotor Bearing and Grease Retainer Disc Brakes—Typical

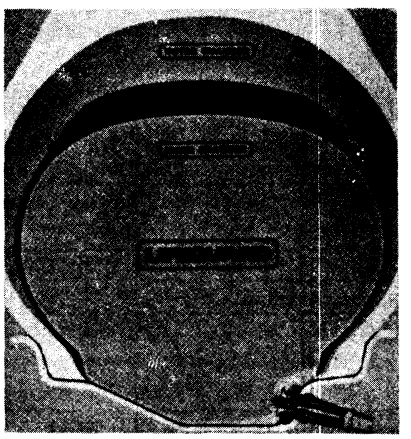


FIG. 3—Life Guard Safety Tire—Sectional View

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

HOISTING INSTRUCTIONS

Damage to steering linkage components and front suspension struts may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the lower arms or the No. 1 crossmember. Do not allow the adapters to contact steering linkage. If the adapters are placed under the crossmember, a piece of wood (2x4x16 inches) should be placed on the hoist channel between the adapters. This will prevent the adapters from damaging the front suspension struts.

FRONT WHEEL BEARING ADJUSTMENT

The front wheel bearings should be adjusted if the wheel is loose on the spindle or if the wheel does not rotate freely. The following procedures will bring the bearing adjustment to specification.

DRUM BRAKES

1. Raise the vehicle until the wheel and tire clear the floor.

2. Pry off the hub cap or wheel cover and remove the grease cap (Fig. 1) from the hub.

3. Wipe the excess grease from the end of the spindle, and remove the cotter pin and nut lock.

4. While rotating the wheel, hub, and drum assembly, torque the adjusting nut to 17-25 ft-lbs to seat the bearings (Fig. 4).

5. Locate the nut lock on the adjusting nut so that the castellations on the lock are aligned with the cotter pin hole in the spindle.

6. Using a 1 1/8-inch box wrench, back off the adjusting nut one half turn. Retighten the adjusting nut to 10-15 in-lbs with a torque wrench or finger tight.

7. Position the lock on the adjusting nut and install a new cotter pin. Bend the ends of the cotter pin around the castellated flange of the nut lock.

8. Check the front wheel rotation. If the wheel rotates properly, install the grease cap and the hub cap or wheel cover. If the wheel still rotates roughly or noisily, clean, inspect or replace the bearings and cups as required.

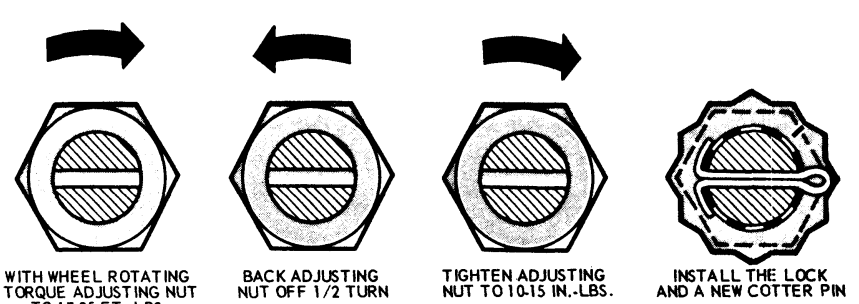


FIG. 4—Front Wheel Bearing Adjustment

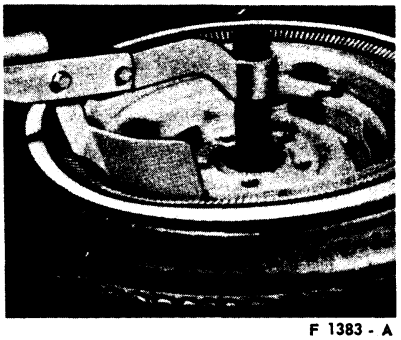
DISC BRAKES

1. Raise the vehicle until the wheel and tire clear the floor.
2. Pry off the wheel cover and remove the grease cap (Fig. 2) from the hub.
3. Wipe the excess grease from the end of the spindle, and remove the adjusting nut cotter pin and nut lock.
4. Loosen the bearing adjusting nut three turns. Then, rock the wheel, hub, and rotor assembly in and out several times to push the shoe and linings away from the rotor.
5. While rotating the wheel, hub, and rotor assembly, torque the adjusting nut to 17-25 ft-lbs to seat the bearings (Fig. 4).
6. Back the adjusting nut off one half turn. Then, retighten the adjusting nut to 10-15 in-lbs with a torque wrench or finger tight.
7. Locate the nut lock on the adjusting nut so that the castellations on the lock are aligned with the cotter pin hole in the spindle.
8. Install a new cotter pin, and bend the ends of the cotter pin around the castellated flange of the nut lock.
9. Check the front wheel rotation. If the wheel rotates properly, install the grease cap and the hub cap or wheel cover. If the wheel still rotates roughly or noisily, clean or replace the bearings and cups as required.
10. Before driving the vehicle, pump the brake pedal several times to obtain normal brake lining to rotor clearance and restore normal brake pedal travel.

BALANCING LIFE GUARD TIRE

Tires fitted with the Life Guard Safety Spare are balanced in the same manner as conventional tires. If an excessive out of balance condition exists the following procedure can be used to correct the condition:

1. Remove the core housing and deflate both air chambers.
2. Install the core housing.
3. Unseat the beads of tire with the bead breakers away from the valve stem as shown in Fig. 5.



F 1383 - A

FIG. 5—Breaking Top Bead of Tire From Wheel Rim

4. Rotate tire casing 90 degrees on the wheel rim.
5. Rotate the tire casing back and forth on the rim to center the valve.
6. Inflate both chambers of the tire following steps 13 through 15 of the Tire Installation procedure.
7. Balance the tire in the normal manner.

CORRECTING VIBRATION AND SHAKE— LIFE GUARD TIRE

The condition of excessive vibration and shake is generally the result of an incorrect pressure relationship between the inner and outer air chambers that may cause the life guard to shift position within the tire. The following procedure should be used to correct vibration and shake conditions:

1. Check pressure of the inner and outer air chambers on all four tires.
2. If the inner chamber has at least five psi more pressure than the outer chamber the pressures should be adjusted and the tires rebalanced if necessary.
3. If the pressures of the inner and outer air chambers are equal the Air Container is leaking. To repair the leaking air container the recommended procedures for the removal, repair of air container, mounting, and balancing should be followed.

3 REMOVAL AND INSTALLATION

HOISTING INSTRUCTIONS

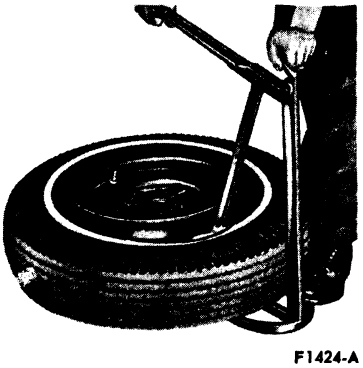
Damage to steering linkage components and front suspension struts may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the lower arms or the No. 1 crossmember. Do not allow the adapters to contact the steering linkage. If the adapters are placed under the crossmember, a piece of wood (2x4x16 inches) should be placed on the hoist channel between the adapters. This will prevent the adapters from damaging the front suspension struts.

WHEELS AND TIRES

WHEEL AND TIRE REMOVAL

1. Pry off the wheel hub cap or wheel cover. Loosen but do not remove the wheel hub nuts.
2. Raise the vehicle until the wheel and tire clear the floor.
3. Remove the wheel hub nuts from the bolts, and pull the wheel and tire from hub and drum.



F1424-A

FIG. 6—Bead Loosening Tool

REMOVING CONVENTIONAL TIRE FROM WHEEL

The tire can be demounted on a mounting machine. **Be sure that the outer side of the wheel is positioned downward.** If tire irons are used, follow the procedure given here.

1. Remove the valve cap and core, and deflate the tire completely.
2. With a bead loosening tool, break loose the tire side walls from the wheel (Fig. 6).
3. **Position the outer side of the wheel downward,** and insert two tire irons about eight inches apart between the tire inner bead and the back side of the wheel rim. **Use only tire irons with rounded edges or irons designed for removing tubeless tires.**
4. Leave one tire iron in position, and pry the rest of the bead over the rim with the other iron. Take small bites with the iron around the tire in

order to avoid damaging the sealing surface of the tire bead.

5. Stand the wheel and tire upright with the tire outer bead in the drop center well at the bottom of the wheel. Insert the tire iron between the bead and the edge of the wheel rim, and pry the wheel out of the tire.

MOUNTING CONVENTIONAL TIRE TO WHEEL

1. If a used tire is being installed remove all dirt from the tire.

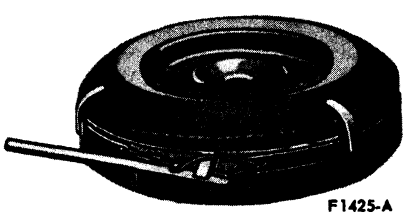
If a tire is being mounted to the original wheel, clean the rim with emery cloth or fine steel wool. Check the rim for dents.

If a new wheel is being installed, coat a new valve with RUGLYDE or similar rubber lubricant and position the valve to the new wheel. Use a rubber hammer or a valve replacing tool to seat the valve firmly against the inside of the rim.

2. Apply RUGLYDE or a similar rubber lubricant to the sealing surface on both tire beads. With the outer side of the wheel down, pry the beads over the wheel rim with two tire irons. **Do not use a hammer or mallet to force the beads over the rim.**

3. Align the balance mark on the tire with the valve on the wheel.

4. Hold the beads against the rim flanges by positioning a tire mounting band over the tire (Fig. 7). If a mounting band is not available, tie a tourniquet of heavy cord around the circumference and in the center of the tire. Tighten the cord with a tire iron. Center the tire on the wheel with a rubber mallet.

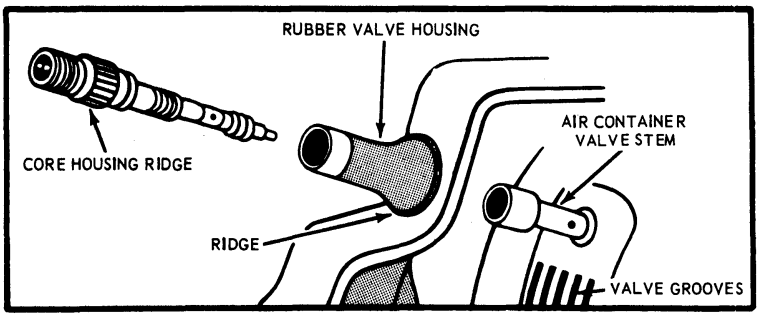


F1425-A

FIG. 7—Tubeless Tire Mounting Band

5. Give the tire a few quick bursts of air to seat the beads properly, then inflate the tire to 40 psi pressure. Check to see that the bead positioning rings (outer rings near the side walls) are evenly visible just above the rim flanges all the way around the tire. If the rings are not even, deflate the tire completely and inflate it again.

6. When the rings are properly positioned, deflate the tire to the recommended pressure.



F 1382 - A

FIG. 8—Core Housing Disassembled

REMOVING LIFE GUARD TIRE FROM WHEEL

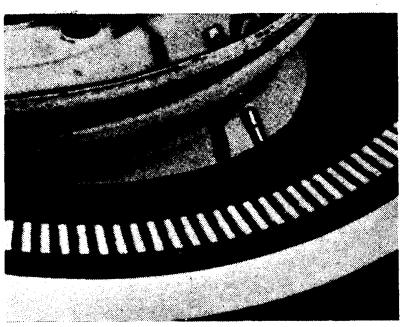
1. Mark the valve stem location on the tire sidewall.

2. Remove the core housing (Fig. 8) and deflate both air chambers.

3. Unseat the beads of the tire with the bead breakers working away from the valve stem (Fig. 5).

4. Starting at the valve stem, work the top bead of the tire over the rim of the wheel.

5. Pull the air container valve stem out of the rubber valve housing (Fig. 9).



F 1384 - A

FIG. 9—Removing Air Container Valve Stem

6. Remove the air container before attempting to remove the tire from the wheel.

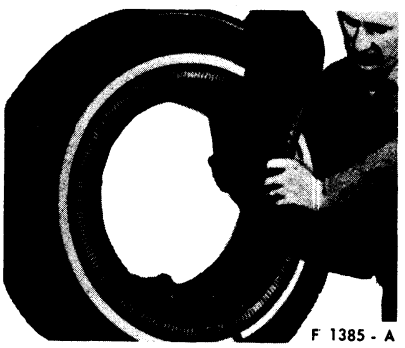
7. Lift the lower bead over the wheel rim to remove the tire.

8. Remove the rubber valve housing from the wheel rim.

INSTALLING LIFE GUARD TIRE ON WHEEL

1. Apply Silicone Lubricant (COAZ-19553-A) as the anti-friction treatment uniformly over the crown and shoulder area inside the tire or outside the life guard.

2. Fold the life guard as shown in Fig. 10.



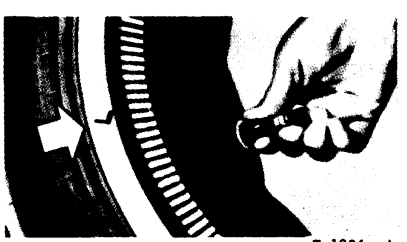
F 1385 - A

FIG. 10—Folding Life Guard For Installation In Tire

3. Insert life guard into tire casing.

4. Install a **new** rubber valve housing on the air container valve stem and thread the core housing into place. It is not necessary to install a new core housing.

5. Insert air container into the life guard with the valve grooves to the outboard side of the tire. Place the valve at the valve stem location marked on the sidewall during removal as shown in Fig. 11.



F 1386 - A

FIG. 11—Aligning Valve With Reference Mark on Tire

6. Apply a soap solution to the beads and the rubber valve housing.

7. Place the wheel on the mounting machine with the valve hole away from bead breakers. **Remove all burrs**

and sharp edges from valve hole in rim.

8. Mount first tire bead exercising care not to pinch air container.

9. Start valve through hole in rim. **Do not pull valve housing into place at this time.**

10. Mount the second bead starting **just past** the valve so the last portion of the bead goes over the rim at the valve.

11. Rotate the tire back and forth to center the valve housing.

12. Pull the valve housing into place. Make certain that the rubber valve ridge is visible around the valve housing (Fig. 12).

13. Tighten the core housing lightly using pliers.

14. Thread the Inflate-Chek adapter onto the core housing.

15. Inflate the inner chamber to seat the tire beads exercising **care not to exceed 45 psi pressure.** Adjust this inner chamber air pressure to 15 psi higher than the recommended tire pressure.

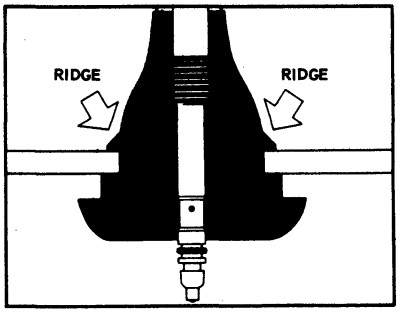


FIG. 12—Valve Installation

16. Remove the Inflate-Chek adapter and adjust tire (outer chamber) pressure to the recommended pressure.

17. Recheck inner chamber pressure.

18. Install valve cap.

WHEEL AND TIRE INSTALLATION

1. Clean all dirt from the hub and drum.

2. Position the wheel and tire on the hub and drum. Install the wheel hub nuts and tighten them alternately to draw the wheel evenly against the hub and drum.

3. Lower the vehicle to the floor, and torque the hub nuts to specification.

4 MAJOR REPAIR OPERATIONS

HOISTING INSTRUCTIONS

Damage to steering linkage components and front suspension struts may occur if care is not exercised when positioning the hoist adapters of 2 post hoists prior to lifting the vehicle.

If a 2 post hoist is used to lift the vehicle, place the adapters under the lower arms or the No. 1 crossmember. Do not allow the adapters to contact the steering linkage. If the adapters are placed under the crossmember, a piece of wood (2x4x16 inches) should be placed on the hoist channel between the adapters. This will prevent the adapters from damaging the front suspension struts.

FRONT WHEEL GREASE SEAL AND BEARING REPLACEMENT AND/OR REPACKING

If bearing adjustment will not eliminate looseness or rough and noisy operation, the hub and bearings should be cleaned, inspected, and repacked with specified wheel grease. If the bearing cups or the cone and roller assemblies are worn or damaged, they should be replaced.

DRUM BRAKES

1. Raise the vehicle until the wheel and tire clear the floor.

2. Remove the wheel cover or hub cap. Remove the grease cap from the hub. Remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle. Remove the outer bearing cone and roller assembly (Fig. 1).

3. Pull the wheel, hub, and drum assembly off the wheel spindle.

4. Remove and discard the grease retainer. Remove the inner bearing cone and roller assembly from the hub with Tool 1175AE.

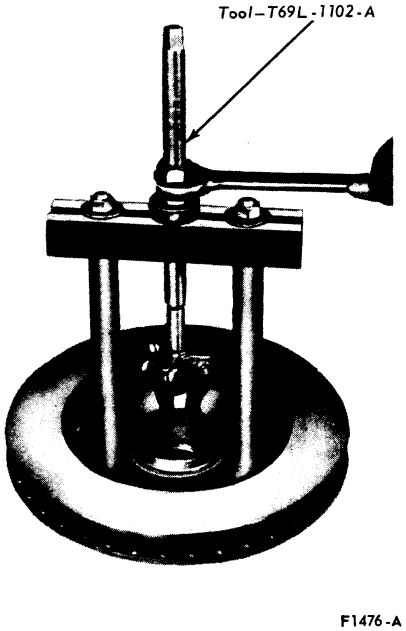


FIG. 13—Removing Front Wheel Bearing Cup—Except Lincoln Continental

5. Clean the lubricant off the inner and outer bearing cups with solvent and inspect the cups for scratches, pits, excessive wear, and other damage. If the cups are worn or damaged, remove them with Tool T69L-1102-A (Fig. 13).

6. Thoroughly clean the inner and outer bearing cone and roller assemblies with solvent and dry them thoroughly. **Do not spin the bearings with compressed air.**

Inspect the cone and roller assemblies for wear or damage, and replace them if necessary. **The cone and roller assemblies and the bearing cups should be replaced as a unit if damage to either is encountered.**

7. Thoroughly clean the spindle and the inside of the hub with solvent to remove all old lubricant.

Cover the spindle with a clean cloth, and brush all loose dust and dirt from the brake assembly. **To prevent getting dirt on the spindle, carefully remove the cloth from the spindle.**

8. If the inner and/or outer bearing cup(s) were removed, install the replacement cup(s) in the hub with the tool shown in Fig. 14. **Be sure to seat the cups properly in the hub.**

9. Pack the inside of the hub with specified wheel bearing grease. Add lubricant to the hub only until the grease is flush with the inside diameter of both bearing cups (Fig. 15).

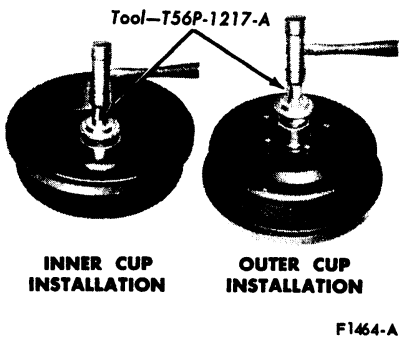


FIG. 14. Installing Front Wheel Drum Bearing Cups

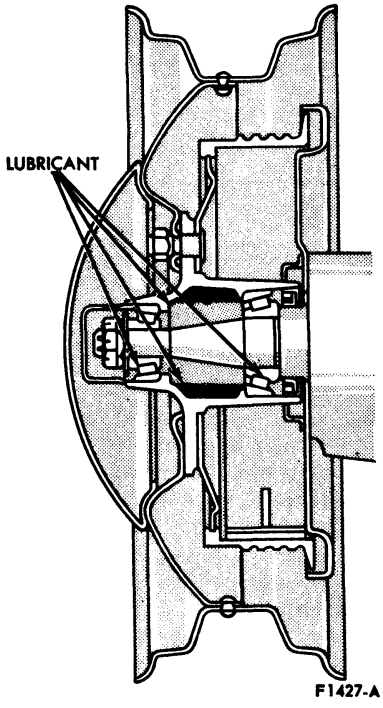


FIG. 15—Front Wheel Hub Lubrication

10. All old grease should be completely cleaned from the bearings and surrounding surfaces before repacking them with new grease (C1AZ-19590-B). The new lithium base grease is not compatible with sodium base grease which may have been present on the bearing surfaces. Pack the bearing cone and roller assemblies with wheel bearing grease. A bearing packer is desirable for this operation. If a packer is not available, work as much lubricant as possible between the rollers and cages. Lubricate the cone surfaces with grease.

11. Place the inner bearing cone and roller assembly in the inner cup, Apply a light film of grease to the lip(s) of the grease retainer and install the new grease retainer with the reverse end of the tool shown in Fig. 6. **Be sure that the retainer is properly seated.**

12. Adjust the brake shoes as outlined in Group 2.

13. Install the wheel, hub, and drum assembly on the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer or the spindle threads.**

14. Install the outer bearing cone and roller assembly and the flat washer on the spindle, then install the adjusting nut (Fig. 1).

15. Adjust the wheel bearings as outlined in Section 2, and install a new cotter pin. Bend the ends of the cotter pin around the castellations of the nut lock to prevent interference with the radio static collector in the grease cap. Install the grease cap.

16. Install the hub cap or wheel cover.

DISC BRAKES

1. Raise the vehicle until the wheel and tire clear the floor.

2. Remove the wheel cover or hub cap from the wheel.

3. Remove the wheel and tire from the hub and rotor.

4. Remove 2 bolts and washers that attach the caliper to the spindle. Remove the caliper from the rotor and wire it to the underbody to prevent damage to the brake hose.

5. Remove the grease cap from the hub. Remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle. Remove the outer bearing cone and roller assembly (Fig. 2).

6. Pull the hub and rotor assembly off the wheel spindle.

7. Remove and discard the old grease retainer and the inner bearing cone and roller assembly from the hub.

8. Clean the lubricant off the inner and outer bearing cups with solvent and inspect the cups for scratches, pits, excessive wear, and other damage. If the cups are worn or damaged, remove them with Tool T69L-1102-A (Fig. 13).

On Lincoln Continental models, remove worn or damaged cups with the tools shown in Fig. 16.

9. Thoroughly clean the inner and outer bearing cones and rollers with computer solvent, and dry them thoroughly. **Do not spin the bearings dry with compressed air.**

Inspect the cones and rollers for wear or damage, and replace them if necessary. The cone and roller assemblies and the bearing cups should be replaced as a set if damage to either is encountered.

10. Thoroughly clean the spindle and the inside of the hub with solvent to remove all old lubricant.

Cover the spindle with a clean cloth, and brush all loose dust and dirt from the dust shield. **To prevent getting dirt on the spindle carefully remove the cloth from the spindle.**

11. If the inner and/or outer bearing cup(s) were removed, install the replacement cup(s) in the hub with the tools shown in Fig. 17. **Be sure to seat the cups properly in the hub.**

12. Pack the inside of the hub with the specified wheel bearing grease. Add lubricant to the hub only until the grease is flush with the inside diameter of both bearing cups.

It is important that all old grease be removed from the wheel bearings and surrounding surfaces because the new Lithium base grease C1AZ-19590-B is not compatible with Sodium base grease which may already be present on the bearing surfaces.

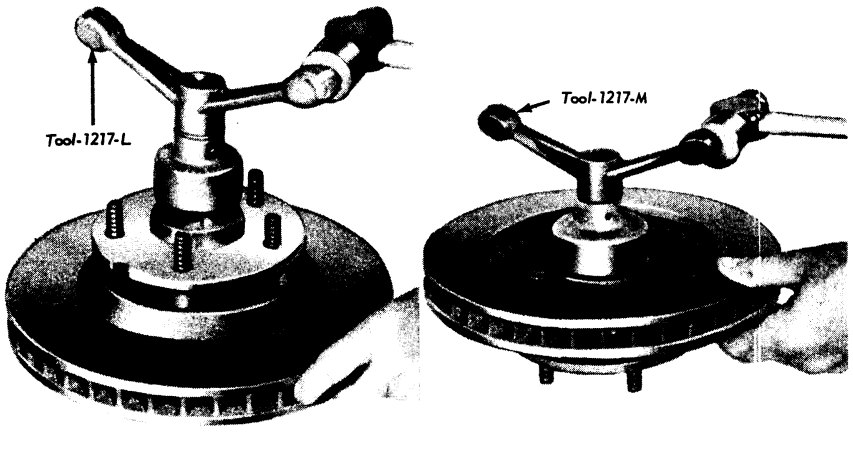


FIG. 16—Removing Front Wheel Bearing Cup—Lincoln Continental

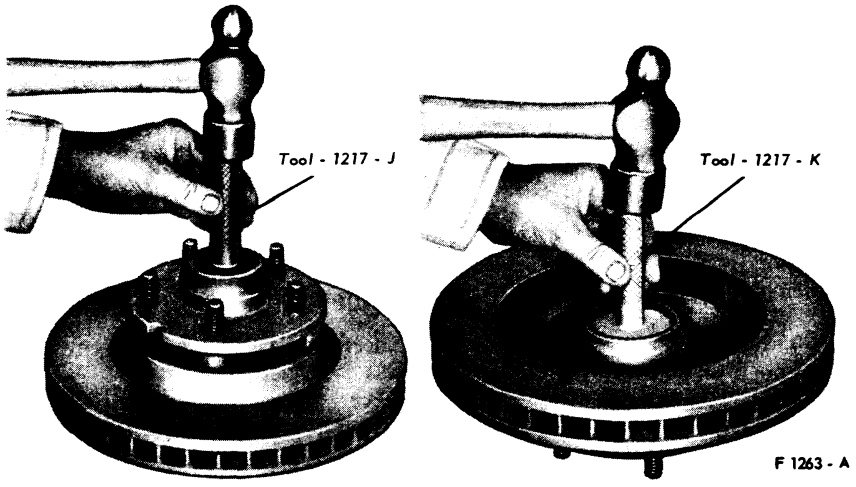


FIG. 17—Installing Front Wheel Bearing Cup

13. Pack the bearing cone and roller assemblies with wheel bearing grease. A bearing packer is desirable for this operation. If a packer is not available, work as much lubricant as possible between the rollers and cages. Lubricate the cone surfaces with grease.

14. Place the inner bearing cone and roller assembly in the inner cup. Apply a light film of grease to the lips of the grease retainer and install the new grease retainer with the tool shown in Fig. 18. **Be sure the retainer is properly seated.**

15. Install the hub and rotor assembly on the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer or the spindle threads.**

16. Install the outer bearing cone and roller assembly and the flat washer on the spindle, then install the adjusting nut.

17. Adjust the wheel bearings as outlined in Section 2, and install a new cotter pin. Bend the ends of the cotter pin around the castellations of the nut lock to prevent interference with the radio static collector in the grease cap. Install the grease cap.

18. Install the caliper to the spindle and torque the attaching bolts to specifications as detailed in Group 2.

19. Install the wheel and tire on the hub.

20. Install the hub cap or wheel cover.

21. Before driving the vehicle, pump the brake pedal several times to obtain normal brake lining to rotor clearance and restore normal brake pedal travel.

FRONT HUB AND DRUM ASSEMBLY REPLACEMENT

When the hub and drum assembly is replaced, new bearings and a grease retainer must be installed in the new assembly. The new grease retainer should be soaked in light engine oil at least 30 minutes before installation.

1. Raise the vehicle until the wheel and tire clears the floor. Pry off the hub cap or wheel cover, and remove the wheel and tire from the hub and drum assembly.

2. Remove the grease cap from the hub. Remove the cotter pin, nut lock adjusting nut, and flat washer from the spindle. Remove the outer bearing cone and roller assembly (Fig. 1).

3. Pull the hub and drum assembly off the wheel spindle.

4. Remove the grease retainer and the inner bearing cone and roller assembly from the hub with Tool 1175AE.

5. Remove the protective coating from the new hub and drum with carburetor degreaser.

6. Pack the inside of the hub with specified wheel bearing grease. Add lubricant to the hub only until the grease is flush with the inside diameter of both bearing cups (Fig. 15).

7. All old grease should be completely cleaned from the bearings before repacking them with new grease. Pack the bearing cone and roller assemblies with wheel bearing grease. A bearing packer is desirable for this operation. If a packer is not available, work as much lubricant as possible between the rollers and cages. Lubricate the cone surfaces with grease.

8. Place the inner bearing cone and roller assembly in the inner cup, and install the new grease retainer with the reverse end of the tool shown in Fig. 6. **Be sure that the retainer is properly seated.**

9. Adjust the brake shoes as outlined in Group 2.

10. Install the new hub and drum assembly on the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer.**

11. Install the outer bearing cone and roller assembly and the flat washer on the spindle; then, install the adjusting nut (Fig. 1).

12. Position the wheel and tire on the new hub and drum assembly. Install the wheel hub nuts and tighten them alternately in order to draw the wheel evenly against the hub and drum.

13. Adjust the wheel bearings as outlined in Section 2, and install a new cotter pin. Bend the ends of the cotter pin around the castellations of the nut lock to prevent interference with the radio static collector in the grease cap. Install the grease cap.

14. Install the hub cap or wheel cover.

FRONT HUB AND ROTOR ASSEMBLY REPLACEMENT

When the hub and rotor assembly is replaced, new bearings and a grease retainer must be installed in the new assembly.

1. Raise the vehicle until the wheel and tire clear the floor. Pry off the hub cap or wheel cover, and remove the wheel and tire from the hub and rotor assembly.

2. Remove 2 bolts and washers that attach the caliper to the spindle. Remove the caliper from the rotor and wire it to the underbody to prevent damage to the brake hose.

3. Remove the grease cap from the hub. Remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle; then, remove the outer bearing cone and roller assembly, (Fig. 2).

4. Pull the hub and rotor off the spindle.

5. Remove the protective coating from the new hub and rotor with carburetor degreaser.

6. Grease and install the inner bearing cone and roller assembly in the inner bearing cup. Apply a light film of grease on the grease retainer

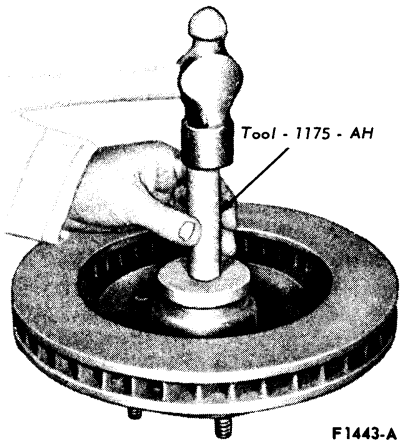


FIG. 18—Installing Grease Retainer

and install the grease retainer.

7. Install the new hub and rotor assembly to the wheel spindle. **Keep the hub centered on the spindle to prevent damage to the grease retainer.**

8. Install the outer bearing cone and roller assembly and the flat washer on the spindle; then, install the adjusting nut.

9. Install the caliper to the spindle and tighten the attaching bolts to specifications as detailed in Group 2.

10. Position the wheel and tire on the new hub and rotor. Install the wheel hub nuts and tighten them alternately in order to draw the wheel evenly against the hub and rotor.

11. Adjust the wheel bearings as outlined in Section 2, and install a new cotter pin. Bend the ends of the cotter pin around the castellations of the nut lock to prevent interference with the radio static collector in the grease cap. Install the grease cap.

12. Install the hub cap or wheel cover.

13. Before driving the vehicle, pump the brake pedal several times to obtain normal brake lining to rotor clearance and restore normal brake pedal travel.

LIFE GUARD TIRE REPAIRS

REPAIR OF OUTER TIRE

Outside Repairs

All outside repairs are made in the same manner as on conventional tubeless tires.

Inside Repairs

1. Remove the anti-friction treatment on the inside of the tire with rubber solvent.

2. Buff the inside area of the tire.

3. Apply a hot cure patch **only.**

REPAIR OF AIR CONTAINER

Air containers are repaired in the same manner as conventional inner tubes.

REPAIR OF LIFE GUARD

A damaged life guard that may pinch the air container should be replace. No repairs are required for small punctures in the life guard.

PART 3-13 *Specifications*

FRONT WHEEL ALIGNMENT

Vehicle Model	Dimension "C" Inches	Dimension "D" Inches	Alignment Factors	Min.	Max.	Desired
Mustang, Cougar	③ 6.30	④ 5.50 (Mustang) 6.35 (Cougar)	Caster ① Camber ① Toe-in-Inches	-3/4° +1/4° 1/16	+1 1/4° +1 3/4° 5/16	+1/4° +3/4° 3/16
Fairlane, Falcon Montego	③ 6.50	④ 6.72	Caster ① Camber ① Toe-in-Inches	-1 3/4° -1/2° 1/8	+1/4° +1° 3/8	-3/4° +1/4° 3/16
Ford, Mercury Meteor	⑤ 4.20	⑥ 6.70	Caster ② Camber ② Toe-in-Inches	0° -1/4° 1/16	+2° +1 1/4° 5/16	+1° +1/2° 3/16
Thunderbird, Mark III	⑤ 4.20	⑥ 6.70	Caster ② Camber ② Toe-in-Inches	0° -1/4° 1/16	+2° +1 1/4° 5/16	+1° +1/2° 3/16
Lincoln Continental	⑦ 5.87	⑧ 8.39	Caster ② Camber ② Toe-in-Inches	-1/2° -1/4° 0	-2 1/2° +1 1/4° 1/4	-1 1/2° +1/2° 1/8

① Maximum difference between wheels not to exceed 1/2° (setting). Maximum checking difference not to exceed 1° with caster and camber within specifications.
② Maximum difference between wheels not to exceed 1/2°.
③ Vertical distance between bottom surface of spring tower on centerline of rebound bumper bolt and point on flat surface of upper suspension arm midway between ball joint rivets.
④ Shortest vertical distance between point on side member and axle housing.
⑤ Distance from corner of lower flange sidemember front to center of bolt head (strut mounting bolt).
⑥ Vertical distance between bottom of sidemember at center of axle bumper bracket and top of axle housing.
⑦ Vertical distance between point on underside of crossmember pocket and point on top of drag strut.
⑧ Distance from axle housing to surface on sidemember immediatly behind axle bumper.

WHEELBASE AND TREAD WIDTH-INCHES

Vehicle Model	Wheelbase	Tread Width	
		Front	Rear
Mustang	108.0	58.5	58.5
Cougar	111.1	58.5	58.5
Fairlane, Montego	116.0	58.8	58.5
Falcon (except Station Wagon)	110.9	58.8	58.5
Falcon Station Wagon	113.0	58.8	58.5
Ford	121.0	63.0	64.0
Mercury, Meteor	124.0	63.0	64.0
Thunderbird (2-Door)	114.7	62.0	62.0
Thunderbird (4-Door), Mark III	117.2	62.0	62.0
Lincoln Continental	126.0	62.4	61.0

FRONT WHEEL TURNING ANGLE

Vehicle Model	Turning Angle of Outside Wheel With Inside Wheel Turned 20°
Mustang, Cougar	18.68°
Fairlane, Falcon, Montego	With Power Steering 17.88° With Manual Steering 18.1°
Ford, Mercury, Meteor	With Power Steering 19.14° With Manual Steering 18.96°
Thunderbird, Mark III	19.26°
Lincoln Continental	17.71°

BALL JOINTS – RADIAL PLAY

Vehicle Model	Description	Radial Play–Max. Allowable
Cougar, Fairlane, Falcon, Montego, Mustang	Lower Ball Joint Upper Ball Joint	Replace if perceptibly loose 0.250 Inch
Ford, Mercury, Meteor, Thunderbird, Mark III, Lincoln Continental	Lower Ball Joint Upper Ball Joint	0.250 Inch Replace if perceptibly loose

STEERING WHEEL TURNING EFFORT

Vehicle Model	Lbs. Effort
Ford, Mercury, Meteor	5.0
Cougar, Fairlane, Falcon, Montego, Mustang	6.5
Lincoln Continental, Mark III, Thunderbird	3.75

POWER STEERING PUMP
SERVICE SPECIFICATIONS

Description	Ford – Thompson	Eaton
Pump Rotor Shaft End Play	.017 in. Max. – .003 in. Min.	–
Max. Torque Allowed to Rotate Rotor Shaft	15 In-Lb.	–
Stamped Housing to Plate Assy. Screw and Washer Assy.	28-32 Ft.-Lb.	–
Reservoir to Stamped Housing Nut	43-47 Ft.-Lb.	–
Cam Ring to Pressure Plate Screw	–	20 In-Lb.
Housing to Cover Screw	–	15-20 Ft.-Lb.

FORD–THOMPSON POWER STEERING
PUMP TORQUE LIMITS (FT–LBS)

Description		Ford, Mercury, Meteor, Thunderbird	Cougar, Falcon, Fairlane, Montego, Mustang
Pump Rear Mounting Nut		14-18	20-30
Pressure Hose Nut		20-30	20-30
Pump Attaching Nuts		25-35	30-40
Bracket to Engine Attaching Nuts	6-Cyl.	12-16	7-10
	302-351 CID	18-25	18-25
	390,427,428,429 CID	30-40	30-40
Bracket to Cylinder Head		25-35	25-35
Belt Adjustment Bolt		–	25-35
Rear Support Bracket Attaching Nuts	240 CID	45-60	–
Bracket to Engine Adapter	170-200 CID	–	25-35
Engine Adapter to Engine	170-200 CID	–	17-25
	250 CID	–	30-40
Engine Adapter to Pump	250 CID	–	25-35

INTEGRAL POWER STEERING GEAR SPECIFICATIONS

Description	Ford Design (XR–50)	Saginaw Design
Type	Recirculating Ball Torsion Bar	
Ratio	17:1	17.5:1
Turns of Steering Wheel (Lock to Lock-Linkage Disconnected)	4	4 1/8
Fluid Specifications	M–2C33–F	
Fluid Capacity (Included in Pump Reservoir Fill)	1.6 Pints (Approx.)	
Phosphorescent Dye Additive (For Leak Detection)	M99B103–A (4 Oz. per quart)	
Sector Shaft End Play – Linkage Disconnected	None	.002" Max.
Sector Shaft Mesh Load. Total Over Mechanical Center Position. Must be①Greater Than Worm Bearing Preload Torque, Shown Below	14 In Lb (Max) (Exc. Lincoln) 17 In Lb (Max.) (Lincoln)	14 In Lb (Max)
Worm Bearing Preload	2-7 In Lb	4-7 In Lb ②
Clearance Between Valve Spool & Retaining Ring	.0035–.0005" Preferable .002"	–
Pressure Variation Between Right & Left Turn (At 250 P.S.I.) – Check Efforts Each Side of Center	4 In Lb Max. Variation	–
Clearance Between Inner Sector Seal and Housing	.025"	–

① 8-9 In Lb (XR–50 Exc. Lincoln) 11-12 In Lb for Lincoln, 4–8 In Lb for Saginaw Gear.
② 3 In Lb in Excess of Valve Assy. Drag Total Worm Bearing Preload and Seal Drag not to Exceed 8 In Lb.

MANUAL AND POWER ASSIST STEERING GEAR SPECIFICATIONS

Vehicle	Ford, Mercury, Meteor	Mustang, Cougar			Falcon, Montego, Fairlane	
Model	SMA-D-1	SMB-D	SMB-K	SMB-F ①	SMA-F	SMA-B
Gear Type	Manual	Manual	Power Assist and Manual ⑤	Manual	Manual	Power Assist
Gear Ratio	24:1	19.9:1	16:1	16:1	22:1	16:1
Turns of Strg. Gr. (Lock to Lock) ③	6-2/5	4-5/8	3-3/4	3-3/4	5-1/2	4
Lube Type	ESW-M1C87-A					
Lube Capacity (Lb.)	.97 ± .07	.55 ± .05	.55 ± .05	.55 ± .05	.87 ± .07	.87 ± .07
Worm Bearing Preload (In Lb) ④	4-5	4-5	3-4 ②	4-5	4-5	3-4
Total Center Meshload (In Lb) ⑤	9-10	9-10	8-9 ②	9-10	9-10	8-9
Adjustments (All Models)	Adjusting screw to bottom of sector shaft T slot clearance: .000 – .002					

①Production only - for service, use Model SMB-K.
②When used for improved or competition handling, worm bearing preload must be adjusted to 4-5 In Lb and total center meshload must be adjusted to 9-10 In Lb.
③Gear only - not attached to Pitman arm.
④Torque required to rotate input shaft at approximately 1-1/2 turns either side of center (gear out of vehicle or Pitman arm disconnected).
⑤Required to rotate input shaft and worm assembly past the center high point.

STEERING GEAR TORQUE LIMITS (FT-LB)

Description	Manual and Power Assist			Ford (XR-50) Power Steering	Saginaw Power Steering
	Ford, Mercury, Meteor	Fairlane, Falcon, Montego	Mustang Cougar		
Sector Shaft Cover Bolts	30-40	17-25	15-22	55-70	30-35
Mesh Load Adjusting Screw Lock Nut	32-40	32-40	32-40	25-35	20-30
Ball Return Guide Clamp Screw	18-42 (In-Lb)	18-42 (In-Lb) Pwr. 42-60 (In-Lb) Man.	18-42 (In-Lb)	60-120 (In-Lb)	3-6
Preload Adjuster Lock Nut	60-80	60-80	45-60	–	50-110
Valve Housing to Gear Housing Screw	–	–	–	35-45	–
Race Retaining Inner Nut	–	–	–	①	–
Race Lock Nut	–	–	–	②	–
Piston End Cap	–	–	–	50-75	50-100
Set Screw-Rack Adjustment	–	–	–	–	–
Lubricant Fill Plug and Vent	3-9 ③	3-9 ③	3-9 ③		

① With tool T66P-3553-B - compute the torque as follows:

$$\text{Torque} = \frac{\text{Length of Torque Wrench X 60 Lb. Ft.}}{\text{Length of Torque Wrench + 5.5 Inches}}$$

Example: With 13 inch torque wrench

$$\frac{13 \text{ In. X 60 Lb. Ft.}}{13 \text{ In. + 5.5 In.}} = \frac{13 \text{ X 60 Lb. Ft.}}{18.5} = 0.703 \text{ X } 60 = 42 \text{ (Lb. Ft.)}$$

② With tool T66P-3553-B - compute the torque as follows:

$$\text{Torque} = \frac{\text{Length of torque wrench X 25 Lb. Ft.}}{\text{Length of torque wrench + 5.5 Inches}}$$

③ Minimum of one thread must remain exposed when installed.

STEERING LINKAGE TORQUE LIMITS (FT–LBS)

Description		Cougar, Fairlane, Falcon, Montego, Mustang	Ford, Mercury, Meteor	Continental Mark III Thunderbird	Lincoln Continental
Cylinder Mounting Bracket to Underbody or Frame	(Side Hole)	28-35	–	–	–
	(Bottom Hole)	35-43	–	–	–
Power Cylinder to Bracket		18-24	–	–	–
Power Cylinder to Bracket Lock Nut		3-5	–	–	–
Steering Tie Rod End to Spindle Arm		30-40 ①	35-47 ①	35-47 ①	40-55
Idler Arm Mounting Bracket to Underbody or Frame		28-35	28-35	28-35	20-30
Pitman Arm to Control Valve (Power Steering)		35-47 ①	–	–	–
Steering Gear to Side Rail or Frame		50-65	50-65	50-65	50-65
Pitman Arm to Sector Shaft		150-225	150-225	150-225	150-200
Idler Arm to Pitman Arm-to-Idler Arm Rod		60-80 ①	60-80 ①	60-80 ①	40-55
Spindle Connecting Rod Clamp to Adjusting Sleeve		10-14	8-13	8-13	19-26
Pitman Arm to Steering Arm-to-Idler Arm Rod		35-47 ①	35-47 ①	35-47 ①	40-55
Steering Spindle Arm Connecting Rod to Arm-to-Idler Arm Rod		30-40 ①	35-47 ①	35-47 ①	40-55

① Torque to low limit of specification; then, tighten the nut to the nearest cotter pin slot and insert the cotter pin.

STEERING COLUMN TORQUE LIMITS (FT–LBS)

Description	Ford, Mercury, Meteor	Fairlane, Falcon, Montego	Cougar, Mustang	Lincoln Continental	Continental Mark III Thunderbird
Column Lower Bracket to Column Upper Bracket	Upper 9-20 Lower 8-12	10-20	8-15	–	–
Intermediate Bracket to Brake Pedal Support Bracket	9-20	–	–	–	–
Lower Trim Shroud to Upper Trim Shroud	5-10	–	–	–	–
Flex Coupling to Steering Gear	24-37	24-37	24-37	25-35	25-35
Flex Coupling to Steering Shaft Flange	10-18	12-18	10-18	–	–
Flex Coupling to Steering Shaft	–	–	–	25-35	25-35
Tee Plate to Instrument Panel	8-13	3-8	5-15	4-9	4-9
Steering Wheel Attaching Nut	30-40	30-40	30-40	20-30	30-40
Brake Pedal Support Bracket to Brake Pedal Support	–	28-42	13-25	–	28-42
Column Upper Bracket to Instrument Panel	–	10-16	–	10-15	7-12
Column Upper Bracket to Lower Clamp	–	–	–	8-12	7-12

TORQUE LIMITS–FRONT SUSPENSION
MONTEGO, FALCON, FAIRLANE, MUSTANG AND COUGAR

Description	Ft - Lbs	
	Montego, Falcon, Fairlane	Mustang and Cougar
Shock Absorber Upper Attachment	20-28	10-15
Shock Absorber Upper Bracket to Body	15-25	22-34
Front Suspension Compression Bumper to Body	12-17	12-17
Brake Backing Plate to Spindle	9-14 (Disc) 25-45 (Drum)	9-14 (Disc) 28-45 (Drum)
Upper Arm and Inner Shaft to Body	75-100	75-100
Spring Seat to Upper Arm	30-40	25-40
Shock Absorber to Spring Seat	8-12	8-12
Ball Joint to Spindle (Upper and Lower)	60-90 ①	60-90 ①
Wheel Bearing Adjusting Nut	17-25 ①	17-25 ①
Strut to Lower Arm	75-105	70-105
Lower Arm to Underbody	75-100	75-100
Stabilizer Bar Mounting Bracket to Underbody	17-25	17-25
Strut to Underbody	60-80	60-80
Stabilizer Bar to Lower Arm	5-10	8-12
Caliper to Spindle (Disc Brake) - Upper	110-140	110-120
- Lower	55-75	55-75
Strut to Underbody Slotted Nut	50-70	50-70

① Torque the adjusting nut to 17-25 ft-lb. Locate nut lock on adjusting nut so castellations are aligned with cotter pin hole in spindle. Then, back off adjusting nut and nut lock so the next castellation aligns with the cotter pin hole.

TORQE LIMITS–FRONT SUSPENSION
FORD, MERCURY, METEOR

Description	Ft-Lbs	Description	Ft-Lbs
Lower Arm to No. 2 Crossmember	55–75	Brake Backing Plate to Spindle	25–45
Upper Arm to Frame	100–130	Strut to Lower Arm	70–113
Upper Arm Bumper	15–25	Stabilizer Bar to Frame	18–27
Brake Backing Plate and Cylinder Assembly to Spindle	80–106	Strut to Frame	60–90 ①
		Shock Absorber Upper Attachment	20–28
Stabilizer Bar to Lower Arm	5–10	Shock Absorber Lower Arm	8–12
Ball Joint to Spindle (Upper and Lower)	60–90①	Caliper to Spindle (Disc Brake)	120–130

① Torque to specification, then tighten the nut to the nearest cotter pin slot and insert the cotter pin.

TORQUE LIMITS–FRONT SUSPENSION
THUNDERBIRD, CONTINENTAL MARK III

Description	Torque Ft-Lbs
Lower Arm to #2 Crossmember	60-90
Upper Arm to Frame	100-150
Upper Arm Bumper	15-25
Stabilizer Bar to Lower Arm	5-10
Ball Joint to Spindle (Upper and Lower)	① 60-90
Strut to Lower Arm	70-113
Stabilizer Bar to Mounting Bracket	8-12
Strut to Frame	① 60-90
Shock Absorber Upper Attachment	20-23
Shock Absorber to Lower Arm	8-12
Brake Splash Shield (Disc) to Spindle	9-14
Caliper to Spindle (Disc Brake)	
Upper Bolt	110-140
Lower Bolt	90-120

① Torque to minimum specification; then, tighten the nut to the nearest cotter pin slot and insert the cotter pin.

TORQUE LIMITS–FRONT SUSPENSION
LINCOLN CONTINENTAL

Description	Ft-Lbs
Brace-Front Suspension to Sidemember (Model 74A Only)	90–110
Drag Strut to Strut Bracket Assembly	70–90
Lower Arm Assembly to Front Crossmember - (Attach Bracket)	55–75
Lower Arm Assembly to No. 2 Crossmember	110–140
Drag Strut to Lower Arm Assembly	70–90
Wheel Spindle to Lower Arm Ball Joint	70–90
Front Wheel Spindle to Upper Arm Ball Joint Assembly	55–75
Upper Arm Inner Shaft to Upper Arm	25–35
Upper Arm and Shaft Assembly to No. 2 Crossmember	100–125
Shock Absorber Bracket Assembly to No. 2 Crossmember Bracket	40–55
Shock Absorber Assembly to No. 2 Crossmember Assembly (Top End)	20–30
Shock Absorber Assembly Lower Arm Spring Seat Reinforcement Assembly	20–30
Upper Ball Joint to Control Arm	21–29
Stabilizer Bar Assembly to Underbody	20–30
Stabilizer Bar to Lower Arm	5–10
Jounce Bumper Assembly to Strut (Lower Arm)	22–28
Front Splash Shield to Spindle	9–14
Caliper to Spindle	100–140

TORQUE LIMITS–REAR SUSPENSION
FORD, MERCURY, METEOR

Description	Ft-Lbs
Shock Absorber to Frame (Upper Attachment)	20–28
Upper Arm to Axle Bracket (Nut)	90–100
Track Bar to Axle Track Bar Stud	80–105
Track Bar Stud to Axle	100–130
Track Bar to Frame (Bolt Torque)	80–105
Track Bar Stud to Axle Bracket (Nut)	80–105
Wheel Lug Nut	70–115
Brake Backing Plate and Bearing Retainer to Axle–All Cars except those with 240 or 302 CID Engines	50–70
Brake Backing Plate and Bearing Retainer to Axle–All Cars with 240 or 302 CID Engines	20–30
Shock Absorber to Axle (Lower Attachment)	50–85
Bumper Assembly to Frame	9–13
Lower Arm to Axle–Bolt	90–120
Lower Arm to Axle–Nut	70–90
Upper Arm to Frame–Bolt	90–120
Upper Arm to Frame–Nut	70–90
Lower Arm to Frame–Bolt	90–120
Lower Arm to Frame–Nut	70–90
Bumper Assembly to No. 4 Crossmember	9–13
Universal Joint U-Bolt Nut	10–15
Air Leveling Compressor to Apron	10–13
Height Control Valve to Bracket	17–25
Height Control Valve Bracket to No. 4 Crossmember	9–13

TORQUE LIMITS – REAR SUSPENSION
MONTEGO, FALCON, FAIRLANE, MUSTANG AND COUGAR

Description	Montego, Falcon, Fairlane	Mustang and Cougar
Spring Shackle Bars to Body and Spring	15–22	15–22
Shock Absorber to Upper Mounting Bracket	20–28	20–28
Shock Absorber to Spring Clip Plate	20–28	20–28
Spring to Axle U-Bolt Nut	35–50	35–50
Wheel Lug Nut 5-Lug Wheel	70–115	70–115
Spring to Spring Front Hanger - Bolt	90–120	60–85
Spring to Spring Front Hanger - Nut	40–60	40–60
Universal Joint U-Bolt Nut – Std. Trans.	6–11	6–11
Universal Joint U-Bolt Nut – Auto. Trans.	10–15	10–15

TORQUE LIMITS–REAR SUSPENSION
LINCOLN CONTINENTAL

Description	Ft-Lbs
Brake Backing Plate Bearing Retainer to Axle	30–55
Spring Center Bolt	15–20
Spring Front Bracket Assembly to Rear Floor Sidemember Assembly	70–90
Spring Front Eye Stud and Washer Assembly to Spring Front Hanger Bracket	76–106
Spring U-Bolt	45–65
Spring Assembly to Spring Shackle Assembly	34–59
Spring Shackle Assembly to Spring Rear Bracket Assembly	34–59
Spring Rear Bracket Assembly to Rear Floor Sidemember Assembly	40–67
Shock Absorber Upper Attaching Bracket to Body Crossmember	20–30
Shock Absorber Assembly to Shock Absorber Upper Attaching Bracket	20–28
Shock Absorber Assembly to Axle	30–45
Axle Bumper Bracket to Underbody	10–15
Pinion Bumper Assembly to Axle Carrier	18–25

TORQUE LIMITS–REAR SUSPENSION
THUNDERBIRD, CONTINENTAL MARK III

Description	Ft-Lbs
Shock Absorber to Frame (Upper Attachment)	20–28
Upper Arm to Axle (Front)	70–90
Track Bar to Axle Track Bar Stud	80–105
Track Bar Stud to Axle	100–130
Track Bar to Frame (Bolt Torqe)	70–90
Wheel Lug Nut	70–115
Brake Backing Plate and Bearing Retainer to Axle	50–75
Shock Absorber to Axle (Lower Attachment)	50–85
Bumper Assembly to Frame	Self-Tapping
Lower Arm to Axle - Bolt	90–120
Lower Arm to Axle - Nut	70–90
Upper Arm to Frame -Bolt	90–120
Upper Arm to Frame - Nut	70–90
Lower Arm to Frame - Bolt	90–120
Lower Arm to Frame - Nut	70–90
Bumper Assembly to No. 4 Crossmember	Self-Tapping

SPECIAL SERVICE TOOLS

Tool No.	Description
T50T-100-A	Slide Hammer–Long
T59L-100-B	Slide Hammer–Short
T58L-101-A	Puller Attachment
T53L-200-A	Handle Adapter
T62L-201-A	Input Shaft Seal Installer
OTC-462	Tie Rod Separator (Owatonna Tool Co.)
T57L-500-A	Bench Mounted Holding Fixture
T69L-1102-A	Front Wheel Bearing Remover
Tool 1175-AB	Grease Seal Remover (Head Only)
Tool 1175-AH	Grease Seal Replacer
T56P-1217-A	Front Hub Bearing Cup and Grease Seal Replacer
T60K-1217-A	Front Hub Bearing Cup and Grease Seal Replacer
Tool 1217-J	Front Hub Outer Bearing Cup Replacer
Tool 1217-K	Front Hub Inner Bearing Cup Replacer
Tool 1217-L	Front Hub Outer Bearing Cup Remover
Tool 1217-M	Front Hub Inner Bearing Cup Remover
T65P-3000-A, D	Adjusting Bars–Caster and Camber
T65P-3000-B, C, E, F	Alignment Spacers
T57P-3006-A	Spindle Ball Joint Remover Press
T60K-3006-A	Spindle Ball Joint Press Adapter Screw
T62F-3006-A	Spindle Ball Joint Press Adapter Screw
Tool 3044-A	Front Suspension Upper Arm Bushing Remover
T54P-3044-A	Front Suspension Upper and Lower Arm Overhaul Kit
T60K-3044-A	Front Suspension Lower Arm Bushing Remover and Replacer
T65P-3044-A	Upper Arm Bushing Overhaul Kit
Tool 3068	Front Suspension Upper Arm Bushing Adapter
Tool 3069-AA	Front Suspension Lower Arm Bushing Remover
Tool 3069-M	Lower Arm Bushings–Remover and Replacer Kit
Tool 3290-C	Tie Rod Ball Ends and Control Valve Ball Stud Remover
T65P-3524-A	Input Shaft Bearing Remover and Installer
T66P-3553-A, B	Spanner Wrench
T66P-3553-C	Spacer
T65P-3548-A	Oil Line Connector Seal Installer
T62F-3576-A	Sector Shaft Bushing Remover and Replacer
T64K-3576-A	Sector Shaft Needle Bearings and Seal Remover and Replacer
T64K-3576-B	Sector Shaft Needle Bearings and Seal Remover and Replacer Adapter
T65P-3576-A, B	Sector Shaft Bushing Remover and Installer
T65P-3576-C	Remover and Installer Adapter
Tool 3583-J	Control Valve Bearing and Seal Remover and Replacer
T65P-3590-F	Steering Pitman Arm Remover
T67L-3600-A	Steering Wheel Remover
T65P-3805-A	Ring Compressor–Rack Piston
T63P-5310-A	Front Coil Spring Remover and Replacer
T64K-5310-A, B	Adapters
T66P-5310-A, B	Adapters
T64N-5781-A	Rear Spring Front Bushing Remover and Installer
T64K-5781-B	Rear Spring Bushing Adapter
Tool 6306-AG	Crankshaft Damper Remover and Power Steering Pump Sprocket Replacer
T63L-8620-A	Bent Tension Gauge
T63L-10300-B	Pulley Remover
T65P-10300-B	Alternator Pulley Replacer
T56L-33610-D	Pressure Testing Gauge Assembly
T68L-33610-A	Bypass and Orifice Gauge
Tool 33623-D	Pump Oil Seal Pilot
T65P-3A537-A	Bearing Preload Spanner Wrench
T65P-3A537-B	Adjuster Plug Seal Protector
T69P-3A674-A	Fixture Adapter Plate
T65P-3A733-A	Power Steering Pump Pulley Remover
T65T-3B177-A	Front Suspension Bushings Remover and Replacer
T68P-3B586-A	Pump Housing Hole Plugging Tool
T68P-3B592-A	Pump Shaft Seal Replacer
T68P-3B592-B	Pump Shaft Seal Protector
T64B-3C716-A	Insulator Remover and Replacer Socket
T65P-3C732-A	Lock Spring Installing Hook
T65P-3D517-A	Rack Piston Arbor
T65P-3D525-A	Adjuster Plug Bearing Remover and Installer
T65P-3D525-B	Thrust Bearing Retainer Installer Adapter
T65P-3D526-A	Adjuster Plug Seal Installer
T69P-3D608-A	Pin Straightness Checking Block
T69P-3D608-B	Pin Guide Support
T65P-3D642-A	Sector Shaft Seal Installer
T67P-3D739-A	Pivot Pin Remover

REAR AXLE

GROUP 4

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PART 4-1 *General Axle Service*

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COMPONENT INDEX	MODEL APPLICATION											
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PINION RETAINER	01-10											
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SHIM AND BACKLASH CHANGES	01-03											
Integral Carrier		01-04	N/A	01-04	01-04	01-04	01-04	01-04	01-04	N/A	N/A	N/A
Removable Carrier	01-03											
U-JOINT FLANGE	01-10											
Cleaning and Inspection	01-10											

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 COMMON ADJUSTMENTS AND REPAIRS

IDENTIFICATION

The AXLE code on the vehicle Warranty Plate (Fig. 1) identifies the rear axle type (conventional or limited-slip differential) and gear ratio.

A metal tag (Fig. 2) stamped with the model designation and gear ratio is secured to one of the rear cover-to-housing bolts (integral carrier-type) or to one of the carrier-to-housing bolts (removable carrier-type).

The spaces on the top line provide the axle model identification code. This code, such as WDT-AN4, WDC-AS4, WEG-C2, etc. indicates a specific combination of the following factors: conventional or limited slip differential; diameter of ring gear; small or large wheel bearings; and the gear ratio. Refer to the specifications group of this manual for the car-line rear axle ratios, gear and code identification.

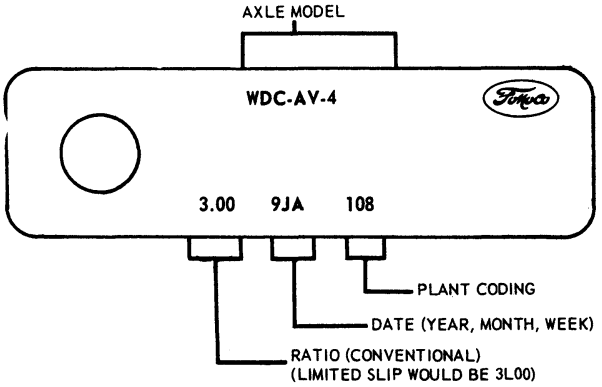
The second line on the tag is used for gear ratio, the production date code and the production plant identification code.

It is important to use the model designation when obtaining correct replacement parts.

LIMITED-SLIP OR TRACTION-LOK DIFFERENTIAL OPERATION CHECK

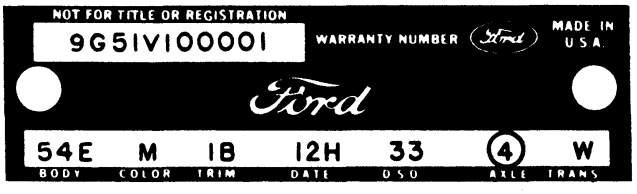
A limited-slip or Traction-Loc differential can be checked for proper operation without removing the carrier from the axle housing.

Jack up one rear wheel and remove the wheel cover. Install the tool on the axle shaft flange studs as shown in Fig. 3.



E 1918-A

FIG. 2—Rear Axle Model Identification Tag



E1917-A

CONVENTIONAL	LIMITED SLIP	RATIO
2	K	2.75:1
3	L	2.79:1
4	M	2.80:1
5	/	2.83:1
6	/	3.00:1
7	P	3.10:1
9	R	3.25:1
A	S	3.50:1
C	U	3.08:1
	V	3.91:1
	W	4.30:1

FIG. 1—Rear Axle Gear Ratio and Type Identification

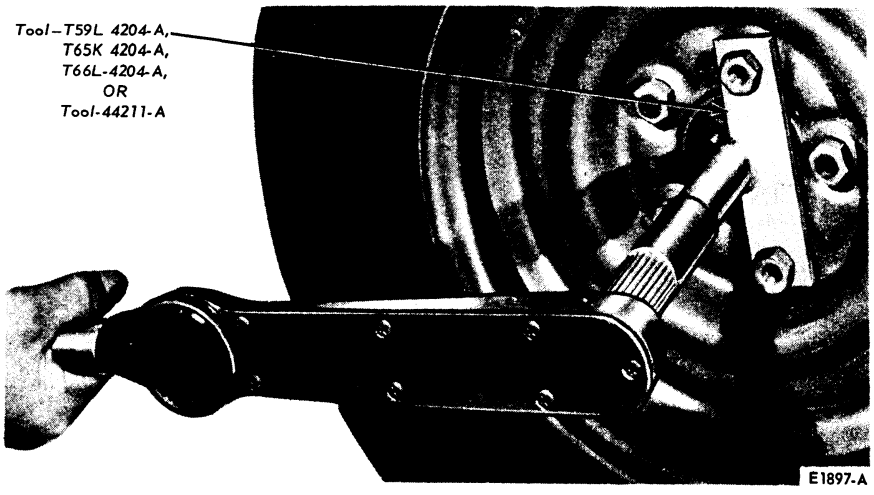


FIG. 3—Limited-Slip Differential Check

Using a torque wrench of at least 200 ft-lbs capacity, rotate the axle shaft. **Be sure that the transmission is in neutral, one rear wheel is on the floor, and the other rear wheel is raised off the floor.** The torque required to continuously rotate the shaft should be at least 75 ft-lbs or 40 ft-lbs (Traction-Lok). The initial breakaway torque may be higher than the continuous turning torque, but this is normal. The axle shaft should turn with even pressure throughout the check without slipping or binding.

If the torque reading is less than specified, check the differential for improper assembly.

A vehicle equipped with a limited-slip differential will always have both wheels driving. If, while the vehicle is being serviced, only one wheel is raised off the floor and the rear axle is driven by the engine, the wheel on the floor will drive the vehicle off the stand or jack.

GEAR TOOTH CONTACT PATTERN CHECK

When rolling a tooth pattern, use the special compound (tube) packed with each service ring gear and pinion set.

Paint all gear teeth and roll a pattern as described in Section 3. After diagnosing the tooth pattern as explained here, make the appropriate adjustments as outlined in Section 2.

In making a final gear tooth contact pattern check, it is necessary to recognize the fact that there are three different types of gear sets, **hunting, non-hunting** and **partial non-hunting.** Each type is determined by the number of teeth in the gears. The non-hunting and partial non-hunting types can be identified by the paint timing marks on the pinion and ring gear teeth. (Part 4-2, Fig. 51). See Part 4-5 for complete identification specifications.

ACCEPTABLE TOOTH PATTERNS (ALL AXLES)

Figure 4 shows acceptable tooth patterns for all axles. Any combination of drive and coast patterns will be acceptable.

In general, desirable tooth patterns should have the following characteristics:

1. The drive pattern should be fairly well centered on the tooth.

2. The coast pattern should be fairly well centered on the tooth.

3. Some clearance between the pattern and the top of the tooth is desirable.

4. There should be no hard lines where the pressure is high.

The individual gear set need not conform exactly to the ideal pattern to be acceptable.

Any combination of drive and coast patterns shown in Fig. 4 are acceptable.

Hunting Gear Set

In a hunting-type gear set, any one pinion gear tooth comes into contact with all ring gear teeth. In this type, several revolutions of the ring gear are required to make all possible gear combinations.

Any combination of drive and coast patterns shown in Fig. 4 will be acceeptable.

Non-Hunting Gear Set

In a non-hunting type gear set, any one pinion gear tooth comes into contact with only a few ring gear teeth. In this type, only one revolution of the ring gear is required to make all possible tooth contact combinations. Any combination of drive and coast patterns shown in Fig. 4 will be acceptable.

Partial Non-Hunting Gear Set

In a partial non-hunting type gear set, any one pinion tooth comes into contact with only part of the ring gear teeth, but more than one revolution of the ring gear is required to make all possible gear tooth combinations. Any combination of drive and coast patterns shown in Fig. 4 will be acceptable.

SHIM AND BACKLASH CHANGES

Since each gear set rolls a characteristic pattern, the patterns shown in Fig. 4 are considered acceptable and should be used as a guide. The drive pattern is rolled on the convex side of the tooth, and the coast pattern is rolled on the concave side.

The movement of tooth contact patterns with changes in shimming can be summarized as follows:

Removable Carrier Type Axle

1. Thicker shim with the backlash set to specifications moves the pinion further from the ring gear:

2. Thinner shim with the backlash set to specifications moves the pinion closer to the ring gear:

If the patterns are not correct, make the changes as indicated. The pinion need not be disassembled to change a shim. All that is required is to remove the pinion, bearing, and retainer assembly and install a different shim. When reinstalling the pinion and retainer assembly of a non- hunting or partial non-hunting gear set, be sure that the marked tooth on the pinion indexes between the marked teeth on the ring gear (Fig. 51, Part 4-2). Refer to Pinion and Ring Gear Tooth Contact Adjustment, Section 2.

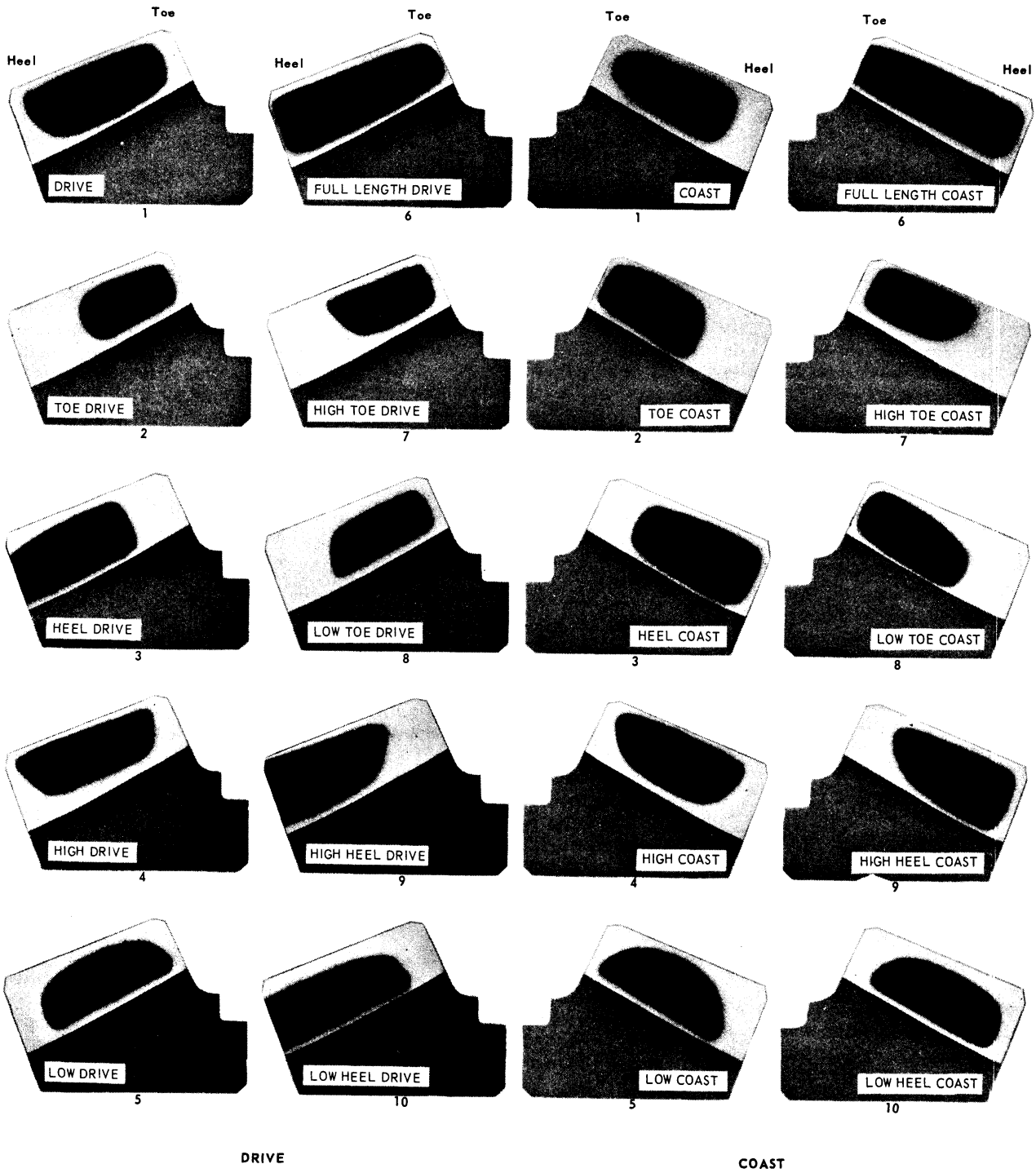


FIG. 4—Acceptable Tooth Pattern Limits (All Axles)

Integral Carrier Type Axle

1. Thinner shim with the backlash set to specifications moves the pinion farther from the ring gear.

2. Thicker shim with the backlash set to specifications moves the pinion closer to the ring gear.

If the patterns are not correct, make the changes as indicated. The differential case and drive pinion will have to be removed from the carrier casting to change a shim. When reinstalling the pinion and ring gear of a non-hunting or partial non-hunting gear set, be sure that the marked tooth on the pinion indexes between the marked teeth on the ring gear (Fig. 51, Part 4-2). Refer to Pinion and Ring Gear Tooth Contact Adjustment, Section 2.

REAR AXLE COMPANION FLANGE RUNOUT CHECK

ALL AXLES EXCEPT THUNDERBIRD AND CONTINENTAL MARK III

1. Raise the vehicle on a hoist that supports the rear axle (twin-post hoist).

2. Remove the driveshaft assembly (Group 5).

3. Check the companion flange damage to the universal joint bearing locating lugs. If the universal joint bearing locating lugs on the companion flange are shaved (worn) or damaged, replace the companion flange (Fig. 5).

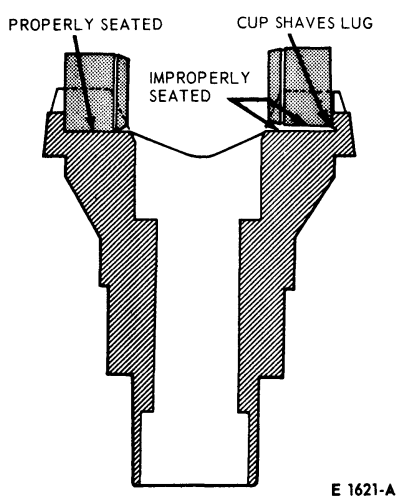


FIG. 5—Checking Companion Flange

4. The rear axle companion flange runout is checked with a modified universal joint (checking tool) a dial indicator with 1.000 inch minimum travel, and a cup-shaped dial indicator adapter tool (Fig. 6). **To fabricate the checking tool, modify a universal joint assembly by removing two bearing cups that are opposite each other, and cuttting or grinding off one of the universal joint bearing flanges (Fig. 6).**

5. Install the cup-shaped adapter on the dial indicator stem. Install the dial indicator on the pinion retainer or pinion nose bumper bracket. Position the indicator to allow an indication at the ends of the universal joint bearing cups and the remaining exposed journal of the cross-shaft.

6. Turn the companion flange so that the dial indicator cup-type adapter rests on the machined surface of the bearing cup (Fig. 6). Rotate the companion flange side-to-side slightly to obtain a reading indicating that the bearing cup surface is perpendicular to the indicator cup-type adapter. **This will be the point at which the dial indicator cup is closest to the center of companion flange rotation. It is also the point at which the dial indicator hand will reverse direction as the companion flange is turning.** Set the dial indicator to zero.

7. Carefully retract the dial indicator stem and rotate the companion flange 180 degrees to position the machined surface of the opposite universal bearing under the dial indicator adapter tool. Again, slightly rotate the flange side-to-side to position the bearing perpendicular to the dial indicator adapter. Again, this is the point at which the indicator hand will reverse direction as the flange is rotated. Record the flange bearing cup runout reading obtained from the indicator (Fig. 7).

Rotate the companion flange 90 degrees and position the dial indicator adapter on the machined end of the exposed journal (Fig. 8). **Be sure the end surface of the exposed journal is perpendicular to the indicator cup-type adapter.** This requires that the cross-shaft be moved fore and aft on the flange bearing cups. **Note the point at which the indicator hand reverses direction.** Rotate the flange assembly side-to-side until the cross-shaft is perpendicular to the pinion shaft axis, and the indicator hand reverses direction. Zero the dial indicator and check the zero point again by

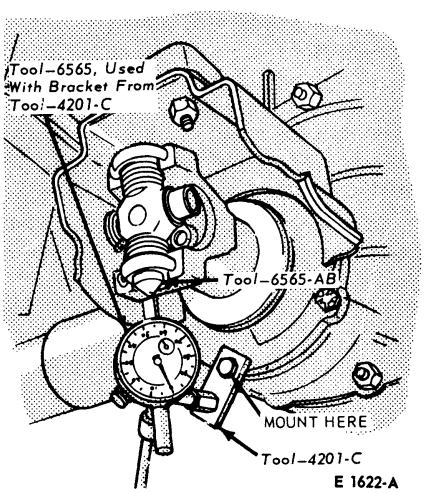


FIG. 6—Flange Bearing Cup Run-out Check—Typical

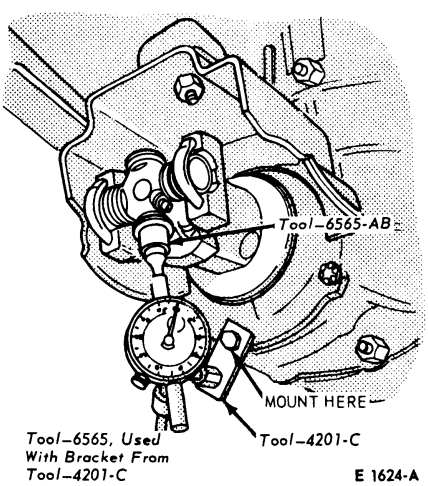


FIG. 8—Cross Shaft Runout Check—Typical

INDICATOR READING	FLANGE BEARING CUP RUNOUT—INCH	DRIVESHAFT UNIVERSAL CROSS-SHAFT RUNOUT—INCH
1	0.004	0.005
2	0.002	0.004
3	0.003	0.003
Average	0.003	0.004

FIG. 7—Flange Bearing Cup and Cross Shaft Runout Averaging Chart—Typical Readings

FLANGE BEARING CUP RUNOUT	DRIVE SHAFT UNIVERSAL CROSS-SHAFT RUNOUT—INCH								
	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008
0.000	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008
0.001	0.001	0.0013	0.0022	0.0032	0.0042	0.0051	0.0061	0.0071	0.0081
0.002	0.002	0.0022	0.0027	0.0037	0.0045	0.0053	0.0062	0.0072	0.0082
0.003	0.003	0.0032	0.0036	0.0042	0.005	0.0058	0.0067	0.0077	0.0085
0.004	0.004	0.0042	0.0045	0.005	0.0057	0.0064	0.0072	0.0081	0.009
0.005	0.005	0.0051	0.0053	0.0058	0.0063	0.0071	0.0078	0.0087	0.0094
0.006	0.006	0.0061	0.0062	0.0068	0.0072	0.0078	0.0085	0.0092	0.010
0.007	0.007	0.0071	0.0073	0.0075	0.0081	0.0087	0.0093	0.0099	0.0103
0.008	0.008	0.0081	0.0082	0.0087	0.009	0.0094	0.010	0.0104	0.011

The total (combined) companion flange runout is located in the square where the columns containing the flange bearing cup runout and universal cross shaft runout readings intersect.

FIG. 9—Companion Flange Combined Runout Chart

slightly moving the cross-shaft fore and aft, then rotate the companion flange from side-to-side.

8. With the indicator at zero, carefully retract the dial stem and rotate the flange 180 degrees. Rotate the cross-shaft 180 degrees on the flange bearing cups to position the exposed journal under the dial indicator adapter. Rock the cross-shaft fore and aft and the companion flange side-to-side to establish the point at which the indicator hand reverses direction. This will determine the driveshaft universal cross-shaft run-out. Record this reading (Fig. 8).

9. Repeat steps 5 through 8 at least three times and average the indicator readings obtained (Fig. 7).

10. To determine the total (combined) companion flange runout, it will be necessary to use the combined runout chart (Fig. 9). Position a straight edge at the amount of flange bearing cup runout indicated on the left hand column of the chart. Position another straight edge vertically at the amount of driveshaft universal cross-shaft runout indicated on the top of the chart. The point at which the straight edges cross the chart indicates the combined rear axle flange runout. For example:

With an indicated 0.003 inch flange bearing cup runout and an indicated 0.004 inch universal cross-shaft runout (Fig. 9), the combined companion flange runout will be 0.005 inch as indicated in the square on the chart (Fig. 9).

11. If the reading obtained in Step 10 exceeds specifications, reposition the companion flange 180 degrees on the pinion shaft and repeat steps 1 through 10.

12. If the repeat readings still exceed specifications, re-position the flange an additional 90 degrees on the pinion shaft and check the runout (Steps 4 through 10).

13. If the runout is still excessive, replace the companion flange and check the runout. If necessary, rotate the new flange on the pinion shaft until an acceptable runout is obtained.

If excessive runout is still evident after replacement of the companion flange, it will be necessary to replace the ring and pinion gear, and repeat the above checks until runout is within specifications.

14. Install the driveshaft assembly (Group 5). **Make sure the universal joint bearing cups are properly positioned between the companion flange lugs.**

15. Lower the vehicle. Road test the vehicle. If drive shaft vibrations are evident during the road test, remove the driveshaft from the companion flange and rotate it 180 degrees. Road test the vehicle again.

THUNDERBIRD AND CONTINENTAL MARK III

1. Raise the vehicle on a hoist that supports the rear axle (twin-post hoist).

2. Remove the driveshaft assembly (Group 5).

3. Check the companion flange for damage.

4. To check radial runout, set up dial indicator as shown in Fig. 10.

5. Rotate the companion flange with the dial indicator in place. If the runout exceeds specifications, remove the flange and reinstall it 180 degrees from original position. Follow the procedure in Part 4-2 for companion flange installation.

6. If the runout is still excessive, remove and reinstall the flange an additional 90 degrees and recheck runout.

7. To check lateral (face) runout, set up the dial indicator as shown in Fig. 11. Repeat steps 5 and 6.

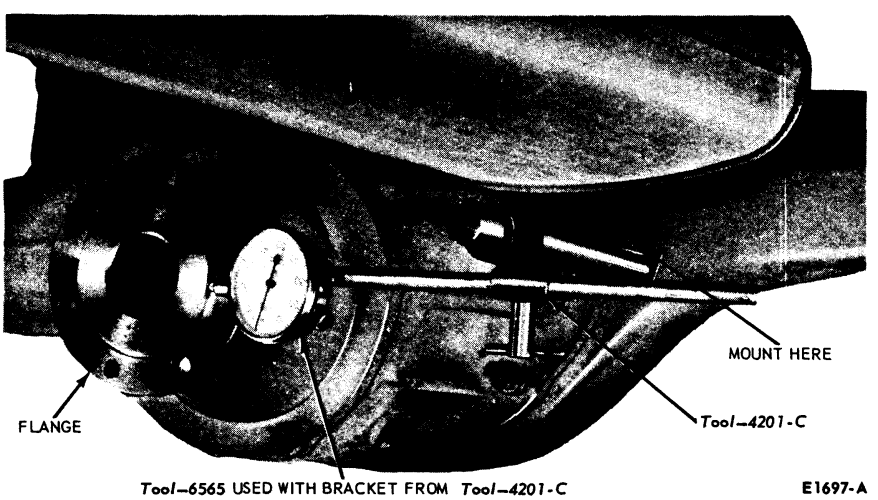


FIG. 10—Checking Companion Flange Radial Runout—Thunderbird and Continental Mark III

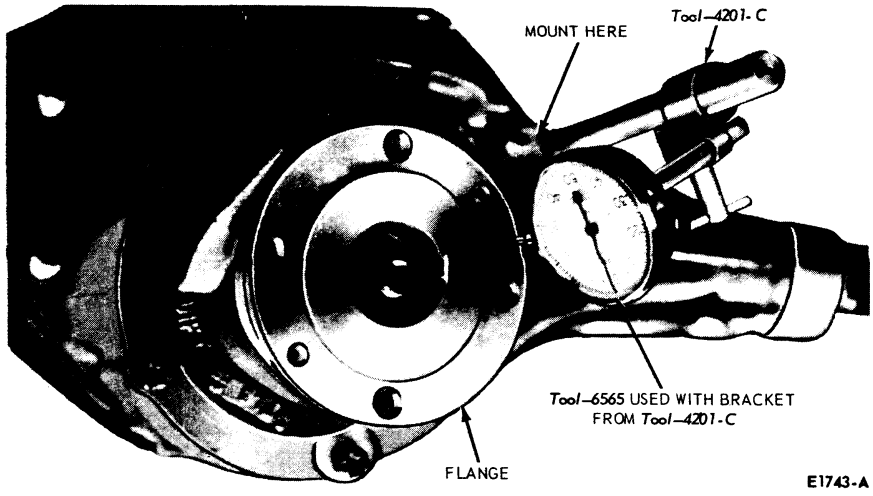


FIG. 11—Checking Companion Flange Lateral Runout—Thunderbird and Continental Mark III

8. If the runout is still excessive, replace the companion flange and check the runout. If necessary, rotate the new flange on the pinion shaft until an acceptable runout is obtained.

If excessive runout is still evident after replacement of the companion flange, it will be necessary to replace the ring and pinion gear, and repeat the above checks until runout is within specifications.

9. Install the driveshaft assembly (Group 5).

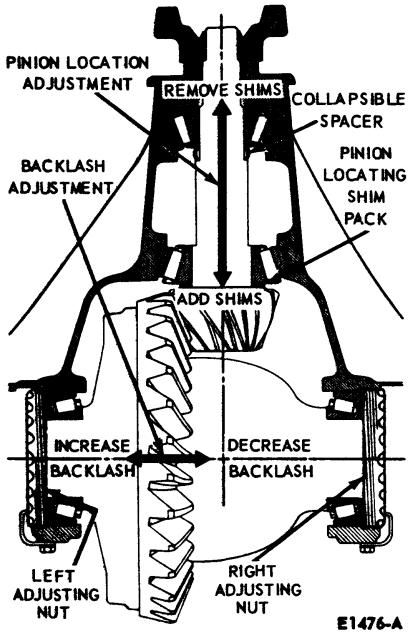


FIG. 12—Pinion and Ring Gear Tooth Contact Adjustment—Integral Carrier Type Axles

PINION AND RING GEAR TOOTH CONTACT ADJUSTMENT

Two separate adjustments affect pinion and ring gear tooth contact. They are pinion location and backlash (Figs. 12 and 13).

Individual differences in matching the differential housing and the gear set require the use of shims to locate the pinion for correct contact with the ring gear.

When adjusting either type axle, shim thickness should be increased or reduced only as indicated by the tooth pattern check described in the foregoing Section 1.

If the tooth pattern check indicates a change in backlash only, follow the procedure under Backlash and Differential Bearing Preload Adjustments. If the tooth pattern indicates a change in shim thickness, follow the procedure under Pinion Location.

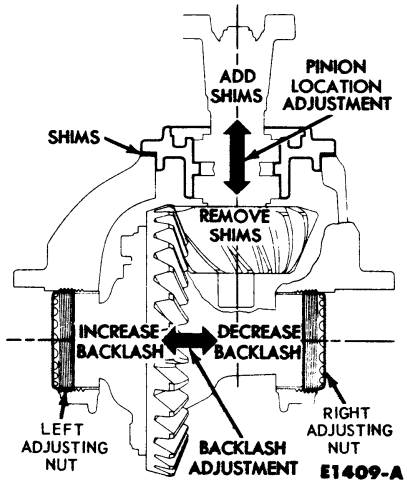


FIG. 13—Pinion and Ring Gear Tooth Contact Adjustment—Removable Carrier Axles

REMOVABLE CARRIER TYPE AXLE

The shim location for the removable carrier type axle is between the pinion retainer and the carrier (Fig. 13). When adjusting this type carrier reducing shim thickness will move the pinion **toward** the ring gear; increasing shim thickness will move the pinion **away** from the ring gear (Fig. 13).

INTEGRAL CARRIER TYPE AXLE

The shim location for the integral carrier type axle, is between the pinion gear and the pinion rear bearing cone (Fig. 12). When adjusting this type axle, **increasing** shim thickness moves the pinion **toward** the ring gear; **reducing** shim thickness moves the pinion away from the ring gear (Fig. 12).

BACKLASH AND DIFFERENTIAL BEARING PRELOAD ADJUSTMENTS (ALL AXLES)

On a Light-Duty (WER) Axle, it is necessary to remove the rear axle shafts prior to performing the adjustment procedures. Refer to Rear Axle Shaft Wheel Bearing and Oil Seal Replacement—Light-Duty (WER), Axle, Part 4-4, Section 2.

To secure a more uniform control of differential side bearing preload in service repairs, a dial indicator set-up such as shown in Fig. 12 is used.

In both types of axle (Fig. 11 and 12), the ring gear is moved away from or toward the pinion as described in the following procedure.

1. Remove the adjusting nut locks, loosen the differential bearing cap bolts, then torque the bolts to 15 ft-lbs on integral carrier type axle; 20 ft-lbs on removable carrier type axles before making adjustments.

2. The left adjusting nut is on the ring gear side of the carrier. The right nut is on the pinion side. Loosen the right nut until it is away from the cup. Tighten the left nut until the ring gear is just forced into the pinion with 0.000 backlash then rotate the pinion several revolutions to be sure no binding is evident. (Recheck the right nut

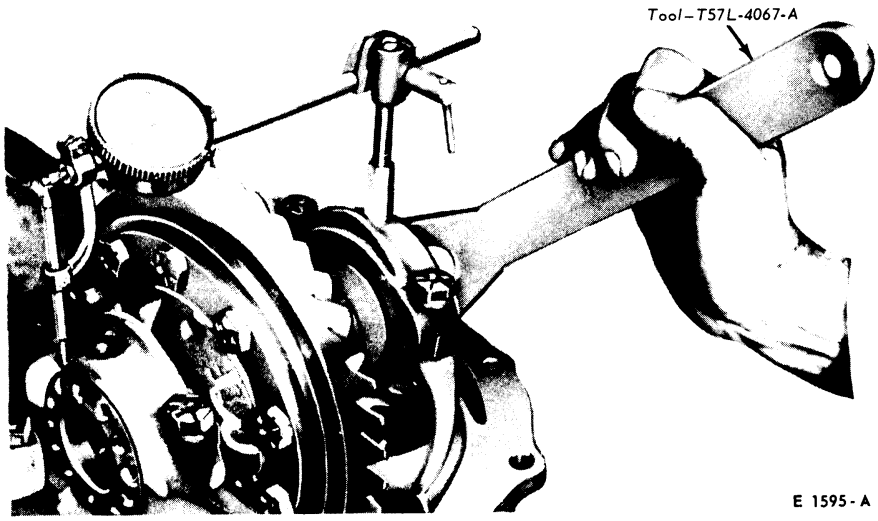


FIG. 14 —Adjusting Side Bearing Preload—Typical

at this time to be sure that it is still loose.) **Tightening the left nut moves the ring gear into the pinion to decrease backlash, and tightening the right nut moves the ring gear away.**

3. Install a dial indicator as shown in Fig. 14.

4. Tighten the right nut until it first contacts the bearing cup. Then preload the bearings from 0.008-0.012 inch case spread. Rotate the pinion gear several revolutions in each direction while the bearings are loaded, to seat the bearings in their cups to be sure no bind is evident. **This step is important.**

5. Again loosen the right nut to release the pre-load. If there is any backlash between the gears as shown by the dial indicator,(Fig.12 or Fig. 10 Part 4-4) tighten the left nut just enough to remove this backlash. At this time, make sure that one of the slots in the left nut is so located that the lock can be installed without turning the nut. Carefully, tighten the right nut until it just contacts the cup.

6. Torque the differential cap bolts to specification.

On integral carrier type axles, set a preload of 0.008 to 0.012 inch case spread for new bearings and 0.003 to 0.005 for the original bearings.

On removable carrier type axles, the preload is 0.008 to 0.012 inch case spread for new bearings and 0.005 to 0.008 for the original bearings. As preload is applied from the right side, the ring gear is forced away from the pinion and usually results in the correct backlash.

7. Measure the backlash on several teeth around the ring gear. If the measurements vary more than 0.003 inch (both integral and removable carrier) there is excessive runout in the gears or their mountings, which must be corrected to obtain a satisfactory unit. If the backlash is out of specification, loosen one adjusting nut and tighten the oposite nut an equal amount to move the ring gear away from or toward the pinion. **When moving the adjusting nuts, the final movement should always be made in a tightening direction. For example, if the left nut had to be loosened one notch, loosen the nut two notches, then tighten it one. This insures that the nut is contacting the bearing cup, and that the cup cannot shift after being put in service.** After all such adjustments, check to be sure that the case spread remains as specified for the new or original bearings used.

8. Again check the tooth contact pattern. If the pattern is still incorrect, a change in pinion location (shim thickness) is indicated.

PINION LOCATION

Removable Carrier Type Axle

1. Remove the attaching bolts and the pinion and bearing retainer assembly from the carrier.

2. Measure the original shim thickness with a micrometer. Increase or decrease the shim thickness as indicated by the tooth pattern check described in Section 1.

3. Replace the pinion retainer O-ring (Fig. 39, Part 4-2). Coat the O-ring with axle lubricant before installing. **Do not roll the O-ring into the groove. Snap it into position.**

4. Being careful not to pinch the O-ring, install the pinion and bearing retainer assembly in the carrier with the corrected shim pack.

Before installing the pinion and bearing retainer assembly, determine which type of gear set is being used. The **non-hunting** and **partial non-hunting** types can be identified by the paint timing marks on the gear teeth (Fig. 51, Part 4-2). Part 4-5 can also be referred to for identification.

If the gear set is of the **non-hunting** or **partial non-hunting** type clean the teeth on both the pinion and drive gear so that the timing marks are visible. Rotate the differential case and ring gear assembly in the carrier until the marked teeth on the ring gear are opposite the pinion entry hole. Place the assembly in the carrier so that the marked tooth on the pinion indexes between the marked teeth on the ring gear (Fig. 51, Part 4-2).

In almost every case of improper assembly (gear assembled out of time) the noise level and probability of failure will be higher than they would be with properly assembled gears.

When installing the **hunting** type gear set (no timing marks), assemble the pinion and retainer assembly into the carrier without regard to the matching on any particular gear teeth.

5. Install the retainer-to-carrier mounting bolts and torque to specifications.

6. Adjust the backlash between the ring gear and pinion as outlined in the foregoing procedures.

7. Make a tooth pattern check. If the pattern is still unsatisfactory, repeat this procedure changing the shim thickness each time until a satisfactory tooth pattern is obtained.

Integral Carrier Type Axle

1. Remove the differential case and the drive pinion from the carrier casting, and then remove the pinion bearings as described under Removal of Differential Case and Drive Pinion in Section 4.

2. Measure the original shim thickness with a micrometer. Increase or decrease the shim thickness as indicated by the tooth pattern check described in the foregoing Section 1 and shown in Fig. 4.

3. Install the corrected shim pack and the bearings on the pinion, and then install the pinion and the differential case in the carrier casting as outlined under Installation of Drive Pinion and Differential Case in Section 4 of Part 4-3.

4. Adjust the backlash between the ring gear and pinion as outlined in the foregoing procedure.

5. Make a tooth pattern check. If the pattern is still unsatisfactory, repeat this procedure changing the shim thickness each time until a satisfactory tooth pattern is obtained.

2 CLEANING AND INSPECTION

INSPECTION BEFORE DISASSEMBLY OF CARRIER (ALL AXLES)

The differential case or carrier should be inspected before any parts are removed from it. These inspections can help to find the cause of the trouble and to determine the corrections needed.

Mount the carrier in the holding fixture shown in Fig. 15. Wipe the lubricant from the internal working parts, and visually inspect the parts for wear or damage.

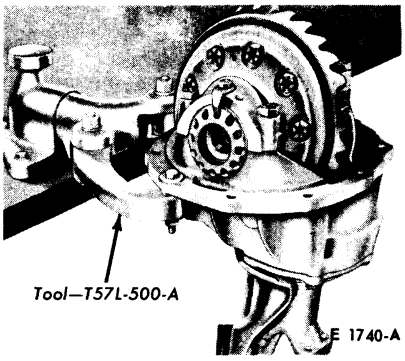


FIG. 15 —Bench Fixture for Carrier Overhaul—Typical

Rotate the gears to see if there is any roughness which would indicate damaged bearings or chipped gears. Check the gear teeth for scoring or signs of abnormal wear.

Set up a dial indicator (Fig. 16) and check the backlash at several points around the ring gear. Backlash should be within specifications.

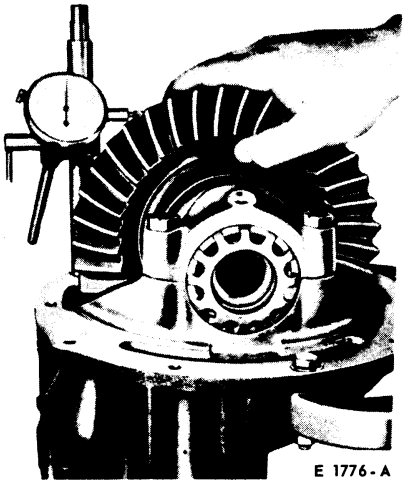


FIG. 16 —Backlash Check—Typical

If no obvious defect is noted, check the gear tooth contact.

To check the gear tooth contact, paint the gear teeth with the special compound furnished with each service ring gear and pinion. A mixture that is too wet will run and smear. Too dry a mixture cannot be pressed out from between the teeth.

As shown in Fig. 17, rotate the ring gear (use a box wrench on the ring gear attaching bolts for a lever) five complete revolutions in both directions or until a clear tooth contact pattern is obtained.

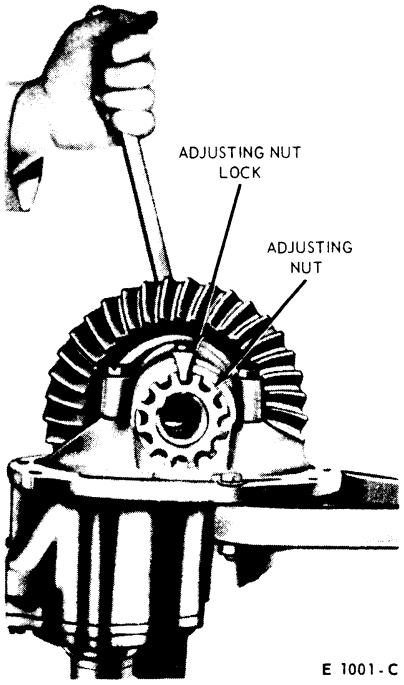


FIG. 17 —Checking Gear Tooth Contact—Typical

Certain types of gear tooth contact patterns on the ring gear indicate incorrect adjustment. Noise caused by incorrect adjustment can often be corrected by readjusting the gears. Acceptable patterns and the necessary corrections are explained under Tooth Contact Pattern Check in Section 1.

Gear tooth runout can sometimes be detected by an erratic pattern on the teeth. However, a dial indicator should be used to measure the runout of the back face of the ring gear as shown in Fig. 18. If this runout exceeds specifications, disassemble the carrier and replace necessary parts as indicated in Part 4-2, Section 4 and Part 4-3, Section 4.

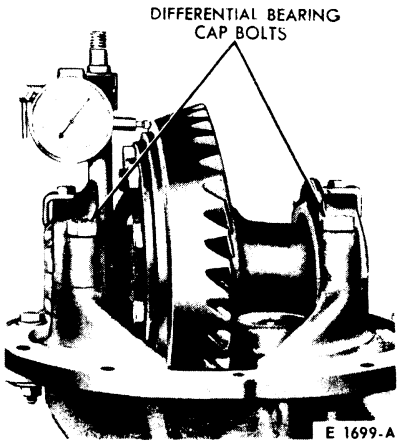


FIG. 18 —Checking Ring Gear Runout—Typical

Loosen the differential bearing cap bolts, and then torque them to 25 ft-lbs. Remove the adjusting nut locks. Carefully loosen one of the adjusting nuts to determine if any differential bearing preload remains. If any preload remains, the differential bearings may be re-used, provided they are not pitted or damaged.

INSPECTION AFTER DISASSEMBLY OF CARRIER (ALL AXLES)

Thoroughly clean all parts. Synthetic seals must not be cleaned, soaked or washed in cleaning solvents. Always use clean solvent when cleaning bearings. Oil the bearings immediately after cleaning to prevent rusting. Inspect the parts for defects. Clean the inside of the carrier before rebuilding it. **When a scored gear set is replaced, the axle housing should be washed thoroughly and steam cleaned.** This can only be done effectively if the axle shafts and shaft seals are removed from the housing. Inspect individual parts as outlined below.

GEARS

Examine the pinion and ring gear teeth for scoring or excessive wear. **Extreme care must be taken not to damage the pilot bearing surface of the pinion.**

The pattern taken during disassembly should be helpful in judging if gears can be re-used. Worn gears cannot be rebuilt to correct a noisy condition. Gear scoring is the result of excessive shock loading or the use of an incorrect lubricant. Scored gears cannot be re-used.

Examine the teeth and thrust surfaces of the differential gears. Wear on the hub of the differential gear can cause a chucking noise known as chuckle when the vehicle is driven at low speeds. Wear of splines, thrust surfaces, or thrust washers, can contribute to excessive drive line backlash.

BEARING CUPS AND CONE AND ROLLER ASSEMBLIES

Check bearing cups for rings, scores, galling, or excessively worn wear patterns. Pinion cups must be solidly seated. Check by attempting to insert a 0.0015-inch feeler between these cups and the bottoms of their bores.

When operated in the cups, cone and roller assemblies must turn without roughness. Examine the roller ends for wear. Step-wear on the roller ends indicates the bearings were not preloaded properly, or the rollers were slightly misaligned.

If inspection reveals either a defective cup or a defective cone and roller assembly, **both parts should be replaced to avoid early failure.**

DIFFERENTIAL BEARING ADJUSTING NUTS

Temporarily install the bearing caps and test the fit of the adjusting nuts in their threads. The nuts should turn easily when the caps are tightened to 25 ft-lbs. The faces of the nuts that contact the bearing cups must be smooth and square. Replace the nuts or examine the threads in the carrier if their fit is not proper. Be sure that the bearing caps and adjusting nuts are on the side they were machined to fit. Observe the punch marks and scribe marks made during disassembly.

U-JOINT FLANGE

Be sure that the ears of the flange have not been damaged in removing the drive shaft or in removing the flange from the axle. The end of the flange that contacts the front pinion bearing inner race as well as the flat surface of the pinion nut counterbore must be smooth. Polish these surfaces if necessary. Roughness aggravates backlash noises and causes wear of the flange and pinion nut with a resultant loss in pinion bearing preload.

PINION RETAINER

Be sure that the pinion bearing cups are seated. Remove any chips or burrs from the mounting flange. Clean the groove for the O-ring seal and all lubricant passages. If the cups were removed, examine the bores carefully. Any nicks or burrs in these bores must be removed to permit proper seating of the cups.

CARRIER HOUSING

Make sure that the differential bearing bores are smooth and the threads are not damaged. Remove any nicks or burrs from the mounting surfaces of the carrier housing.

DIFFERENTIAL CASE

Make sure that the hubs where the bearings mount are smooth. Carefully examine the differential case bearing shoulders, which may have been damaged when the bearings were removed. The bearing assemblies will fail if they do not seat firmly against the shoulders. Check the fit (free rotation) of the differential side gears in their counterbores. Be sure that the mating surfaces of the two parts of the case are smooth and free from nicks or burrs.

LIMITED SLIP AND TRACTION-LOK DIFFERENTIAL PARTS

Inspect the clutch plates for uneven or extreme wear. The dog-eared clutch plates must be free from burrs, nicks or scratches which could cause excessive or erratic wear to the bonding material of the internally splined clutch plates. The internally splined clutch plates should be inspected for condition of the bond, bonding material, and wear. Replace the bonded plates if their thickness is less than 0.085 inch or if the bonded material is scored or badly worn. Inspect the bonded plate internal teeth for wear. Replace them, if excessive wear is evident. **Bonded plates should be replaced as a set only**

Examine all thrust surfaces and hubs for wear. Abnormal wear on these surfaces can contribute to a noisy axle.

Inspect the Belleville spring (limited slip) for proper free height of 1/4 inch.

LUBRICANT LEVEL

The lubricant level should be checked every 6000 miles with the vehicle in normal curb attitude. The lubricant level should be at the lower edge of the filler plug hole located in either the carrier casting or housing cover. It is unnecessary to periodically drain the axle lubricant. The factory fill should remain in the housing for the life of the vehicle, except when repairs are made. The specified lubricant should be installed when the axle is overhauled.

PART 4-2 *Rear Axle—Removable Carrier Type*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
AXLE HOUSING (Coil Spring Suspension)												
Cleaning and Inspection		01-09	01-09	01-09	N/A	N/A	N/A	N/A	N/A	N/A	01-09	01-09
Removal and Installation		02-08	02-08	02-08	N/A	N/A	N/A	N/A	N/A	N/A	02-08	02-08
AXLE HOUSING (Leaf Spring Suspension)												
Cleaning and Inspection		N/A	N/A	N/A	01-09	01-09	01-09	01-09	01-09	01-09	N/A	N/A
Removal and Installation		N/A	N/A	N/A	02-11	02-11	02-11	02-11	02-11	02-11	N/A	N/A
AXLE SHAFT												
Cleaning and Inspection	01-10											
Removal and Installation	02-04											
CONVENTIONAL DIFFERENTIAL												
Cleaning and Inspection	01-10											
Disassembly and Overhaul	02-13											
Removal and Installation	02-08											
DIFFERENTIAL BEARINGS AND RING GEAR												
Adjustment	02-19											
Cleaning and Inspection	01-10											
Removal and Installation	02-19											
DIFFERENTIAL CARRIER												
Cleaning and Inspection	01-10											
Disassembly and Overhaul	02-13											
Removal and Installation	02-08											
LIMITED SLIP DIFFERENTIAL												
Cleaning and Inspection	01-10											
Description	02-03											
Disassembly and Overhaul	02-13											
Removal and Installation	02-13											
PILOT BEARING												
Cleaning and Inspection	01-10											
Removal and Installation	02-15											
PINION AND RING GEAR												
Cleaning and Inspection	01-10											
Removal and Installation	02-15											
PINION BEARING												
Cleaning and Inspection	01-10											
Removal and Installation	02-15											
PINION BEARING RETAINER												
Cleaning and Inspection	01-10											
Removal and Installation	02-15											
PINION SPACER (Collapsible)												
Removal and Installation		02-17	N/A	02-17	02-17	02-17	02-17	02-17	02-17	N/A	N/A	N/A
PINION OIL SEAL												
Removal and Installation	02-04											

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
PINION SPACER (Solid)												
Determining Spacer Size	02-18											
Removal and Installation	02-18											
REAR WHEEL BEARINGS AND SEALS												
Cleaning and Inspection	01-10											
Removal and Installation	02-04											
TRACTION-LOK DIFFERENTIAL												
Cleaning and Inspection		N/A	N/A	N/A	01-10	01-10	01-10	01-10	01-10	N/A	N/A	N/A
Description		N/A	N/A	N/A	02-03	02-03	02-03	02-03	02-03	02-03	N/A	N/A
Disassembly and Overhaul		N/A	N/A	N/A	02-22	02-22	02-22	02-22	02-22	N/A	N/A	N/A
Removal and Installation		N/A	N/A	N/A	02-13	02-13	02-13	02-13	02-13	N/A	N/A	N/A
U-JOINT FLANGE												
Cleaning and Inspection	01-10											
Removal and Installation	02-07											

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

CONVENTIONAL AXLE

The rear axle is of the banjo-housing, hypoid gear type using an 8 3/4, 9 or 9 3/8 inch ring gear, in which the centerline of the pinion is mounted below the centerline of the ring gear (Fig. 1).

The pinion gear and the pinion bearings are assembled in a pinion retainer, which is bolted to the carrier. The pinion is straddle mounted; that

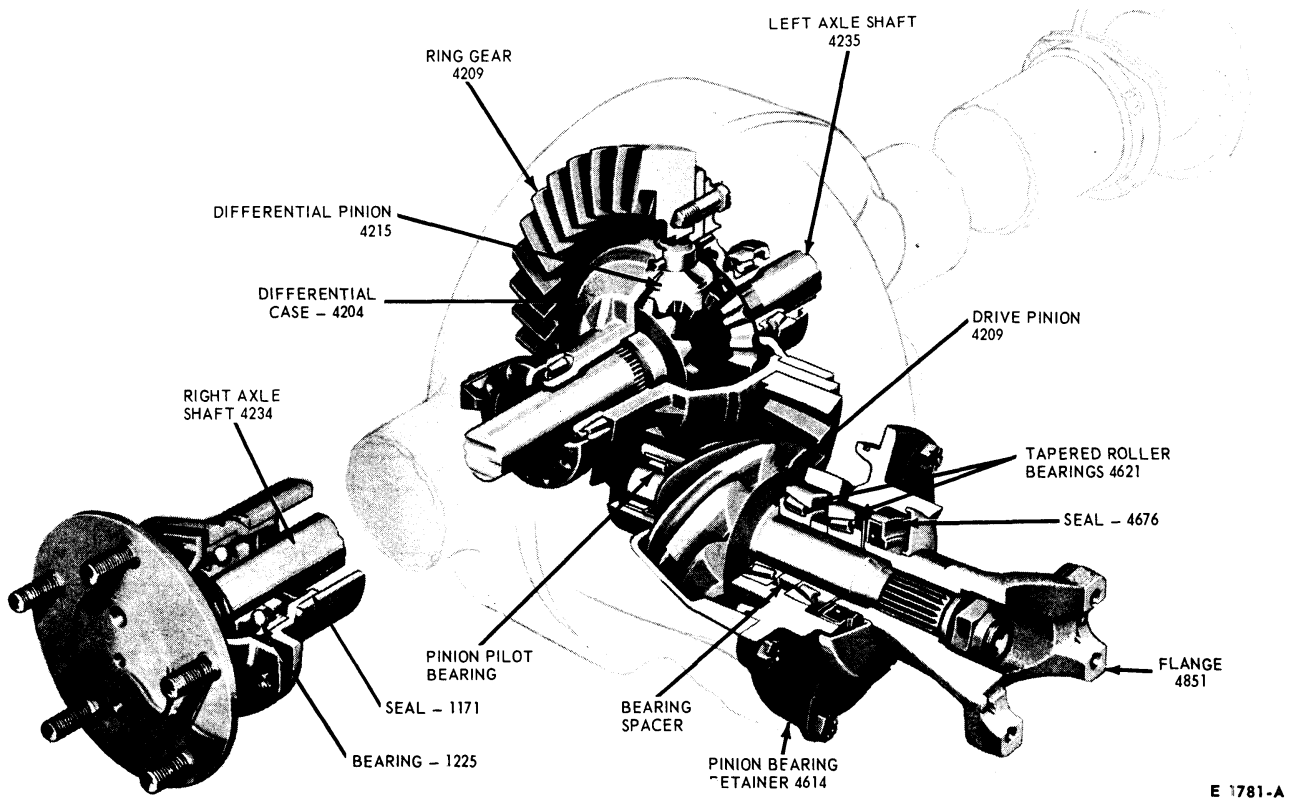


FIG. 1—Rear Axle Assembly—Integral Pinion Gear and Shaft—8-3/4, 9, or 9-3/8 Inch Ring Gear—Typical

is, it is supported by bearings both in front of and to the rear of the pinion gear. Two opposed tapered roller bearings support the pinion shaft in front of the pinion gear with a collapsible spacer for 8-3/4 inch or 9 inch ring gear, and a solid spacer used with the 9 3/8 inch ring gear. A straight roller (pilot) bearing supports the pinion shaft at the rear of the pinion gear. Pinion and ring gear tooth contact is adjusted by adding or removing shims from between the pinion retainer and the carrier housing.

The differential assembly is mounted on two opposed tapered roller bearings, which are retained in the carrier by removable caps. The entire carrier assembly is bolted to the axle housing.

Ball bearing assemblies (rear wheel bearings) are pressed onto the outer ends of the axle shafts and set in the outer ends of the axle housing. These bearings support the semi-floating axle shafts at the outer ends. The inner ends of the shafts spline to the differential side gears. Bearing retainer plates hold the shafts in the housing. The left and right axle shafts are not interchangeable, the left shaft being shorter than the right.

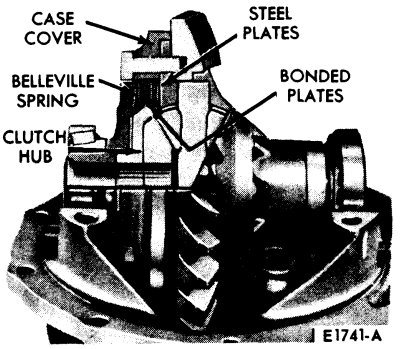


FIG. 2—Limited-Slip Differential

LIMITED-SLIP DIFFERENTIAL

The axle assembly, except for the differential case and its internal components, is identical to the conventional axle.

A constant-friction locking differential, which employs clutch plates to control differential action, is available as optional equipment (Fig. 2).

Four steel clutch plates are locked into the differential cover. Three bronze, bonded clutch plates are splined to a clutch hub which, in turn, is splined to the left axle shaft. A Belleville spring washer maintains a constant pressure between the steel and bonded clutch plates so that the clutch is always engaged.

TRACTION-LOK DIFFERENTIAL

The Traction-Lok (torque sensitive) locking differential (Fig. 3) employs a multiple disc clutch to control differential action. Shim(s), which control side gear mounting distance, four steel, four friction and one composite plate (steel on one side and friction material on the other) stacked on a clutch hub, and four ear guides are housed in the differential cover. Located in the differential case between the side gears is a one-piece pre-load plate and block (four-pinion) and four calibrated pre-load springs, which apply an initial force to the clutch pack. Additional clutch capacity is derived from the side gear thrust loads. The four friction plates are splined to the clutch hub which in turn is splined to the left axle shaft, and the eared steel plates are dogged to the case; thus, the clutch is always engaged.

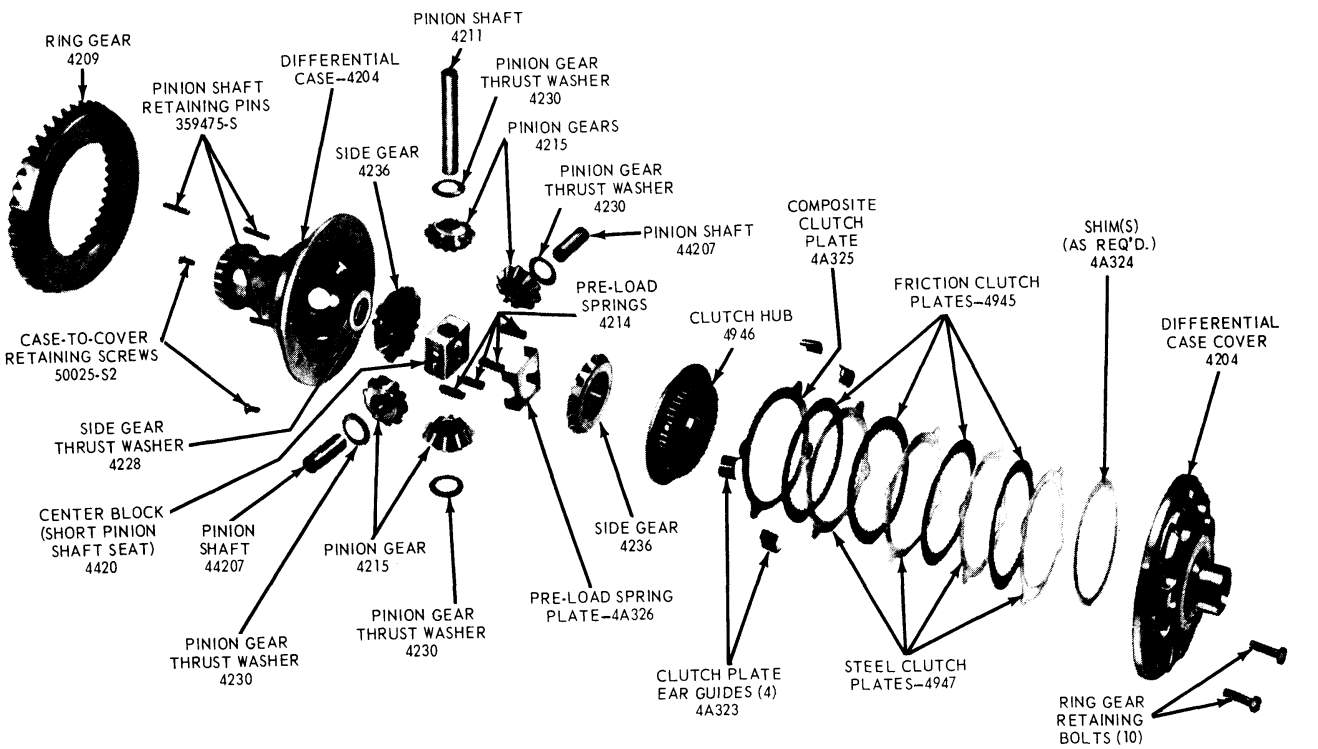


FIG. 3—Traction-Lok Differential

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

REAR AXLE SHAFT, WHEEL BEARING AND OIL SEAL REPLACEMENT

The rear axle shafts, wheel bearings, and oil seal can be replaced without removing the differential assembly from the axle housing.

REMOVAL OF AXLE SHAFT

Synthetic wheel bearing seals are used in production only. Removal and insertion of rear axle shafts must be performed with caution. The entire length of the shaft (including spline) up to the seal journal must pass through the seal without cutting of the seal element during axle removal or installation will result in early seal failure. Leather seals only will be used as service replacement for synthetic wheel bearing seals.

1. Remove the wheel cover, wheel and tire from the brake drum.
2. Remove the nuts that secure the brake drum to the axle shaft flange, then remove the drum from flange.
3. Working through the hole provided in each axle shaft flange, remove the nuts that secure the wheel bearing retainer plate. Then pull the axle shaft assembly out of the axle housing (Fig. 4). **The brake backing plate must not be dislodged. Install one nut to hold the plate in place after the axle shaft is removed.**

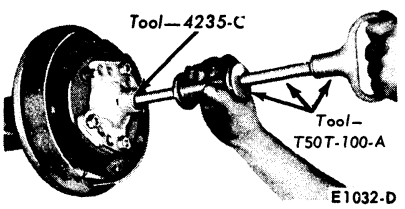


FIG. 4—Removing Axle Shaft

REMOVAL OF REAR WHEEL BEARING AND SEAL

Synthetic seals must not be cleaned, soaked or washed in cleaning solvents.

Removal of the wheel bearings from the axle shaft makes them unfit for further use.

1. On all models except Ford, Mercury or Meteor, if the rear wheel bearing is to be replaced, loosen the inner retainer ring by nicking it deeply with a cold chisel in several places (Fig. 5). It will then slide off easily.

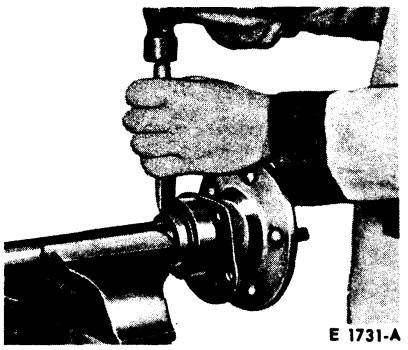


FIG. 5—Removing Rear Wheel Bearing Retainer Ring

On Ford, Mercury and Meteor models, it is necessary to first drill a 1/4 inch hole **not more than 5/16 inch** deep in the retainer ring surface before using the cold chisel.

2. Remove the bearing from the axle shaft with the tool shown in Fig. 6 or Fig. 7.
3. **Whenever a rear axle shaft is replaced, the oil seal must be replaced.** Remove the seal with Tool 1175-AB and a slide hammer (Fig. 8). If new leather-type wheel bearing service seals are to be installed, soak new oil seals in SAE 10 oil for 1/2 hour before installing.

INSTALLATION OF REAR WHEEL BEARING AND SEAL

1. Inspect the machined surface of the axle shaft and the axle housing for rough spots or other irregularities which would affect the sealing action of the oil seal. Check the axle shaft splines for burrs, wear or twist. Carefully remove any burrs or rough spots. Replace worn or damaged parts.
2. Lightly coat wheel bearing bores with axle lubricant.
3. Place the retainer plate on the axle shaft, and press the new wheel bearing on the shaft with the tool shown in Fig. 6 or Fig. 9. **Do not attempt to press on both the bearing and the inner retainer ring at the same time.**
4. Using the bearing installation tool (Tool 4621-A or 4234-4), press the bearing inner retainer ring on the shaft until the retainer seats firmly against the bearing. **On Ford, Mercury, or Meteor models, before assembling the retainer onto the axle shaft, the shaft journal and the inside diameter of the retainer should be wiped clean with a dry cloth. These parts must not be degreased or lubricated.**
5. **Rear wheel oil seals with synthetic sealing elements have been incorporated in production only. However, leather seals only will be used as replacements for the synthetic sealing elements.** Install the new oil seal with the tools shown in Figs. 10 and 12. Be sure the new seal has been soaked in SAE 10 oil for 1/2 hour before installing it. Wipe a small amount of oil resistant sealer on the outer edge of the seal before it is installed. **Do not put sealer on the sealing lip.**

INSTALLATION OF AXLE SHAFT

1. Carefully slide the axle shaft into the housing so that the rough forging of the shaft will not damage the oil seal. Start the axle splines into the side gear, and push the shaft in until the bearing bottoms in the housing.
2. Install the bearing retainer plate and the nuts that secure it. Torque the nuts to specifications.
3. Install the brake drum and the drum attaching (Tinnerman) nuts.
4. Install the wheel and tire on the drum. Install the wheel cover.

DRIVE PINION OIL SEAL REPLACEMENT

COLLAPSIBLE SPACER

Synthetic seals must not be cleaned, soaked or washed in cleaning solvent.

The drive pinion oil seal can be replaced without removing the differential carrier assembly from the axle housing.

1. Raise the vehicle and install safety stands. Remove both rear wheels and brake drums.
2. Make scribe marks on the drive shaft end yoke and the axle U-joint flange to insure proper position of the drive shaft at assembly (Fig. 11). Disconnect the drive shaft from the axle U-joint flange. **Be careful to avoid dropping the loose universal joint bearing cups.** Hold the cups on the spider with tape. Mark the cups so that they will be in their original position in relation to the flange when they are assembled. Remove the drive shaft from the transmission extension housing. Install an oil seal replacer tool in the transmission extension housing to prevent transmission fluid

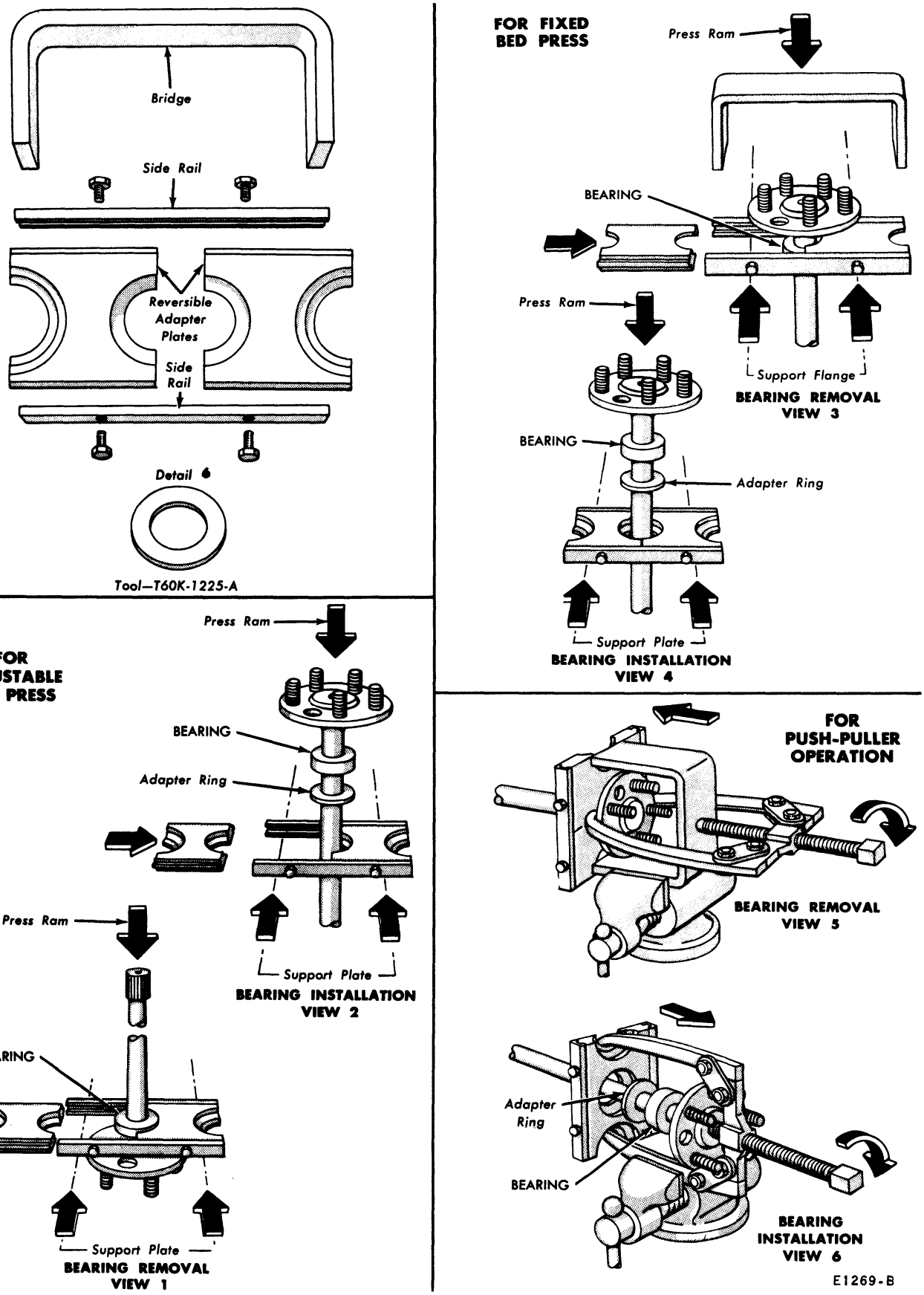


FIG. 6—Removing and Installing Wheel Bearing

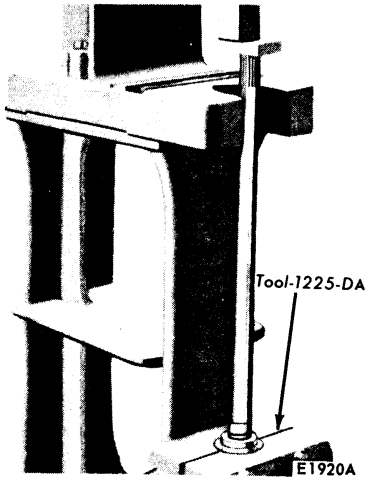


FIG. 7—Removing Wheel Bearing

leakage. Refer to the transmission group for the appropriate tool.

3. Install an in-lb torque wrench on the pinion nut. Record the torque required to maintain rotation of the pinion shaft through several revolutions.

4. Scribe the pinion shaft and the U-joint flange inner surface for assembly realignment. While holding the flange with the tool shown in Fig. 22 or Fig. 23, remove the integral pinion nut and washer.

5. Clean the pinion bearing retainer around the oil seal. Place a drain pan under the seal, or raise the front of the vehicle higher than the rear.

6. Using the tool shown in Fig. 24 or Fig. 25, remove the U-joint flange.

7. Using the tool shown in Fig. 26 remove the drive pinion oil seal.

8. Clean the oil seal seat.

9. Install the new seal in the retainer, using the applicable tool shown in Fig. 47.

10. Check splines on the pinion shaft to be sure they are free of burrs. If burrs are evident, remove them by using a fine crocus cloth, working in a rotational motion. Wipe the pinion shaft clean.

11. Apply a small amount of lubricant to U-joint splines.

Align scribe marks on U-joint flange and pinion shaft.

12. Install the U-joint flange using the tool shown in Fig. 46.

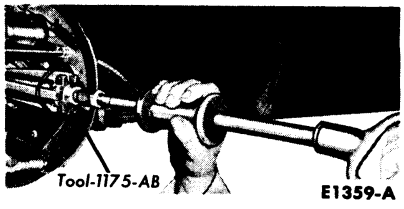


FIG. 8—Removing Rear Wheel Bearing Oil Seal

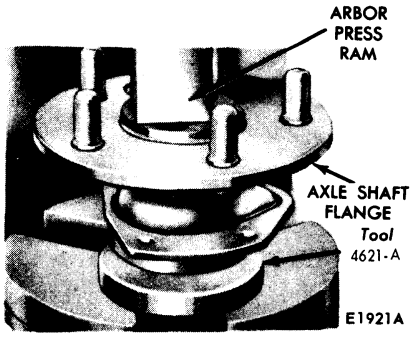


FIG. 9—Installing Wheel Bearing

13. Install a new integral nut and washer on the pinion shaft. (Apply a small amount of lubricant on the washer side of the nut).

14. Hold the flange with the tool shown in Fig. 24 or Fig. 25 while tightening nut.

15. Tighten the pinion shaft nut, rotating the pinion occasionally to insure proper bearing seating, and take frequent preload readings until the preload is at the original recorded reading established in step 3.

16. After original preload has been reached, tighten the pinion nut slowly, until an additional preload of 8 to 14 in-lb over the original reading is reached. The preload should not exceed 8 to 14 in-lb over the original reading, or bearing failure may result. Under no circumstances should the pinion nut be backed off to lessen preload. If this is done, a new pinion bearing spacer must be installed. In addition, the U-joint flange must never be hammered on, or pneumatic tools used.

17. Remove the oil seal replacer tool from the transmission extension housing. Install the front end of the drive shaft on the transmission output shaft.

18. Connect the rear end of the drive shaft to the axle U-joint flange, aligning the scribe marks made on the

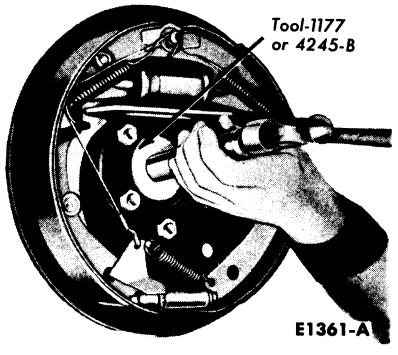


FIG. 10—Installing Rear Wheel Bearing Oil Seal

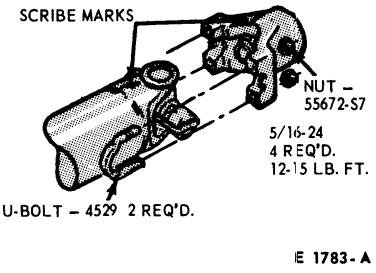


FIG. 11—Drive Shaft-To-Axle U-Joint Connection

drive shaft end yoke and the axle U-joint flange (Fig. 11).

19. Check the lubricant level. Make sure the axle is in running position. Add whatever amount of specified lubricant is required to reach the lower edge of the filler plug hole.

SOLID SPACER

The drive pinion oil seal can be replaced without removing the differential carrier assembly from the axle housing.

1. Make scribe marks on the drive shaft end yoke and the axle U-joint flange to insure proper position of the drive shaft at assembly (Fig. 11). Disconnect the drive shaft from the axle U-joint flange. **Be careful to avoid dropping the loose universal joint bearing cups.** Hold the cups on the spider with tape. Mark the cups so that they will be in their original position in relation to the flange when they are assembled. Remove the drive shaft from the transmission extension housing to prevent transmission leakage. Refer to the transmission group for the appropriate tool.

2. Make punch marks on the end of the pinion shaft and the U-joint flange inner surface for realignment. While holding the flange with the tool shown in Fig. 22 or Fig. 23, remove the integral pinion nut and washer.

3. Clean the pinion bearing retainer around the oil seal. Place a drain pan under the seal, or raise the front of the vehicle higher than the rear.

4. Using the tool shown in Fig. 24 or Fig. 23, remove the U-joint flange.

5. Using the tool shown in Fig. 26 remove the drive pinion oil seal.

6. Clean the oil seal seat.

7. Install the new seal in the retainer, using the applicable tool shown in Fig. 47.

8. Check splines on the pinion shaft to be sure they are free of burrs. If

burrs are evident, remove them with a fine crocus cloth, working in a rotational motion, then wipe clean. Apply a small quantity of lubricant to U-joint splines.

9. Install the U-joint flange using the tool shown in Fig. 46.

10. Install a new integral attaching nut and washer on the pinion shaft.

11. Tighten the pinion attaching nut, rotating the pinion several times to seat the bearing, then torque the pinion nut to 180-200 ft-lbs. Hold the flange with the tool shown in Fig. 22 or Fig. 23 while the nut is being tightened.

12. Remove the oil seal replacer tool from the transmission extension housing. Install the front end of the drive shaft on the transmission output shaft.

13. Connect the rear end of the drive shaft to the axle U-joint flange, aligning the scribe marks made on the drive shaft end yoke and the axle U-joint flange.

14. Check the lubricant level, and add whatever amount of specified lubricant is necessary to reach the lower edge of the filler plug hole. Make sure the axle is in running position when the level is checked.

ORIGINAL U-JOINT FLANGE (IN VEHICLE REPLACEMENT)

Use procedure as outlined under Drive Pinion Oil Seal Replacement.

Synthetic seals must not be cleaned, soaked or washed in cleaning solvent.

INSTALLATION OF A NEW UNIVERSAL JOINT FLANGE

COLLAPSIBLE SPACER

1. Raise the vehicle and install safety stands. Remove both rear wheels and brake drums.

2. Disconnect the drive shaft from the axle U-joint flange. **Be careful to avoid dropping the loose universal joint bearing cups. Hold the cups on the spider with tape.** Mark the cups so that they will be in their original position in relation to the flange when they are assembled. Remove the drive shaft from the transmission extension housing. Install an oil seal replacer tool in the transmission extension housing to prevent transmission fluid leakage. Refer to the transmission group for the appropriate tool.

3. Install an in-lb torque wrench on the pinion nut. Record the torque required to maintain rotation of the pinion shaft through several revolutions.

4. While holding the flange with the tool shown in Fig. 23 or Fig. 24, remove the integral pinion nut and washer.

5. Clean the pinion bearing retainer around the oil seal. Place a drain pan under the seal, or raise the front of the vehicle higher than the rear. Synthetic seals must not be cleaned, soaked or washed in cleaning solvent.

6. Using the tool shown in Fig. 23 or Fig. 24, remove the U-joint flange.

7. Check splines on the pinion shaft to be sure they are free of burrs. If burrs are evident, remove them by using a fine crocus cloth, working in a rotational motion, then wipe clean.

Apply a small amount of lubricant to U-joint splines.

8. Install the U-joint flange using the tool shown in Fig. 46.

9. Install a new integral nut and washer on the pinion shaft. (Apply a small amount of lubricant on the washer side of the nut.)

10. Hold the flange with the tool shown in Fig. 23 or Fig. 24 while the nut is being tightened.

11. Tighten the pinion shaft nut, rotating the pinion occasionally to insure proper bearing seating, and take frequent preload readings until the preload is at the original recorded reading established in step 3.

12. After original preload has been reached, tighten the pinion nut slowly, until an additional preload of 8 to 14 in-lb over the original reading is reached. (The preload should not exceed 8 to 14 in-lb over the original reading, or bearing failure may result.

Under no circumstances should the pinion nut be backed off to lessen preload. If this is done, a new pinion bearing spacer must be installed. In addition, the U-joint flange must never be hammered on, or power tools used.

13. Remove the oil seal replacer tool from the transmission extension housing. Install the front end of the drive shaft on the transmission output shaft.

14. Connect the rear end of the drive shaft to the axle U-joint flange, aligning the scribe marks made on the drive shaft end yoke and the axle U-joint flange.

15. Check the lubricant level. **Make sure the axle is in running position.** Add whatever amount of specified lubricant is required to reach the lower edge of the filler plug hole.

SOLID SPACER

1. Disconnect the drive shaft from the axle U-joint flange. **Be careful to avoid dropping the loose universal joint bearing cups.** Hold the cups on the spider with tape. Mark the cups so that they will be in their original position in relation to the flange when they are assembled. Remove the drive shaft from the transmission extension housing. Install an oil seal replacer tool in the transmission extension housing to prevent transmission leakage. Refer to the transmission group for the appropriate tool.

2. While holding the flange with the tool shown in Fig. 23 or Fig. 24, remove the integral pinion nut and washer.

3. Clean the pinion bearing retainer around the oil seal. Place a drain pan under the seal, or raise the front of the vehicle higher than the rear.

4. Using the tool shown in Fig. 23 or Fig. 24, remove the U-joint flange.

5. Check splines on the pinion shaft to be sure they are free of burrs. If burrs are evident, remove them by using a fine crocus cloth, working in a rotational motion, then wipe clean. Apply a small amount of lubricant to U-joint splines.

6. Install the U-joint flange using the tool shown in Fig. 46.

7. Install integral attaching nut and washer on the pinion shaft.

8. Tighten the pinion attaching nut, rotating the pinion several times to seat the bearing, then torque the pinion attaching nut to 180-220 ft-lbs. Hold the flange with the tool shown in Fig. 23 or Fig. 24 while the nut is being tightened.

9. Remove the oil seal replacer tool from the transmission extension housing. Install the front end of the drive shaft on the transmission output shaft.

10. Connect the rear end of the drive shaft to the axle U-joint flange.

11. Check the lubricant level, and add whatever amount of specified lubricant is necessary to reach the lower edge of the filler plug hole. Make sure the axle is in running position when the level is checked.

DRIVE SHAFT PINION ANGLE ADJUSTMENT

Refer to **Group 3, Part 3-2** for this procedure.

3 REMOVAL AND INSTALLATION

CARRIER ASSEMBLY

REMOVAL

1. Raise the vehicle on a hoist and remove the two rear wheels and tires.
2. Remove the two brake drums (3 Tinnerman nuts at each drum) from the axle shaft flange studs. If difficulty is experienced in removing the drums, remove the brake adjuster knockout slug or rubber plug (if so equipped) and back off the brake shoes.
3. Working through the hole provided in each axle shaft flange, remove the nuts that secure the rear wheel bearing retainer plate. Pull each axle shaft assembly out of the axle housing using axle shaft remover, Tool 4235-C. (Fig. 4). **Care must be exercised to prevent damage to the production-type synthetic oil seal, if so equipped. Any roughing or cutting of the seal element during removal or installation can result in early seal failure.** Install a nut on one of the brake backing plate attaching bolts to hold the plate to the axle housing after the shaft has been removed. **Whenever a rear axle shaft is replaced, the wheel bearing oil seals must be replaced. Remove the seals with tool 1175AB.**
4. Make scribe marks on the drive shaft end yoke and the axle U-joint flange to insure proper position at assembly. Disconnect the drive shaft at the rear axle U-joint. Hold the cups on the spider with tape. Mark the cups so that they will be in their original position relative to the flange when they are assembled. Remove the drive shaft from the transmission extension housing. Install an oil seal replacer tool in the housing to prevent transmission leakage. Refer to the transmission group for the appropriate tool.
5. Clean area around carrier to housing surfaced with a wire brush and wipe clean, to prevent dirt entry into the housing. Place a drain pan under the carrier and housing, remove the carrier attaching nuts, and drain the axle. Remove the carrier assembly from the axle housing.

INSTALLATION

Synthetic production-type wheel bearing seals **must not be cleaned, soaked or washed in cleaning solvent.**

1. Clean the axle housing and shafts using kerosene and swabs. To avoid contamination of the grease in the sealed ball bearings, do not allow any quantity of solvent directly on the wheel bearings. Clean the mating surfaces of the axle housing and carrier.
2. Position the differential carrier on the studs in the axle housing using a new gasket between carrier and housing. Install the carrier-to-housing attaching nuts, and torque them to specifications.
3. Remove the oil seal replacer tool from the transmission extension housing. Position the drive shaft so that the front U-joint slip yoke splines to the transmission output shaft.
4. Connect the drive shaft to the axle U-joint flange, aligning the scribe marks made on the drive shaft end yoke and the axle U-joint flange during the removal procedure. Install the U-bolts and nuts and torque to specifications.
5. If the synthetic, production-type wheel bearing seals were replaced with service-type leather seals, soak the new rear wheel bearing oil seals in SAE 10 oil for 1/2 hour before installation. Wipe a small amount of an oil resistant sealer on the outer edge of each seal before it is installed. **Do not put any of the sealer on the sealing lip.** Install the oil seals in the ends of the rear axle housing with one of the tools shown in Figs. 10 and 12.

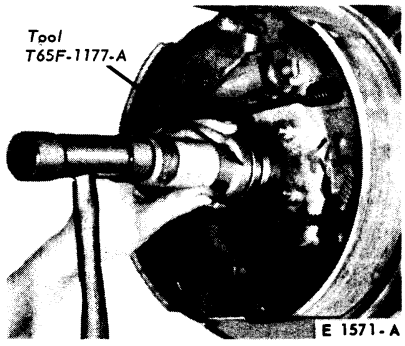


FIG. 12—Rear Axle Shaft Bearing Seal Installation

6. Install the two axle shaft assemblies in the axle housing. Care must be exercised to prevent damage to the oil seals. The shorter shaft goes into the left side of the housing.

Carefully slide the axle shaft into the housing so that the rough forging of the shaft will not damage the oil seal. Start the axle splines into the differential side gear, and push the shaft in until the bearing bottoms in the housing.

7. Install the bearing retainers on the attaching bolts on the axle housing flanges. Install the nuts on the bolts and torque to specifications.
8. If the rear brake shoes were backed off, adjust the brakes as outlined in Part 2-1 and install rubber plugs in the adjuster slots.
9. Install the two rear brake drums and the drum Tinnerman nuts.
10. Install the rear wheels and tires.
11. Fill the rear axle with specified lubricant.

AXLE HOUSING (COIL SPRING SUSPENSION)

REMOVAL

1. Remove the carrier assembly from the axle housing as outlined in Differential Carrier Removal and Installation.
2. Position safety stands under the frame rear members, and support the axle housing with either a floor jack or hoist.
3. Disengage the brake line from the clips that retain the line to the axle housing.
4. Disconnect the vent tube from the rear axle housing.
5. Remove the brake backing plate assemblies from the axle housing, and support them with wire. **Do not disconnect the brake line.**
6. Disconnect the lower studs of the two rear shock absorbers from the mounting brackets on the axle housing (Fig. 13 and 14).
7. Remove the attaching nut and washer, and disconnect the track bar from the mounting stud on the axle housing bracket.
8. Lower the axle housing until the coil springs are released. Lift out the coil springs and insulators.
9. Remove the nuts, washers and pivot bolts that connect the suspension lower arms to the axle housing. Disconnect both arms from the axle housing.
10. Disconnect the upper suspension arm from the axle housing by removing the pivot bolt, nut, lock washer and the two eccentric washers (Fig. 13 and 14).
11. Lower the axle housing and remove it from under the vehicle.

INSTALLATION

1. Transfer the track bar mounting stud from the old to the new housing.

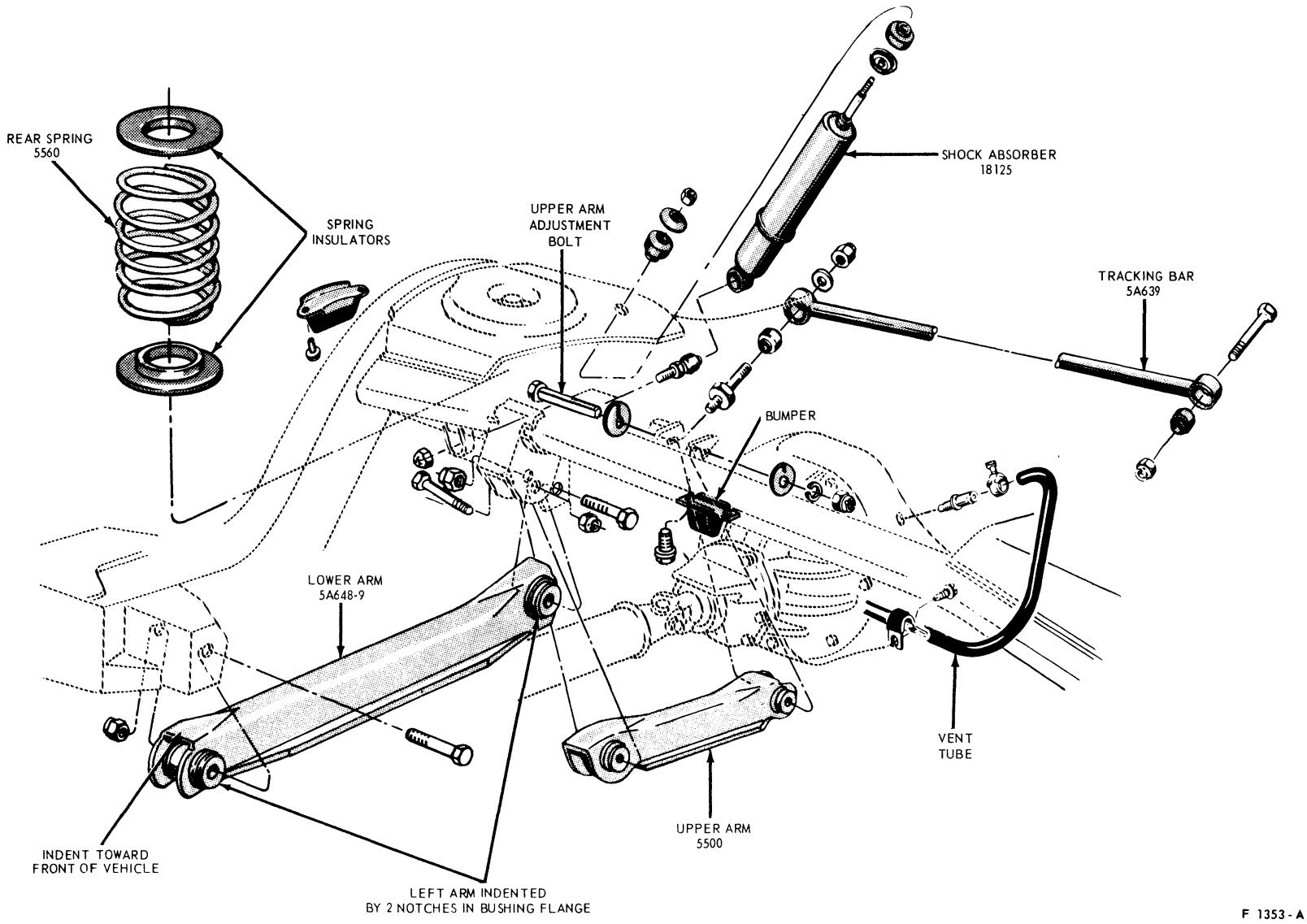


FIG. 13—Rear Axle Installation—Typical Coil Spring Suspension

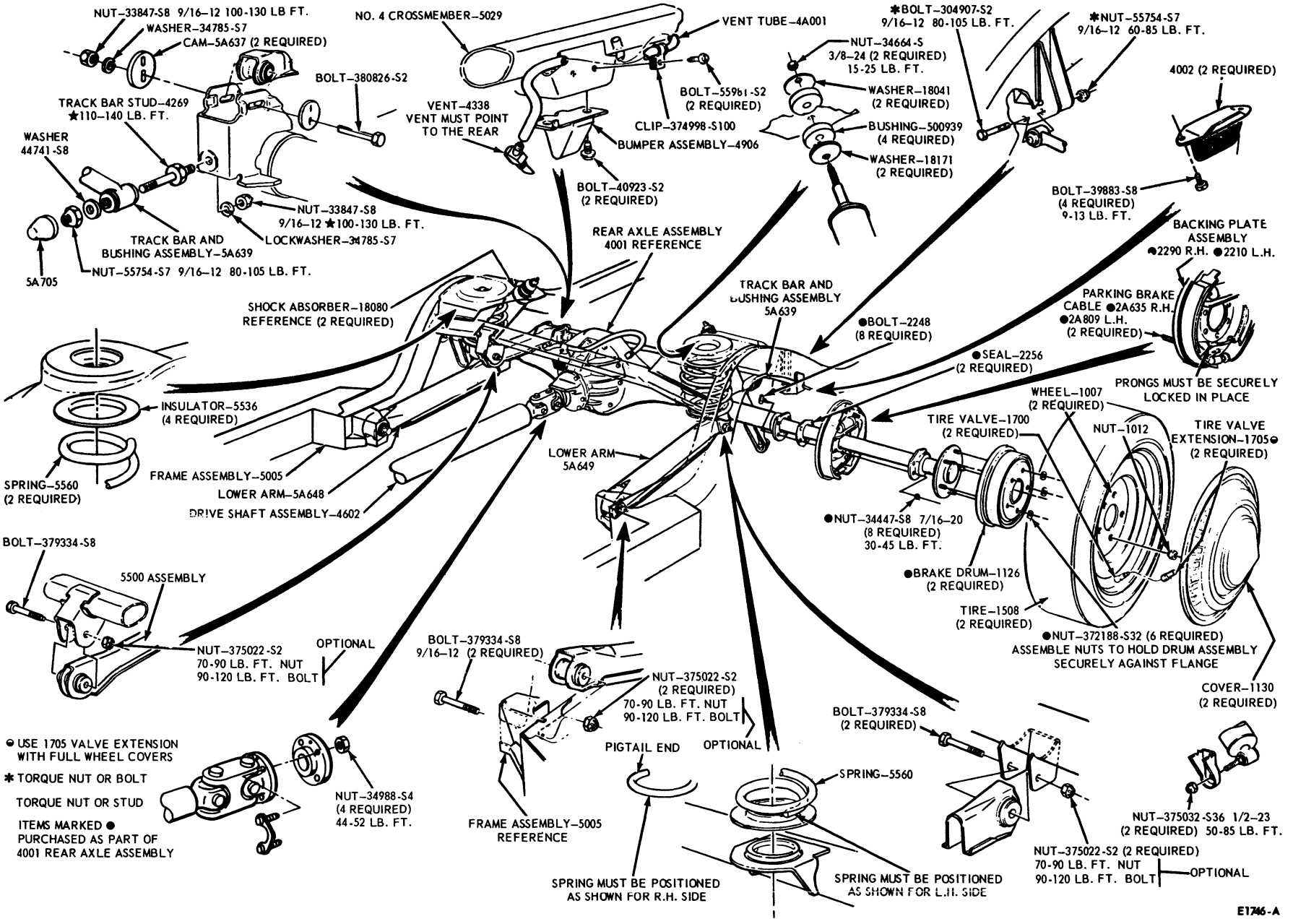


FIG. 14—Rear Axle Installation—Thunderbird—Typical Ford, Mercury, Meteor and Continental Mark III

If the axle housing is new, install a new vent. The hose attaching portion must face toward the front of the vehicle.

2. If leather-type wheel bearing service seals are to be installed, soak the new rear wheel bearing oil seals in SAE 10 oil for 1/2 hour before installation. Wipe a small amount of an oil resistant sealer on the outer edge of each seal before it is installed. **Do not put any of the sealer on the sealing lip.** Install the oil seals in the ends of the axle housing with one of the tools shown in Fig. 10 and 12.

3. Position the replacement axle housing under the vehicle, and raise the axle with a hoist or floor jack. Connect the suspension lower arms to their mounting brackets on the axle housing with pivot bolts and nuts. **Do not tighten the bolts and nuts at this point.**

4. Position the suspension upper arm in its mounting bracket on the axle housing, and install the adjusting bolt, eccentric washers, lock washer and nut. **Leave the bolt and nut loose at this point.**

5. Position the brake lines to the axle housing, and secure with the retaining clips.

6. Install the brake backing plates on the axle housing flanges.

7. Connect the track bar to the mounting stud, install the washer and attaching nut, and torque to specifications.

8. Position the rear coil springs and insulators in the pockets provided.

9. Connect the lower studs of the two rear shock absorbers to the mounting brackets on the axle housing. Install the attaching nuts, and torque to specifications.

10. Connect the vent tube to the vent on the housing. **If axle housing is new, install a new vent.**

11. Clean the mating surfaces of the axle housing and differential carrier. Position the carrier on the mounting studs on the housing using a new gasket between carrier and housing. Install the copper washers and the carrier-to-housing attaching nuts, and torque to specifications.

12. Make sure that both the front and rear pivot bolts of the upper and the two lower arms are loose, and then raise the axle assembly to controlled curb height (Fig. 15). Hold the axle at controlled curb height by placing blocks or pieces of steel pipe between the axle housing and the bumper rear screw on the side rail. (See specifications for dimensions.)

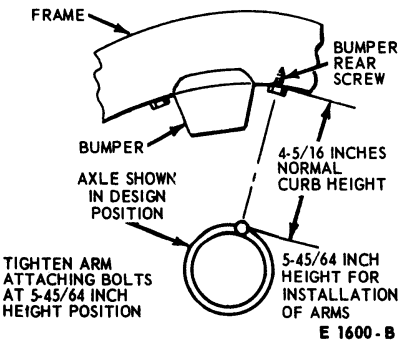


FIG. 15—Axle Normal Curb Height and Controlled Height for Arm Installation

13. With the axle at controlled curb height, torque the suspension upper and lower arm front pivot bolts and nuts to specifications. Torque the lower arm-to-axle housing pivot bolts and nuts to specifications.

14. Remove the oil seal replacer tool from the transmission extension housing. Position the drive shaft so that the front U-joint slip yoke splines to the transmission output shaft.

15. Connect the drive shaft to the U-joint flange, aligning the scribe marks made on the drive shaft end yoke and the axle U-joint flange during the removal procedure. Install the U-bolts and nuts and torque to specifications.

16. Carefully slide the two axle shaft assemblies in the axle housing. The shorter shaft goes into the left side of the housing. Use care in sliding the axle shafts into the housing so that the rough forging of the shaft will not damage the oil seal. Start the axle splines into the differential side gear, and push the shaft in until the rear wheel bearing bottoms in the housing.

17. Install the rear wheel bearing retainers on the attaching bolts on the axle housing flanges. Install the nuts on the bolts and torque to specifications.

18. If the rear brake shoes were backed off, adjust the brakes as outlined in **Part 2-1,** and install rubber plugs in the adjuster slots.

19. Install the two rear brake drums and the drum attaching (Tinnerman) nuts.

20. Install the rear wheels and tires.

21. Fill the rear axle to the bottom of the filler plug hole located in either the carrier casting or housing cover with specified lubricant. Be sure that the axle is in operating position.

22. Road test the vehicle to be sure that pinion and driveshaft angles are correct. Any shudder during heavy acceleration, or deceleration may require a pinion and driveshaft angle readjustment as detailed in **Driveshaft and Pinion Angle Adjustment, Group 3, Part 3-2.**

AXLE HOUSING (LEAF SPRING SUSPENSION)

REMOVAL

1. Raise the vehicle and support it with safety stands under the rear frame member.

2. Drain the lubricant from the axle.

3. Make scribe marks on the drive shaft end yoke and the axle U-joint flange to insure proper position of the drive shaft at assembly. Disconnect the drive shaft at the drive pinion flange.

4. Disconnect the lower end of the shock absorbers.

5. Remove the wheels, brake drums and both axle shafts as outlined in Section 2.

6. Remove vent hose front vent tube (Corbin clamp) and remove vent tube from brake tube junction and axle housing.

7. Remove the hydraulic brake T-fitting from the axle housing. **Do not open the hydraulic brake system lines.** Remove the hydraulic brake line from its retaining clip on the axle housing.

8. Remove both axle shaft oil seals with the tool shown in Fig. 8.

9. Remove both brake backing plates from the axle housing and suspend them above the housing with mechanic's wire. The hydraulic brake lines and the parking brake cables are still attached to the brake backing plates.

10. Support the rear axle housing on a jack, and then remove the spring clip nuts. Remove the spring clip plates (Fig. 16).

11. Lower the axle housing and remove it from under the vehicle.

12. If the axle housing is being replaced, transfer all the differential and pinion parts to the new housing. See Section 4, Major Repair Operations.

INSTALLATION

1. Raise the axle housing into position so that the spring clip plates can be installed. On a Montego or Fairlane, position the spring upper insulators and retainers between the axle housing and springs and install the

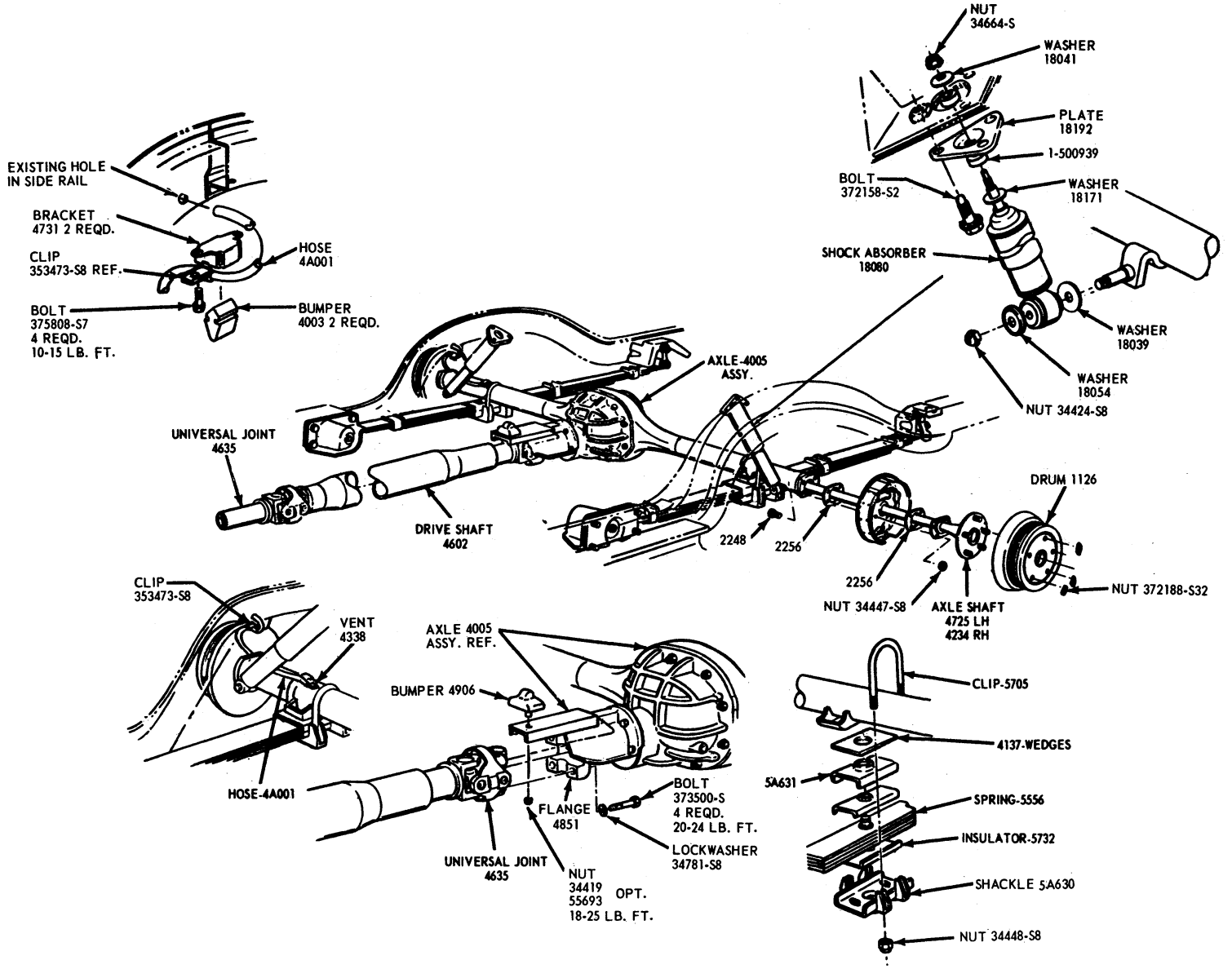


FIG. 16—Rear Axle Installation—Lincoln Continental—Typical of Cougar, Fairlane, Montego and Mustang

lower insulators. Torque the spring clip nuts to specification.

2. Place the brake backing plates in their normal position on the axle housing.

3. Install new axle shaft oil seals with the tool shown in Fig. 10. Soak the new seals in light weight engine oil (SAE 10) for 1/2 hour before installing them. **Installation without use of the proper tool will distort the seal and cause leakage.** Coat the outside edges of the new oil seal with a non-hardening type of sealer such as Permatex No. 2 or its equivalent.

4. Install the axle shafts, brake drums and wheels as outlined in Section 2.

5. Attach the hydraulic brake line T fitting to the axle housing, and secure the hydraulic brake line in its retainer on the axle housing.

6. Install vent tube to brake tube junction and install vent hose to vent tube.

7. Raise the axle housing and connect the shock absorbers.

8. Connect the rear end of the drive shaft to the axle U-joint flange, aligning the scribe marks made on the drive shaft end yoke and the axle U-joint flange.

9. Fill the axle with the proper grade and amount of lubricant.

10. Road test the vehicle.

4 MAJOR REPAIR OPERATIONS

DISASSEMBLY OF DIFFERENTIAL CARRIER

CONVENTIONAL DIFFERENTIAL

A disassembled view of the rear axle assembly is shown in Fig. 17.

After mounting the carrier in a holding fixture, disassemble the carrier as outlined in the following procedures:

1. Mark one differential bearing cap and the mating bearing support with punch marks to help position the parts properly during assembly of the carrier. Also, mark one of the bearing adjusting nuts and the carrier with scribe marks for proper location during assembly.

2. Remove the adjusting nut locks, bearing caps, and adjusting nuts. Then lift the differential case assembly out of the carrier.

(Remove the bearing caps by tapping the caps lightly with a soft mallet).

3. Remove the differential bearings with the tools shown in Fig. 18.

4. Mark the differential case, cover, and ring gear for assembly in the original position.

5. Remove the bolts that attach the ring gear to the differential case. Press the gear from the case or tap it off with a soft-faced hammer.

6. With a drift, drive out the differential pinion shaft lock pin (Fig. 19), and separate the 2-piece differential case.

7. Drive out the pinion shaft with a brass drift (Fig. 20).

8. Remove the gears and thrust washers (Fig. 48).

LIMITED-SLIP DIFFERENTIAL

1. Remove the differential case from the carrier and remove the bearings from the differential case in the same manner as the conventional differential case.

2. Place the differential case in a hydraulic press, and apply about one ton pressure across the case bearing hubs while removing the ring gear at-

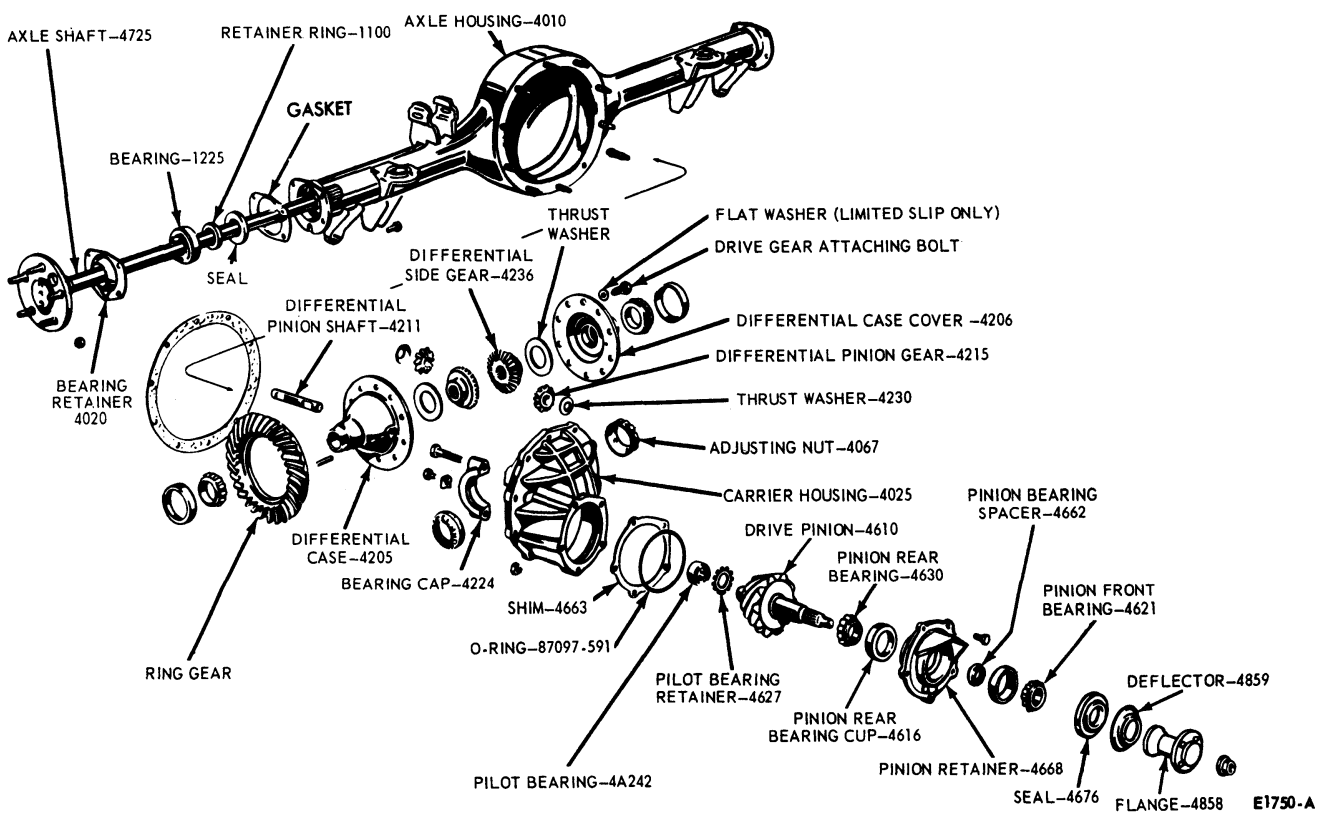


FIG. 17—Rear Axle Disassembled—Typical

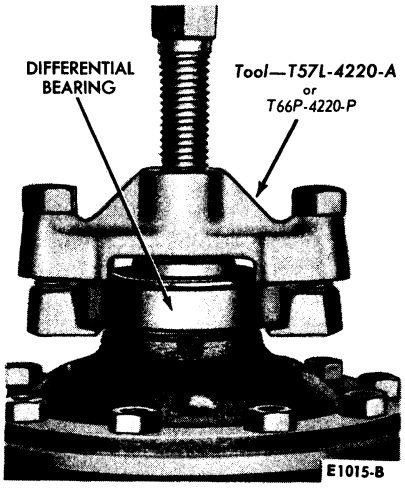


FIG. 18—Removing Differential Bearing—Ford

taching bolts. Applying pressure will contain the spring pressure between the differential case and cover until after the bolts are removed, and thereby prevent stripping of the threads.

3. Release the hydraulic press ram, and remove differential case cover.
4. Remove the Belleville spring (Fig. 54).
5. Remove the steel and the bonded clutch plates.
6. Remove the differential clutch hub, side gear, and thrust washer.
7. Remove the ring gear from the differential case.
8. Drive out the differential pinion shaft lock pin.
9. With a brass drift, drive out the differential pinion shaft. Then remove the pinion gears, the other side gear, and thrust washers.

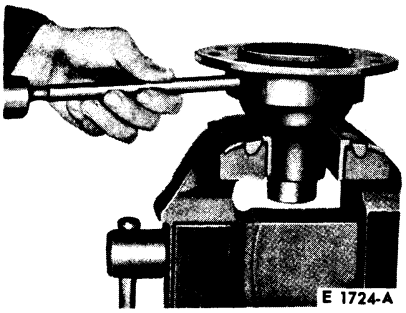


FIG. 20—Driving Out Differential Pinion Shaft

TRACTION-LOK DIFFERENTIAL

1. Remove the differential case from the carrier and remove the bearings from the differential case in the same manner as the conventional differential case.
2. Remove ten bolts securing the ring gear to the differential case assembly. The ring gear must be removed in order to separate the case halves.
3. Remove the ring gear by tapping the gear with a soft hammer or press the gear from the case.
4. Place the differential case in a press to load the bearing journals so that the pre-load of the springs is overcome (approx. 1,500 lbs.). (If a press is not available, two 7/16 inch bolts and nuts can be used in the ring gear mounting holes (one on each side) to compress the case halves together and overcome pre-load spring tension.) Then, while the case is still under pressure, loosen the two Allen or Phillips head screws which hold the case halves together until one or two threads of the screws remain engaged. Remove the case assembly from the press. Tap on the cover to spring it loose; then, remove both screws.
5. With the cover facing down, lift off the case. Remove the pre-load spring plate and four pre-load springs.
6. From the cover remove the side gear, four clutch plate ear guides, clutch hub, friction and steel clutch plates and shim(s).
7. With a suitable drift, drive out the pinion shaft lock pins from the case.
8. With a brass drift, drive out the long pinion shaft from the case. Drive from the end opposite the lock pin hole.
9. Remove the two short pinion shafts using a drift, driving each shaft from the center outward. Lift out the center block, then remove the pinion gears, thrust washers and side gear and thrust washer.
10. If the differential bearings are removed, the bearings can be installed in one of the following ways:

a. With the differential case and cover completely assembled.

b. On the case or cover when disassembled. However, when pressing the bearings on the cover, a block of wood or fiber must be used as shown in Fig. 21 in order to avoid damage to the cover.

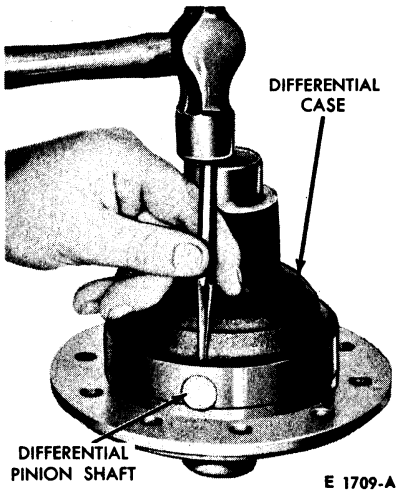


FIG. 19—Removing Differential Pinion Shaft Lock Pin

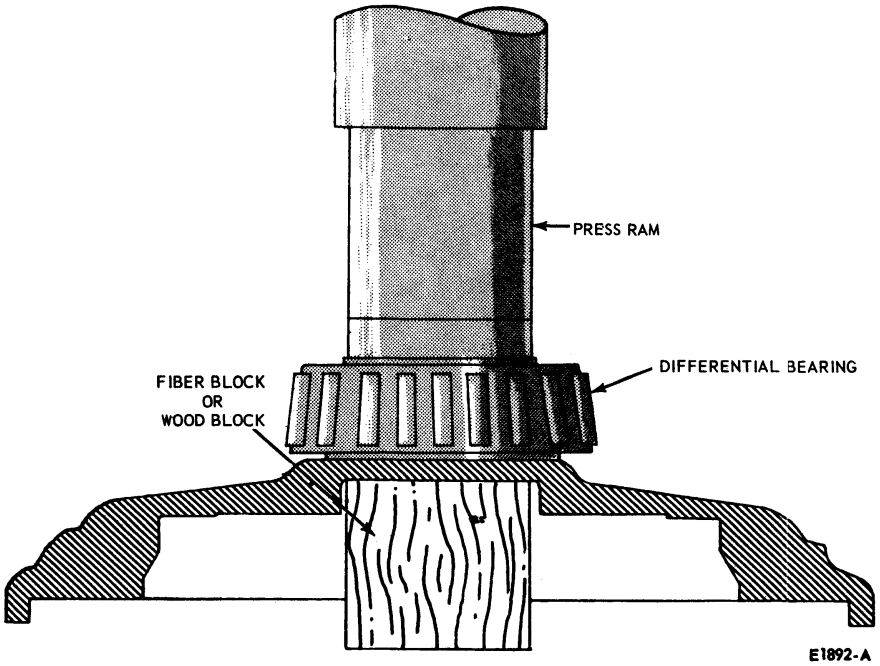


FIG. 21—Installing Differential Bearing—Traction-Lok

REMOVAL AND DISASSEMBLY OF DRIVE PINION AND BEARING RETAINER

1. Turn the carrier assembly upright and remove the pinion shaft nut (Fig. 22 and Fig. 23).

2. Remove the U-joint flange from the pinion shaft (Figs. 24 and 25).

3. Remove the pinion seal (Fig. 26).

4. Remove the pinion, bearing, and retainer assembly from the carrier housing (Fig. 41). Measure the shim thickness with a micrometer. Record this original shim thickness. If a new gear set is installed during assembly, a new shim will have to be installed. The original shim thickness is one of the factors necessary in determining the new shim thickness. **Extreme care must be taken not to damage the mounting surfaces of the retainer and carrier.**

5. Place a protective sleeve (hose) on the pinion pilot bearing surface. Press the pinion shaft out of the pinion front bearing cone with the tool shown in Fig. 27.

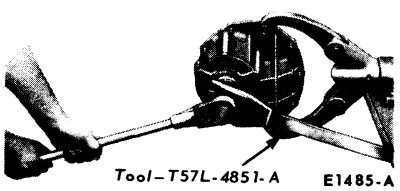


FIG. 22—Removing Pinion Shaft Nut

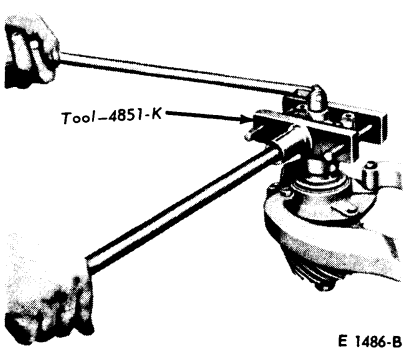


FIG. 23—U-Joint Flange Holding Tool

6. Press the pinion shaft out of the pinion rear bearing cone and roller (Fig. 28).

PILOT BEARING

1. Remove the pilot bearing as shown in Fig. 29. Drive out the pilot bearing and the bearing retainer together.

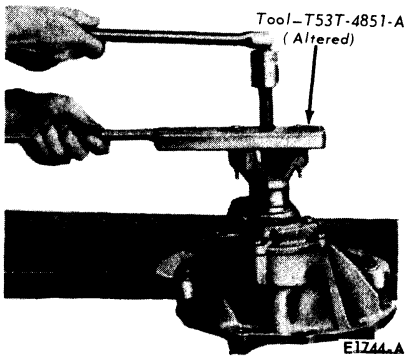


FIG. 24—Removing U-Joint Flange

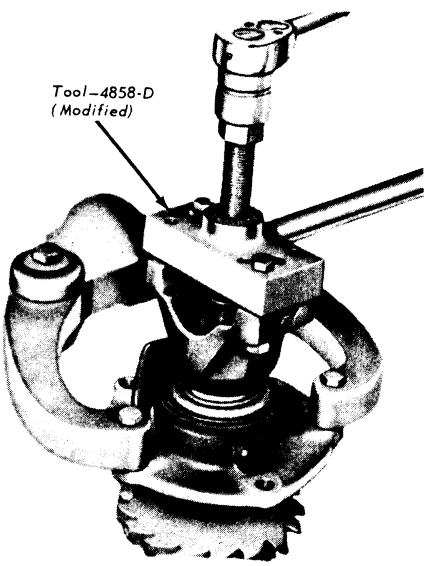


FIG. 25—Flange Removal Tool

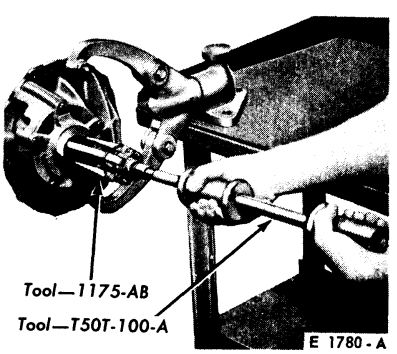


FIG. 26—Removing Pinion Seal

PINION BEARING CUPS

Do not remove the pinion bearing cups from the retainer unless the cups are worn or damaged. The flange and pilot of the retainer are machined during manufacture by locating on these cups after they are installed in their bores. If the cups are worn or damaged, they should be replaced.

Remove the bearing cups as shown in Figs. 30, 31 and 32. Install the cups as shown in Figs. 33 and 34.

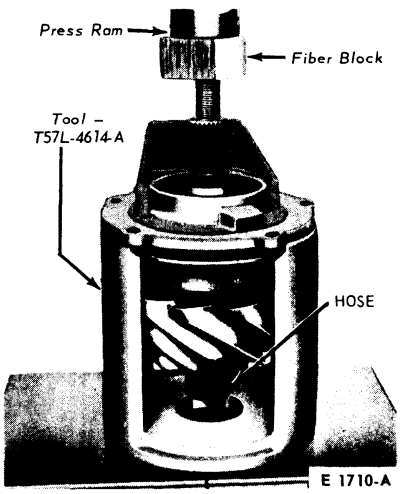


FIG. 27—Removing Pinion Front Bearing

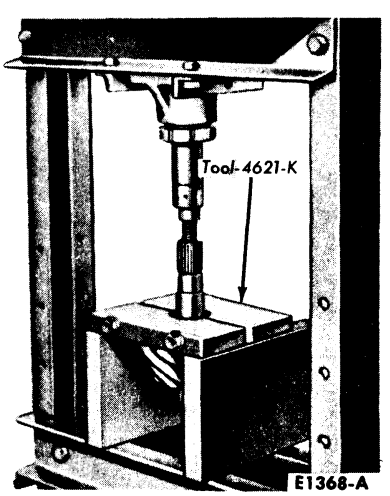


FIG. 28—Removing Pinion Rear Bearing Cone

After the new cups are installed, make sure they are seated in the retainer by trying to insert a 0.0015-inch feeler gauge between the cup and the bottom of the bore.

Whenever the cups are replaced, the cone and roller assemblies should also be replaced.

DRIVE PINION AND RING GEAR SET

When replacing a ring gear and pinion, note that the original factory installed shim is of the correct thickness

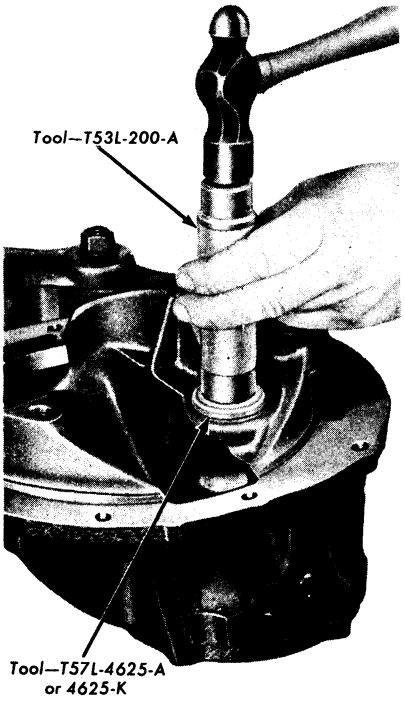


FIG. 29—Removing Pilot Bearing

to adjust for individual variations in both the carrier housing dimension and in the original gear set dimension. Therefore, to select the correct shim thickness for the new gear set to be installed, follow these steps:

1. Use a micrometer to measure the thickness of the original shim removed from the axle and use the same thickness upon installation of the replacement carrier assembly or drive pinion. If further shim change is necessary, it will be indicated in the tooth pattern check.

2. If the original shim is lost, substitute a nominal shim for the original and use the tooth pattern check to determine if further shim changes are required. Nominal shim thicknesses is

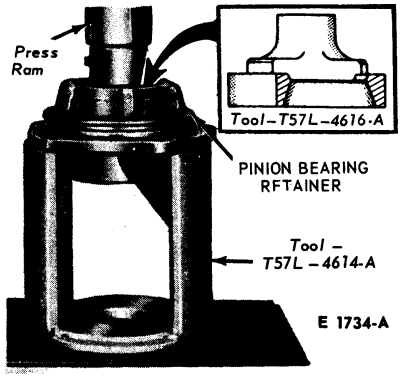


FIG. 30—Removing Pinion Front Bearing Cup

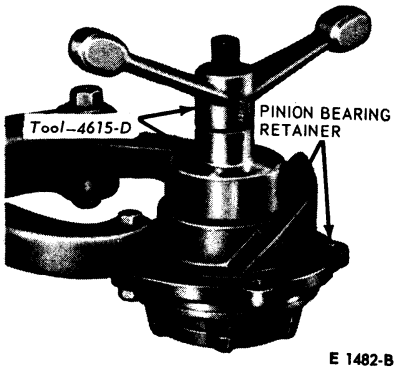


FIG. 31—Removing Pinion Front Bearing Cup

indicated in Part 4-3, Specifications.

A new ring gear and pinion should always be installed in an axle as a matched set (never separately). **Be sure the same identifying (matching) number, appears on the bolt hole face of the ring gear and on the head of the drive pinion (Fig. 35).**

3. After determining the correct shim thickness as explained in the

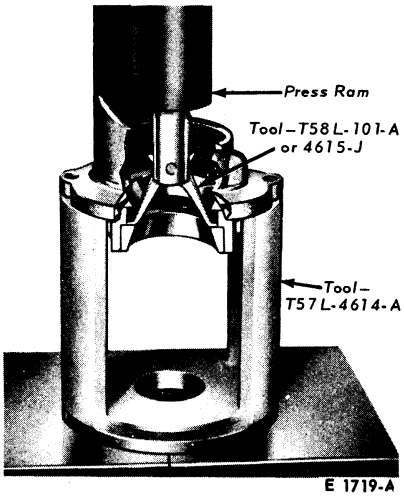


FIG. 32—Removing Pinion Rear Bearing Cup

foregoing steps, install the new pinion and ring gear as outlined under Assembly.

DIFFERENTIAL CASE BEARINGS AND RING GEAR TEST

If the ring gear runout check (before disassembly) exceeded specifications, the condition may be caused by a warped gear, a defective case, or excessively worn differential bearings.

To determine the cause of excessive runout proceed as follows:

1. Assemble the two halves of the differential case together **without** the ring gear, and press the two differential side bearings on the hubs.

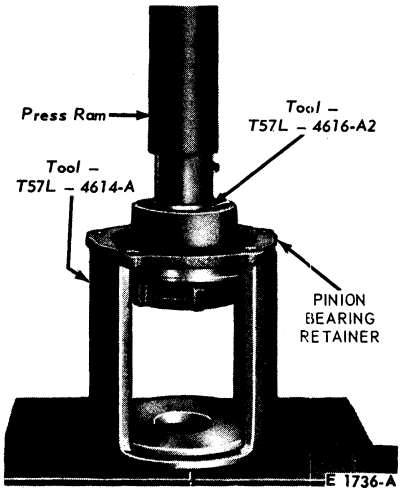


FIG. 33—Installing Pinion Front Bearing Cup

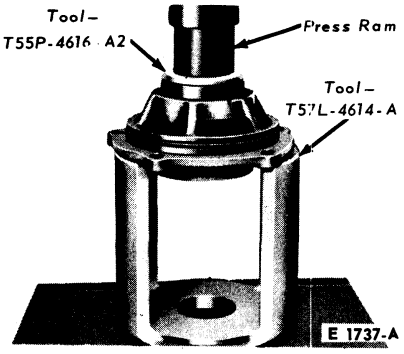


FIG. 34—Installing Pinion Rear Bearing Cup

2. Place the cups on the bearings and set the differential case in the carrier.

3. Install the bearing caps and adjusting nuts as outlined in Steps 11 thru 14 under Assembly and Installation of Conventional Differential Case which follows in this section.

4. Tighten the right nut two notches beyond the position where it first contacts the bearing cup. Rotate the differential case several revolutions in each direction while the bearings are

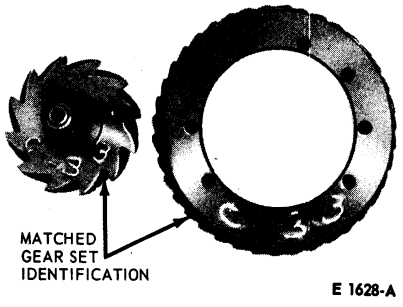


FIG. 35—Pinion and Ring Gear Markings

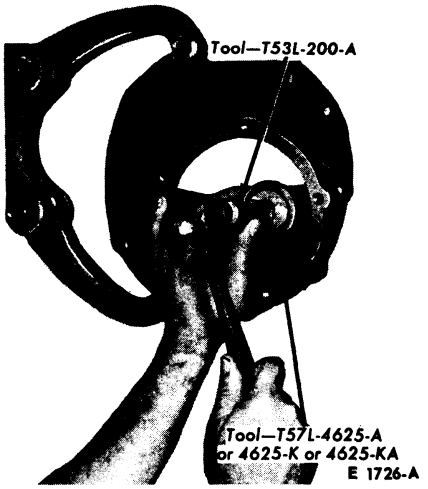


FIG. 36—Installing Pilot Bearing

loaded to seat the bearings in their cups. **This step is important.**

5. Again loosen the right nut to release the preload. Check to see that the left nut contacts the bearing cup. Using the dial indicator set-up shown in Fig. 10, Part 4-1, adjust the preload to 0.008 to 0.012 case spread for new bearings or 0.005 to 0.008 for the original bearings, if re-used.

6. Check the runout of the differential case flange with a dial indicator. If the runout does **not now** exceed specifications, install a new ring gear. If the runout still exceeds specifications, the ring gear is true and the trouble is due to either a defective case or worn bearings.

7. Remove the differential case from the carrier and remove the side bearings from the case.

8. Install **new** bearings on the case hubs, and again install the differential assembly in the carrier **without** the ring gear.

9. Check the case runout again with the new bearings. If the runout is **now** within limits, the old bearings were excessively worn. Use the new bearings for assembly. **If the runout is still excessive, the case is defective and should be replaced.**

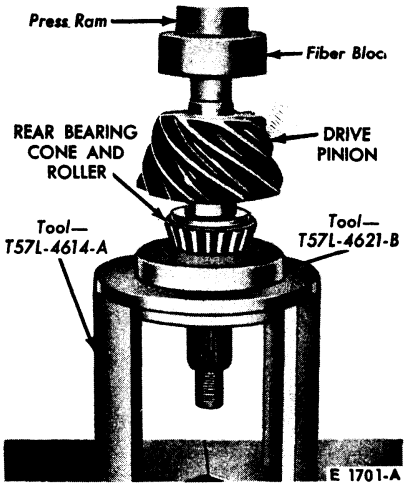


FIG. 37—Installing Pinion Rear Bearing Cone

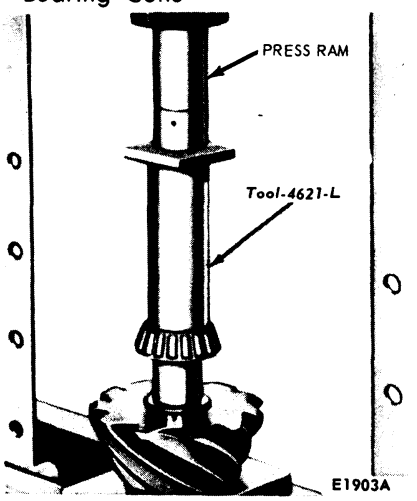


FIG. 38—Installing Pinion Rear Bearing Cone

ASSEMBLY OF DIFFERENTIAL CARRIER

PILOT BEARING INSTALLATION

1. Drive the new pilot bearing inward until it bottoms, as shown in Fig. 36.

2. Using the same tool indicated in Fig. 36, install the new pilot bearing retainer with the concave side up.

COLLAPSIBLE PINION BEARING SPACER INSTALLATION

1. Install the drive pinion rear bearing cone and roller on the pinion shaft (Figs. 37 & 38).

Place a new spacer on the pinion shaft (Fig. 39).

2. Place the bearing retainer on the pinion shaft, and install the front bearing cone and roller. Press the front bearing cone and roller into position as shown in Fig. 40. Be careful not to crush the bearing spacer.

3. Lubricate the O-ring with axle lubricant and install it in its groove in the pinion retainer. Be careful not to twist it. Snap the O-ring into position.

4. Place the proper shim on the carrier housing and install the pinion and retainer assembly, being careful not to pinch the O-ring (Fig. 41).

5. Install the pinion attaching bolts. Torque the bolts to specification.

6. Place the slinger over the pinion shaft and against the front bearing.

7. Install a new seal in the bearing retainer (Fig. 47).

8. Install the U-joint flange (Fig. 49).

9. Start a new integral nut and washer on the pinion shaft.

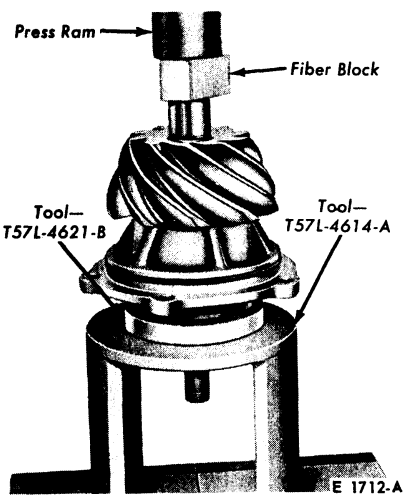


FIG. 40—Installing Pinion Front Bearing

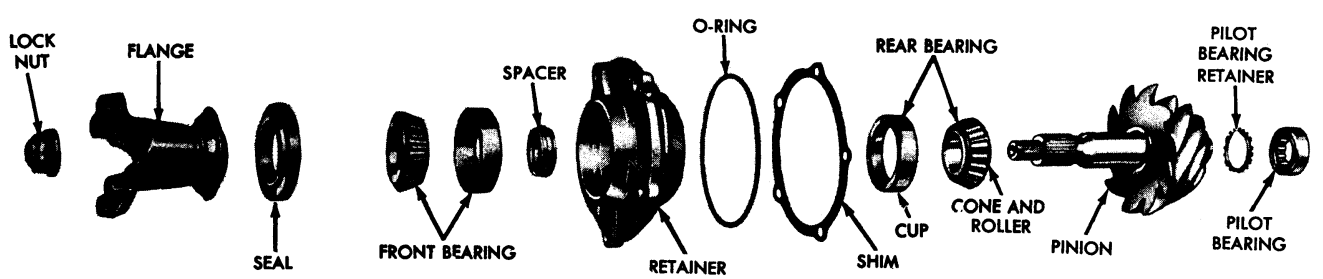


FIG. 39—Pinion and Bearing Retainer

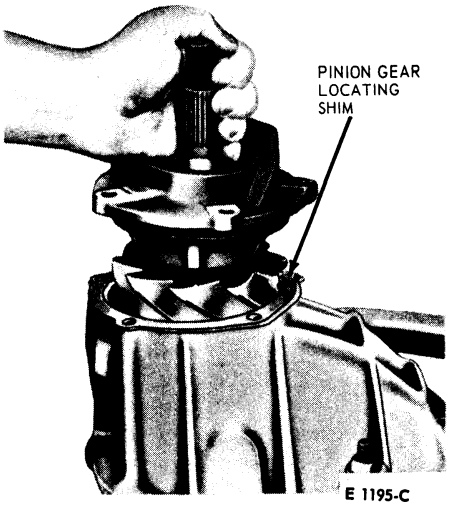


FIG. 41—Removing or Installing Pinion and Retainer Assembly

10. Hold the flange with the tool shown in Fig. 22 (Ford) or Fig. 23 (Mercury), and torque the pinion shaft nut to 175 ft-lbs. **Do not exceed 175 ft-lbs at this time.**

11. Check the pinion bearing preload as shown in Fig. 42. Correct pre-load will be obtained when the torque required to rotate the pinion in the retainer is as specified in Part 4-3. If the torque required to rotate the pinion is less than specified, tighten the pinion shaft nut a little at a time until the proper preload is established. **Do not overtighten the nut.** If excessive preload is obtained as a result of overtightening, replace the collapsible bearing spacer.

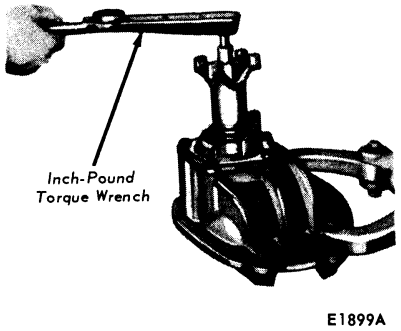


FIG. 42—Checking Pinion Bearing Preload

Do not back off the pinion shaft nut to establish pinion bearing preload. If the torque on the pinion shaft nut is less than 175 ft-lbs after bearing preload is established, a new collapsible spacer must be used.

SOLID PINION BEARING SPACER INSTALLATION

The spacer is serviced in 20 sizes listed in Part 4-5. The manner of selecting the size spacer required for obtaining correct preload is included in the following assembly procedure.

1. Install the drive pinion rear bearing cone and roller assembly on the pinion shaft as shown in Figs. 38 or 39.

2. Select a new solid spacer of a larger size (0.485 inch thick), and slide it over the pinion shaft against the rear bearing.

The pinion bearing preload can be accurately measured only when the pinion shaft nut is torqued to 180-220 ft-lbs. If a spacer smaller than required was used, the specified 180-220 ft-lbs torque would damage the bearings. For this reason, the largest spacer should be tried first. Then, if the bearings are too loose, the size of the spacer can be decreased until the correct preload is obtained.

3. Position the bearing retainer and cup assembly on the pinion shaft and install the front bearing cone and roller. Press the front bearing cone and roller assembly into position, as shown in Fig. 38.

4. Mount the retainer in a holding fixture as shown in Fig. 23, and place the slinger over the pinion shaft and against the front bearing.

5. Install the U-joint flange with the tool shown in Fig. 46.

6. Hold the flange with the tool shown in Fig. 23 or 24, and install the old pinion shaft nut. Using a ft-lb torque wrench, torque the nut to 180-220 ft-lbs. While tightening the nut, rotate the bearing retainer to determine the existance of any bearing preload which will be indicated by a slight drag in the rotation of the retainer.

DETERMINING SPACER SIZE FROM PRELOAD READING

1. If bearing drag indicates a preload condition exists, apply an in-lb torque wrench to the pinion nut as shown in Fig. 42 and read the torque required to turn the shaft. Effort should be 12-1/2 to 32-1/2 in-lbs.

2. If preload is the correct valve, proceed with assembly procedure given in Final Assembly of Pinion and Retainer, which follows.

2. If preload exists, but is below specification, select the correct spacer from Fig. 43 and install, completing assembly as shown in Final Assembly of Pinion and Retainer.

DETERMINING SPACER SIZE FROM END PLAY READING

1. If no perceptible preload is felt when rotating the pinion shaft, install a dial indicator as shown in Fig. 44, so that the indicator point is resting on the end of the pinion gear shaft (companion flange end).

2. Use both hands to squeeze the pinion shaft and the bearing retainer together (Fig. 45). Record the endplay reading shown on the dial indicator.

3. Disassemble the pinion shaft and retainer and install the correct spacer as shown in Fig. 43.

4. Proceed with assembly of the pinion shaft and retainer as directed in **Final Assembly of Pinion and Retainer.**

FINAL ASSEMBLY OF PINION AND RETAINER

1. Install the drive pinion rear bearing cone and roller assembly on the

AS END PLAY READS (10/1000 inch)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
USE THIS SPACER	0.481	0.480	0.479	0.478	0.476	0.476	0.474	0.474	0.472	0.472	0.470	0.470	0.468	0.468	0.466	0.465

If there is no end play and preload on the bearings exists:				
IF PRELOAD READS (in-lbs.)	2-11	12-20	21-30	31-45
USE THIS SPACER	0.482	0.483	0.484	0.485

FIG. 43—Solid Spacer Selection

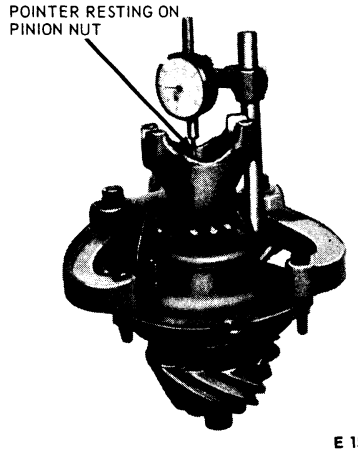


FIG. 44—End Play Indicator Installation

pinion shaft as shown in Figs. 37 and 38.

2. Slide the correct spacer over the pinion shaft against the rear bearing.

3. Position the bearing retainer and cup assembly on the pinion shaft and install the front bearing cone and roller. Press the front cone and roller into position, as shown in Fig. 46.

4. Lubricate a new O-ring with axle lubricant and install it in the groove provided in the pinion retainer. **Be careful not to twist the O-ring.** Install it by snapping it into place.

5. Place the proper shim on the carrier housing and install the pinion and retainer assembly, being careful not to pinch the O-ring (Fig. 41).

6. Install the pinion retainer bolts. Torque the bolts to specification.

7. Place the slinger over the pinion shaft and against the front bearing.

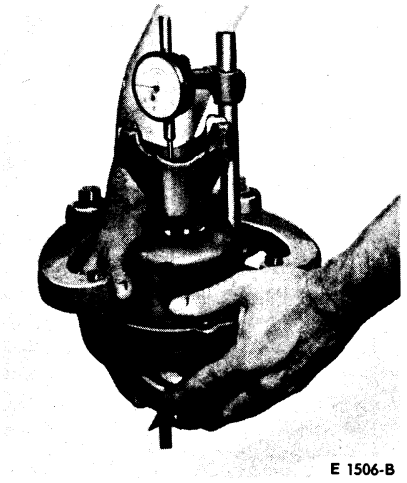


FIG. 45—Checking Pinion End Play

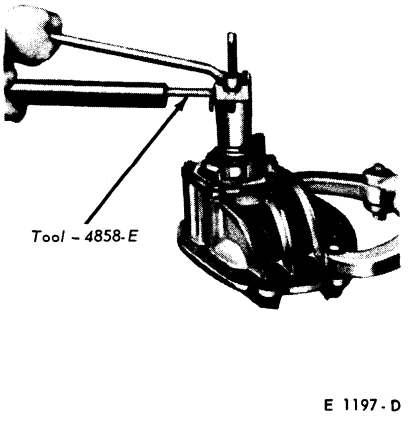


FIG. 46—Installing U-Joint Flange

8. Install a seal in the bearing retainer, (Fig. 47).

9. Start a new integral nut and washer on the pinion shaft.

10. Hold the companion flange with the tool shown in Fig. 20 or 22 and torque the pinion nut to specifications (200 ft-lbs).

11. With a new seal installed pinion bearing preload should now read 17 to 32 in-lbs for new pinion bearings and new seal, or 8 to 14 in-lbs for original bearings and a new seal.

ASSEMBLY AND INSTALLATION OF DIFFERENTIAL CASE

Conventional Differential Case

1. Place a side gear and thrust washer in the differential case bore (Fig. 48). **Lubricate all differential parts liberally with axle lubricant during assembly.**

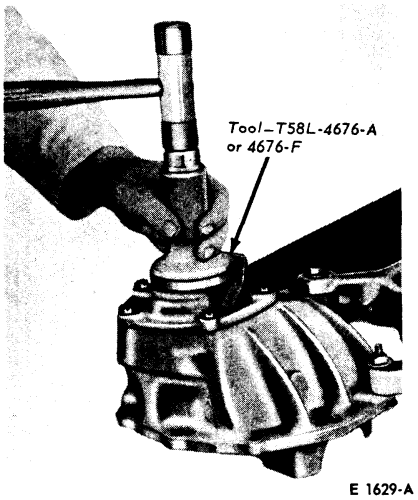


FIG. 47—Installing Oil Seal

2. With a soft-faced hammer, drive the differential pinion shaft into the case only far enough to retain a pinion thrust washer and pinion gear.

3. Place the second pinion and thrust washer in position, and drive the pinion shaft into place. **Carefully line up the pinion shaft lock pin holes.**

4. Place the second side gear and thrust washer in position (Fig. 48), and install the cover on the differential case. Install the pinion shaft lock pin. A pinion or axle shaft spline can be inserted in the side gear spline to check for free rotation of the differential gears.

5. Insert two 7/16 (N.F.) bolts two inches long through the differential case flange, and thread them three or four turns into the ring gear as a guide in aligning the ring gear bolt holes. Press or tap the ring gear into position.

6. Install and tighten the ring gear bolts and washers evenly, and torque them alternately across the gear to specification.

7. If the differential bearings have been removed, press them on as shown in Figs. 49 and 50.

8. Wipe a thin coating of lubricant on the bearing bores so that the differential bearing cups will move easily.

9. Place the cups on the bearings. If the gear set is of the **non-hunting** or **partial non-hunting** type, assemble the differential case and ring gear assembly in the carrier so that the marked tooth on the pinion indexes between the marked teeth on the ring gear as shown in Fig. 51.

In almost every case of improper assembly (gears assembled out of time), the noise level and probability of failure will be higher than they would be with properly assembled gears.

When installing the **hunting** type gear set (no timing marks), assemble the differential case and ring gear assembly in the carrier without regard to the matching of any particular gear teeth.

10. Slide the assembly along the bores until a slight amount of backlash is felt between the gear teeth.

11. Set the adjusting nuts in the bores so that they just contact the bearing cups. The nuts should be engaged about the same number of threads on each side.

12. Carefully position the bearing caps on the carrier. Match the marks made when the caps were removed.

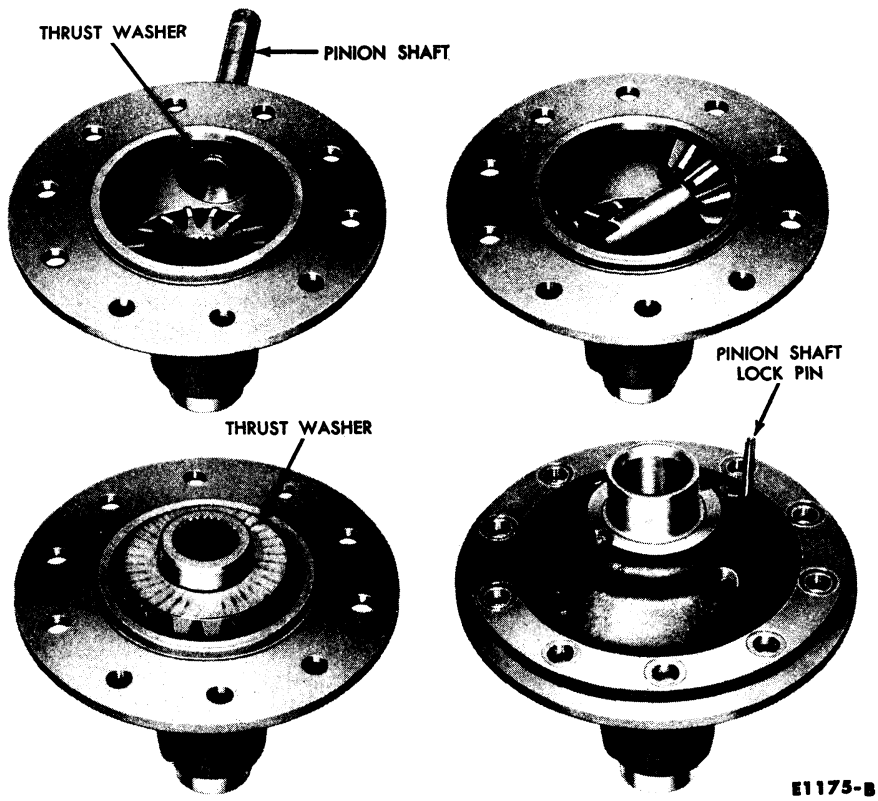


FIG. 48—Assembling Differential Case

13. Install the bearing cap bolts and alternately torque them. The 9 3/8 inch ring gear size axle requires 60-70 ft-lbs. The 8 3/4 inch and 9 inch ring gear size axles require 70-85 ft-lbs.

14. If the adjusting nuts do not turn freely as the cap bolts are tightened, remove the bearing caps and again inspect for damaged threads of incorrectly positioned caps. Tightening the bolts to the specified torque is done to be sure that the cups and adjusting nuts are seated. Loosen the cap bolts, and torque them to only 25 ft. lbs before making adjustments.

15. Adjust the backlash between the ring gear and pinion as outlined in Part 4-1, Section 2.

16. Be sure to make a final tooth pattern check before installing the carrier assembly in the axle housing.

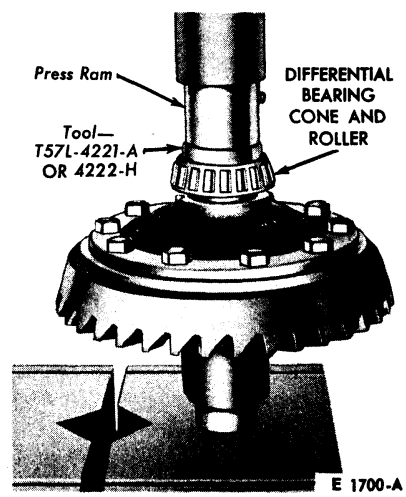


FIG. 49—Installing Differential Bearing

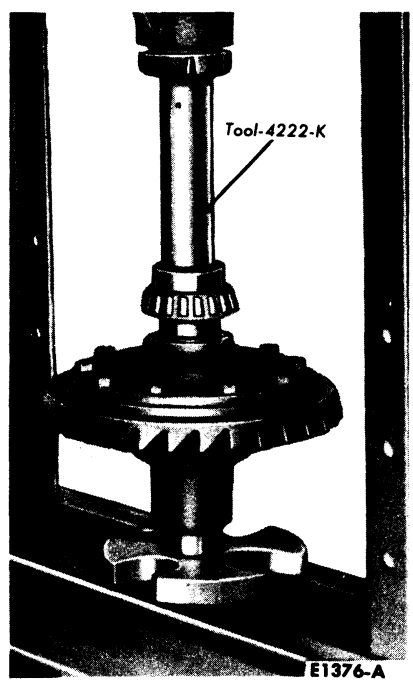


FIG. 50—Installing Differential Bearing

Limited-Slip Differential Case

1. Place the inner side gear and thrust washer in the differential case (Fig. 52). Lubricate all parts liberally with limited-slip axle lubricant during assembly.

2. With a soft-faced hammer, drive the pinion shaft into the case only far enough to retain a pinion thrust washer and pinion gear.

3. Place the second pinion and thrust washer in position and drive the pinion shaft into place. **Carefully line up the pinion shaft lock in holes.**

4. Install the pinion shaft lock pin. **The lock pin must not extend beyond the surface of the case.**

5. Insert two 2-inch 7/16 (NF) bolts through the differential case flange, and thread them three or four turns into the ring gear as a guide in aligning the ring gear bolt holes. Press or tap the ring gear into position.

6. Clamp the differential case in a soft-jawed vise. Install the differential outer side gear on the differential pinion gears. Place the clutch hub on the side gear. Place the thrust washer on the hub

Limited-Slip Clutch Plate Installation

Prior to clutch plate installation, the friction bonded plates must be soaked in C6AZ-19570-C (ESW-M2C-104-A) differential lubricant for approximately 1/2 hour. In addition, the differential lubricant must be liberally applied to all components to be assembled.

1. Place the clutch hub into position in a soft-jawed vise.

2. First, install a steel clutch plate in the cavity of the differential case opposite the ring gear and then a bonded friction plate (Fig. 53). **Any tab on the steel plates can be inserted into any cavity in the differential case, however when the first steel plate is inserted the others must be placed in the same manner (Fig. 54) so the tabs with slots line up.** Install the remaining plates: a steel plate, bonded friction plate, a steel plate, bonded friction plate and lastly a steel plate.

Make sure the bonded friction plate inner-spline teeth properly engage the hub spline.

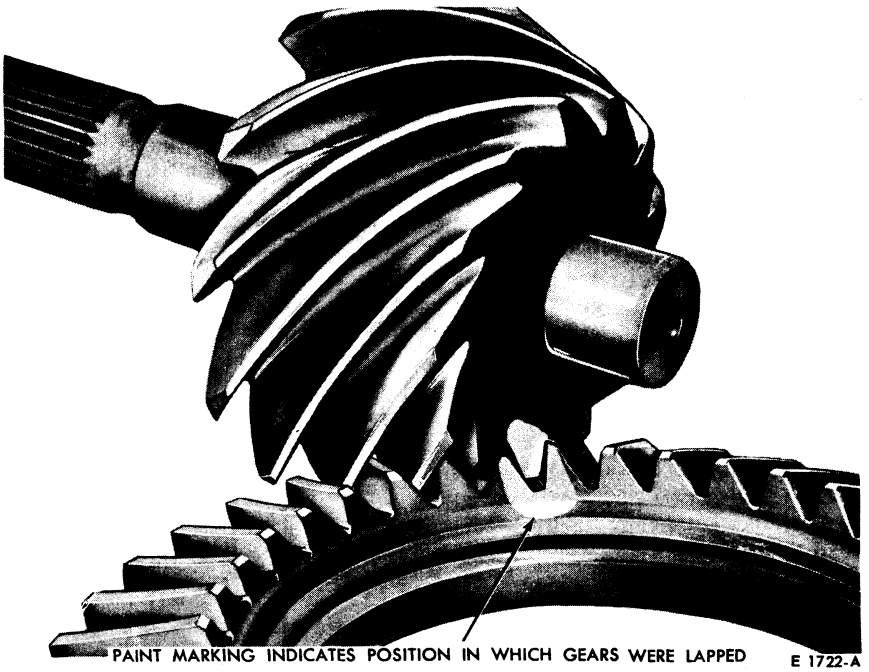


FIG. 51—Gear Set Timing Marks

3. Center the Belleville spring on the clutch pack (spring concave-side facing downward on the pack) to prevent trapping the spring between the left and right handcase in an eccentric position (Fig. 54). **Improper location of the Belleville spring will cause extremely high torque and differential chatter. Be sure the slots in the rabbit ears of the steel plates are in proper alignment.**

4. Carefully set the differential case cover over the right hand case (Fig. 55). **At this point, no force or pressure should be applied to the cover. The cover contains two 3/16 inch holes by which the clutch plates can be properly aligned.** Insert the shank ends of two 1/8 inch drill bits into the holes, and work the drill bits back-and forth until the plates are centered (Fig. 55). When the clutch plates are centered, the weight of the cover will cause it to fall into position. Remove the drill bits.

5. Install the ring gear to differential case bolts, and tighten them evenly and alternately across the diameter of the ring gear. Tighten the bolts to specification.

6. Prior to installation of the limited-slip differential into the vehicle, a differential torque check must be made. Check the torque required to rotate one side gear while the other side gear is held (Fig. 56). The initial breakaway torque required to start the side gear turning may exceed 300 ft-lbs. Observe only the torque required for continuous even rotation. There should be no abnormal roughness or binding. In some instances the rotating torque may reach 250 ft-lbs, this condition is acceptable, if rotation is smooth. If the results of the bench check are not within specified limits, internal trouble may be present and should be corrected before installing the assembly in the vehicle. Some possible torque problems as follows:

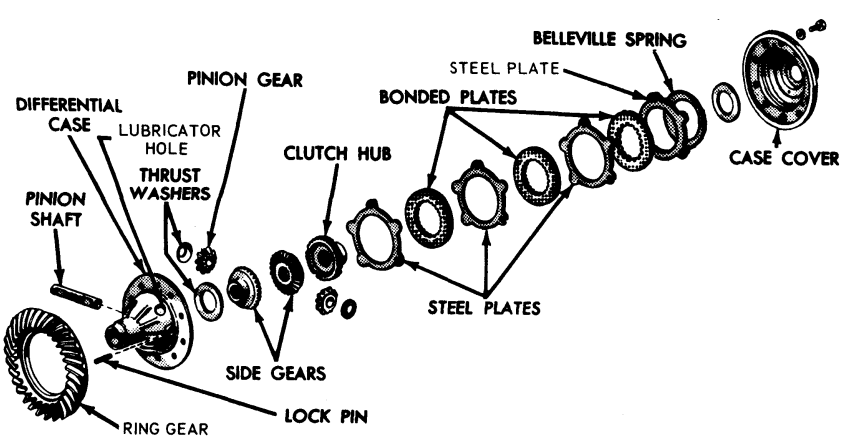


FIG. 52—Limited-Slip Differential Assembly

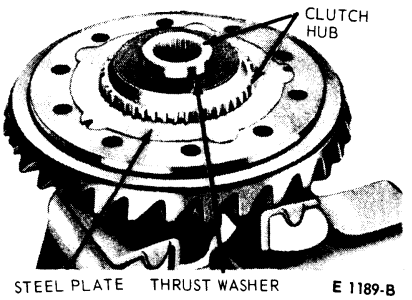


FIG. 53—Installing Steel Clutch Plates and Friction Plates

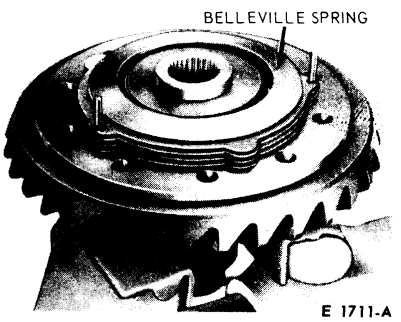


FIG. 54—Belleville Spring Installation

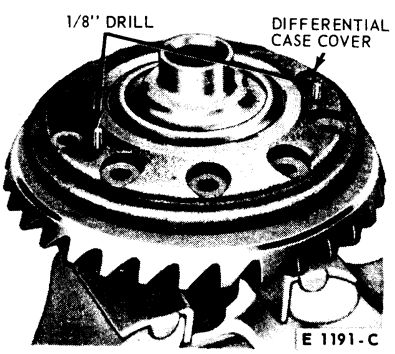


FIG. 55—Differential Cover Installation

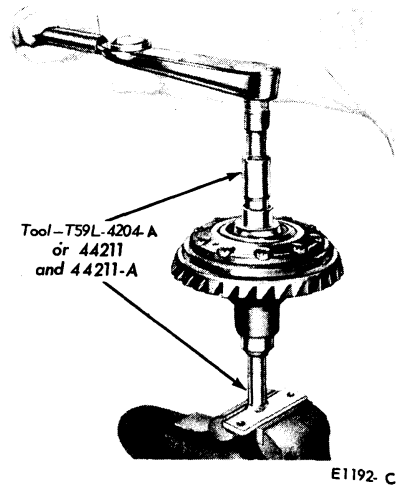


FIG. 56—Checking Differential Torque

High Torque

a. Insufficient lubricant on the clutch plates.

b. A clutch plate wedged in between the case halves.

c. An improperly centered Belleville spring.

Low Torque

a. Weak Belleville spring.

b. Improper amount of clutch plates installed.

Under no circumstances should the Belleville spring be ground down to reduce torque. The torque required to keep the side gear turning with new clutch plates is 155 to 195 ft-lbs. On reused clutch plates, the torque required is 75 ft-lbs minimun.

7. If the differential bearings have been removed, press them on as shown in Figs. 49 and 50.

8. Install the side bearings on the differential case, and install the case in the carrier as described in steps 7 through 16 under Assembly and Installation of Conventional Differential Case. Adjust and check backlash between the ring gear and pinion as directed under Differential Bearing Preload Adjustments.

ASSEMBLY OF TRACTION-LOK DIFFERENTIAL CASE

1. Lubricate all parts with Ford Hypoid Lubricant (Ford Part No. C6AZ-19580-C), during assembly of differential.

2. Mount the differential case in a soft jawed vise and place a side gear thrust washer and side gear in the counterbore of the case.

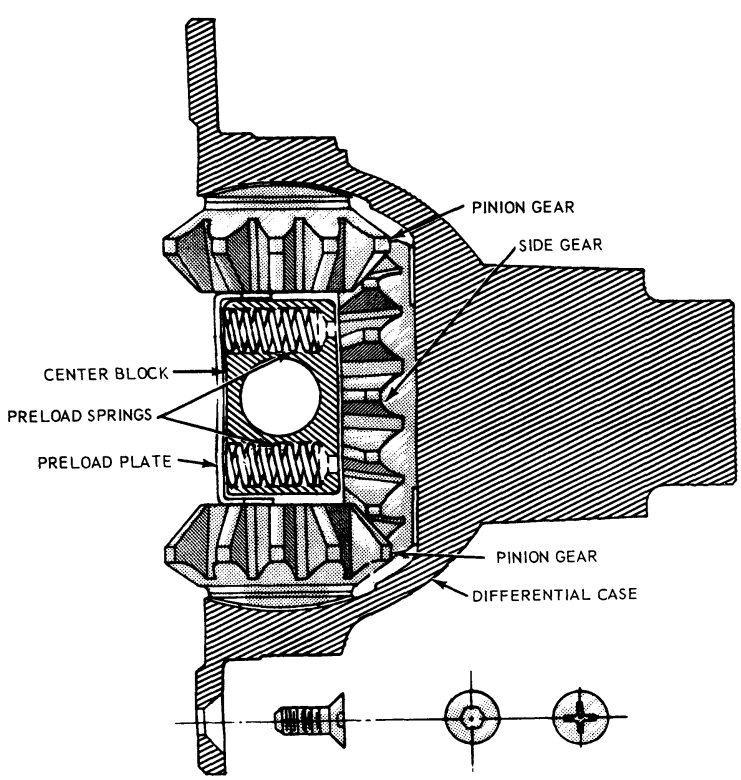


FIG. 57—Center Block and Pre-Load Springs Installation

3. Install the pinion thrust washers and place the pinion gears on the side gear; aligning the holes in the washers and gears with the holes in the case.

4. Install the center block so that the shaft holes are aligned with the holes in the pinion gears and case. The center block has two machined sides and two rough sides.

5. With a brass drift, drive in the long pinion shaft from the outside of the case aligning the lock pin holes in the shaft with the holes in the case. The center block should be positioned so the long shaft is driven through the rough side and short shafts driven through the machined side (Fig. 57).

6. With a suitable drift, install the shaft lock pins. Make sure the pinion and side gears move freely.

7. Place the four pre-load springs in the holes provided in the center block.

8. Position a pre-load plate over the four springs, making sure the springs are properly seated. The pre-load plate straddles the center block over its narrower or machined width.

9. Mount the differential cover in a soft jawed vise or holding fixture.

10. Insert shim(s) of 0.050 total thickness in the cover cavity.

11. Install the composite plate (friction material on one side and steel on the opposite) on the back side of the clutch hub with the friction material against the hub; next, install a friction plate, then steel, friction, stee, friction, steel, friction, and lastily a steel plate (Figures 3 and 58). **When new clutch plates are used, soak the plates in Ford Hypoid Lubricant (Ford Part No. C6AZ-19580-C), or equivalent lubricant, for approximately 30 minutes before installation.**

12. Place the clutch hub with the clutch plates into the clutch ear cavities in the differential cover. Make sure that the splines on the last friction plate are engaged on the hub.

13. Obtain locally a 5/8 inch x 2 1/2 inch or 9/16 inch x 2 1/2 inch bolt, nut and two 1 1/2 inch outside diameter flat washers approx. 1/8 inch in thickness. These parts are required to compress the clutch pack in order to obtain the proper shim selection.

Install a flat washer on the bolt, and place the bolt through the clutch hub. Hold the bolt in position and turn the cover over. Place a flat washer on the bolt and then install the nut. Be sure the washers are centered, and torque the nut 10 to 15 ft-lbs (Fig. 59).

14. Place the shim template tool (Ford Tool No. T68P-4946-A) in the clutch hub. Some clearance should be

observed between the shim tool and the cover-to-case mating surface. Using a feeler gauge, determine the exact amount of clearance. Refer to the shim pack thickness chart specifications which will indicate the correct amount of shim(s) to subtract from the 0.050 shim originally installed. In order to correctly select the proper shim(s), the shim template tool and the chart must be used.

15. After the proper shim selection is determined, remove the bolt, nut and flat washers. If it is necessary to revise the shim thickness, remove the clutch hub and clutch plates.

16. Install the selected shim(s) in the cover cavity, reinstall the components as outlined in Steps 11 and 12.

17. Install the four steel clutch ear guides and side gear.

18. Place both assemblies in a press, and press the two halves together; then, insert the two Allen or Phillips head screws, and tighten evenly until tight. If a press is not available, any two stock bolts and nuts may be used opposite each other in the ring gear retaining holes to compress both halves.

19. Install the ring gear and ring gear bolts and washers. Tighten evenly and alternately across the diameter of the ring gear. Torque the bolts to 65-80 ft-lbs.

20. Prior to installation of the torque sensitive locking differential into a vehicle, a bench torque check must be made. Check the torque required to rotate one side gear while the other is held stationary (Fig. 56). The initial break-away torque may exceed 250 ft-lbs. The rotating torque required to keep the side gear turning with new clutch plates is 100 to 250 ft-lbs. With re-used clutch plates, the minimum torque required is 40 ft-lbs. (The torque may fluctuate 10-40 ft-lbs.).

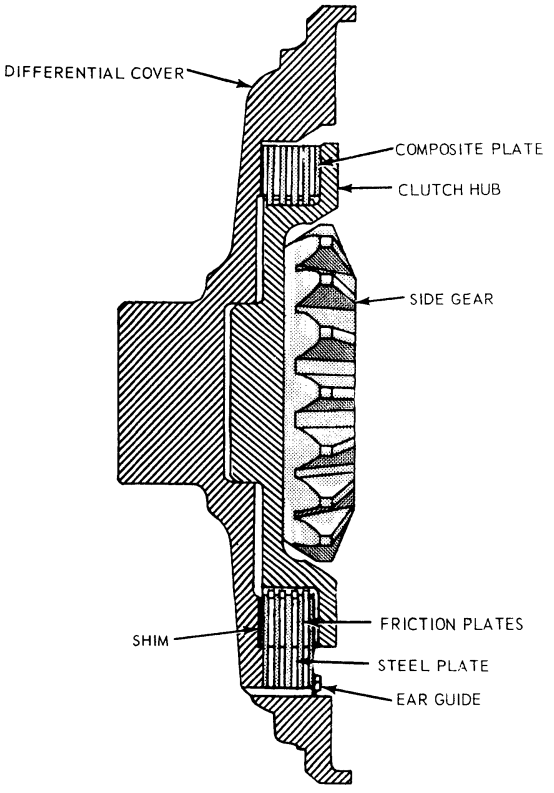


FIG. 58—Clutch Pack Installation

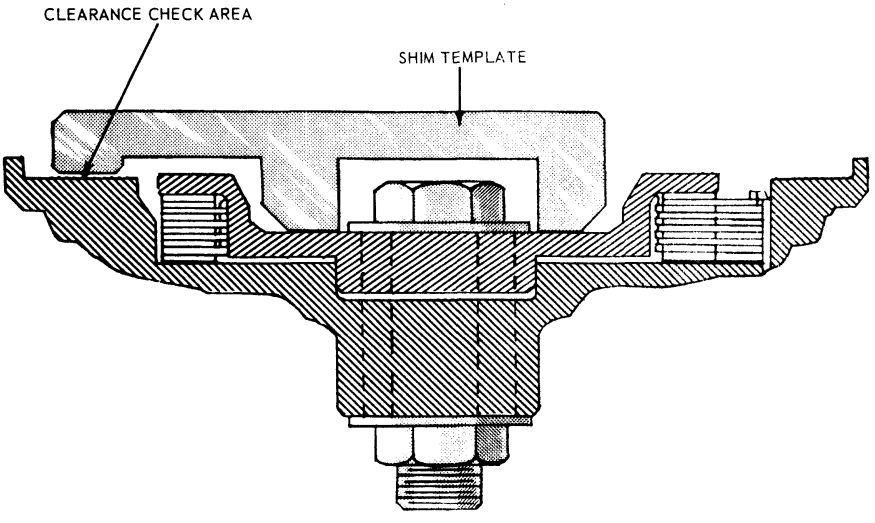


FIG. 59—Shim Template Tool Application

PART 4-3 *Rear Axles—Integral Carrier Type (Except Ford Light Duty WER Axle)*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
AXLE HOUSING												
Cleaning and Inspection	01-09											
Removal and Installation		N/A	N/A	N/A	03-06	03-06	03-06	03-06	03-06	N/A	N/A	N/A
AXLE SHAFT												
Cleaning and Inspection	01-10											
Removal and Installation		N/A	N/A	N/A	03-02	03-02	03-02	03-02	03-02	N/A	N/A	N/A
CONVENTIONAL DIFFERENTIAL CASE												
Cleaning and Inspection	01-10											
Disassembly and Overhaul		N/A	N/A	N/A	03-08	03-08	03-08	03-08	03-08	N/A	N/A	N/A
Removal and Installation		N/A	N/A	N/A	03-07	03-07	03-07	03-07	03-07	N/A	N/A	N/A
DIFFERENTIAL BEARINGS AND RING GEAR												
Cleaning and Inspection	01-10											
Removal and Installation		N/A	N/A	N/A	03-08	03-08	03-08	03-08	03-08	N/A	N/A	N/A
LIMITED SLIP DIFFERENTIAL CASE												
Disassembly and Overhaul		N/A	N/A	N/A	03-08	03-08	03-08	03-08	03-08	N/A	N/A	N/A
PINION AND RING GEAR												
Cleaning and Inspection	01-10											
Removal and Installation		N/A	N/A	N/A	03-09	03-09	03-09	03-09	03-09	N/A	N/A	N/A
PINION BEARING CUPS												
Cleaning and Inspection	01-10											
Removal and Installation		N/A	N/A	N/A	03-08	03-08	03-08	03-08	03-08	N/A	N/A	N/A
PINION OIL SEAL												
Removal and Installation		N/A	N/A	N/A	03-04	03-04	03-04	03-04	03-04	N/A	N/A	N/A
REAR WHEEL BEARINGS AND SEALS												
Cleaning and Inspection	01-10											
Removal and Installation		N/A	N/A	N/A	03-02	03-02	03-02	03-02	03-02	N/A	N/A	N/A
U-JOINT FLANGE												
Cleaning and Inspection	01-10											
Removal and Installation		N/A	N/A	N/A	03-05	03-05	03-05	03-05	03-05	N/A	N/A	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

The rear axle assembly is an integral-type housing, hypoid design, with the centerline of the pinion set below the centerline of the ring gear (Fig. 1).

The semi-floating axle shafts are retained in the housing by ball bearings and a bearing retainer at the axle housing outer ends.

The differential assembly is mounted on two opposed tapered roller bearings. The bearings are retained in the housing by removable caps. Differential bearing preload and drive gear backlash is adjusted by nuts located behind each differential bearing cup.

The drive pinion assembly is mounted on two opposed tapered roller bearings. Pinion bearing preload is adjusted by a collapsible spacer on the pinion shaft. Pinion and ring gear tooth contact is adjusted by shims between the rear bearing cone and pinion gear.

A cover on the rear of the differential housing provides access for inspection and removal and installation of the differential assembly and drive pinion.

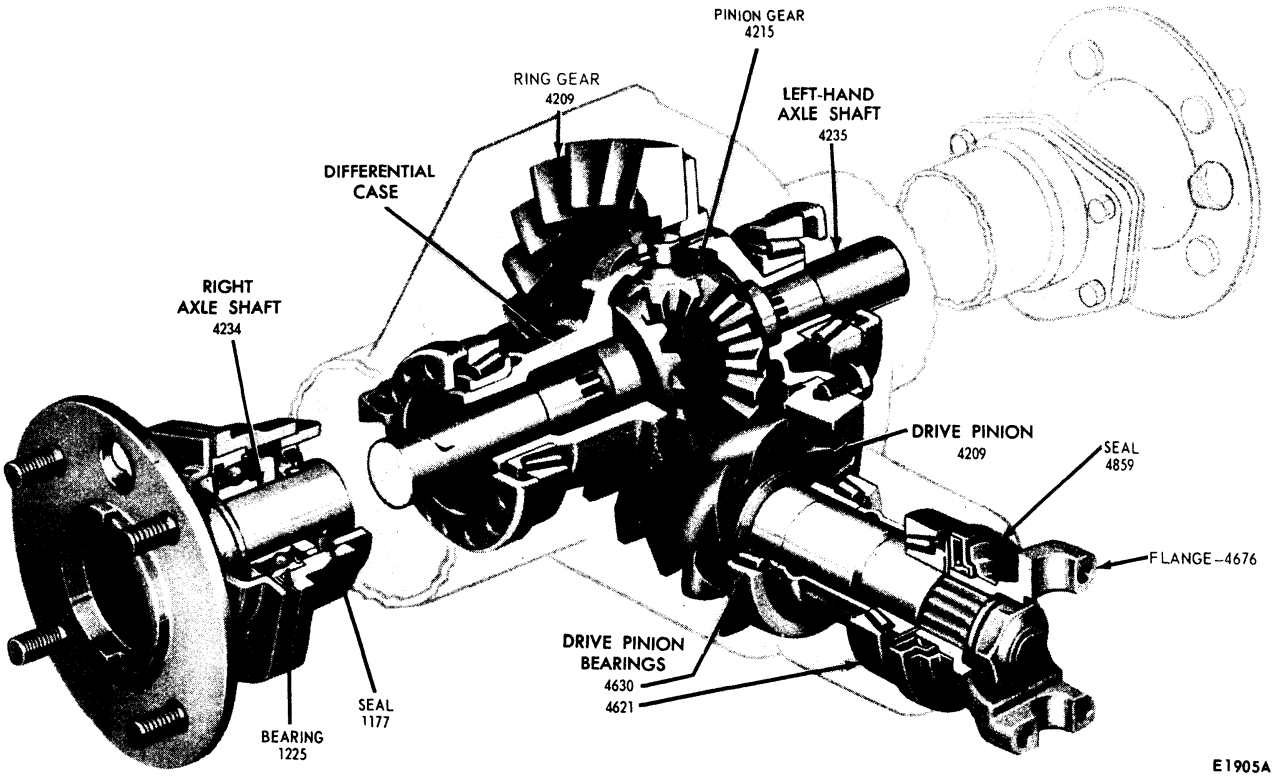


FIG. 1—Typical Rear Axle Assembly

2 IN-VEHICLE ADJUSTMENT AND REPAIR

REAR AXLE SHAFT, WHEEL BEARING AND OIL SEAL REPLACEMENT

Synthetic wheel bearing seals are used for production purposes only. Removal and insertion of rear axle shafts must be performed with caution. The entire length of the shaft (including spline) up to the seal journal must pass through the seal without contact. Any roughing or cutting of the seal element during axle removal or installation will result in early seal failure. Leather seals only will be used as service replacements for synthetic wheel bearing seals.

The rear axle shafts, wheel bearings, and oil seal can be replaced without removing the differential assembly from the axle housing. **Removal of the wheel bearings from the axle shafts make them unfit for further use.**

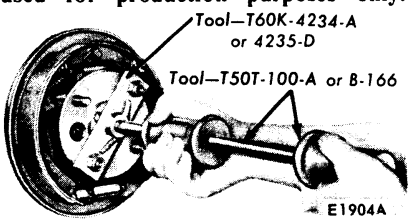


FIG. 2—Removing Axle Shaft

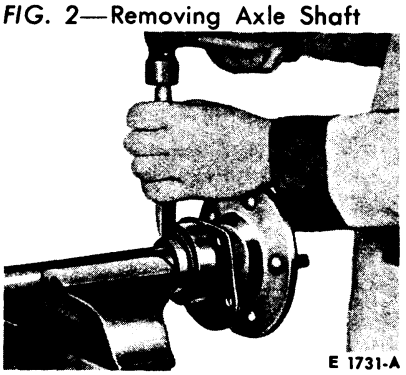


FIG. 3—Removing Rear Wheel Bearing Retainer Ring

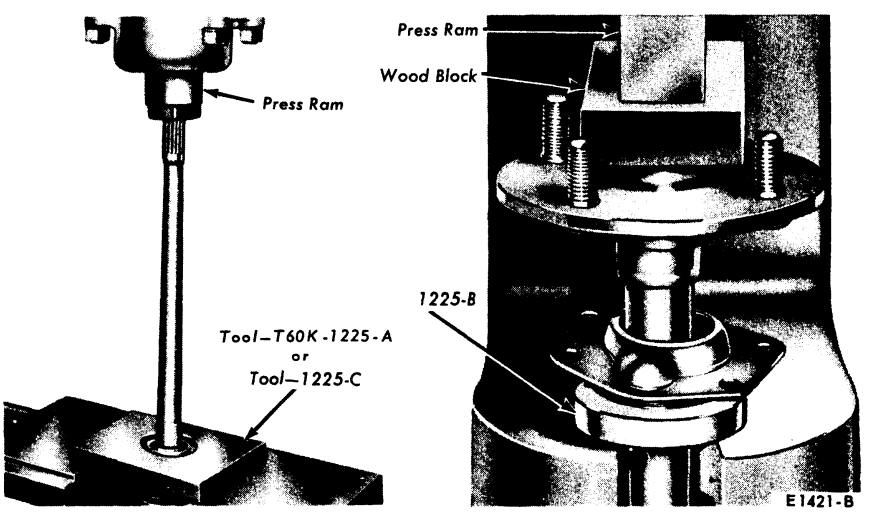
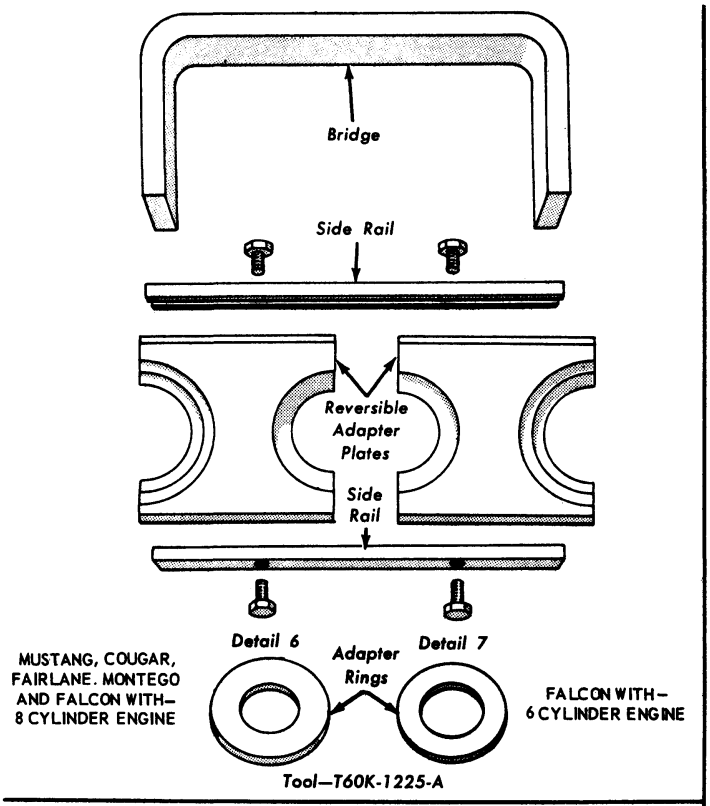
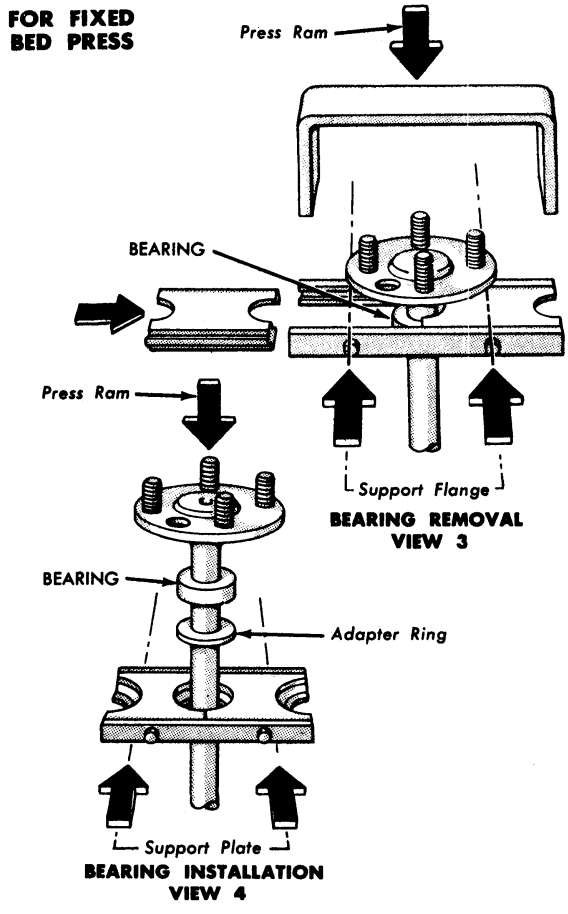
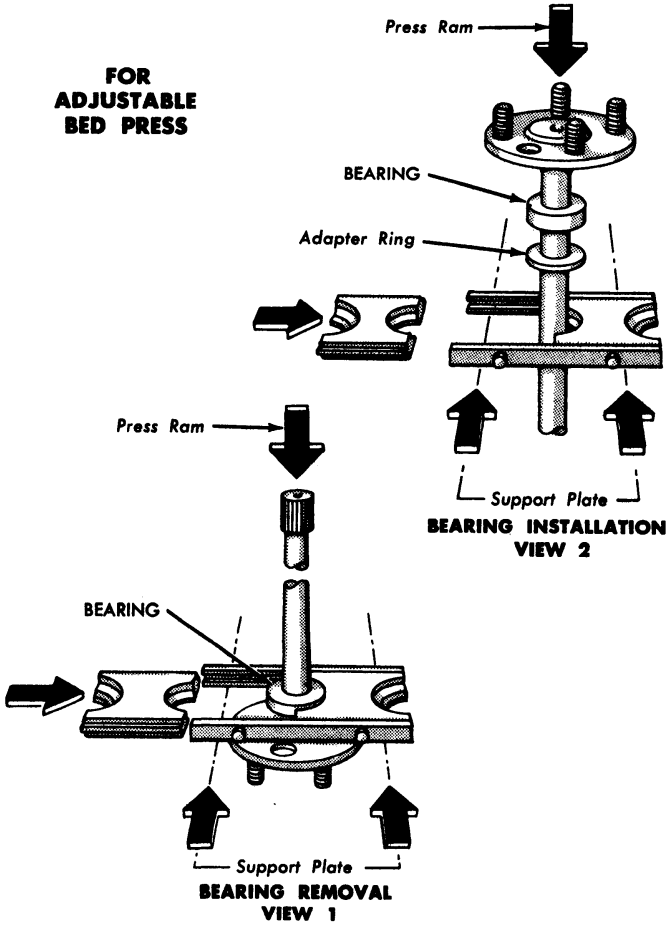


FIG. 4—Removing and Installing Rear Wheel Bearing—Montego—Cougar







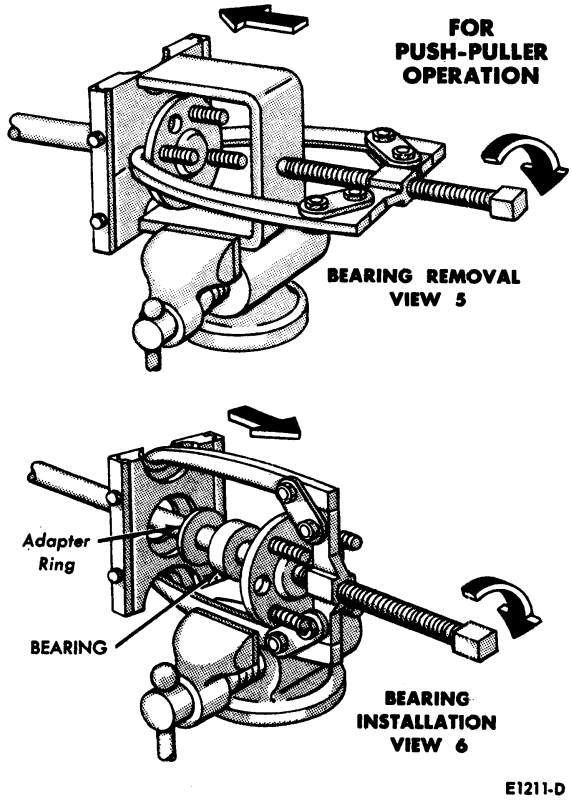


FIG. 5—Removing and Installing Rear Wheel Bearing—Falcon, Mustang and Fairlane

1. Remove the wheel cover, wheel and tire from the brake drum.

2. Remove the Tinnerman nuts that secure the brake drum to the axle housing flange, and then remove the drum from the flange.

3. Working through the hole provided in each axle shaft flange, remove the nuts that secure the wheel bearing retainer plate. Then pull the axle shaft assembly out of the axle housing (Fig. 2). **The brake backing plate must not be dislodged. Install one nut to hold the plate in place after the axle shaft is removed.**

4. If the rear wheel bearing is to be replaced, loosen the inner retainer ring by nicking it deeply with a cold chisel in several places (Fig. 3). It will then slide off easily.

5. Remove the bearing from the axle shaft with the tool shown in Fig. 4 or 5. If the push-puller operation shown in Fig. 5 is used, be sure that the puller arms contact **the flat surface** of the axle shaft flange rather than the bolt heads. Also with this method, be careful not to damage or burr the oil seal journal as the bearing breaks loose.

6. **Whenever a rear axle shaft is replaced the oil seal must be replaced.** Remove the seal with the tools shown in Fig. 8. Soak new oil seals in SAE 10 oil for 1/2 hour before installing.

7. Inspect the machined surfaces of the axle shaft and the axle housing for rough spots or other irregularities which would affect the sealing action of the oil seal. Check the axle shaft splines for burrs, wear or damage. Carefully remove any burrs or rough spots. Replace worn or damaged parts.

8. Lightly coat wheel bearing bores with axle lubricant.

9. Place the retainer plate on the axle shaft, and press the new wheel bearing on the shaft with the tool shown in Fig. 4 or 5. **The bearing should seat firmly against the shaft shoulder. Do not attempt to press on both the bearing and the inner retainer ring at the same time.**

10. Using the bearing installation tool, press the bearing inner retainer ring on the shaft until the retainer seats firmly against the bearing.

11. Wipe all lubricant from the inside of the axle housing in the area of the oil seal before installing the new seal.

12. Wipe a small amount of oil resistant sealer on the outer edge of the seal before it is installed. **Do not put sealer on the sealing lip.**

13. **Rear wheel oil seals with synthetic sealing elements have been incorporated in production. However, only leather seals will be used as replacements for the synthetic sealing element seals.** Install the new oil seal with the tools shown in Fig. 8. **Installation without use of the proper tool will distort the seal and cause leakage. Be sure the new seal has been soaked in SAE 10 oil for 1/2 hour.**

14. Carefully slide the axle shaft into the housing so that the rough forging of the shaft will not damage the oil seal. Start the axle splines into the side gear, and push the shaft in until the bearing bottoms in the housing.

15. Install the bearing retainer plate on the mounting bolts at the axle housing, and install the attaching nuts. Torque the nuts to specifications.

16. Install the brake drum and the drum retaining nuts.

17. Install the wheel and tire on the drum, and install the wheel cover.

REMOVAL AND REPLACEMENT OF DRIVE PINION OIL SEAL

Synthetic seals must not be cleaned, soaked or washed in cleaning solvent.

Replacement of the pinion oil seal involves removal and installation of only the pinion shaft nut and the universal joint flange. **However, this operation disturbs the pinion bearing preload, and this preload must be carefully reset when assembling.**

1. Raise the vehicle and install safety stands. Remove the rear wheels and brake drums.

2. Make scribe marks on the drive shaft end yoke and the axle U-joint flange to insure proper position of the drive shaft at assembly (Fig. 14). Disconnect the drive shaft from the axle U-joint flange. **Be careful to avoid dropping the loose universal joint bearing cups.** Hold the cups on the spider with tape. Mark the cups so that they will be in their original position in relation to the flange when they are assembled. Remove the drive shaft from the transmission extension housing. Install an oil seal replacer tool in the transmission extension housing to prevent transmission leakage. Refer to the transmission group for the appropriate tool.

3. Install an in-lb torque wrench on the pinion nut Fig. 6. Record the torque required to maintain rotation of the pinion shaft through several revolutions.

4. While holding the flange with the tool shown in Fig. 9, remove the integral pinion nut and washer.

5. Clean the pinion bearing retainer around the oil seal. Place a drain pan under the seal, or raise the front of the vehicle higher than the rear.

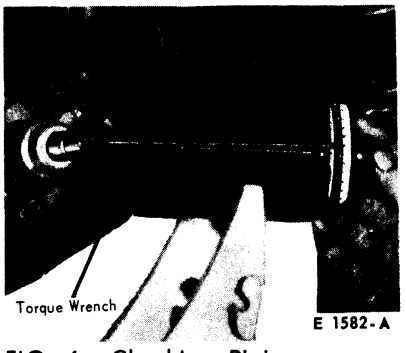


FIG. 6—Checking Pinion Bearing Preload

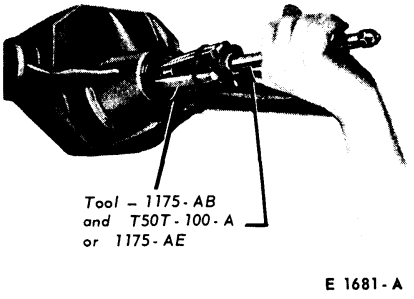
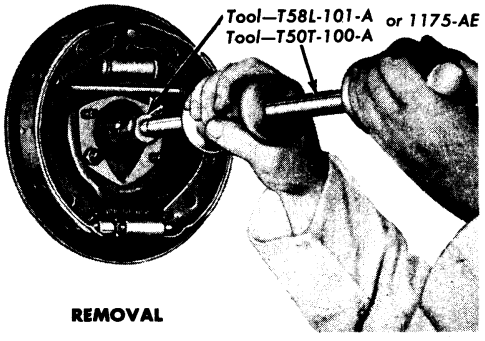


FIG. 7—Removing Pinion Seal



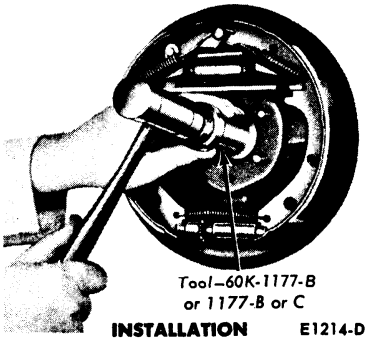


FIG. 8—Removing and Installing Axle Shaft Seal

6. Using the tool shown in Fig. 10, remove the pinion U-joint flange.

7. Using the tool shown in Fig. 7, remove the drive pinion oil seal.

8. Clean the oil seal seat.

9. **Pinion oil seals have pre-applied oil resistant sealer.** Install the seal in the retainer using the tool shown in Fig. 11.

10. Check splines on the pinion shaft to be sure they are free of burrs. If burrs are evident, remove them by using a fine crocus cloth, working in a rotational motion. Wipe the pinion shaft clean.

11. Apply a small amount of lubricant to the U-joint splines.

12. Align the punch mark on the U-joint flange with the mark on the end of the pinion shaft, and install the flange.

13. Install a new integral nut and washer on the pinion shaft. (Apply a small amount of lubricant on the washer side of the nut.)

14. Hold the flange with the tool shown in Fig. 9 while tightening the nut.

15. Tighten the pinion shaft nut, rotating the pinion occasionally to insure proper bearing seating, and take frequent preload readings (Fig. 6) until the preload is at the original recorded reading established in step 3.

16. After original preload has been reached, tighten the pinion nut slowly, until an additional preload of 6 to 12 in-lbs has been added.

The preload should not exceed the amount indicated above, or bearing failure may result. Under no circumstances should the pinion nut be backed-off to lessen preload. If this is done, a new pinion bearing spacer must be installed. In addition, the U-joint flange must never be hammered on, or power tools used.

17. Remove the oil seal replacer tool from the transmission extension housing. Install the front end of the drive shaft on the transmission output shaft.

18. Connect the rear end of the drive shaft to the axle U-joint flange, aligning the punch marks made on the drive shaft end yoke and the axle U-joint flange (Fig. 14).

19. Check the lubricant level. Make sure the axle is in running position. Add whatever amount of specified lubricant is required to reach the lower edge of the filler plug hole, located in the carrier casting or the housing cover.

REMOVAL AND INSTALLATION OF THE ORIGINAL U-JOINT FLANGE

Use procedure as outlined under drive pinion oil seal replacement.

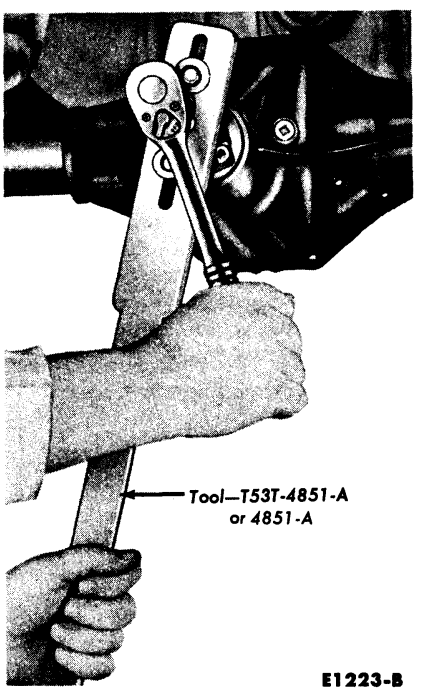


FIG. 10—Typical Drive Pinion Flange Removal

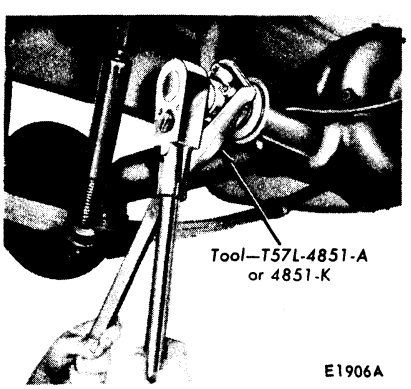


FIG. 9—Removing or Installing Drive Pinion Nut

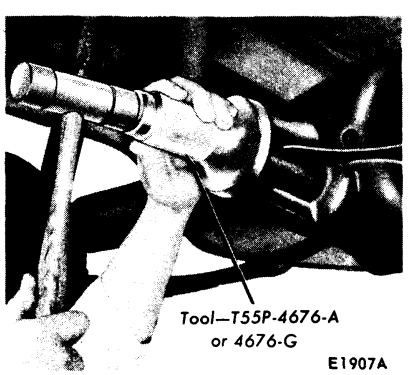


FIG. 11—Typical Drive Pinion Flange Seal Installation

INSTALLATION OF A NEW UNIVERSAL JOINT FLANGE

1. Raise the vehicle and install safety stands. Remove both rear wheels and brake drums.

2. Disconnect the drive shaft from the axle U-joint flange. **Be careful to avoid dropping the loose universal joint bearing cups. Hold the cups on the spider with tape.** Mark the cups so that they will be in their original position in relation to the flange when they are assembled. Remove the drive shaft from the transmission extension housing. Install an oil seal replacer tool in the transmission extension housing to prevent transmission fluid leakage. Refer to the transmission group for the appropriate tool.

3. Install an in-lb torque wrench on the pinion nut Fig. 6. Record the torque required to maintain rotation of the pinion shaft through several revolutions.

4. While holding the flange with the tool shown in Fig. 9, remove the integral pinion nut and washer.

5. Clean the pinion bearing retainer around the oil seal. Place a drain pan under the seal, or raise the front of the vehicle higher than the rear. **Synthetic seals must not be cleaned, soaked or washed in cleaning solvents.**

6. Using the tool shown in Fig. 10, remove the U-joint flange.

7. Check splines on the pinion shaft to be sure they are free of burrs. If burrs are evident, remove them by using a fine crocus cloth, working in rotational motion, then wipe clean.

Apply a small amount of lubricant to U-joint splines.

8. Install the U-joint flange using the tool shown in Fig. 12.

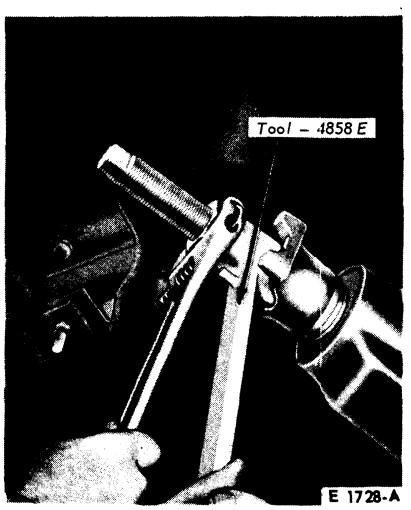


FIG. 12—U-Joint Flange Installation

9. Install a new integral nut and washer on the pinion shaft. (Apply a small amount of lubricant on the washer side of the nut.)

10. Hold the flange with the tool shown in Fig. 9 while the nut is being tightened.

11. Tighten the pinion shaft nut, rotating the pinion occasionally to insure proper bearing seating, (Fig. 6) and take frequent preload readings until the preload is at the original recorded reading established in step 3.

12. After original preload has been reached, tighten the pinion nut slowly, until an additional preload of 6 to 12 in-lbs has been added.

The preload should not exceed the amount shown above, or bearing failure may result.

Under no circumstances should the pinion nut be backed off to lessen preload. If this is done, a new pinion bearing spacer must be installed. (In addition, the U-joint flange must never be hammered on, or pneumatic--tools used.)

13. Remove the oil seal replacer tool from the transmission extension housing. Install the front end of the drive shaft on the transmission output shaft.

14. Connect the rear end of the drive shaft to the axle U-joint flange, aligning the scribe marks made on the drive shaft end yoke and the axle U-joint flange (Fig. 14).

15. Check the lubricant level. **Make sure the axle is in running position.** Add whatever amount of specified lubricant is required to reach the lower edge of the filler plug hole, located in the carrier casting or housing cover.

3 REMOVAL AND INSTALLATION

REAR AXLE HOUSING

REMOVAL

1. Raise the vehicle and support it with safety stands under the rear frame member.

2. Drain the lubricant from the axle.

3. Make scribe marks on the drive shaft end yoke and the axle U-joint flange to insure proper position of the drive shaft at assembly (Fig. 14). Disconnect the drive shaft at the drive pinion flange.

4. Disconnect the lower end of the shock absorbers.

5. Remove the wheels, brake drums and both axle shafts as outlined in the foregoing Section 2.

6. Remove vent hose front vent tube (Corbin clamp) and remove vent tube from brake tube junction and axle housing.

7. Remove the hydraulic brake T-fitting from the axle housing. **Do not open the hydraulic brake system lines.** Remove the hydraulic brake line from its retaining clip on the axle housing.

8. Remove both axle shaft oil seals with the tools shown in Fig. 8.

9. Remove both brake backing plates from the axle housing and suspend them above the housing with mechanic's wire. The hydraulic brake lines and the parking brake cables are still attached to the brake carrier plates.

10. Support the rear axle housing on a jack, and then remove the spring clip nuts. Remove the spring clip plates (Fig. 13)

11. Lower the axle housing and remove it from under the vehicle.

12. If the axle housing is being replaced, transfer all the differential and pinion parts to the new housing. See Section 4, Major Repair Operations.

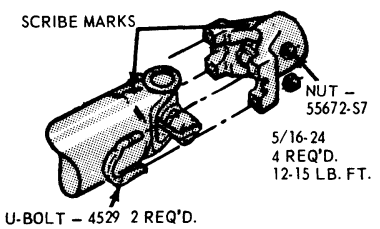


FIG. 14—Drive Shaft-to-Axle U-Joint Connection

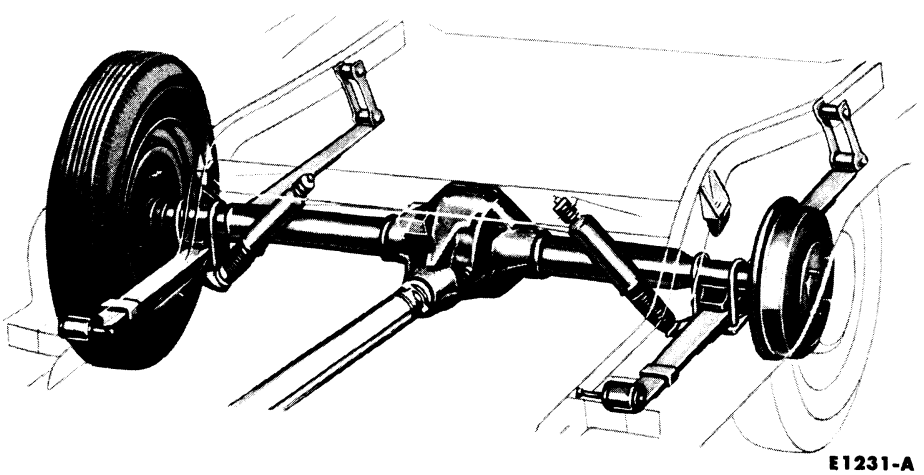


FIG. 13—Rear Axle Installation—Typical

INSTALLATION

1. Raise the axle housing into position so that the spring clip plates can be installed. On a Montego or Fairlane, position the spring upper insulators and retainers between the axle housing and springs and install the lower insulators. Torque the spring clip nuts to specification.

2. Place the brake backing plates in their normal position on the axle housing. Use new gaskets on each side of the brake backing plates.

3. Install new axle shaft oil seals with the tool shown in Fig. 8. Soak the new seals in light weight engine oil (SAE 10) for 1/2 hour before installing them. **Installation without use of the proper tool will distort the seal and cause leakage.** Coat the outside edges of the new oil seal with a non-hardening type of sealer such as Permatex No. 2 or its equivalent.

4. Install the axle shafts, brake drums and wheels as outlined in Section 2.

5. Attach the hydraulic brake line T fitting to the axle housing, and secure the hydraulic brake line in its retainer on the axle housing.

6. Install vent tube to brake tube

junction and install vent hose to vent tube.

7. Raise the axle housing and connect the shock absorbers.

8. Connect the rear end of the drive shaft to the axle U-joint flange, aligning the scribe marks made on the drive shaft end yoke and the axle U-joint flange (Fig. 14).

9. Fill the axle with the proper grade and amount of lubricant.

10. Road test the vehicle.

4 MAJOR REPAIR OPERATIONS

DISASSEMBLY

All service operations on the differential case assembly and the drive pinion assembly can be performed with the housing in the vehicle.

REMOVAL OF DIFFERENTIAL CASE AND DRIVE PINION

1. Raise the vehicle and support it on the underbody, so that the rear axle drops down as far as the springs and shock absorbers permit.

2. Remove the cover from the carrier casting rear face, and drain the lubricant.

3. Perform the Inspection Before Disassembly of Carrier in Part 4-1, Section 3.

4. Remove both rear wheels.

5. Remove the brake drums.

6. Working through the hole provided in the axle shaft flange, remove the nuts that attach the wheel bearing retainers to the axle housing.

7. Pull the axle shafts with the tool shown in Fig. 2. **Care must be exercised to prevent damage to the oil seals.** Install a nut on one of the brake backing plate attaching bolts to hold the plate to the axle housing after the shaft has been removed. Remove both seals with the tool shown in Fig. 8.

8. Make scribe marks on the drive shaft end yoke and the axle U-joint flange to insure proper position of the drive shaft at assembly (Fig. 14). Disconnect the drive shaft from the axle U-joint flange. **Be careful to avoid dropping the loose universal joint bearing cups.** Hold the cups on the spider with tape. Mark the cups so that they will be in their original position in relation to the flange when they are assembled. Remove the drive shaft from the transmission extension housing. Install an oil seal replacer tool in the transmission extension housing to prevent transmission leakage. Refer to the transmission group for the appropriate tool.

9. Remove the differential bearing adjusting nut locks (Fig. 15).

10. Mark one differential bearing cap and the case (Fig. 16) to help position the parts properly during assembly.

11. Remove the differential bearing cap bolts and bearing caps. **Hold the differential case assembly in the housing after the caps are removed.**

12. Remove the differential case and bearing cups (Fig. 17).

13. Hold the drive pinion flange and remove the pinion nut (Fig. 9).

14. Remove the pinion flange (Fig. 10).

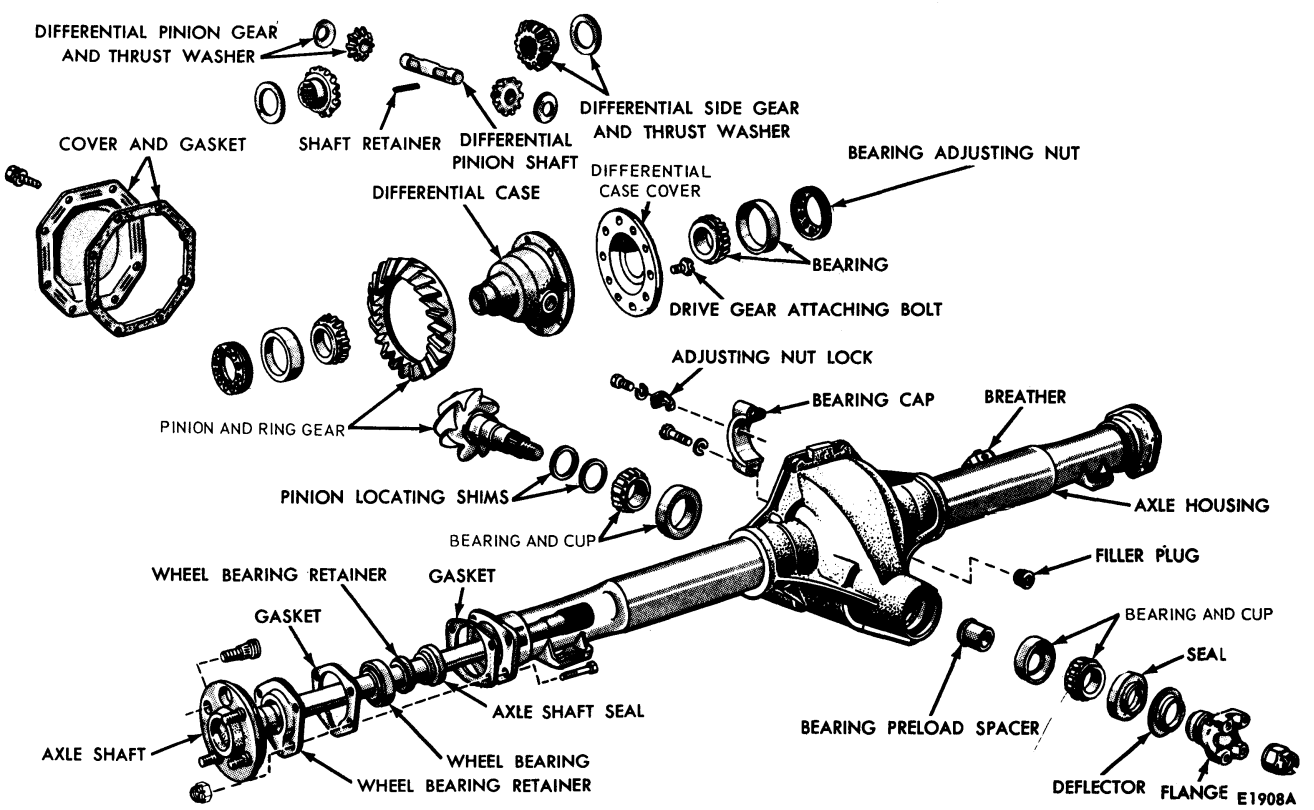


FIG. 15—Disassembled Rear Axle

15. With a soft-faced hammer, drive the pinion out of the front bearing cone and remove it through the rear of the carrier casting.

16. Drive against the pinion front bearing cone and drive the pinion flange seal and the bearing cone out of the front of the carrier casting.

17. To remove and install the pinion rear bearing cone use the tools in Fig. 18 and 19.

18. Measure the shim which is found under the bearing cone with a micrometer. Record the thickness of the shim.

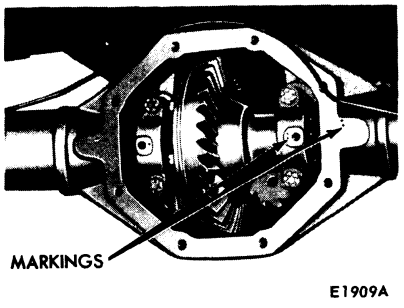


FIG. 16—Typical Differential Bearing Cap Marking

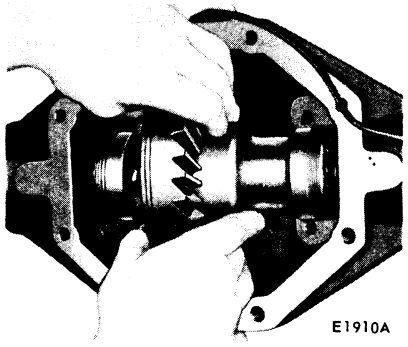


FIG. 17—Differential Case Removal or Installation

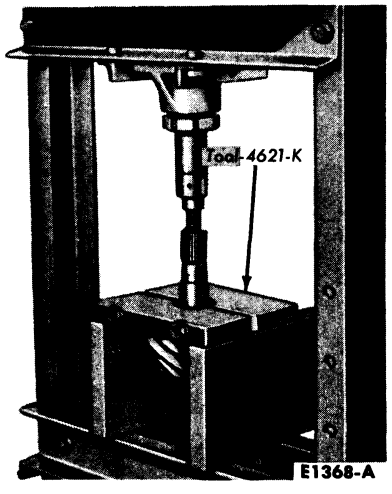


FIG. 18—Removing Pinion Rear Bearing Cone

DISASSEMBLY OF DIFFERENTIAL CASE

1. If the differential bearings are to be removed, use the tools shown in Fig. 20.

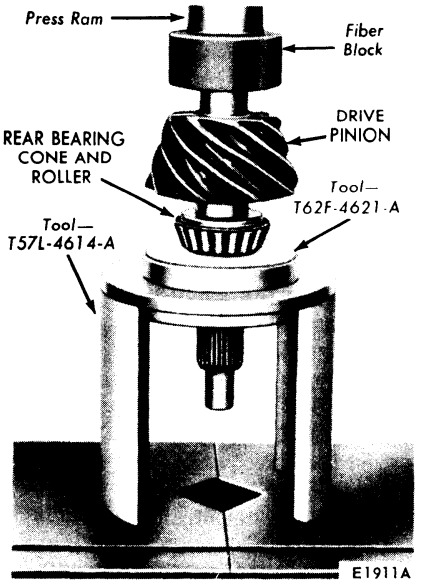


FIG. 19—Installing Pinion Rear Bearing Cone

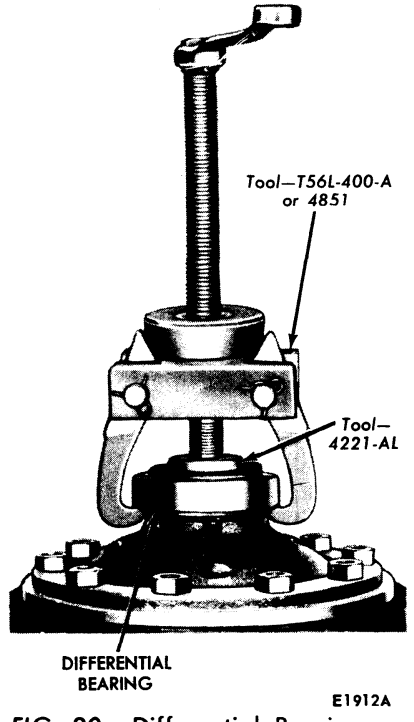


FIG. 20—Differential Bearing Removal

2. Remove the bolts that attach the ring gear to the differential case. Press the ring gear from the case or tap it off with a soft-faced hammer.

3. With a drift, drive out the differential pinion shaft lock pin (Fig. 21).

4. Drive out the pinion shaft with a brass drift. Remove the gears and thrust washers.

PARTS REPAIR OR REPLACEMENT

Clean and inspect all the parts as outlined in Part 4-1, Section 3. Before assembling the carrier, repair or replace all parts as indicated by the inspection.

The principal replacement operations are covered in the following procedures. All other repair or replacement operations are performed during Cleaning and Inspection Part 4-1, Section 3, or during the Assembly in this section.

PINION BEARING CUPS

Do not remove the pinion bearing cups from the carrier casting unless the cups are worn or damaged.

If the pinion bearing cups are to be replaced, drive them out of the carrier

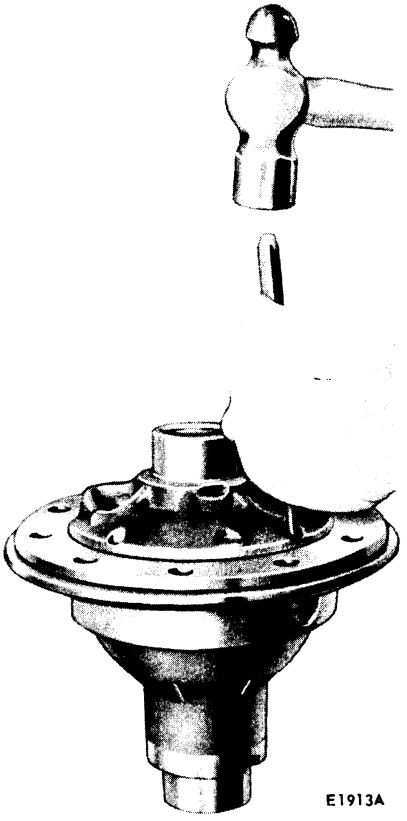


FIG. 21—Differential Pinion Shaft Lock Pin Removal

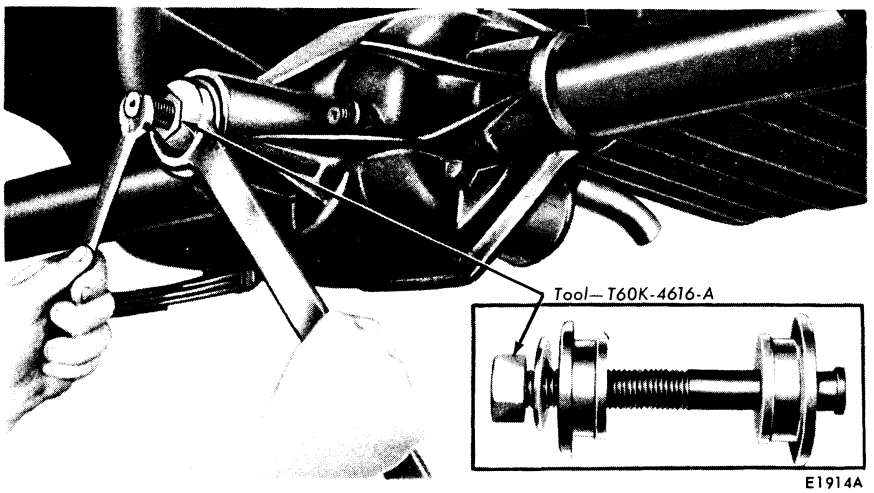


FIG. 22—Pinion Bearing Cup Removal or Installation

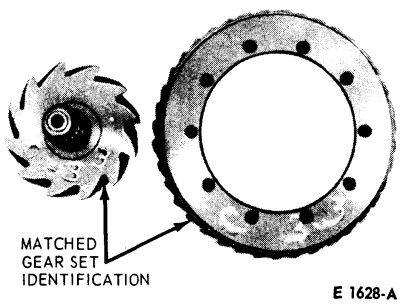


FIG. 23—Pinion and Ring Gear Marking

casting with a drift. Install the new cups with the tool shown in Fig. 22. Make sure the cups are properly seated in their bores. If a 0.0015-inch feeler gauge can be inserted between a cup and the bottom of its bore at any point around the cup the cup is not properly seated.

Whenever the cups are replaced, the cone and roller assemblies should also be replaced.

DRIVE PINION AND GEAR SET

Individual differences in machining the carrier casting and the gear set require a shim between the pinion rear bearing cone and the pinion gear to locate the pinion for correct tooth contact with the ring gear.

When replacing a ring gear and pinion it should be noted that the **original** factory installed shim is of the correct thickness to adjust for individual variations in **both** the carrier casting dimension and in the original gear set dimension; therefore, to select the correct shim thickness for the new gear set to be installed, follow these steps:

1. With a micrometer, measure the thickness of the original shim removed from the axle and use the same thickness upon installation of the replacement carrier assembly or drive pinion.

2. If further shim change is necessary, it will be indicated in the tooth pattern check.

3. If the original shim is lost, substitute a nominal shim for the original and use the tooth pattern check to determine if further shim changes are required. Nominal shim thickness is indicated in Part 4-5, Specifications.

A new ring gear and pinion should always be installed in an axle as a matched set (never separately). Be sure the same identifying (matching) number, painted in white, appears on the bolt hole face of the ring gear and on the head of the drive pinion (Fig. 23).

4. After determining the correct shim thickness as explained in the foregoing steps, install the new pinion and ring gear as outlined under Assembly.

DIFFERENTIAL CASE, BEARINGS, AND RING GEAR

If the ring gear runout check (before disassembly) exceeded specifications, the condition may be caused by a warped gear, a defective case, or excessively worn differential bearings.

To determine the cause of excessive runout proceed as follows:

1. Assemble the two halves of the differential case together **without** the ring gear, and press the two differential side bearings on the case hubs.

2. Place the cups on the bearings and set the differential case in the carrier.

3. Install the bearing caps and adjusting nuts as outlined in steps 11 thru 14 under Installation of Drive Pinion and Differential Case in this section.

4. Tighten the right nut two notches beyond the position where it first contacts the bearing cup. Rotate the differential case several revolutions in each direction while the bearings are loaded to seat the bearings in their cups. **This step is important.**

5. Again loosen the right nut to release the preload. Check to see that the left nut contacts the bearing cup. Using the dial indicator set-up shown in Fig. 10, Part 4-1, adjust the preload to 0.008 to 0.012 case spread for new bearings or 0.005 to 0.008 for the original bearings, if reused.

6. Check the runout of the differential case flange with a dial indicator. If the runout does **not now** exceed specifications, install a new ring gear. If the runout still exceeds specifications, the ring gear is true and the trouble is due to either a defective case or worn bearings.

7. Remove the differential case from the carrier and remove the side bearings from the case.

8. Install **new** bearings on the case hubs, and again install the differential assembly in the carrier **without** the ring gear.

9. Check the case runout again with the new bearings. If the runout is **now** within limits, the old bearings were excessively worn. Use the new bearings for assembly. If the runout is still excessive, the case is defective and should be replaced.

ASSEMBLY

Refer to Part 4-1 for Cleaning and Inspection before starting assembly operations.

ASSEMBLY OF DIFFERENTIAL CASE

1. Lubricate all the differential parts with axle lubricant, before they are installed in the case.

2. Place the side gears and thrust washers in the case.

3. Place the two pinion gears and thrust washers exactly opposite each other in the case openings and in mesh with the side gears.

4. Turn the pinions and thrust washers until the holes in the pinion gears align with the pinion shaft holes in the case.

5. Start the pinion shaft into the differential case. Carefully align the shaft lock pin hole with the pin hole

in the case. Drive the shaft into place and install the lock pin (Fig. 21).

6. Place the ring gear on the differential case and install the bolts. Torque the bolts to specification.

7. If the differential bearings have been removed, press them on as shown (Fig. 24).

INSTALLATION OF DRIVE PINION AND DIFFERENTIAL CASE

1. Place the shim and pinion rear bearing cone on the pinion shaft. Press the bearing and shim firmly against the pinion shaft shoulder (Fig. 19).

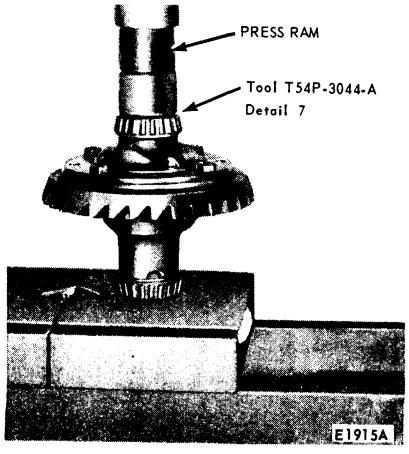


FIG. 24—Differential Bearing Installation

2. Place a **new** pinion bearing preload spacer on the pinion shaft.

3. Lubricate the pinion rear bearing with axle lubricant.

4. Lubricate the pinion front bearing cone and place it in the housing.

5. Install a new pinion oil seal in the carrier casting (Fig. 11).

6. Insert the drive pinion shaft flange into the seal and hold it firmly against the pinion front bearing cone. From the rear of the carrier casting, insert the pinion shaft into the flange.

7. Start a new pinion shaft nut. Hold the flange with the tool shown in Fig. 9 and tighten the pinion shaft nut. As the pinion shaft nut is tightened, the pinion shaft is pulled into the front bearing cone and into the flange.

As the pinion shaft is pulled into the front bearing cone, pinion shaft end play is reduced. While there is still end play in the pinion shaft, the flange and cone will be felt to bottom. This indicates that the bearing cone and flange have bottomed on the collapsible spacer.

From this point, a much greater torque must be applied to turn the pinion shaft nut, since the spacer must be collapsed. From this point, also, the nut should be tightened very slowly and the pinion shaft end play checked often, so that the pinion bearing preload does not exceed the limits (Fig. 6).

If the pinion shaft nut is tightened to the point that pinion bearing preload exceeds the limits, the pinion shaft must be removed and a new collapsible spacer installed. **Do not decrease the preload by loosening the pinion shaft nut.** This will remove the compression between the pinion front and rear bearing cones and the collapsible spacer and may permit the front bearing cone to turn on the pinion shaft.

8. As soon as there is preload on the bearings, **turn the pinion shaft in both directions several times to set the bearing rollers.**

9. Adjust the bearing preload to specification. Measure the preload with the tool shown in Fig. 6.

10. Apply a thin coating of lubricant on the bearing bores so that the differential bearing cups will move easily.

11. Place the cups on the bearings and set the differential case assembly in the carrier casting (Fig. 17).

If the gear set is of the **non-hunting** or **partial non-hunting** type, assemble the differential case and ring gear assembly in the carrier so that the marked tooth on the pinion indexes between the marked teeth on the ring gear as shown in Fig. 25.

In almost every case of improper assembly (gears assembled out of time), the noise level and probability of failure will be higher than they would be with properly assembled gears.

When installing the **hunting** type gear set (no timing marks), assemble the differential case and ring gear assembly in the carrier without regard to the matching of any particular gear teeth.

12. Slide the case assembly along the bores until a slight amount of backlash is felt between the gear teeth. Hold the differential case in place.

13. Set the adjusting nuts in the



FIG. 25—Typical Gear Set Timing Marks

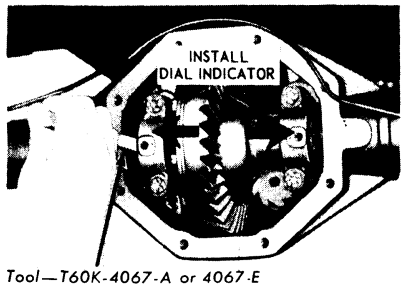


FIG. 26—Backlash and Bearing Pre-Load Adjustment

bores so that they just contact the bearing cups.

14. Carefully position the bearing caps on the carrier casting. Match the marks made when the caps were removed.

15. Install the bearing cap bolts and lockwashers. As the bolts are tightened, turn the adjusting nut with the tool shown in Fig. 26.

16. If the adjusting nuts do not turn freely as the cap bolts are tightened, remove the bearing caps and again inspect for damaged threads or incorrectly positioned caps. Tightening the bolts to the specified torque is done to be sure that the cups and adjusting nuts are seated. Loosen the cap bolts, and torque them to only 5 ft-lbs before making adjustments. Refer to Part 4-1 for backlash and bearing preload adjustment procedures.

LIMITED-SLIP DIFFERENTIAL

For integral carrier limited-slip differentials see the repair procedures for removable carrier limited-slip differentials, Part 4-2. These procedures are good for the differential case only. When the limited slip differential case has been repaired replace the case using the procedure for the conventional intergral carrier differential case in this part.

PART 4-4 Rear Axle—Ford Light-Duty (WER)

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
AXLE HOUSING												
Cleaning and Inspection		01-09	N/A	01-09	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Removal and Installation		04-04	N/A	04-04	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AXLE SHAFT												
Cleaning and Inspection		01-10	N/A	01-10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Removal and Installation		04-06	N/A	04-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DESCRIPTION		04-01	N/A	04-01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DIFFERENTIAL CASE												
Cleaning and Inspection		01-10	N/A	01-10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Disassembly and Overhaul		04-07	N/A	04-07	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Removal and Installation		04-06	N/A	04-06	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DIFFERENTIAL BEARINGS AND DRIVE GEAR												
Cleaning and Inspection		01-10	N/A	01-10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Removal and Installation		04-08	N/A	04-08	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PINION AND RING GEAR												
Cleaning and Inspection		01-10	N/A	01-10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Removal and Installation		04-08	N/A	04-08	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PINION BEARING CUPS												
Cleaning and Inspection		01-10	N/A	01-10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Removal and Installation		04-08	N/A	04-08	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

A light-duty, integral-carrier, conventional-type rear axle assembly (Fig. 1) is used in Ford and Meteor passenger vehicles equipped with 240-1V and 302 2V engines and related transmissions. The axle (model WER) incorporates the following features:

The hypoid gear set consists of an 8.50 inch diameter ring gear and an overhung drive pinion which is supported by two opposed tapered roller bearings. A drive pinion pilot bearing is not used in this axle.

The differential carrier is the non-removable type, with a stamped bolt-on cover. The filler hole is tapped in the front portion of the carrier casting and uses a 1/2-14 tapered pipe plug with a 3/8 inch square female drive. A bumper pad is machined on the pinion nose portion of the carrier. The rubber bumper is mounted on the vehicle underbody.

The differential case is a one-piece design, with openings allowing assembly of the internal components and lubricant flow. The differential pinion shaft is retained with a threaded bolt (lock) assembled to the case.

The axle housing assembly consists of tube assemblies pressed and welded into the differential casting. The brake backing plate retainer is welded inboard of the outer edges of the tubes, and allows assembly of the backing plate, independent of the axle shafts.

The roller-type wheel bearings have no inner race, and contact the bearing journals of the axle shafts.

The axle shafts do not use an inner or outer bearing retainer. They are held in the axle by means of C-locks, positioned in a slot on the splined end. These C-locks also fit into a machined recess in the differential side gears within the differential case. There is no retainer bolt access hole in the axle shaft flange.

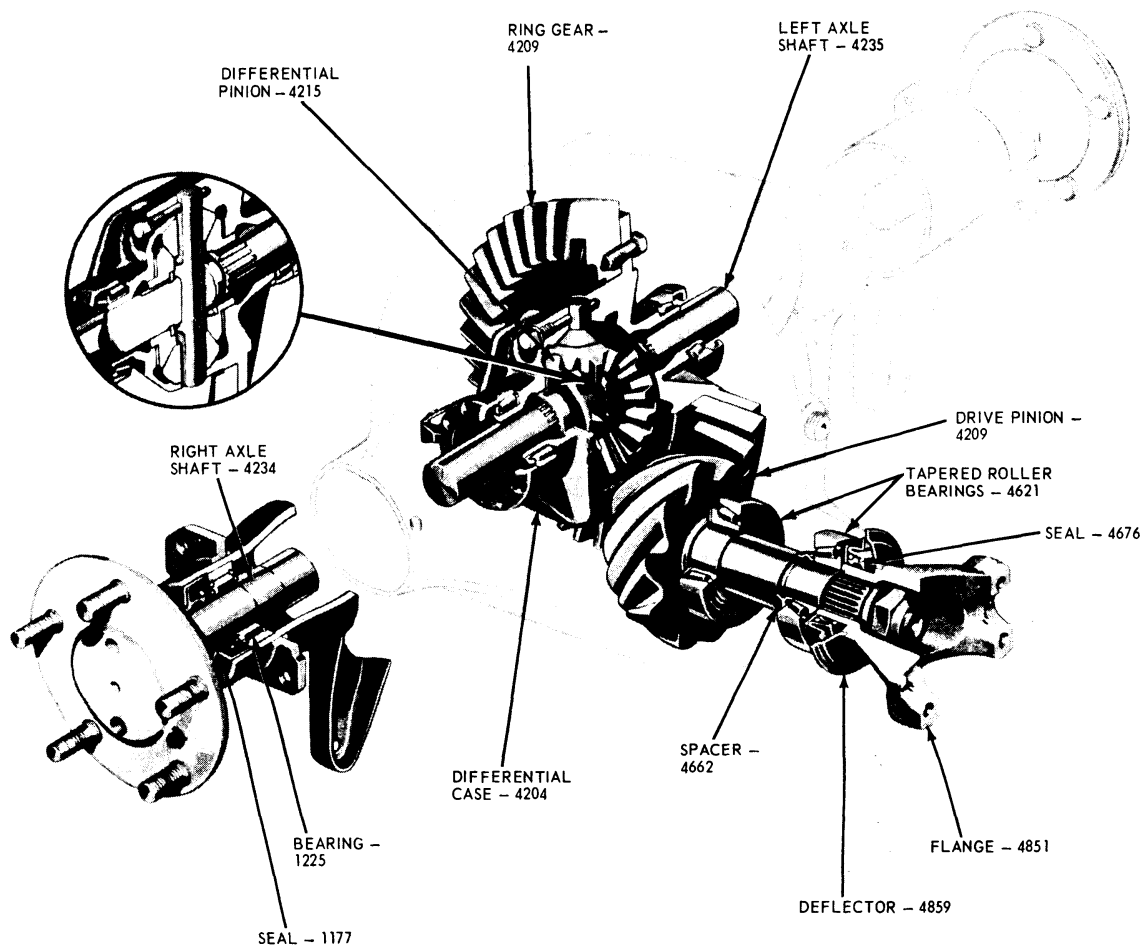


FIG. 1—Rear Axle Assembly—Light Duty (WER) Axle

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

REAR AXLE SHAFT, WHEEL BEARING AND OIL SEAL REPLACEMENT

REMOVAL

Synthetic wheel bearing seals are used for production and as service replacements. Removal and insertion of rear axle shafts must be performed with caution. The entire length of the shaft (including spline) up to the seal journal must pass through the seal without contact. Any roughing or cutting of the seal element during axle removal or installation will result in early seal failure.

1. Raise the vehicle on a hoist.
2. Remove the wheel(s) and tire(s) from the brake drum(s).
3. Position a drain pan and loosen the cover to differential housing retaining bolts. Drain the housing.
4. Remove the attaching (Tinnerman) nuts that secure the brake drum(s) to the axle shaft flange(s), and then remove the drum(s).
5. Remove the differential housing cover bolts, cover and gasket. Discard the gasket. Remove the drain pan.
6. Position safety stands under the rear frame member. Lower the hoist and allow the axle to lower as far as possible.
7. Working through the differential case opening, remove the pinion shaft lock bolt and the pinion shaft (Fig. 2).
8. Push the axle shaft(s) inward toward the center of the axle housing. Remove the C-lock(s) (Fig. 3) from the inner end of the axle(s). Remove the axle shaft(s) from the housing. **Extreme care must be used to avoid contact of the axle shaft seal lip with any portion of the axle shaft except the seal journal.**
9. Remove the bearing and oil seal from the housing as shown in Fig. 4.
10. Inspect the machined surface of the axle shaft and the axle housing for rough spots or other irregularities which would affect the sealing action of the oil seal. Check the axle shaft splines for burrs, wear or damage.



FIG. 2—Differential pinion shaft and Lock Bolt

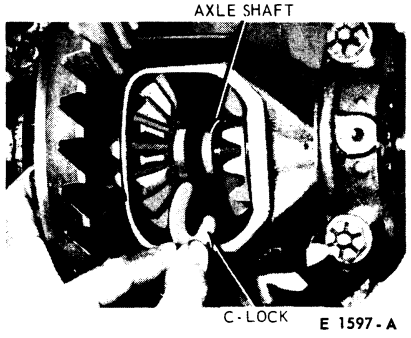


FIG. 3—Removal and Installation of C-Locks and Axle Shaft

Carefully remove any burrs or rough spots. Replace worn or damaged parts. A brownish yellow color on the bearing journal of the shaft is normal and the shaft need not be replaced. Slight pitting and wear is also normal.

INSTALLATION

1. Lightly coat the wheel bearing rollers with axle lubricant. Install the bearings in the axle housing with the tool shown in Fig. 5. The bearing should seat firmly against the shoulder.

2. Wipe all lubricant from the oil seal bore before installing the seal.

3. Inspect the original seal for nicks, scuffs or abnormal wear, and replace it if necessary. **The new seals are pre-packed with lubricant and do not require an oil soak before installation.**

4. Install the oil seal with the tool shown in Fig. 6. **Installation without the use of the proper tool will distort the seal and cause leakage.**

5. Replace the O-ring in the C-lock groove on the axle shaft.

6. Slide the axle shaft(s) into place in the axle housing. **Exercise care that splines or any portion of the axle shaft(s) do not damage the oil seal(s) and that they engage with the splines of the differential side gear(s).**

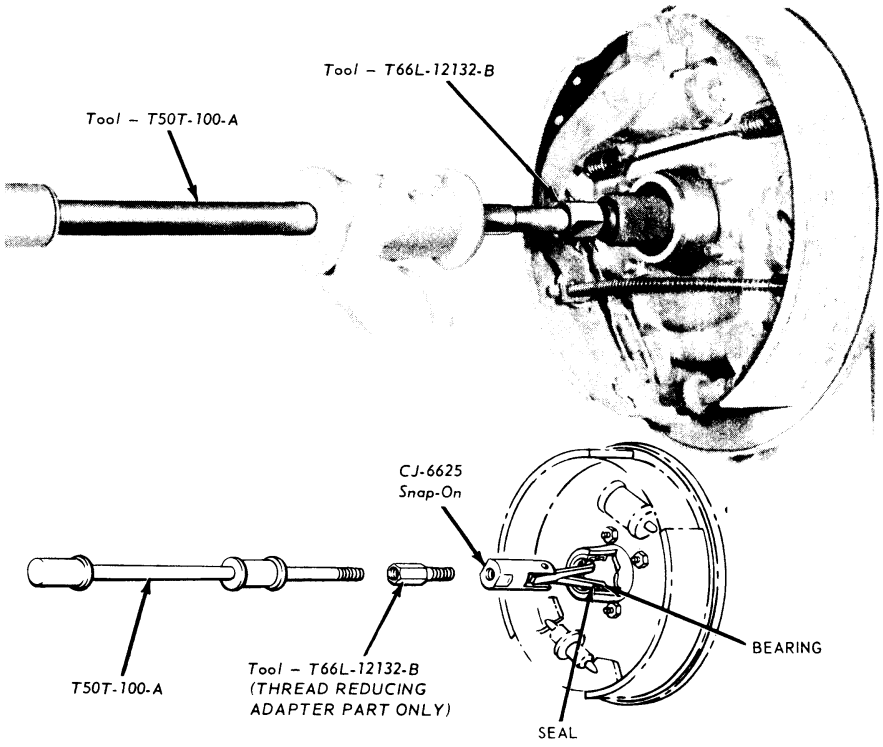


FIG. 4—Removal of Axle Seal or Axle Bearing

7. Install the axle shaft C-lock(s) on the inner end of the shaft(s) (Fig. 3) and push the shaft(s) outward so that the shaft locks seat in the conterbore(s) of the differential side gear(s).

8. Position the differential pinion gears and thrust washers 180 degrees apart to the differential side gears. Revolve the gear assembly until the holes in the differential case are aligned with the pinion gears.

9. Position the differential pinion shaft through the case and pinions, aligning the hole in the shaft with the lock bolt hole. Install the lock bolt and torque it to specification.

10. Install the brake drum and tighten the attaching (Tinnerman) nuts.

11. Install the wheel and tire on the brake drum.

12. Clean the gasket mounting surfaces of the rear axle differential housing and the cover. Install a new cover gasket, cover and the attaching bolts. Torque the bolts to specification.

13. Raise the rear axle. **Make sure the rear axle is in running position.** Add the amount of specified lubricant required to reach to the bottom of the filler plug hole. Install the filler plug and torque it to specification.

14. Remove the safety support stands and lower the vehicle.

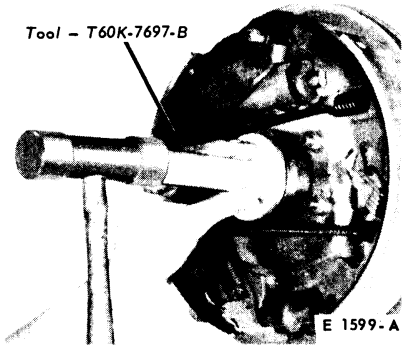


FIG. 5—Installation of Axle Shaft Bearing

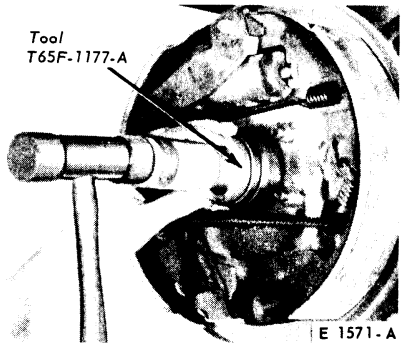


FIG. 6—Rear Axle Shaft Bearing Seal Installation

3 REMOVAL AND INSTALLATION

AXLE HOUSING

Refer to Fig. 7.

REMOVAL

1. Raise the vehicle on a hoist.
2. Remove the wheels and tires from the brake drums.
3. Position a drain pan and loosen the rear axle cover to housing attaching bolts. Drain the housing.
4. Remove the attaching (Tinnerman) nuts that secure the brake drums to the axle shaft flanges, and then remove the drums (Fig. 7).
5. Remove the axle housing cover bolts, cover and gasket. Discard the gasket. Remove the drain pan.
6. Disconnect the drive shaft at the drive pinion companion flange. Remove the drive shaft from the transmission extension housing. Install an oil seal replacer tool in the transmission housing to prevent leakage. Refer to the transmission group for the appropriate tool.
7. Disconnect the lower end of the shock absorbers at the mounting brackets.
8. Disconnect the track bar from the axle housing stud. If the axle housing is to be replaced, transfer the stud to the new housing.
9. Position safety stands under the rear frame members. Lower the vehicle with the hoist and allow the axle to lower far enough to relieve rear spring tension.
10. Remove the pinion shaft lock bolt and pinion shaft (Fig. 2), differential pinion gears and thrust washers.
11. Push the axle shaft(s) inward toward the center of the axle housing. Remove the C-locks from the inner ends of the axles (Fig. 3). Remove the axle shafts from the housing. **Extreme care must be used to avoid contacting the axle shaft seal lip with any portion of the axle shaft other than the seal journal.**
12. Disconnect the vent hose from the rear vent tube and remove all brake lines from the axle housing retaining clips.
13. Remove the brake backing plate attaching nuts and the plates from the axle housing. Suspend the plates above the axle housing with mechanics wire. **The hydraulic brake lines and the parking brake cables will remain attached to the brake backing plates.**
14. Support the rear axle housing on a jack.
15. Remove the right and left rear springs and insulators.
16. Remove the nuts, washers and pivot bolts that connect the suspension lower arms to the axle housing. Disconnect both arms from the axle housing.
17. Disconnect the upper suspension arm from the axle housing by removing the pivot bolt, nut, lock washer and two eccentric washers.
18. Lower the rear axle to the floor with the jack and remove the axle from under the vehicle.
19. Remove the wheel bearings and oil seals with the tool shown in Fig. 4.
20. If the axle housing is being replaced, transfer all the differential and pinion parts to the new housing. Refer to Section 4, Major Repair Operation for the procedure.

INSTALLATION

1. Lightly coat the wheel bearing rollers with axle lubricant. Install wheel bearings in the axle housing with the tool shown in Fig. 5. The bearings should seat firmly against the shoulder.
2. Wipe all lubricant from the oil seal bore before installing the seal. **If axle housing is being replaced, new seals must be installed.**
3. Inspect the original seal for nicks, scuffs or abnormal wear, and replace if necessary. **New seals are pre-packed with lubricant and do not require an oil soak.**
4. Install the seal with the tool shown in Fig. 6. **Installation without the use of the proper tool will distort the seal and cause leakage.**
5. Raise the rear axle into position under the vehicle with a hoist or floor jack. Connect the suspension lower arms to their mounting brackets on the axle housing with pivot bolts and nuts. **Do not tighten the mounting bolts at this point.**
6. Position the suspension upper arm in its mounting bracket on the axle housing and install the adjusting bolt, eccentric washers, lock washer and nut. **Do not tighten the mounting bolt at this point.**
7. Place the rear coil springs and insulators into position in the pockets provided.
8. Place the brake backing plates on the axle housing flanges, install 4 attaching bolts and nuts and torque them to specifications.
9. Position the brake lines to the axle housing and secure them with the retaining clips. **If the axle housing is new, install a new vent.** When installing the new axle vent apply a small amount of Locktite (C5AZ-19554-B) to prevent oil leakage between vent and axle housing. Connect the vent tube to the vent.
10. Install the pinion side gears and thrust washer.
11. Slide the axle shafts into place in the axle housing. **Exercise care that splines or any portion of the axle shafts do not damage the oil seals and that they engage with the splines of the differential side gears.**
12. Install the axle shaft C-lock O-ring and C-lock on the inner end of the shaft and push the shaft outward so that the shaft lock seats in the counterbore of the differential side gear.
13. Position the pinion differential gears and thrust washers 180 degrees apart to the differential side gears. Revolve the gear assembly until the holes in the differential case are aligned with the pinion gears.
14. Position the differential pinion shaft through the case and pinions, aligning the hole in the shaft with the lock bolt hole. Install the lock bolt and tighten it to specification.
15. Clean the gasket mounting surface of the rear axle housing and the cover. Install a new cover gasket, cover and the attaching bolts. Torque the bolts to specification.
16. Raise the rear axle on a hoist and remove the safety stands.
17. Connect the track bar to the mounting stud. Install the washer and nut. Torque the nut to specification.
18. Connect the two rear shock absorbers to the mounting brackets on the axle housing and torque the attaching nuts to specification.
19. Make sure that both the front and rear pivot bolts of the upper and the two lower arms are loose, then raise the axle assembly to the controlled height (Fig. 8). Hold the axle at the controlled height by placing blocks or pieces of steel pipe between the axle housing and the bumper rear screw on the side rail.

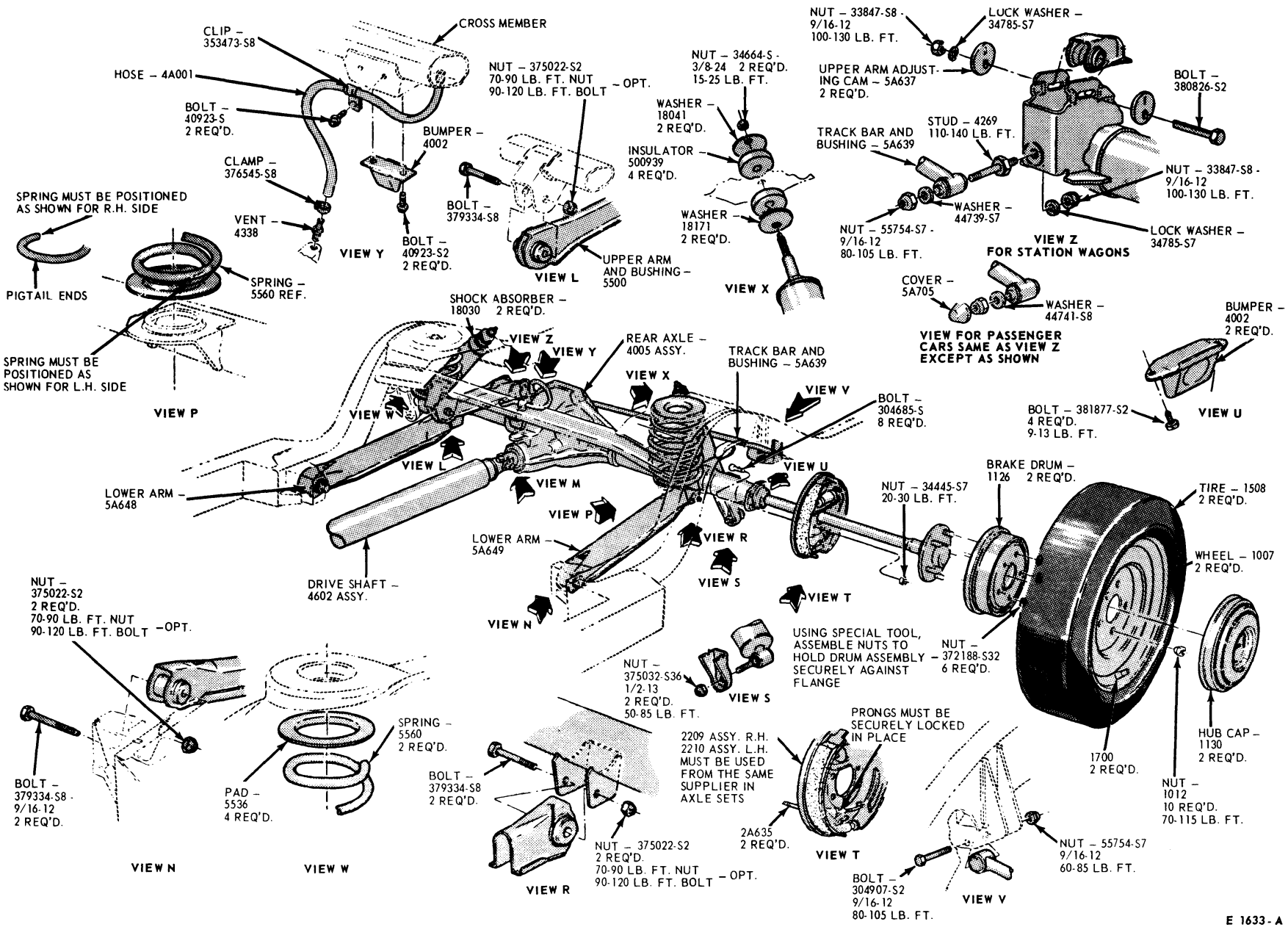


FIG. 7—Rear Axle Installation—WER Axle

20. With the axle at controlled height, torque the suspension upper and lower arm front pivot bolts and nuts to specifications. Torque the lower arm to axle housing pivot bolts and nuts to specifications.

21. Remove the oil seal replacer from the transmission extension housing. Install the drive shaft in the extension housing. Align the scribe marks on the cups, flange and drive shaft and connect the drive shaft at the drive pinion flange. Torque the attaching bolts to specification

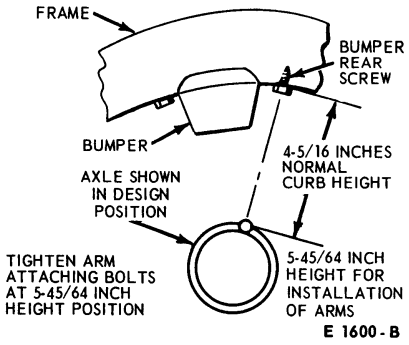


FIG.8—Axle Normal Curb Height and Controlled Height for Arm Installation

22. Install the brake drum and attaching (Tinnerman) nuts.

23. Install the wheel and tire on the brake drum. Install the wheel covers.

24. Adjust the drive shaft and pinion angle to specification.

25. Add the amount of specified lubricant required to reach to the bottom of the filler plug hole. **Make sure the rear axle is in running position.** Install the filler plug and torque it to specification.

26. Lower the vehicle.

4 MAJOR REPAIR OPERATIONS

DISASSEMBLY OF AXLE

The rear axle components are shown in Fig. 9.

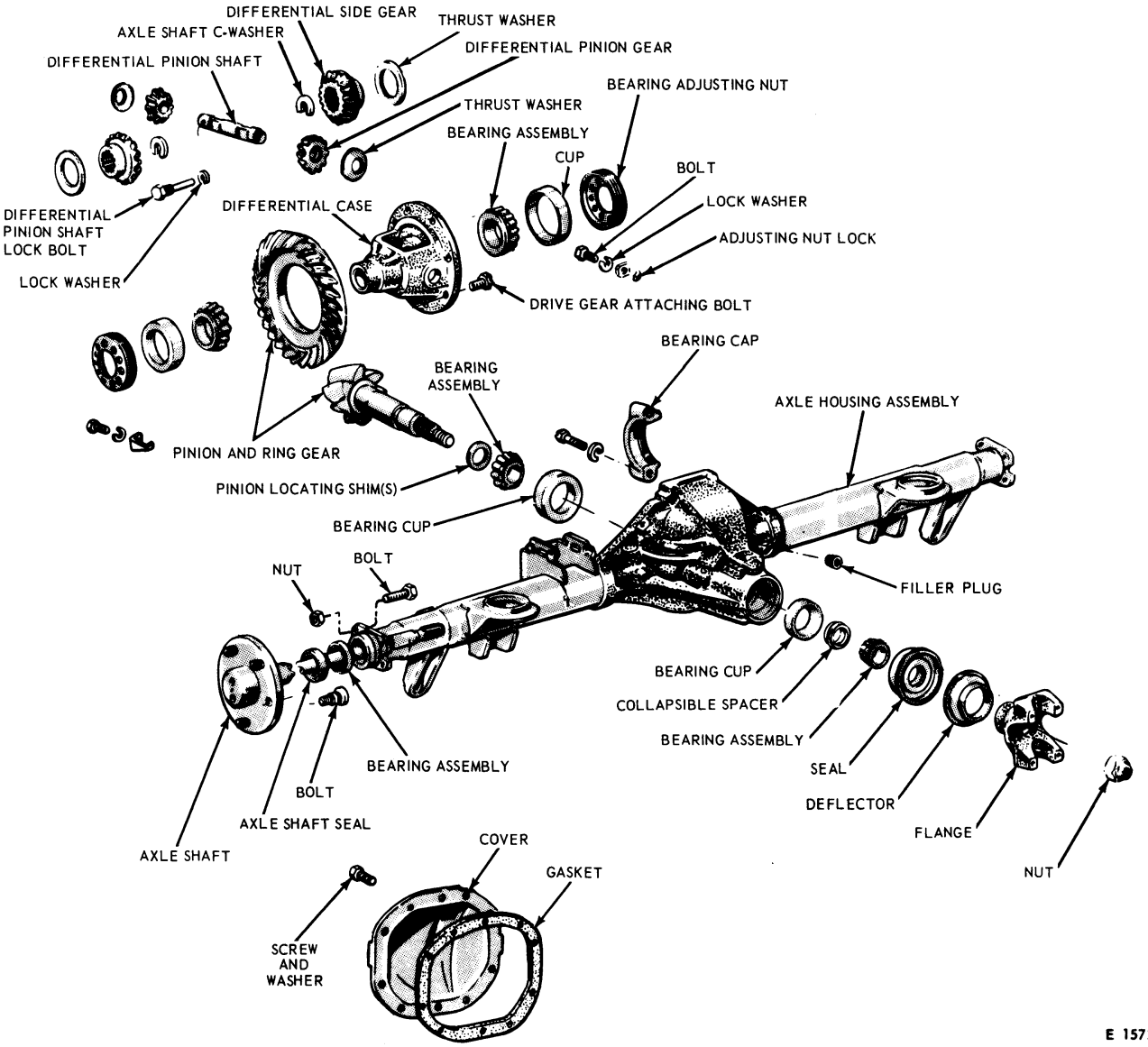


FIG. 9—Disassembled Light-Duty (WER) Rear Axle

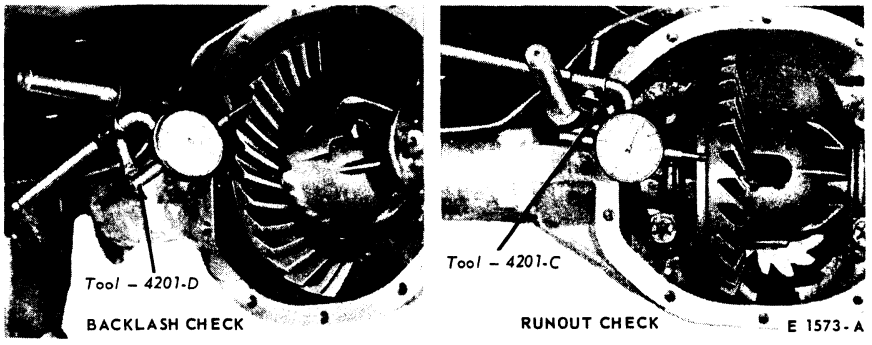


FIG. 10—Checking Backlash and Runout—Light-Duty (WER) Axle

All service operations on the differential case assembly can be performed with the axle housing in the vehicle.

1. Raise the vehicle on a hoist.

2. Position the drain pan under the axle housing. Loosen the housing cover attaching bolts. Drain the lubricant from the housing.

3. Make scribe marks on the drive shaft end yoke and the rear axle shaft companion flange to insure proper position of the drive shaft at assembly. Disconnect the driveshaft from the rear axle companion flange. **Be careful to avoid dropping the loose universal joint bearing cups.** Hold the cups on the spider with tape. Mark the cups so that they will be in their original position in relation to the flange when they are reassembled. Remove the drive shaft from the transmission extension housing. Install an oil seal replacer tool in the transmission extension housing to prevent transmission leakage. Refer to the transmission group for the appropriate tool.

4. Raise the vehicle and place jack-type stands under the rear frame crossmember. Lower the vehicle on a hoist and allow the axle to lower as far as possible.

5. Remove the axle housing cover and gasket. Discard the gasket.

6. Perform the Inspection Before Disassembly of Carrier procedure. Refer to Part 4-1, Section 3 of this Shop Manual.

7. Remove the attaching (Tinnerman) nuts that secure the rear brake drums to the axle shaft flanges, and then remove the drums.

8. Working through the differential case opening, remove the pinion shaft lock bolt and pinion shaft (Fig. 2).

9. Push the axle shafts inward toward the center of the axle housing. Remove the C-locks (Fig. 3) from the inner ends of the rear axles. Remove the axle shafts from the housing. **Extreme care must be used to avoid contacting the axle shaft seal lip with any portion of the axle shaft except the seal journal.**

10. Remove the bearings and oil seals from the axle housing as shown in Fig. 4.

11. Remove the pinion side gears and the side gear thrust washers.

12. Remove both side bearing adjusting nut locks (bolts).

13. Install a dial indicator (Fig. 10), and check and record the backlash and ring gear runout.

14. Mark one differential bearing cap and the case to help in positioning the parts properly during assembly.

15. Remove the bearing cap retaining bolts. Remove the bearing caps, cups, adjusting nuts and case assembly.

16. Hold the drive pinion flange and remove the pinion nut (Fig. 11). Discard the nut.

17. Remove the pinion flange (Fig. 12).

18. Drive the pinion out of the front bearing cone and remove it from the carrier housing. Remove and discard the bearing spacer.

19. With a hammer and drift remove the pinion shaft oil seal out through the front of the carrier housing.

20. Remove the pinion rear bearing from the drive pinion shaft (Fig. 13).

21. Measure the shim which is found under the bearing cone with a micrometer. Record the thickness of the shim.

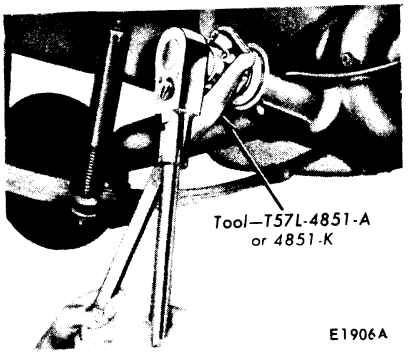


FIG. 11—Typical Drive Pinion Shaft Nut Removal

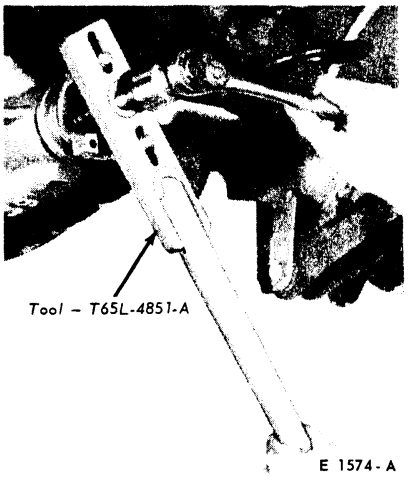


FIG. 12—Drive Pinion Flange Removal

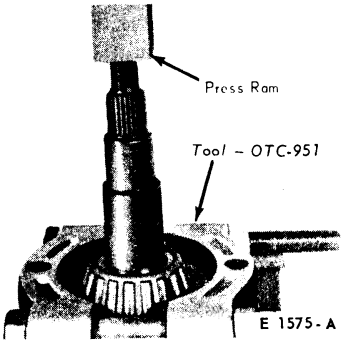


FIG. 13—Pinion Rear Bearing Removal

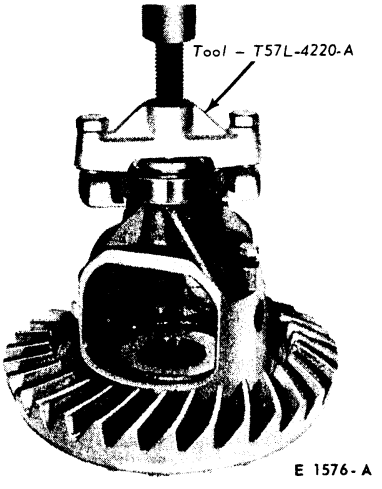


FIG. 14—Differential Bearing Removal

DISASSEMBLY OF DIFFERENTIAL CASE

1. If the 2 differential side bearings are to be removed from the differential case, use the tool shown in Fig. 14.

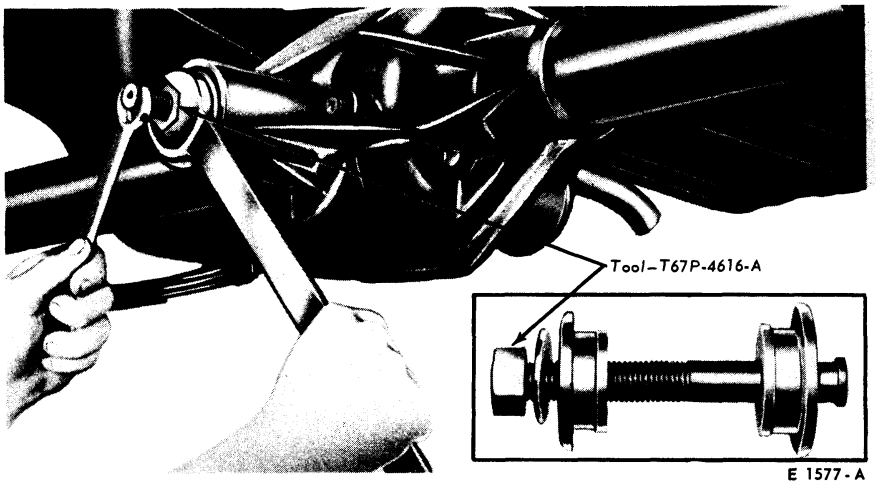


FIG. 15—Pinion Bearing Cup Installation—Typical

2. Remove the bolts that attach the ring gear to the differential case. Press the ring gear from the case or tap it off with a soft-faced hammer.

PARTS REPAIR OR REPLACEMENT

Clean and inspect all the parts as outlined in Cleaning and Inspection, Part 4-1, Section 3 of this Shop Manual. Before assembling the carrier, repair or replace all parts as indicated by the inspection. The principle replacement operations are covered in the following procedures. All other repair or replacement operations are performed during the Cleaning and Inspection, Part 4-1, Section 3 operations noted above, or during the assembly in this section.

PINION BEARING CUPS

Do not remove the pinion bearing cups from the carrier casting unless the cups are worn or damaged.

If the pinion bearing cups are to be replaced, drive them out of the carrier casting with a drift. Tap on the side opposite the cup. **Use care to prevent the cups from cocking in the carrier.** Install the new cups with the tool shown in Fig. 15. Make sure the cups are properly seated in their bores. If a 0.0015-inch feeler gauge can be inserted between a cup and the bottom of its bore at any point around the cup, the cup is not properly seated.

Whenever the cups are replaced, the cone and roller assemblies should also be replaced.

DRIVE PINION AND GEAR SET

Individual differences in machining the carrier casting and the gear set require a shim between the pinion rear bearing cone and the pinion gear to locate the pinion for correct tooth contact with the ring gear.

When replacing a ring gear and pinion it should be noted that the **original** factory installed shim is of the correct thickness to adjust for individual variations in **both** the carrier casting dimension and in the original gear set dimension; therefore, to select the correct shim thickness for the new gear set to be installed, follow these steps:

1. Use a micrometer to measure the thickness of the original shim removed from the axle and use the same thickness upon installation of the replacement carrier assembly or drive pinion. If further shim change is necessary, it will be indicated in the tooth pattern check.

2. If the original shim is lost, substitute a nominal shim for the original and use the tooth pattern check to determine if further shim changes are required. Nominal shim thicknesses is indicated in Part 4-3, Specifications.

A new ring gear and pinion should always be installed in an axle as a matched set (never separately). **Be sure the same identifying (matching) number, painted, appears on the bolt hole face of the ring gear and on the head of the drive pinion (Fig. 16).**

3. After determining the correct shim thickness as explained in the foregoing steps, install the new pinion and ring gear as outlined under Assembly which follows in this section.

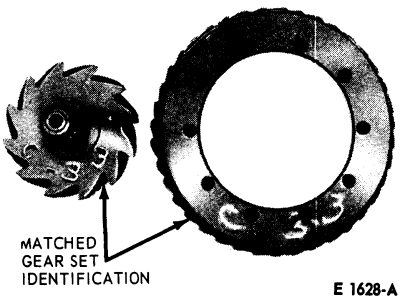


FIG. 16—Pinion and Ring Gear Markings

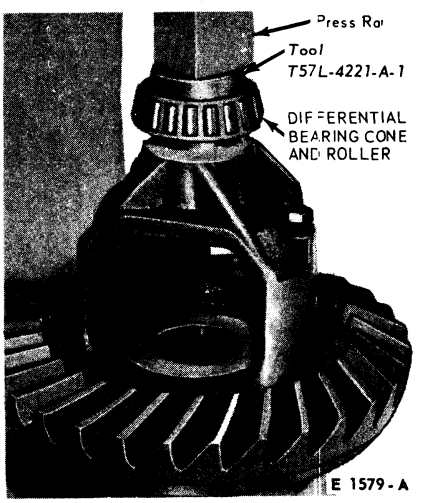


FIG. 17—Differential Bearing Installation

DIFFERENTIAL CASE, BEARINGS, AND DRIVEN GEAR

If the ring gear runout check (before disassembly) exceeded specifications, the condition may be caused by a warped gear, a defective case, or excessively worn differential bearings.

To determine the cause of excessive runout, proceed as follows:

1. Press the original bearings on the one-piece differential case hubs **without** the ring gear installed.

2. Place the differential bearing cups on the bearing cone and roller and set the differential case in the carrier.

3. Install the matched (marked) bearing caps and adjusting nuts as outlined in steps 11 thru 14 under Installation of Drive Pinion and Differential Case which follows in this section.

4. Tighten the left adjuster nut until it just touches the bearing cup then tighten the nut two notches beyond the point where it first contacts the bearing cup. Rotate the differential

case several revolutions in each direction while the bearings are loaded to seat the bearings in their cups. **This step is important.**

5. Again loosen the right nut to release the preload. Check to see that the left nut contacts the bearing cup. Using the dial indicator set-up shown in Fig. 13, Part 4-1, adjust the preload to 0.008 to 0.012 case spread for new bearings or 0.005 to 0.008 for the original bearings, if re-used.

6. Check the runout of the differential case flange with a dial indicator. If the runout does **not now** exceed specifications, install a new ring gear. If the runout still exceeds specifications, the ring gear is true and the trouble is due to either a defective casting or worn bearings.

7. Remove the differential case from the carrier and remove the side bearings from the case.

8. Install **new** bearings on the case hubs, and again install the differential assembly in the carrier **without** the ring gear.

9. Check the case runout again with the new bearings. If the runout is **now** within limits, the old bearings were excessively worn. Use the new bearings for assembly. If the runout is still excessive, the case is defective and should be replaced.

ASSEMBLY OF AXLE

Refer to Part 4-1 of this Shop Manual for Cleaning and Inspection procedures before starting assembly operations.

ASSEMBLY OF DIFFERENTIAL CASE

1. Place the ring gear on the differential case. Install the retaining bolts and torque them to specification.

2. If the differential bearings were removed, press them on as shown in Fig. 17.

3. Insert the pinion gear shaft lock bolt into the case (loosely).

INSTALLATION OF DRIVE PINION AND DIFFERENTIAL CASE

1. Place the shim(s) and pinion rear bearing cone on the pinion shaft. Press the bearing and shim(s) firmly against the pinion shaft shoulder (Fig. 18).

2. Place a **new** pinion bearing preload (collapsible) spacer on the pinion shaft.

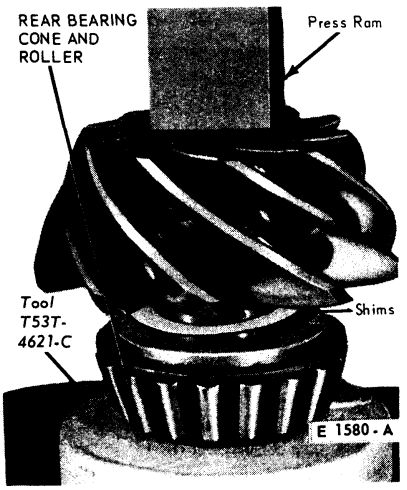


FIG. 18—Drive Pinion Bearing Installation

3. Lubricate the pinion rear bearing with axle lubricant.

4. Lubricate the pinion front bearing with axle lubricant. Lubricate the pinion front bearing cone and place it in the carrier housing.

5. Install a new oil seal in the carrier casting (Fig. 19).

6. Insert the drive pinion shaft (U-joint) flange into the pinion seal and hold it firmly against the pinion front bearing cone. From the rear of the carrier casting, insert the pinion shaft into the flange.

7. Apply a small amount of lubricant to the washer side of the flange nut and start the nut. **Use a new nut.** Hold the flange with the tool shown in Fig. 12 and tighten the pinion shaft nut. As the pinion shaft nut is tightened, the pinion shaft is pulled into the front bearing cone and into the flange.

As the pinion shaft is pulled into the front bearing cone, pinion shaft end play is reduced. While there is still end play in the pinion shaft, the flange and cone will be felt to bottom. This indicates that the bearing cone and flange have bottomed on the collapsible spacer.

From this point, a much greater torque must be applied to turn the pinion shaft nut, since the spacer must be collapsed. From this point, also, the nut should be tightened very slowly and the pinion bearing preload play checked often, so that the pinion bearing preload does not exceed the specified limits.

If the pinion shaft nut is tightened to the point that pinion bearing preload exceeds the limits, the pinion shaft must be removed and a new collapsible spacer installed. **Do not decrease the preload by loosening the pinion shaft nut.** This will remove the compression between the pinion front and rear bearing cones and the collapsible spacer and may permit the front bearing cone to turn on the pinion shaft.

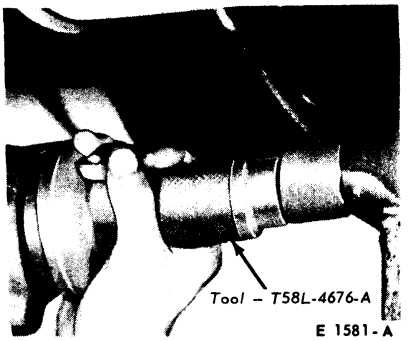


FIG. 19—Installing Pinion Seal

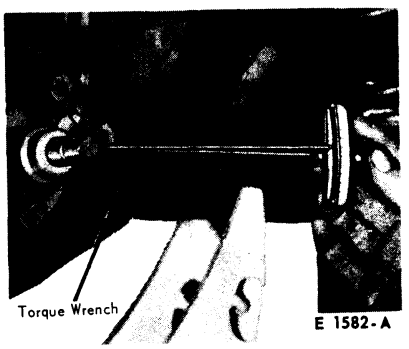


FIG. 20—Checking Pinion Bearing Preload

8. As soon as there is preload on the bearings, **turn the pinion shaft in both directions several times to seat the bearing rollers.**

9. Adjust the bearing preload to specification. Measure the preload with the tool shown in Fig. 20.

10. Apply a thin coating of lubricant on the bearing bores so that the differential bearing cups will move easily.

11. Place the cups on the bearings and set the differential case assembly in the carrier casting.

If the gear set is of the **non-hunting** or **partial non-hunting** type, assemble the differential case and ring gear assembly in the carrier so that the marked tooth on the pinion indexes between the marked teeth on the ring gear as shown in Fig. 49, Part 4-2.

In almost every case of improper assembly (gears assembled out of time), the noise level and probability of failure will be higher than they would be with properly assembled gears.

When installing the **hunting** type gear set (no timing marks), assemble

the differential case and ring gear assembly in the carrier without regard to the matching of any particular gear teeth.

12. Slide the case assembly along the bores until a slight amount of backlash is felt between the gear teeth. Hold the differential case in place.

13. Set the adjusting nuts in the bores so that they just contact the bearing cups.

14. Carefully position the bearing caps on the carrier casting. Match the marks made when the caps were removed (Fig. 21).

15. Install the bearing cap bolts and lockwashers. As the bolts are tightened, turn the adjusting nut with the tool shown in Fig. 21.

16. If the adjusting nuts do not turn freely as the cap bolts are tightened, remove the bearing caps and again inspect for damaged threads or incorrectly positioned caps. Tightening the bolts to the specified torque is done to be sure that the cups and adjusting nuts are seated. Loosen the cap bolts, and torque them to only 5 ft-lbs before making adjustments. Refer to part 4-1, Section 2 of this shop manual for backlash and bearing preload adjustment procedures.

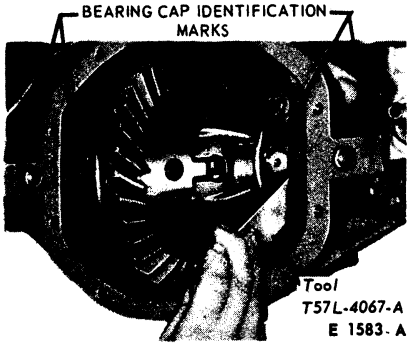


FIG. 21—Bearing Cap Installation

17. Clean the marking compound from the gear teeth.

18. Install both side bearing adjusting nut locks (bolts) and torque them to specification.

19. Install the differential pinion side gears and thrust washers.

20. Install the rear wheel bearings seals, rear axle shafts, wheels and tires and the axle carrier cover as outlined under Part 4-3, Section 2, Rear Axle Shaft, Wheel Bearing and Oil Seal Replacement, Steps 10 through 19.

21. Raise the axle all the way up. Remove the safety support stands.

22. Connect the track bar to the mounting stud. Install the washer and retaining nut, and torque the nut to specification.

23. Remove the oil seal replacer tool from the transmission extension housing. Install the front end of the drive shaft on the transmission output shaft. Align the scribe marks on the cups, flange and drive shaft and connect the rear end of the drive shaft to the axle U-joint flange. Torque the retaining bolts to specification.

24. Lower the vehicle.

PART 4-5 *Specifications*

REAR AXLE RATIOS, GEAR AND CODE IDENTIFICATION – COUGAR FALCON, FAIRLANE, MUSTANG AND MONTEGO

Identification Tag	Ring Gear Diameter (Inches)	Type of Differential①	Axle Ratio	No. of Teeth	
				Ring Gear	Pinion
WCY-R1	7 1/4	Conventional	2.83:1	34	12
WCY-AJ2	7 1/4	Conventional	3.08:1	37	12
WCZ-F1	8	Conventional	3.00:1	39	13
WCZ-V	8	Conventional	2.79:1	39	14
WDJ-C1	8	Limited Slip	3.00:1	39	13
WDV-B	7 1/4	Conventional	2.83:1	34	12
WDV-G	7 1/4	Conventional	3.20:1	32	10
WDW-H	7 1/4	Limited Slip	3.20:1	32	10
WDW-B1	8	Conventional	3.00:1	39	13
WDW-C1	8	Conventional	3.25:1	39	12
WDW-F	8	Conventional	3.00:1	39	13
WDW-J	8	Conventional	2.79:1	39	14
WDW-K	8	Conventional	2.79:1	39	14
WDY-A1	8	Conventional	3.00:1	39	13
WDY-B1	8	Conventional	3.25:1	39	12
WDZ-B1	8	Limited Slip	3.00:1	39	13
WDZ-E	8	Limited Slip	3.00:1	39	13
WEA-A1	8	Limited Slip	3.00:1	39	13
WEA-F1	8	Limited Slip	3.25:1	39	12
WEB-F6	9	Conventional②	3.00:1	39	13
WEB-F6	9	Conventional②	3.25:1	39	12
WEB-H2	9	Conventional	2.75:1	44	16
WEB-L	9	Conventional③	3.50:1	35	10
WEB-M	9	Conventional②	3.00:1	39	13
WEB-N	8 3/4	Conventional	3.00:1	39	13
WEB-P	9	Conventional②	2.75:1	44	16
WEB-R	9	Conventional	3.00:1	39	13
WEB-S	9	Conventional	3.25:1	39	12
WEB-T	9	Conventional②	3.25:1	39	12
WEB-U	8 3/4	Conventional	3.25:1	39	12
WEC-D5	9	Conventional③	3.00:1	39	13
WEC-E5	9	Conventional③	3.25:1	39	12
WEC-H	9	Conventional③	3.00:1	39	13
WEC-J	8 3/4	Conventional	3.00:1	39	13
WEC-K	9	Conventional	3.00:1	39	13
WEC-L	9	Conventional③	3.25:1	39	12
WEC-M	8 3/4	Conventional	3.25:1	39	12
WEC-N	9	Conventional	3.25:1	39	12
WEC-R	9	Conventional③	3.50:1	35	10
WES-F	9	Conventional③	3.00:1	39	13
WES-G1	9	Limited Slip④	3.25:1	39	12
WES-M	9	Conventional③	3.25:1	39	12
WES-N	8 3/4	Conventional	3.00:1	39	13
WES-P	8 3/4	Conventional	3.25:1	39	12
WES-S1	9	Conventional②	2.75:1	44	16
WES-T1	9	Conventional	2.75:1	44	16
WES-U	9	Conventional③	3.50:1	35	10
WES-AA	9	Conventional	3.00:1	39	14
WES-AB	9	Conventional	3.25:1	39	12
WES-AC	9	Conventional③	3.00:1	39	13
WES-AD	9	Conventional③	3.25:1	39	12
WFA-A	9	Traction Lok③	3.25:1	39	12
WFA-C	9	Traction Lok③	3.25:1	39	12
WFA-D	9	Traction Lok③	3.25:1	39	12
WFA-E	9	Traction Lok③	3.00:1	39	13
WFB-A	9	Traction Lok③	3.25:1	39	12
WFB-C	9	Traction Lok③	3.25:1	39	12
WFC-A	9	Traction Lok③	3.50:1	35	10
WFC-B	9	Traction Lok③	3.91:1	43	11
WFC-C	9	Traction Lok③	4.30:1	43	10
WFC-D	9	Traction Lok③	3.91:1	43	11
WFC-E	9	Traction Lok③	4.30:1	43	10
WFC-F	9	Traction Lok③	3.91:1	43	11
WFC-S	9	Traction Lok③	3.50:1	35	10
WFC-K	9	Traction Lok③	4.30:1	43	10
WFC-G	9	Traction Lok③	3.00:1	39	13
WFD-A	9	Traction Lok③	3.50:1	35	10
WFD-B	9	Traction Lok③	3.91:1	43	11
WFD-C	9	Traction Lok③	4.30:1	43	10
WFD-H	9	Traction Lok③	3.25:1	39	12

①2 - Pinion Unless Otherwise Noted ②Conventional 4 - Pinion
③Torque Sensitive Locker (4 - Pinion) ④Limited Slip 4 - Pinion

REAR AXLE RATIOS, GEAR AND CODE IDENTIFICATION – FORD, MERCURY AND METEOR

Identification Tag	Ring Gear Diameter (Inches)	Type of Differential	Axle Ratio	No. of Teeth	
				Ring Gear	Pinion
WDC-AS4	8 3/4	Conventional	3.25:1	39	12
WDC-AV4	8 3/4	Conventional	3.00:1	39	13
WDC-CA4	9	Conventional	2.75:1	44	16
WDC-CC4	9	Conventional①	3.00:1	39	13
WDC-CK4	9	Conventional	3.25:1	39	12
WDC-CL4	9	Conventional①	3.25:1	39	12
WDC-CM4	9	Conventional①	3.50:1	35	10
WDC-CN	9	Conventional①	2.75:1	44	16
WDC-CR	9	Conventional①	3.25:1	39	12
WDL-W4	8 3/4	Limited Slip	3.00:1	39	13
WDL-AA4	9	Limited Slip	2.75:1	44	16

Identification Tag	Ring Gear Diameter (Inches)	Type of Differential	Axle Ratio	No. of Teeth	
				Ring Gear	Pinion
WDL-AC4	8 3/4	Limited Slip	3.25:1	39	12
WDL-AE	9	Limited Slip	3.25:1	39	12
WDL-AF	9	Limited Slip①	2.75:1	44	16
WDL-AG	9	Limited Slip①	3.25:1	39	12
WDT-F4	9 3/8	Conventional	2.80:1	42	15
WDT-R4	9 3/8	Conventional②	3.25:1	39	12
WDT-AL4	9 3/8	Conventional	3.25:1	39	12
WDT-AM4	9 3/8	Conventional②	3.50:1	35	10
WDT-AN4	9 3/8	Limited Slip②	3.25:1	39	12
WDT-AS4	9 3/8	Limited Slip	2.80:1	42	15
WER - A4	8 1/2	Conventional	3.10:1	31	10
WER-C4	8 1/2	Conventional	2.80:1	42	15

① 4 - Pinion

② Equipped With Torsional Damper

REAR AXLE RATIOS, GEAR AND CODE IDENTIFICATION – LINCOLN CONTINENTAL

Identification Tag	Ring Gear Diameter (Inches)	Type of Differential	Axle Ratio	No. of Teeth	
				Ring Gear	Pinion
WEG-C2	9 3/8	Conventional	2.80:1	42	15
WEG-D2	9 3/8	Limited Slip	2.80:1	42	15

Identification Tag	Ring Gear Diameter (Inches)	Type of Differential	Axle Ratio	No. of Teeth	
				Ring Gear	Pinion
WEG-E2	9 3/8	Conventional	3.00:1	39	13
WEG-F2	9 3/8	Limited Slip	3.00:1	39	13

REAR AXLE RATIOS, GEAR AND CODE IDENTIFICATION – THUNDERBIRD AND CONTINENTAL MARK III

Identification Tag	Ring Gear Diameter (Inches)	Type of Differential	Axle Ratio	No. of Teeth	
				Ring Gear	Pinion
WGA-A	9 3/8	Conventional	2.80:1	42	15
WGA-B	9 3/8	Conventional	3.00:1	39	13

Identification Tag	Ring Gear Diameter (Inches)	Type of Differential	Axle Ratio	No. of Teeth	
				Ring Gear	Pinion
WGA-C	9 3/8	Limited Slip	2.80:1	42	15
WGA-D	9 3/8	Limited Slip	3.00:1	39	13

CLEARANCE, TOLERANCE AND ADJUSTMENT SPECIFICATIONS (BY AXLE RING GEAR DIAMETER)

Description	Inches
Maximum Runout of Backface of Ring Gear	0.003
Differential Side Gear Thrust Washer Thickness	0.030-0.032
Differential Pinion Gear Thrust Washer Thickness	0.030-0.032
Drive Pinion Bearing Solid Spacers- (9-3/8" only)	
6 spacers in increments of 0.002 inches	0.466-0.476
14 spacers in increments of 0.001 inches	0.477-0.490
Differential Bearing Preload (Case spread across Differential)	
New Bearings (All)	0.008-0.012
Original Bearings -	
7 1/4" Ring Gear	0.003-0.005
8 3/4" & 9 3/8" Ring Gear	0.005-0.008
8 1/2" Ring Gear	0.006-0.010

Description	Inches
Nominal Pinion Locating Shim -	
8 3/4", 9" & 9 3/8" Ring Gear	0.015
8 1/2" Ring Gear	0.030
8" Ring Gear	0.022
7 1/4" Ring Gear	0.017
Available pinion Gear Shims in steps of .001":	
8 3/4", 9" & 9 3/8"	0.010-0.029
8 1/2"	0.022-0.038
7 1/4"	0.008-0.024
Backlash between ring gear and pinion teeth	0.008-0.012
Maximum backlash variation between teeth	0.003
Maximum radial runout of U-joint flange in assembly:	
All except 9 3/8"	0.010-T.I.R.
9 3/8"	0.005-T.I.R.

SHIM PACK THICKNESS CHART TRACTION-LOK DIFFERENTIAL

Feeler Gauge Reading	Remove Shim(s) From Nominal	Total Req'd Shim Pack Thickness ①	Feeler Gauge Reading	Remove Shim(s) From Nominal	Total Req'd Shim Pack Thickness ①
0.001 0.002	None	0.050	0.028 0.029 0.030 0.031 0.032	0.030	0.020
0.003 0.004 0.005 0.006 0.007	0.005	0.045			
0.008 0.009 0.010 0.011 0.012	0.010	0.040	0.033 0.034 0.035 0.036 0.037	0.035	0.015
0.013 0.014 0.015 0.016 0.017	0.015	0.035	0.038 0.039 0.040 0.041 0.042	0.040	0.010
0.018 0.019 0.020 0.021 0.022	0.020	0.030	0.043 0.044 0.045 0.046 0.047	0.045	0.005
0.023 0.024 0.025 0.026 0.027	0.025	0.025	0.048 0.049 0.050	0.050	0.000

① Service Shims are available in 0.010" and 0.005" Thicknesses.

ADJUSTMENT TORQUE SPECIFICATION -(BY AXLE RING GEAR DIAMETER)

Description	Torque Lbs. In.	Torque Lbs. Ft.	Description	Torque Lbs. In.	Torque Lbs. Ft.
Minimum torque required to tighten pinion flange nut to obtain correct pinion bearing preload			Lockers Only - Minimum rotating Torque required to turn axle shaft and side gear with one wheel on ground:		
7 1/4" & 8 1/2"		140 ①	Limited Slip 7 1/4"		50
8", 8 3/4" & 9"		175 ①	All other R. G. Sizes		75
9 3/8"		180-220	Traction-Lok-All		40
Pinion Bearing Preload- (Collapsible spacer) ②			Lockers only-Rotating Torques required during bench check after assembly:		
Original Bearings 7 1/4"	6-12		Original Clutch Plates-		
8", 8 1/2", 8 3/4", 9"	8-14		Limited Slip 7 1/4",		50 Min.
New Bearings 7 1/4"	17-32		All other R. G. Sizes		75 Min.
8", 8 1/2", 8 3/4", 9"	22-32		Traction-Lok-(All)		40 Min.
Pinion Bearing Preload- (Solid Spacer) 9 3/8" Only	15-35		New Clutch Plates-		
			Limited Slip 7 1/4"		100-125
			All other R. G. Sizes		155-195
			Traction-Lok-All		100-250③

① If pinion bearing preload exceeds specification before this torque is obtained, install a new spacer.
② With Oil Seal.
③ Rotating torque may fluctuate up to 40 Lbs. Ft.

ATTACHING TORQUE SPECIFICATIONS – (By Axle Ring Gear Diameter)

Description	Torque Lbs. Ft.
Differential Bearing Cap Bolt- 7 1/4"	40-55
8"	55-70
All Others	70-85
Differential Bearing Adjusting Nut Lock Bolts	12-25
Carrier to Housing Stud Nuts- 8", 8 3/4", 9" 8 3/8"	25-40
Pinion Retainer to Carrier Bolts- 8", 8 3/4", 9" 9 3/8"	30-45
Ring Gear Attaching Bolts- 7 1/4"	40-55
All Others	65-80
Differential Pinion Shaft Lock Pin - 8 1/2" Only	15-22

Description	Torque Lbs. Ft.
Rear Cover Screw and Washer Assemblies - 8 1/4" & 8 1/2 Only	25-35
Oil Filler Plug	25-50
Rear Axle Shaft Bearing Retainer Bolt Nuts: Falcon, Fairlane, Montego, Mustang and Cougar (All)	20-40
Ford & Meteor (Exc. 8 1/2" R.G.) Mercury, T' Bird	50-75
Lincoln Continental (All)	30-55
Brake Backing Plate Bolt Nuts- Ford & Meteor 8 1/2" Only	20-40

LUBRICANT CAPACITIES AND CHECKING PROCEDURES①

Vehicle	Engine (C.I.D.)	Axle Ratio	U.S. Measure Capacity② (Pints)	Imperial Capacity② (Pints)
Falcon, Mustang	170, 200	All	2.5	2
Cougar, Fairlane, Falcon Montego, Mustang	250, 302	All	4.0	3 1/5
Ford, Meteor	240, 302	2.80:1, 3.10:1	4.0	3 1/5
Ford, Meteor	240, 302	All Except 2.80:1, 3.10:1	5.0	4.0
Cougar, Fairlane, Falcon, Ford, Mercury, Meteor, Montego, Mustang	351, 390, 428, 429	All	5.0	4.0
Lincoln, Thunderbird	429, 460	All	5.0③	4.0③

①All limited slip and Traction-Lok axles use ESW-M2C-104-A lubricant (C6AZ-19580-C).
All conventional axles use ESW-M2C-105-A lubricant (C6AZ-19580-B).
②Approximate refill capacity – Actual lubricant capacities are determined by filling to bottom of filler hole.
③To check these axles, the plug should be backed out slowly. If seepage occurs around the threads, the plug should be turned back in immediately to avoid any drainage. This indicates that the specified amount of lubricant is present in the axle.

SPECIAL TOOLS

FORD, MERCURY, METEOR

Ford Tool No.	Former No.	Description
T66L-4204-L	42211 or 42211-A	Limited-Slip Differential Check
T57L-500-A	6005-M 6005-MS	Bench Fixture
T50T-100-A	B-160	Impact Hammer
TOOL-4235-C	4235C	Axle Shaft Remover
TOOL-4621-A	—	Drive Pinion Bearing and Rear Wheel Bear Replacer
TOOL-1225-D	—	Rear Wheel Bearing Remover
TOOL-4234-4	4234-A	Rear Wheel Bearing Installer
TOOL-1177	4245-B	Rear Wheel Bearing Oil Seal Installer
TOOL-1175-AB	1175-AB	Rear Wheel Bearing Oil Seal Remover
T57L-4220-A	—	Differential Bearing Remover
TOOL-4221-AE TOOL-4221-AF T66P-4220-P	4221-AF	Differential Bearing Remover
TOOL-4851-K	T57L-4851-A 4851-K	U-Joint Flange Holder

Ford Tool No.	Former No.	Description
T53T-4851-A	4851-A, D	U-Joint Flange Remover
TOOL-4858-D	—	U-Joint Flange Remover
T57L-4614-A	4614	Drive Pinion Retainer Support
TOOL-4621-K	4621-K	Pinion Rear Bearing Cone Remover
T53L-200-A	—	Handle Adapter
T57L-4625-A or TOOL-4625-K	4625-K	Pinion Pilot Bearing Remover and Installer
T57L-4616-A or TOOL-4615-D	—	Pinion Front Bearing Cup Remover and Replacer
T58L-101-A	—	Puller Attachment—For Bearing Cup Removal
T55P-4616-A2	—	Pinion Rear Bearing Cup Remover and Replacer
T57L-4621-B or TOOL-4621-L	—	Pinion Rear Bearing Cone Installer
T58L-4676-A	4676-F	Drive Pinion Oil Seal Replacer
TOOL-4858-E	4858-E	U-Joint Flange and Pinion Bearing Replacer

SPECIAL TOOLS

FORD MERCURY, METEOR (Continued)

Ford Tool No.	Former No.	Description
T57L-4221-A1 or Tool-4222-K	4222-H	Differential Bearing Installer
TOOL 6565-AB	6565-AB	Adapter
TOOL 6565	6565	Dial Indicator
TOOLS 4201-C and D	4201-C	Differential Backlash and Runout Gauge with Universal Bracket, Dial Indicator and Bracket
TOOL-T57L-4067-A	4067-B	Differential Bearing Adjuster Wrench
TOOL-T50T-100-A	—	Impact Hammer-Long
TOOL-T66L-12132-B	—	Adapter
CJ-6625 (Snap-On)	—	Puller

Ford Tool No.	Former No.	Description
TOOL-T60K-7697-B	—	Transmission Extension Housing Bushing Replacer
TOOL-T65F-1177-A	—	Rear Wheel Bearing Oil Seal Replacer
TOOL-T65L-4851-A	—	Flange (Universal Joint) Axle End Remover
TOOL-OTC-951	—	Universal Puller
TOOL-T67P-4616-A	—	Pinion Bearing Cups Replacer
TOOL-T53T-4621-C	—	Pinion Bearing Cone Replacer

COUGAR, FAIRLANE, FALCON, MONTEGO, MUSTANG

Ford Tool No.	Former No.	Description
T50T-100-A	B-160	Impact Hammer
T58L-101-A		Puller Attachment
T62L-201-A	–	Handle Adapter
T56L-400-A	4851-A	Puller
T57L-500-A	–	Bench Mounted Holding Fixture
TOOL-1175-AB	1175-AB	Grease Seal Remover (Head Only)
T50T-100-A and TOOL-1175-AB	1175-AE	Seal Remover
T60K-1177-B	1177-B	Rear Wheel Bearing Oil Seal
T60K-1225-A or TOOL-1225-C	–	Axle Shaft Bearing Remover and Replacer Axle Shaft Bearing Remover
TOOL-1225-B		Axle Shaft Bearing Replacer
TOOL-T54-P-3044-A	–	Front Suspension Upper and Lower Arm Overhaul Tool Kit
TOOL-T57L-4067-A	4067-B	Differential Bearing Adjuster Nut Wrench
T57L-4067-A or T60K-4067-A	4221 or 4211-A	Limited-Slip Differential Check
TOOL-4201-C and D	4201-C	Differential Backlash and Runout Gauge With Universal Bracket, Dial Indicator and Bracket
T65K-4204-A or T59L-4204-A	4067-E	Differential Bearing Adjuster Nut Wrench
TOOL-4221-AL	4221-AL	Differential Bearing Cone Remover Pilot (Use with TOOL-4221-C or TOOL-4851-A)
T57L-4221-A	4222-K	Differential Bearing Cone Replacer
TOOL-4222-H	4222	Differential Bearing Cone Replacer
T66L-4235-A		Rear Axle Shaft Assembly Remover Adapter

Ford Tool No.	Former No.	Description
T57L-4614-A	4614	Drive Pinion and Drive Pinion Retainer Assembly Support
TOOL-4615-J	4615-J	Drive Pinion Front Bearing Cup Remover
T60K-4616-A	4615-HF 4625-HR	Pinion Bearing Cup Replacer
T57L-4616-A	4615-E and F	Pinion Front Bearing Cup Remover
T57L-4616-A2	4615-E and F	Pinion Front Bearing Cup Replacer
T55P-4616-A2	–	Pinion Rear Bearing Cup Replacer
TOOL-4621-K	4621-K	Drive Pinion Rear Bearing Cone Remover
T62F-4621-A	–	Pinion Bearing Cone Replacer
T62F-4625-A	4625-AC 1 and 2	Drive Pinion Pilot Bearing Remover and Replacer
T55P-4676-A	4676-G	Drive Pinion Oil Seal Replacer
T62F-4676-A	4676-H	Drive Pinion Oil Seal Replacer
T53T-4851-A	4851-A 4858-D	Flange (Universal Joint) Axle End Remover
T57L-4851-A	4851-K	Universal Joint Flange Holder
TOOL-4858-E	4858-E	Companion Flange and Pinion Bearing Replacer
T65K-4204-A	–	Limited-Slip Differential Torque Check Adapter
T59L-4204-A	44211 and 44211-A	Locking Differential Torque Check
TOOL-6565-AB	6565-AB	Adapter
TOOL-6565	6565	Dial Indicator
T68P-4946-A	–	Traction-Lok Shim Template Tool

THUNDERBIRD, CONTINENTAL MARK III

Ford Tool No.	Former No.	Description
T50T-100-A	T50T-100-C	Slide Hammer
T50T-100-A & TOOL-1175-AB	1175-AE	Seal Remover
TOOL-1225-DA	1225-DA	Rear Wheel Bearing Remover
TOOL-4005	4005	Engine Repair Stand Axle Adapter—Keyed Shaft
TOOL-4020-B	4020-B	Pinion Depth Gauge—Complete With Depth Micrometer and Gauge Block
T57L-4067-A	—	Differential Bearing Adjuster Wrench
TOOL-4201	4201	Pinion Shaft Drive Nut
TOOL-4201-C	4201-C	Differential Backlash & Runout Gauge With Univ. Bracket, Dial Indicator and Bracket
TOOL-4205-B	4205-B	Differential Assembly Bench Holder
TOOL-4205-C	4205-C	Axle Housing Dummy Bearings (1 pr.)
TOOL-4221-C	4221-C	Differential Side Bearing Remover
TOOL-4222-H	4222-H	Differential Bearing Cone Replacer
TOOL-4235-C	4235-C	Axle Shaft & Bearing Remover
TOOL-4245-B	4245-B	Wheel Bearing Seal Replacer

Ford Tool No.	Former No.	Description
TOOL-4616	4616	Drive Pinion Bearing Cup Replacer (Front)
TOOL-4621-A	4621-A	Drive Pinion Bearing and Rear Wheel Bearing Replacer
TOOL-4621-BA	4621-BA	Rear Pinion Bearing Remover
TOOL-4628	4628	Pinion Rear Bearing Cup Replacer
TOOL-4628-B	4628-B	Pinion Bearing Front Cup Remover
TOOL-4628-D	4628-D	Pinion Rear Bearing Cup Remover
T64N-4676-A	4676	Pinion Shaft Oil Seal Replacer
T68P-4851-A	—	Universal Joint Flange Holder
T64N-4858-A	4858-B	Companion Flange & Pinion Bearing Replacer
TOOL-4858-G	4858-G	Pinion Flange Nut Adjusting Wrench (Use With T64N-4858-A)
TOOL-4859	4859	Companion Flange Dust Shield Replacer
TOOL-6565-AB	—	Dial Indicator Adapter
TOOL-6565	—	Dial Indicator
TOOL-7657-J	7657-J	Extension Housing Bushing & Seal Replacer

LINCOLN CONTINENTAL

Ford Tool No.	Former No.	Description
TOOL-4245-B	4245-B	Wheel Bearing Seal Replacer
TOOL-4616	4616	Drive Pinion Bearing Cup Replacer (Front)
TOOL-4621-A	4621-A	Drive Pinion Bearing and Rear Wheel Bearing Replacer
TOOL-4621-BA	4621-BA	Rear Pinion Bearing Remover
TOOL-4628	4628	Pinion Rear Bearing Cup Replacer
TOOL-4628-B T64N-4628-B	4628-B	Pinion Bearing Front Cup Remover
TOOL-4628-D	4628-D	Pinion Rear Bearing Cup Remover
T64N-4676-A	4676	Pinion Shaft Oil Seal Replacer
TOOL-4851-K	T57L-4851-A	Universal Joint Flange Holder
T64N-4858-A	4858-B	Companion Flange & Pinion Bearing Replacer
TOOL-4858-G	4858-G	Pinion Flange Nut Adjusting Wrench (Use With T64N-4858-A)
TOOL-4859	4859	Companion Flange Dust Shield Replacer
TOOL-6565-AB	—	Dial Indicator Adapter
TOOL 6565	—	Dial Indicator
TOOL-7657-J	7657-J	Extension Housing Bushing & Seal Replacer

Ford Tool No.	Former No.	Description
T50T-100-A T50T-100-A &	T50T-100-C	Slide Hammer
TOOL-1175-AB	1175-AE	Seal Remover
TOOL-1225-DA	1225-DA	Rear Wheel Bearing Remover
TOOL-4000-C	4000-C	Differential Housing Spreader
TOOL-4005	4005	Engine Repair Stand Axle Adapter—Keyed Shaft
TOOL-4020-B	4020-B	Pinion Depth Gauge—Complete With Depth Micrometer and Gauge Block
TOOL-4201	4201	Pinion Shaft Drive Nut
TOOL-4201-C	4201-C	Differential Backlash & Runout Gauge With Univ. Bracket, Dial Indicator and Bracket
TOOL-4204-A		Limited Slip Differential Check
TOOL-4205-B	4205-B	Differential Assembly Bench Holder
TOOL-4205-C	4205-C	Axle Housing Dummy Bearings (1 pr.)
TOOL-4209-C	4209-C	Pinion Tension Scale With 4209-C12 Socket
TOOL-4221-C	4221-C	Differential Side Bearing Remover
TOOL-4222-H	4222-H	Differential Bearing Cone Replacer
TOOL-4235-C	4235-C	Axle Shaft & Bearing Remover

Drive Shaft and Clutch

GROUP 5

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PART 5-1 *Drive Shaft*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
DESCRIPTION	01-01											
DRIVE SHAFT ANGLE CHECK	01-01											
DRIVE SHAFT BALANCE CHECK	01-01											
DRIVE SHAFT BALANCING (Single Universal Joint)		01-04	01-04	01-04	01-04	01-04	01-04	01-04	01-04	N/A	N/A	N/A
DRIVE SHAFT DISASSEMBLY AND OVERHAUL												
Single Universal Joint — Ford Design		01-04	01-04	01-04	01-04	01-04	01-04	01-04	01-04	N/A	N/A	N/A
Double Cardan Joint — Dana Design		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	01-04	N/A	N/A
Double Cardan Joint — Saginaw Design		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	01-05	01-05
DRIVE SHAFT REMOVAL AND INSTALLATION	01-02											
DRIVE SHAFT RUNOUT CHECK	01-01											

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DRIVE SHAFT TESTS

DRIVE LINE BALANCE CHECK

If detailed parts of the drive shaft are replaced and shaft vibration is encountered after installation, disconnect the shaft at the slip yoke. Rotate the slip yoke 180 degrees; then, reconnect the shaft to the slip yoke. If the vibration persists, disconnect the shaft at the rear axle companion flange. Rotate the companion flange 180 degrees and reconnect the shaft to the flange.

DRIVE LINE ANGLE CHECK

Vibration or "shudder" which is noticeable either on fast acceleration or when coasting, using the engine for a brake, may be caused by the rear axle housing being loose on the rear springs or by improper pinion angle. Refer to Group 3, Part 2 for pinion angle checking procedures. If the rear axle U-bolts (Fairlane, Montego, Mustang, Cougar, Falcon models only) are loose, torque the nuts to specification.

DRIVE SHAFT RUNOUT CHECK

Using a dial indicator, check the runout at each end and in the middle of the driveshaft. The rear check should be made on the small tube section of the shaft between the balance weights and the yoke welds. Driveshaft runout should not exceed 0.035 inch at any one point.

2 DESCRIPTION

The drive shaft is the means of transferring power from the engine, through the transmission, to the differential in the rear axle, and then to the rear wheels. The drive shaft incorporates two universal joints and a slip yoke (Fig. 1) or two double cardan universal joints, one at each end of the shaft (Figs. 2 and 3). Each double

cardan has a center yoke (or cage), a centering socket yoke, and a stud yoke which is welded to each end of the tube assembly. The splines in the yoke and on the transmission output shaft permit the drive shaft to move forward and rearward as the axle moves up and down.

All drive shafts are balanced. If the vehicle is to be undercoated, cover the drive shaft and universal joints to prevent application of the undercoating material.

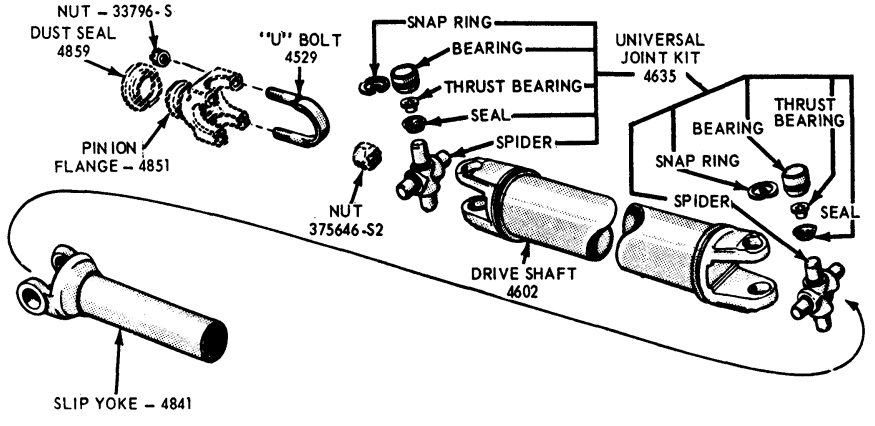


FIG. 1—Drive Shaft and Universal Joints Disassembled

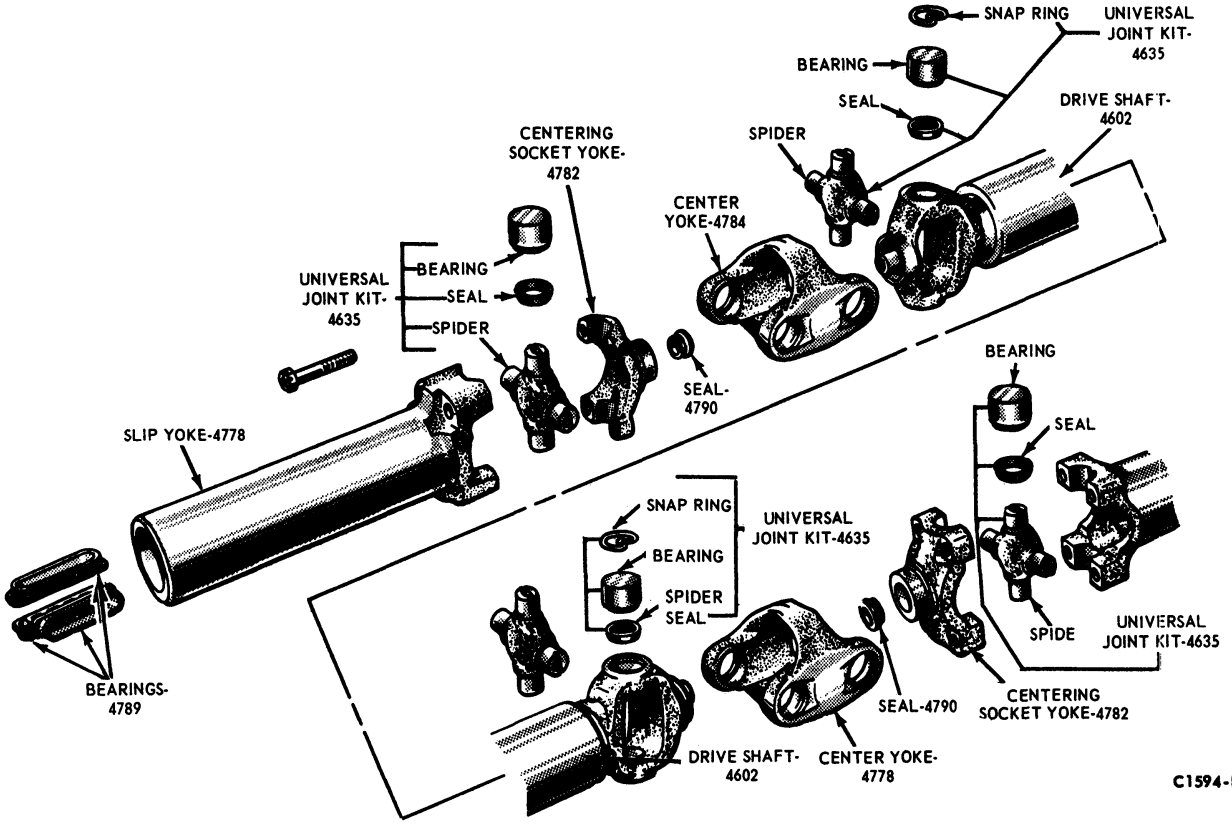


FIG. 2—Drive Shaft and Universal Joints Disassembled—Lincoln Continental

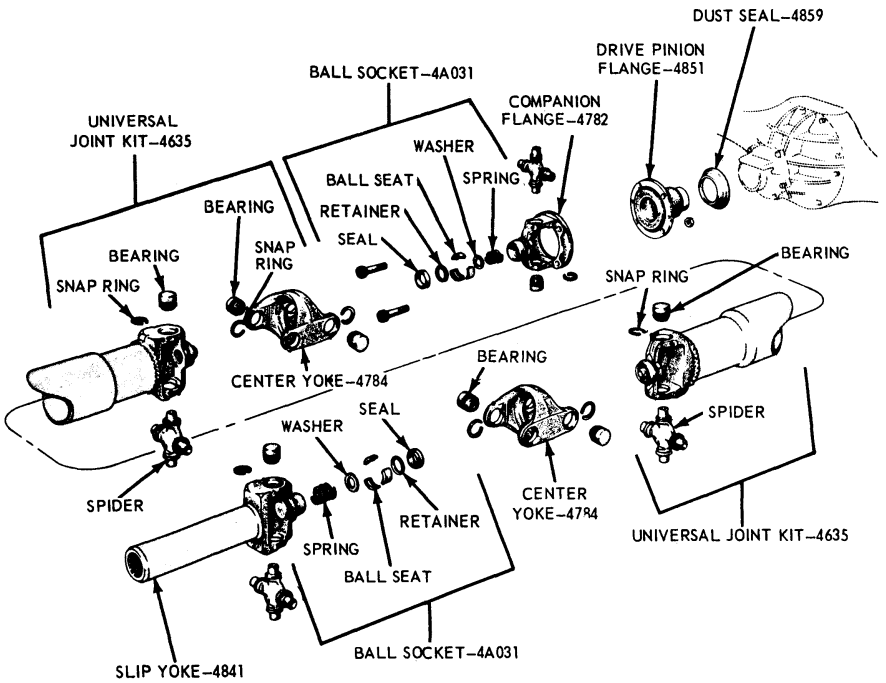


FIG. 3—Drive Shaft and Universal Joints Disassembled —Thunderbird, Continental Mark III

3 REMOVAL AND INSTALLATION

REMOVAL

1. To maintain drive line balance, mark the relationship of the rear drive shaft yoke and the drive pinion flange of the axle (if the yellow alignment marks are not visible) with the shaft so that they may be installed in their original positions.

2. Disconnect the rear U-joint or rear double cardan joint from the companion flange. Wrap tape around the loose bearing caps to prevent them from falling off the spider. Pull the drive shaft toward the rear of the vehicle until the slip yoke clears the transmission extension housing and the seal. On Lincoln Continental models, remove the three roller bearing assemblies off the spline teeth inside the slip yoke (Fig. 3). Install the appropriate tool in the extension housing to prevent lubricant leakage.

INSTALLATION

1. If either the rubber seal on the output shaft or the seal in the end of the transmission extension housing is damaged in any manner, replace the seal or seals as required. Also, if the lugs on the axle pinion flange are shaved or distorted so that the bearings slide, replace the flange.

2. On Lincoln Continental models, install the bearing assemblies over the spline teeth in the slip yoke. Lubricate the yoke spline with B8A-19589-A lubricant. This spline is sealed so that the transmission fluid does not "wash" away the spline lubricant (Figs. 4 and 5). Remove the tool from the extension housing. Install the yoke on the transmission output shaft. Do not allow the yoke assembly to bottom on the output shaft with excessive force.

Install the drive shaft so that the index marks or the yellow mark (if visible) on the yoke (light side) is in line with the yellow mark on the companion flange. This prevents vibration which occurs when the balance of the shaft and balance of the axle pinion flange become additive instead of neu-

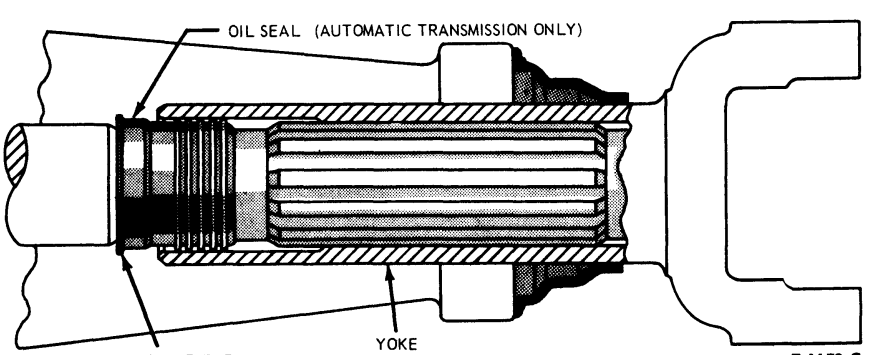


FIG. 4—Output Shaft Spline Seal — All except Continental Mark III and Thunderbird

tralizing. If a vibration exists, the drive shaft should be disconnected from the axle, rotated 180 degrees and reinstalled.

3. Install the U-blots and nuts that attach the U-joint to the drive pinion flange. Torque the U-bolt nuts to specification. On vehicles equipped with a double cardan joint, install the rear joint-to-drive pinion flange attaching bolts. Torque the bolts to specification.

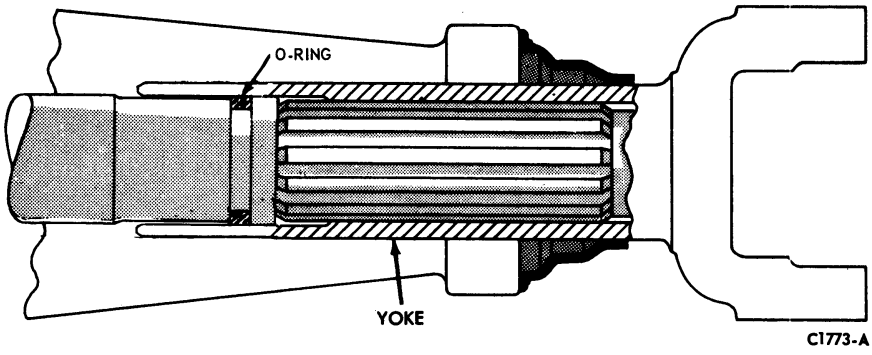


FIG. 5—Output Shaft Spline Seal — Continental Mark III and Thunderbird

4 IN-VEHICLE REPAIR

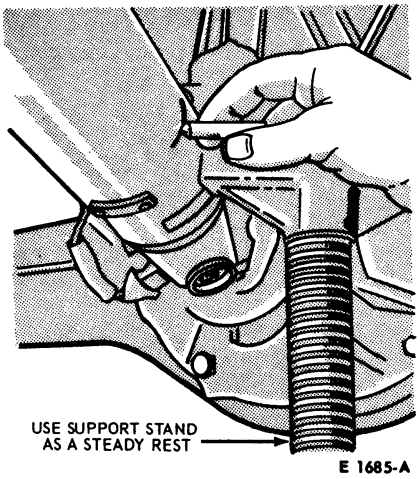


FIG. 6—Marking Driveshaft

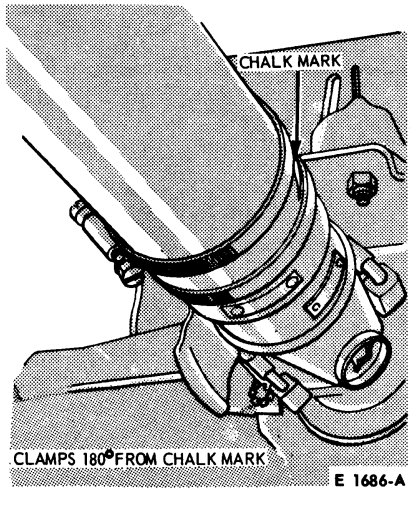


FIG. 7—Installing Whittek Clamps

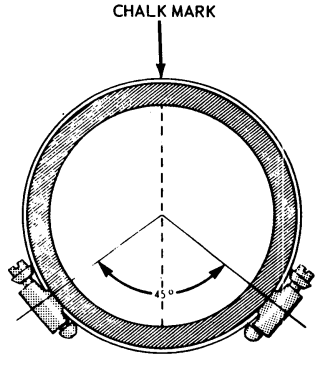


FIG. 8—Rotating Whittek Clamps

DRIVESHAFT BALANCING (SINGLE UNIVERSAL JOINT)

If rotating the driveshaft 180 degrees does not eliminate vibration, the driveshaft may be balanced using the following procedure:

1. Place the vehicle on a twin post hoist so that the rear of the vehicle is supported on the rear axle housing with the wheels free to rotate.

2. With the driveshaft rotating at a speedometer speed of 40-50 mph, carefully bring a crayon or colored pencil up until it just barely contacts the rearward end of driveshaft (Fig. 6). The mark made by the crayon or pencil will indicate the heavy side of the shaft. **Care should be exercised when working near the balance weights to prevent injury to the hands.**

3. Install two Whittek type hose clamps on the driveshaft so that the heads are located 180 degrees from the crayon marking (Fig. 7). Tighten the clamps.

4. Run the vehicle up to 65-70 mph speedometer speed. If no vibration is felt, lower the vehicle and road test. If unbalance still exists rotate the clamp heads approximately 45 degrees away from each other and test for vibration (Fig. 8).

5. Continue to rotate the clamp heads apart in smaller amounts until vibration is eliminated. **To prevent overheating, do not run the vehicle on the hoist for an extended period.**

6. Road test the vehicle.

5 MAJOR REPAIR OPERATIONS

DISASSEMBLY (SINGLE UNIVERSAL JOINT — FORD DESIGN)

1. Place the drive shaft in a vise being careful not to damage it.
2. Remove the snap rings that retain the bearings in the slip yoke and in the drive shaft.
3. Position the tool shown in Fig. 9 on the shaft and press the bearing out of the slip yoke. If the bearing cannot be pressed all the way out of the yoke, remove it with vise grip or channel lock pliers.
4. Reposition the tool to press on the spider to remove the bearing from the opposite side of the yoke.
5. Remove the yoke from the spider.
6. Remove the bearings and spider from the drive shaft in the same manner.
7. Clean all foreign matter from the yoke area at each end of the drive shaft.

ASSEMBLY (SINGLE UNIVERSAL JOINT— FORD DESIGN)

1. Start a new bearing into the yoke at the rear of the drive shaft.
2. Position the spider in the rear yoke and press the bearing 1/4 inch below the surface (Fig. 10).
3. Remove the tool and install a new snap ring.
4. Start a new bearing into the opposite side of the yoke.
5. Install the tool and press on the bearing until the opposite bearing contacts the snap ring.
6. Remove the tool and install a new snap ring. It may be necessary to grind the surface of the snap ring to permit easier entry.
7. Reposition the drive shaft and install the new spider and two new bearings in the same manner as the rear yoke.
8. Position the slip yoke on the spider and install two new bearings, nylon thrust bearings and snap rings.
9. Check the joint for freedom of movement. If a bind has resulted from misalignment during the foregoing

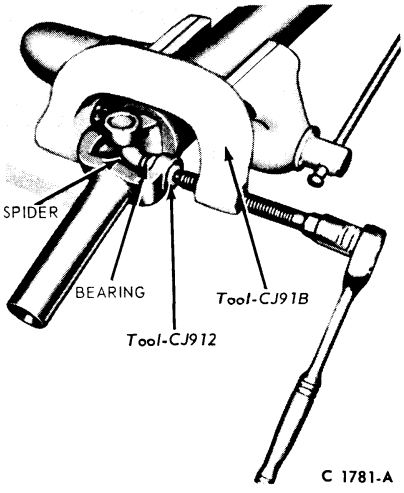


FIG. 9—Removing Universal Joint Bearing

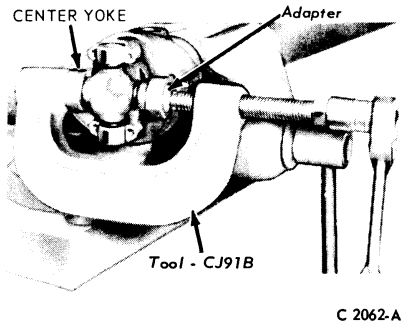


FIG. 11—Partially Pressing Bearing from Center Yoke

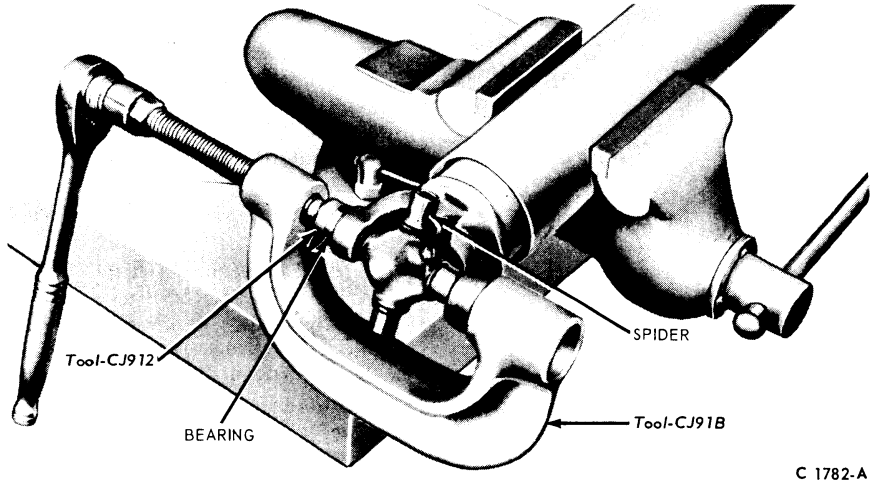


FIG. 10—Installing Universal Joint Bearing

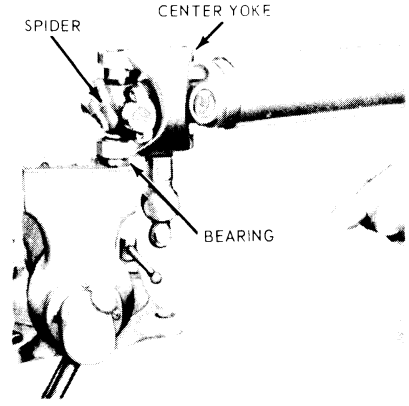


FIG. 12—Removing Bearing from Center Yoke

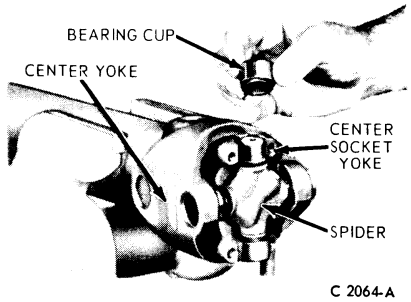


FIG. 13—Removing Bearing Cup from Centering Yoke Socket

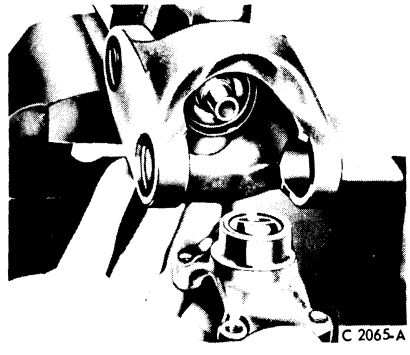


FIG. 14—Removing Center Socket Yoke

procedures, a sharp rap on the yokes with a brass hammer will seat the bearings needles and usually provide freedom of movement. Care must be taken to support the shaft end during this operation, as well as preventing blows to the bearings themselves. Do not install the drive shaft unless the universal joints are free of bind.

DISASSEMBLY (DOUBLE CARDAN JOINT — LINCOLN CONTINENTAL — DANA DESIGN)

1. Mark the position of the spiders, the center yoke, and the centering socket yoke as related to the stud yoke which is welded to the front of the drive shaft tube. **The spiders must be assembled with the bosses in their original position to provide proper clearance.**
2. Remove the snap rings that secure the bearings in the front of the center yoke.
3. Position the tool as shown in Fig. 11. Thread the tool clockwise until the bearing protrudes approximately 3/8 inch out of the yoke.
4. Remove the drive shaft from the vise.
5. Tighten the bearing in the vise and drive on the center yoke as shown in Fig. 12 to free it from the bearing.
6. Lift the two bearings (Fig. 13) from the spider at this time.
7. Reposition the tool on the yoke and move the remaining bearing in the opposite direction so that it protrudes approximately 3/8 inch out of the yoke.
8. Grip the bearing in a vise. Drive on the center yoke to free it from the bearing (Fig. 12).
9. Remove the spider from the center yoke.
10. Pull the centering socket yoke off the center stud (Fig. 14). Remove the rubber seal from the centering ball stud.
11. Remove the snap rings from the center yoke and from the drive shaft yoke.
12. Position the tool on the drive shaft yoke (Fig. 15) and press the bearing outward until the inside of the center yoke almost contacts the slinger ring at the front of the drive shaft yoke. Pressing beyond this point can distort the slinger ring. The arrow in Fig. 16 illustrates the interference point.
13. Clamp the exposed end of the bearing in a vise and drive on the center yoke with a soft-faced hammer to free it from the bearing.
14. Reposition the tool and press on the spider to remove the opposite bearing.
15. Remove the center yoke from the spider.
16. Remove the spider from the drive shaft yoke in the same manner.
17. Clean all serviceable parts in cleaning solvent. If using a repair kit, install all of the parts supplied in the kit. If the drive shaft is damaged, replace the complete shaft to be assured of a balanced assembly.

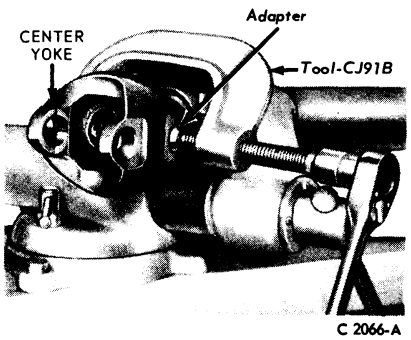


FIG. 15—Removing Bearing from Rear of Center Yoke

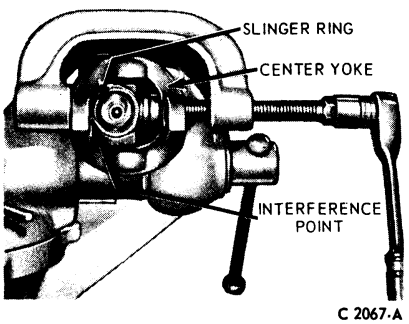


FIG. 16—Center Yoke Interference Point

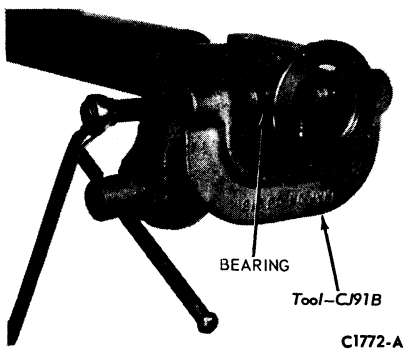


FIG. 17—Partially Pressing Bearing From Center Yoke

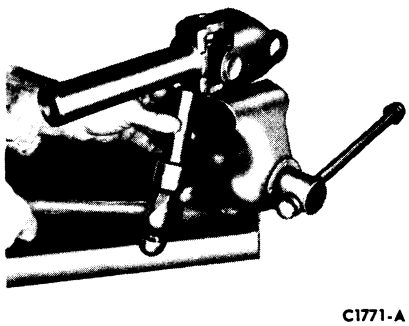


FIG. 18—Removing Bearing From Center Yoke

ASSEMBLY (DOUBLE CARDON JOINT — LINCOLN CONTINENTAL — DANA DESIGN)

1. To assemble the double cardan joints, position the spider in the drive shaft yoke. Make sure the spider bosses (or lubrication plugs on kits) will be in the same position as originally installed. Press in the bearing cups. Install the snap rings.
2. Position the center yoke over the spider ends and press in the bearing cups. Install the snap rings.
3. Install a new seal on the centering ball stud. Position the centering socket yoke on the stud.
4. Place the front spider in the center yoke. Make sure the spider bosses (or lubrication plugs on kits) are properly positioned. Press in the bearing cups and install the snap rings.
5. Apply pressure on the centering socket yoke and install the remaining bearing cup.
6. On kits, remove the plug from each spider and lubricate the universal joints. Reinstall the plug in each spider.

DISASSEMBLY (DOUBLE CARDAN JOINT — CONTINENTAL MARK III, THUNDERBORD — SAGINAW DESIGN)

1. Working at the rear axle end of the shaft, mark the position of the spiders, the center yoke, and the centering socket yoke as related to the companion flange. The spiders must be assembled with the bosses in their original position to provide proper clearance.
2. Position tool CJ91B as shown in Fig. 17. Thread the tool clockwise until the injected nylon moulding snaps and the bearing protrudes approximately 3/8 inch out of the yoke.
3. Remove the driveshaft from the vise.
4. Tighten the bearing in the vise and tap on the weld yoke to free the bearing from the center yoke (Fig. 18). **Do not tap on the driveshaft tube.**

5. Reposition tool CJ91B on the yoke and force the opposite bearing outward and remove it.

6. Position the tool on one of the remaining bearings and force it outward approximately 3/8 inch.

7. Grip the bearing in the vise and tap on the weld yoke to free the bearing from the center yoke. **Do not tap on the driveshaft tube.**

8. Reposition the tool on the yoke to press out the remaining bearing.

9. Remove the spider from the center yoke.

10. Remove the bearings from the driveshaft yoke as outlined above and remove the spider from the yoke.

11. Insert a screwdriver into the centering ball socket located in the companion flange and pry out the rubber seal. Remove the retainer, three piece ball seat, washer and spring from the ball socket.

12. Inspect the centering ball socket assembly for worn or damaged parts. If any damage is evident replace the entire assembly.

13. Repeat Steps 1 through 12 to disassemble the transmission end of the driveshaft.

ASSEMBLY (DOUBLE CARDAN JOINT — CONTINENTAL MARK III, THUNDERBIRD — SAGINAW DESIGN)

1. Working at the rear axle end of the driveshaft, insert the spring, washer, three piece ball seat and retainer into the ball socket.

2. Using a suitable tool, install the centering ball socket seal.

3. Position the spider in the driveshaft yoke. Make sure the spider bosses are in the same position as originally installed. Press in the bearing cups with tool CJ91B. Install the internal snap rings provided in the repair kit.

4. Position the center yoke over the spider ends and press in the bearing cups. Install the snap rings.

5. Install the spider in the companion flange yoke. Make sure the spider bosses are in the same position as originally installed. Press on the bearing cups and install the snap rings.

6. Position the center yoke over the spider ends and press on the bearing cups. Install the snap rings.

7. Repeat steps 1 through 6 to assemble the transmission end of the driveshaft.

PART 5-2 General Clutch Service

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
CLUTCH DISC Cleaning and Inspection		02-04	02-04	02-04	02-04	02-04	02-04	02-04	02-04	N/A	N/A	N/A
CHECKING FLYWHEEL HOUSING ALIGNMENT		02-01	02-01	02-01	02-01	02-01	02-01	02-01	02-01	N/A	N/A	N/A
CORRECTING FLYWHEEL HOUSING ALIGNMENT		02-03	02-03	02-03	02-03	02-03	02-03	02-03	02-03	N/A	N/A	N/A
PILOT BUSHING Cleaning and Inspection		02-04	02-04	02-04	02-04	02-04	02-04	02-04	02-04	N/A	N/A	N/A
PRESSURE PLATE AND COVER Cleaning and Inspection		02-04	02-04	02-04	02-04	02-04	02-04	02-04	02-04	N/A	N/A	N/A
RELEASE BEARING Cleaning and Inspection		02-04	02-04	02-04	02-04	02-04	02-04	02-04	02-04	N/A	N/A	N/A

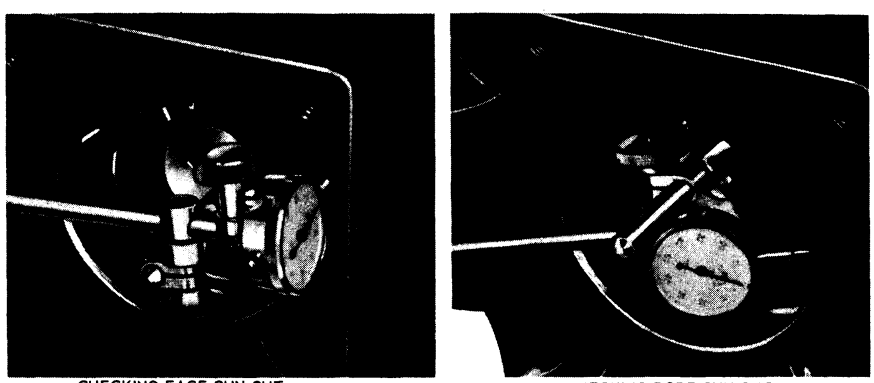
A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 FLYWHEEL HOUSING ALIGNMENT

Alignment of the flywheel housing bore and rear face with the engine should be checked as a possible cause of any of the following troubles: excessive transmission gear wear, transmission jumping out of gear, especially third gear, drive line vibration, excessive pilot bushing wear, noisy release bearing, or excessive clutch spin time.

INSPECTION

1. With the clutch release bearing removed, install the indicator pilot tool shown in Fig. 1.
2. Clean the faces of the flywheel housing bolt bosses, and remove all burrs, nicks, and paint from the mounting face of the housing.
3. Install the dial indicator on the pilot and adjust the holder so the button will contact a circumference just inside of the transmission mounting holes.
4. Push the flywheel forward to remove crankshaft end play. Set the dial indicator face to read zero.
5. Remove the spark plugs to alleviate compression.
6. Pull the engine crankshaft through one revolution. The crankshaft must be held in the forward position while rotating it.
7. Note the indicator reading and mark the maximum point of runout on the face of the housing (Fig. 1).
8. Position the dial indicator to check bore alignment (Fig. 1). The bore must be clean and free of burrs, nicks and paint.
9. Pull the crankshaft through one revolution. Note the indicator reading and mark the maximum point of runout on the face of the housing as shown in Fig. 1.
10. Remove the dial indicator from the crankshaft and the housing.
11. Select the Dia-L-Igner pilot (Fig. 2) which will fit snugly in the bore of the flywheel housing.
12. Press the pilot into place on the locator on the back of the dial.
13. Position the Dia-L-Igner on the face of the housing (Fig. 3) with the pilot in the bore.
14. Rotate the face runout arrow to the positive face runout mark on the housing.
15. Without moving the face runout arrow, rotate arrow A until it is at the negative bore reading.
16. Slide arrow A to register the amount of bore runout on the .010— line of the white scale. Use the scale No. to coincide with the pilot being used.
17. Rotate arrow B until it points



CHECKING FACE RUN OUT — CHECKING BORE RUN OUT

C 1783-A

FIG. 1—Flywheel Housing Alignment Check

STEP 1
WITH A DIAL INDICATOR MEASURE THE FACE RUNOUT OF THE HOUSING.

STEP 2
MARK ON THE FACE OF THE HOUSING THE POINT OR THE EXTREMES AND THE MAXIMUM AMOUNT OF THE POSITIVE (+) READING.

STEP 3
MEASURE THE RUNOUT OF THE TRANSMISSION PILOT BORE.

STEP 4
MARK ON THE FACE OF THE HOUSING THE POINT OR EXTREMES AND THE AMOUNT OF THE MAXIMUM NEGATIVE (–) READING.

STEP 5
SELECT THE DIA-L-IGNER PILOT WHICH WILL FIT SNUGLY IN THE BORE OF THE HOUSING. OBSERVE THE NUMBER 1, 2, OR 3 ON THE PILOT.

STEP 6
PRESS THE PILOT FIRMLY OVER THE ROUND LOCATOR ON THE BACK OF THE DIAL.

STEP 7
POSITION THE DIA-L-IGNER ON THE FACE OF THE HOUSING WITH THE PILOT IN THE BORE.

STEP 8
ROTATE THE FACE RUNOUT ARROW UNTIL IT POINTS AT THE MARK INDICATING THE POSITIVE FACE READING MARK (OR ONE OF THE EXTREMES—SEE NOTE)

STEP 9
LEAVING THE FACE RUNOUT ARROW IN POSITION, ROTATE ARROW "A" UNTIL IT POINTS AT THE MARK INDICATING THE NEGATIVE (–) BORE READING. (OR ONE OF THE EXTREMES—SEE NOTE)

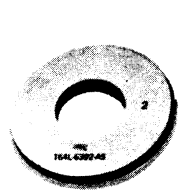
STEP 10
SET THE AMOUNT OF BORE RUNOUT ON THE BORE RUNOUT SLIDE. (USE SCALE NUMBER INDICATED BY THE PILOT NO. SELECTED)

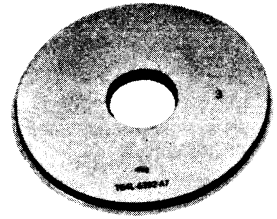
STEP 11
ROTATE ARROW "B" UNTIL IT POINTS IN THE DIRECTION OF THE FACE RUNOUT ARROW AND ITS 4 PARALLEL TO THE FACE R. O. ARROW 4.

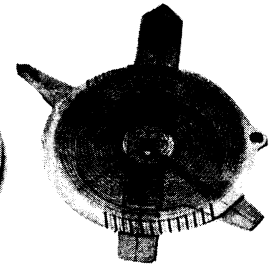
STEP 12
FIND THE AMOUNT OF THE FACE R.O. ON THE "B" ARROW CHART.

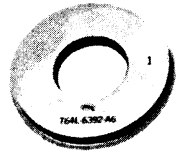
STEP 13
THE VALUE OF THE CIRCULAR LINE BENEATH THE AMOUNT OF FACE RUNOUT WILL BE THE DESIRED READING.

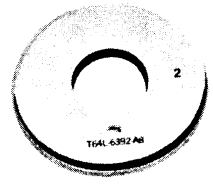
NOTE: IF THE READING IS GREATER THAN .004 THE HOUSING ALIGNMENT IS UNACCEPTABLE

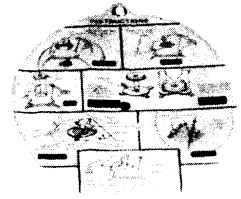


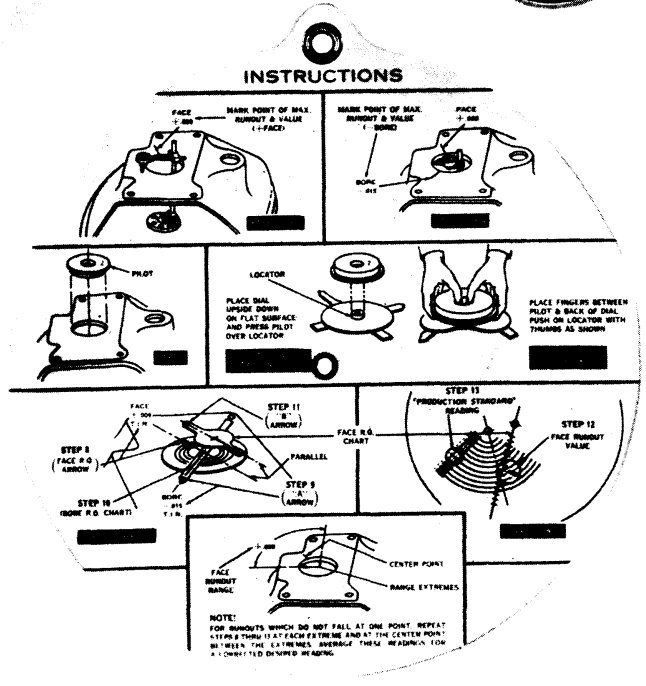












C1467-A

in the direction of the face runout arrow and its center line is parallel to the center line of the face runout arrow.

18. Determine the amount of the face runout on the B arrow scale.

19. The value of the circular line beneath the amount of face runout will be the desired reading. If the reading is in excess of 0.014 inch the housing alignment is unacceptable.

20. Remove the Dia-L-Igner gauge from the flywheel housing.

21. Install the spark plugs and connect the wires.

ENGINE IN VEHICLE

Since any change in face alignment will change bore alignment, it may be possible to correct bore alignment by changing face alignment. Face alignment can be changed by shimming between the flywheel housing and engine. Fig. 4 shows the type of shim which can be fabricated.

Not more than 0.010 inch thickness shims may be used between the flywheel housing and engine. If a 0.010-inch shim will not bring face and bore alignment within limits, replace the flywheel housing.

The shim required is one half the maximum (—) indicator reading, and should be located at the point of maximum minus (—) indicator reading.

If both the bore and face alignment are out of limits, shim between the flywheel housing and engine to bring face alignment within limits. Check the bore alignment.

If the bore alignment is out of limits and the face alignment is within limits, shim the flywheel housing to the limit of face misalignment and check the bore alignment. If it is not within limits, replace the housing.

ENGINE OUT OF VEHICLE

The same procedure to correct alignment may be used with the engine out of the vehicle or in the vehicle, up to the point of replacing the flywheel housing. If the bore alignment cannot be brought within limits by shimming, follow this procedure:
dure:

1. Remove the flywheel housing from the engine and remove the dowel pins. Install the flywheel housing and tighten the attaching bolts.

2. Install the dial indicator (Fig. 1). Check the face alignment, and shim as

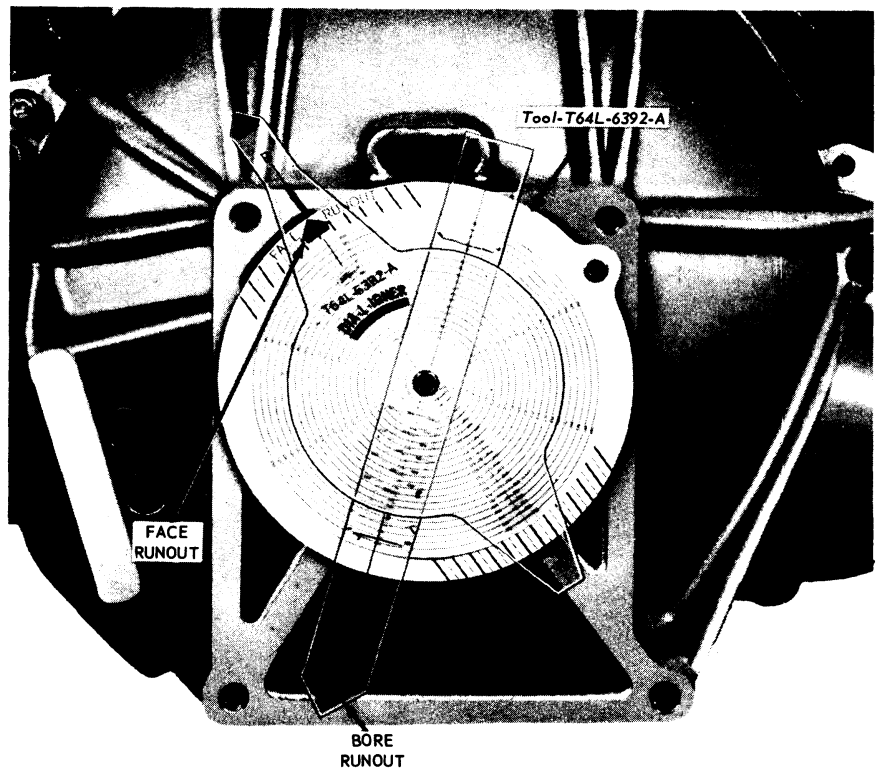


FIG. 3—Dia-L-Igner Gauge Installed

required to bring face alignment within limits.

3. Position the indicator to check the bore alignment. If the bore alignment is not within limits, reduce the tension on the flywheel housing attaching bolts so that the housing can be moved by striking it with a lead hammer or a block of wood and a steel hammer.

4. The lateral alignment should be brought within limits so that an indicator reading is within limits between the 9 o'clock and the 3 o'clock positions on the bore circle. When the lateral alignment is within limits the housing usually can be moved straight up or down without disturbing the lateral alignment. When alignment is within limits, torque the housing bolts and recheck bore alignment.

5. If the flywheel housing cannot be moved enough to bring the alignment within limits, mark the holes restricting movement, and then remove the housing and drill the marked bolt holes 1/32 inch larger.

6. When the flywheel housing bore alignment is within limits and the attaching bolts are at normal torque,

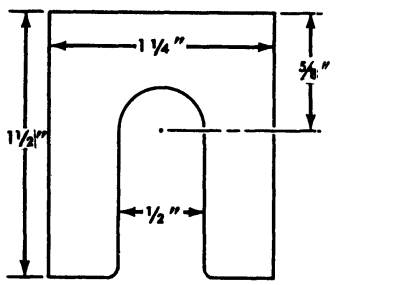


FIG. 4—Fabricated Flywheel Housing Shim

hand ream the dowel pin holes 1/32 inch larger. Use a straight reamer and ream from the flywheel housing side. Oversize dowel pins can be made from drill rod stock.

7. Remove the flywheel housing and then install the oversize dowel pins in the cylinder block. Complete the assembly in the usual way.

8. Recheck the flywheel housing with the Dia-L-Igner gauge to make sure that the housing is within the specified limits.

2 CLEANING AND INSPECTION

RELEASE BEARING

Wipe all oil and dirt off the release bearing. **The bearing is prelubricated and should not be cleaned with solvent.**

Inspect the bearing retainer for loose spring clips and rivets.

Inspect the release bearing assembly for burrs which may cause the assembly to drag on the transmission bearing retainer. Any such burrs should be cleaned up with fine crocus cloth. If burrs are found, inspect the transmission input shaft bearing retainer for evidence of scoring. Any scoring should be polished out with crocus cloth. Coat the bearing retainer with a thin film of lithium-base grease (C3VY-19586-A). Prior to release bearing installation, apply a light film of lithium base grease (C3VY-19586-A) on both sides of the release lever fork where it contacts the release bearing hub and retaining springs. Apply a light film of lithium base grease (C3VY-19586-A) plate to the release bearing surface that contacts the pressure plate fingers. Carefully fill the grease groove inside the bearing hub with lithium base grease (no polyethylene). Clean all excess grease from the bore of the bearing hub. Excess grease will be forced onto the spline by the transmission input shaft bearing retainer and will contaminate the clutch disc. Also, care must be exercised when applying lubricants to the release bearing, release bearing hub and the release lever fork to avoid excessive grease from contaminating the clutch disc.

Hold the bearing inner race and rotate the outer race while applying pressure to it. If the bearing rotation is rough or noisy, replace the bearing.

Most release bearing failures are caused by improper clutch pedal adjustments. If the clutch linkage does not have enough free travel, the release bearing will constantly touch the release fingers and will spin whenever the engine is running.

When installing a release bearing on vehicles equipped with separate hub and bearing, use the tool shown in Fig. 5.

Release bearing failure can be caused by the release lever contact points being out of plane. Check the wear on the release bearing assembly where the release lever contacts it.

If one side of the assembly shows more wear than the other, the release lever is bent out of plane, or is not centering on the bracket on the flywheel housing.

Misalignment between the engine and transmission can cause release bearing failure. Other symptoms of misalignment are transmission jumping out of gear, especially third gear, drive line vibration; excessive wear in the pilot bushing, excessive clutch disc spin time resulting in gear clash, and excessive transmission gear wear.

PRESSURE PLATE AND COVER

Inspect the surface of the pressure plate for burn marks, scores, or ridges. Generally, pressure plate resurfacing is not recommended. However minor burn marks, scores, or ridges may be removed. During the resurfacing process, the flatness of the pressure plate must be maintained. If the pressure plate is badly heat-checked or deeply scored, replace the pressure plate and cover assembly. Clean pressure plate and flywheel surfaces with a suitable solvent, such as alcohol to be sure the surfaces are free from any oil film. **Do not use cleaners with petroleum base, and do not immerse the pressure plate in the solvent.**

Place the plate on the floor, being careful not to score or scratch the surface. Force each individual finger down, then release quickly. If the finger does not return quickly, a binding condition is indicated, and the pressure plate should be replaced.

The pressure plate should be lubricated with a lithium-base grease between the driving lugs and the edges of the pressure plate openings, as shown in Fig. 6. Depress the pressure plate fingers fully, apply the lubricant, and then move the fingers up and down until the lubricant is worked in. **Do not apply excessive lubricant.**

CLUTCH DISC

Inspect the clutch disc facings for oil or grease. **Eliminate the source of any oil or grease before replacing the disc.** An excessive amount of grease in the pilot bushing or release bearing hub will find its way to the disc facings. Too much lubricant in the transmission or a plugged transmission vent will force the transmission lubricant out the input shaft and onto the disc facings. Also, rear main bearing oil seal leaks or oil leaks from the flywheel mounting bolts can contaminate the clutch disc.

Inspect the clutch disc for worn or loose facings. Check the disc for worn or loose facings. Check the disc for distortion and for loose rivets at the hub. Check for broken springs. **Springs loose enough to rattle will not cause noise when the car is operating.** Replace the disc assembly if any of these defects are present. **Be especially careful when installing a new disc to avoid dropping it or contaminating it with oil or grease.**

PILOT BUSHING

Check the fit of the clutch pilot bushing in the bore of the crankshaft.

The bushing is pressed into the crankshaft and should not be loose. Inspect the inner surface of the bushing for wear or a bell-mouthed condition. If the bushing is worn or damaged, replace the bushing with a new service bearing. Refer to the applicable engine for the replacement procedure.

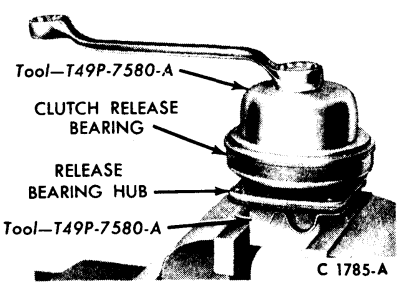


FIG. 5—Installing Clutch Release Bearing on Hub

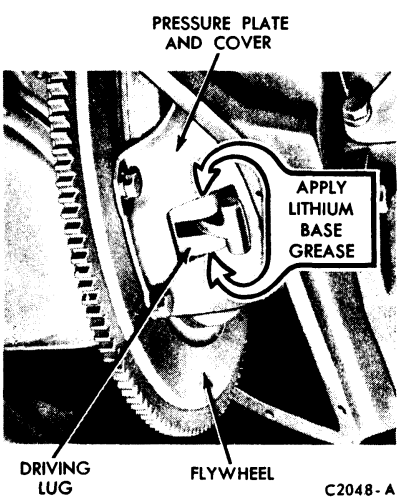


FIG. 6—Pressure Plate Lubrication Points

PART 5-3 Clutch

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
CLUTCH EQUALIZER BAR AND/OR BUSHING Removal and Installation		03-05	03-05	03-05	03-05	03-05	03-05	03-05	03-05	N/A	N/A	N/A
CLUTCH PEDAL ASSIST SPRING Removal and Installation		N/A	N/A	N/A	N/A	03-03	03-03	03-03	N/A	N/A	N/A	N/A
CLUTCH PEDAL AND/OR BUSHING Removal and Installation		N/A	N/A	N/A	N/A	03-04	03-04	03-04	N/A	N/A	N/A	N/A
CLUTCH PEDAL, PEDAL ASSIST SPRING AND/OR BUSHING Removal and Installation		03-03	03-03	03-03	03-04	N/A	N/A	N/A	03-04	N/A	N/A	N/A
CLUTCH PEDAL FREE PLAY ADJUSTMENT		03-03	03-03	03-03	03-03	03-03	03-03	03-03	03-03	N/A	N/A	N/A
CLUTCH REMOVAL AND INSTALLATION		03-05	03-05	03-05	03-05	03-05	03-05	03-05	03-05	N/A	N/A	N/A
DESCRIPTION		03-01	03-01	03-01	03-01	03-01	03-01	03-01	03-01	N/A	N/A	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 DESCRIPTION

DESCRIPTION

The clutch is of the centrifugal single dry disc type and consists of the clutch disc, pressure plate and the clutch release bearing.

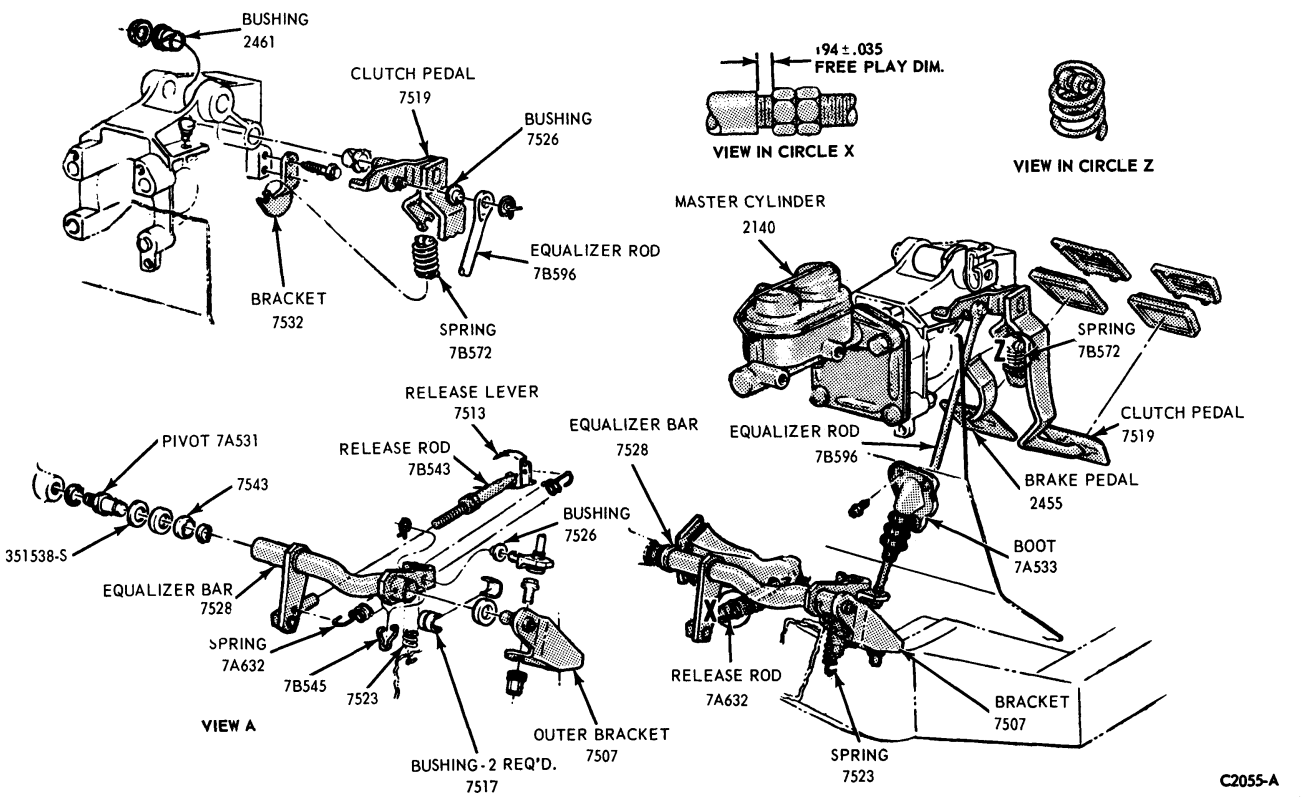


FIG. 1—Clutch Pedal and Linkage Adjustments — Ford, Mercury, Meteor

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

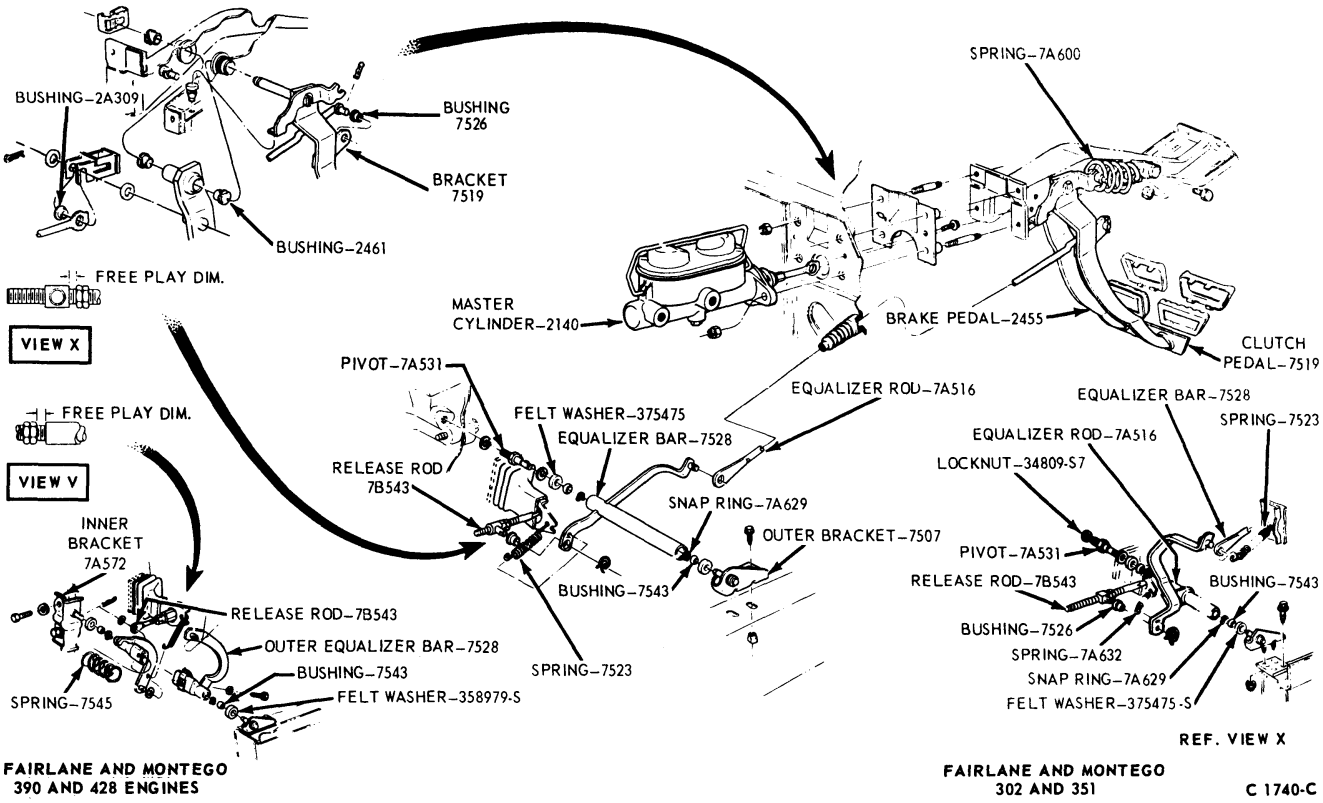


FIG. 2—Clutch Pedal and Linkage Adjustment — Fairlane, Montego and Falcon

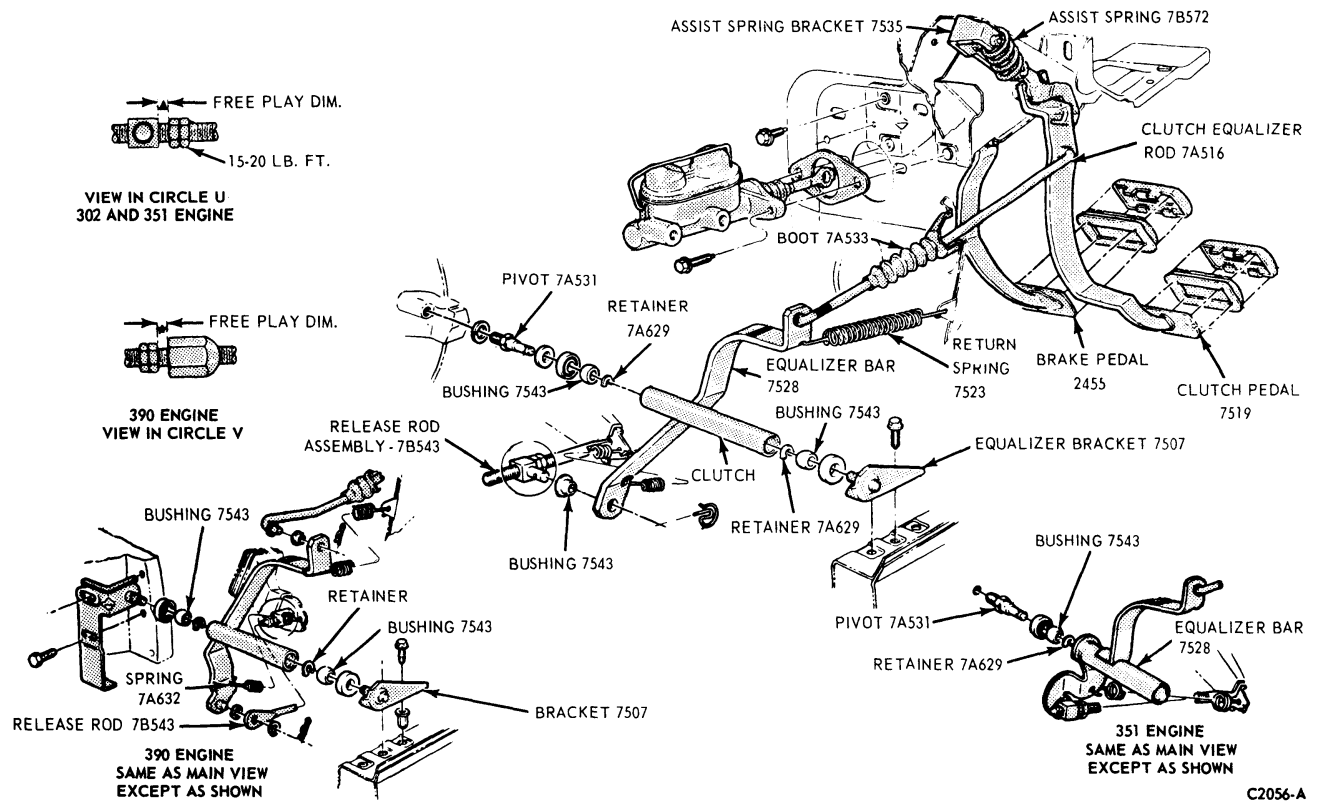


FIG. 3—Clutch Pedal and Linkage Adjustment — Mustang, Cougar

CLUTCH PEDAL ADJUSTMENTS

Adjust the clutch pedal free travel whenever the clutch does not disengage properly, or when new clutch parts are installed. **Improper adjustment of the clutch pedal is one of the most frequent causes of clutch failure and can be a contributing factor in some transmission failures.**

FREE TRAVEL

1. Disconnect the clutch return spring from the release lever.
2. Loosen the release lever rod locknut and adjusting nut (Figs. 1, 2 and 3).
3. Move the clutch release lever rearward until the release bearing lightly contacts the clutch pressure plate release fingers.
4. Adjust the rod length until the rod seats in the release lever pocket.
5. Insert the specified feeler gauge between the adjusting nut and the swivel sleeve. Then tighten the adjusting nut against the gauge finger tight.
6. Tighten the locknut against the adjusting nut, being careful not to disturb the adjustment. Torque the locknut to specification and remove the feeler gauge.
7. Install the clutch return spring.
8. Check the free travel at the pedal for conformance to specification. Readjust if necessary.
9. As a final check, measure the pedal free travel with the transmission in neutral and the engine running at about 3000 rpm. If the pedal free travel at this speed is not a minimum of 1/2 inch, readjust the clutch pedal free travel. Otherwise, the release fingers may contact the release bearing continuously, resulting in premature bearing and clutch failure. **Free travel must be exactly to specification.**

CLUTCH ASSIST SPRING REPLACEMENT (FAIRLANE, FALCON, MONTEGO)

1. Remove the cotter pin from the clutch rod at the clutch pedal lever assembly inside the passenger compartment.
2. Grasp the clutch pedal lever firmly to prevent slipping and remove the clutch rod from the lever. Allow the clutch pedal lever to rest on the floor panel.
3. Remove the forward bolt securing the assist spring bracket to the brake pedal bracket and loosen the rear bolt two or three turns. Do not remove the rear bolt.
4. Grasp the assist spring bracket with pliers and rotate upward until the spring can be separated from the bracket.
5. Position the assist spring in the clutch pedal spring bracket and the assist spring bracket. Rotate the spring bracket downward until the forward bolt holes in the assist spring bracket line up with the holes in the brake pedal bracket (Fig. 4).
6. Install the forward bolt retaining the assist spring bracket to the brake pedal bracket and torque the forward and rear bolts to specification.
7. Install the clutch rod to the clutch pedal lever and insert the cotter pin.

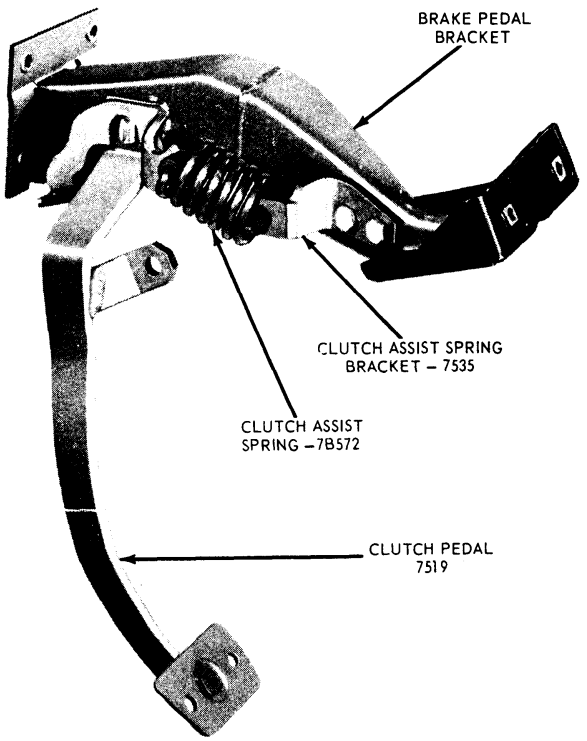


FIG. 4—Clutch Pedal Assembly — Fairlane, Montego, Falcon

CLUTCH PEDAL, PEDAL ASSIST SPRING AND/OR BUSHING REMOVAL AND INSTALLATION

FORD, MERCURY, METEOR

1. Remove the pin that secures the clutch pedal-to-equalizer rod to the clutch pedal.
2. Grasp the clutch pedal lever firmly to prevent slipping and remove the clutch rod from the lever. Allow the clutch pedal lever to rest on the floor.
3. Loosen the lower bolt securing the assist spring bracket to the pedal support bracket two or three turns. Then, remove the upper bolt from the bracket. Do not remove the lower bolt.
4. Grasp the assist spring bracket with pliers and rotate it counterclockwise until the spring is free (Fig 5).
5. Remove the retaining ring from the end of the clutch pedal shaft. Then remove the shaft, bushings and clutch pedal from the support.
6. Remove the bushings from the pedal shaft and pedal support and transfer the rubber pedal pad.
7. After lubricating the pedal shaft

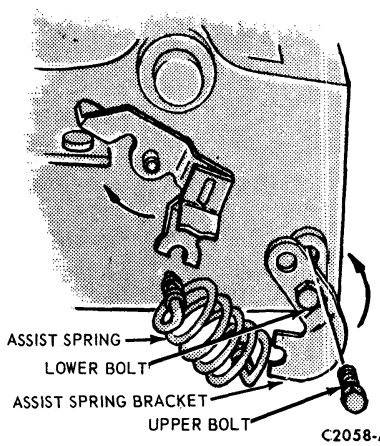


FIG. 5—Removing Clutch Assist Spring — Ford, Mercury and Meteor

bushings, position the clutch pedal and bushings in the pedal support.

8. Install the retaining ring on the clutch pedal shaft.

9. Position the assist spring in the pedal support bracket and the assist spring bracket. Rotate the assist spring bracket clockwise until the upper bolt holes line up and install the bolt. Torque both the upper and lower bolts to specification.

10. Check the clutch pedal free travel and adjust as required.

MUSTANG, COUGAR

1. Disconnect the battery ground cable.

2. Remove the steering column. Refer to Group 3 of this manual for the procedure.

3. Remove the two capscrews retaining the master cylinder or booster to the dash panel. Then remove the two capscrews retaining the pedal support bracket to the dash panel.

4. Working inside the vehicle, disconnect the clutch pedal-to-equalizer rod at the clutch pedal by removing the retainer and bushing.

5. Secure the clutch pedal against the bumper stop with a small C-clamp as shown in Fig. 6.

6. Disconnect the stop light switch wires at the connector.

7. Remove the switch retainer and slide the stop light switch off the brake pedal pin **just far enough for the switch outer hole to clear the pin. Then lower the switch away from the pin.** Remove the master cylinder push rod, bushing and nylon washer from the brake pedal pin.

8. Remove the screw retaining the pedal support bracket to the top inner cowl bracket (Fig. 6).

9. Remove the two sheet metal screws retaining the pedal support bracket to the dash panel.

10. Remove the two screws retaining the pedal support bracket to the upper cowl brace and lower the pedal support bracket away from the steering column studs.

11. Remove the pedal support bracket assembly from the vehicle.

12. Mount the bracket in a vise.

13. Remove the small C-clamp securing the clutch pedal to the bumper. Slowly pivot the pedal away from the bumper until the assist spring can be lifted from its seat.

14. Remove the retainer clip from the clutch and brake pedal shaft. Then, remove the clutch pedal and shaft assembly, brake pedal assembly, and bushings from the pedal support bracket.

15. Apply a coating of SAE 10 engine oil to the bushings and locate all bushings in their proper places on the brake and clutch pedal assemblies.

16. Position the brake pedal to the pedal support bracket. Install the clutch and brake pedal shaft through the pedal support and brake pedal assembly. Install the retainer.

17. Install the clutch pedal assist spring and pivot the pedal against its bumper stop. Secure the pedal against the bumper with a small C-clamp as shown in Fig. 6.

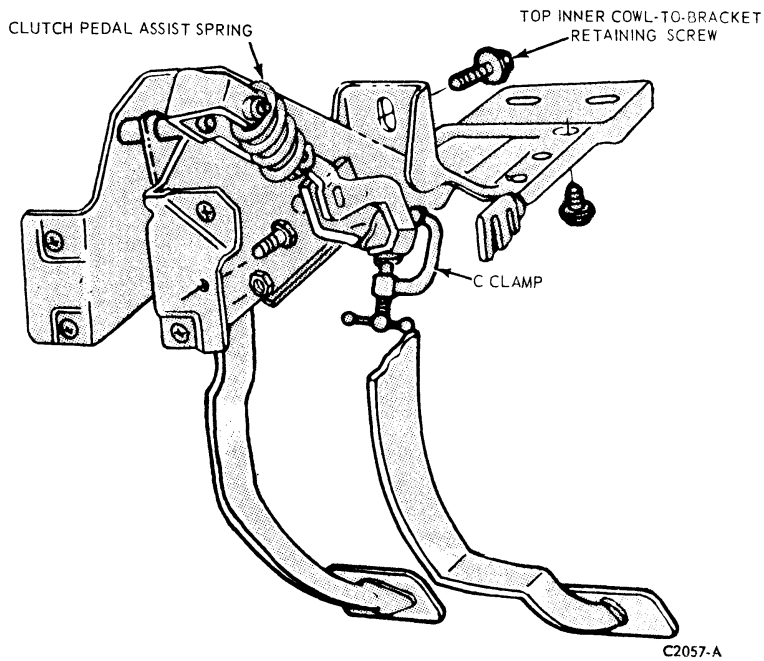


FIG. 6—Clutch Pedal —Mustang and Cougar

18. Position the pedal support bracket assembly to the dash panel and to the steering column retainer studs.

19. Align the pedal support bracket holes with the holes in the dash panel and install the two sheet metal screws.

20. Install the two capscrews attaching the pedal support bracket to the upper cowl bracket.

21. Install the screw attaching the support bracket to the top inner cowl bracket (Fig. 6).

22. Install the inner nylon washer, bushing master cylinder push rod on the brake pedal pin. Position the stop light switch so that it straddles the push rod with the switch slot on the pedal pin and the switch outer hole just clearing the pin. Slide the switch completely onto the pin, and install the outer nylon washer. Secure with the self-locking pin.

23. Connect the stop light switch wires to the connector and install the wires to the retaining clip.

24. Connect the clutch pedal-to-equalizer rod to the clutch pedal assembly with the bushing and retainer and remove the C-clamp from the bracket.

25. Working from the engine side of the dash panel, install the two capscrews attaching the pedal support bracket to the dash panel. Then install the two screws attaching the master cylinder to the dash panel.

26. Install the steering column. Refer to Group 3 of this manual for the procedure.

27. Adjust the clutch pedal free travel.

28. Check the brake pedal free height and travel measurements (Group 2).

29. Connect the battery ground cable.

CLUTCH PEDAL AND/OR BUSHING REMOVAL AND INSTALLATION

MONTEGO, FALCON FAIRLANE

1. Remove the retaining clip (Fig. 2) that secures the equalizer rod to the clutch pedal. Disconnect the rod from the pedal.

2. Remove the lower bolt retaining the assist spring bracket to the pedal support. Then, loosen the upper bracket retaining bolt (approximately 4 turns) and disconnect the spring from the clutch pedal and bracket.

3. Disconnect the brake pedal push rod from the brake pedal.

4. Remove the bolt that secures the left air vent control cable bracket to the instrument panel. Position the control cable to one side.

5. Remove the retaining clip and flat washer from the clutch pedal shaft. Then, remove the shaft, bushing, clutch pedal and brake pedal from the support.

6. Remove the bushings from the pedal shaft, and transfer the pedal pad.

7. Lubricate the clutch pedal shaft bushings and position them on the shaft. Then, position the brake pedal and clutch pedal in the pedal support.

8. Install the flat washer and retaining clip on the pedal shaft.

9. Position the assist spring to the pedal and bracket. Pry the bracket forward and install the lower bolt. Torque the bolts to specifications.

10. Position the master cylinder push rod, bushing, and washers on the brake pedal and secure with a retaining clip.

11. Connect the equalizer rod to the clutch pedal and secure it in place with a retaining clip.

12. Position the air vent control cable bracket to the instrument panel and secure with the attaching bolt.

13. Adjust the clutch pedal free travel.

EQUALIZER BAR AND/OR BUSHING REMOVAL AND INSTALLATION

FORD, MERCURY AND METEOR

1. Raise the vehicle and disconnect the clutch pedal-to-equalizer rod at the equalizer bar (Fig. 1).

2. Disconnect the return spring and retaining spring at the release lever. Separate the release lever rod from the release lever.

3. Remove the equalizer bar frame bracket from the frame.

4. Remove the equalizer bar from the pivot on the flywheel housing.

5. Remove the wire clip to replace the outer bushing and the snap ring from the inner pivot stud to replace the inner bushing.

6. Position the flat washer, felt washer and bushing on the inner and outer pivots. Secure these parts with the snap ring.

7. Position the equalizer bar on the inner pivot and bolt the equalizer bar frame bracket to the frame. Torque the attaching bolts to specification.

8. Install the clutch release rod, return spring and retaining spring.

9. Connect the clutch pedal rod to the equalizer bar.

10. Adjust the clutch pedal free travel.

MUSTANG, COUGAR, MONTEGO, FALCON, FAIRLANE (EXCEPT MONTEGO AND FAIRLANE WITH 390 V-8)

1. Disconnect the clutch pedal equalizer rod at the equalizer bar (Figs. 2 and 3).

2. Raise the vehicle and disconnect the release lever, return spring at the lever.

3. Remove the equalizer bar outer bracket and bushing assembly.

4. Remove the release rod from the equalizer bar, and then remove the equalizer bar. Remove the bushing and washers from the inner mounting stud.

5. Position the equalizer bar, washers, inner bushing, and retainer on the inner stud.

6. After positioning the outer bushing, install the outer bracket (with the equalizer bar in place).

7. Connect the release rod and the release lever return spring.

8. Lower the vehicle. Connect the clutch pedal equalizer rod to the equalizer bar and secure with the retaining pin.

9. Adjust the clutch pedal free travel as required.

MONTEGO AND FAIRLANE—390 V-8

1. Disconnect the clutch pedal equalizer rod at the equalizer bar (Fig. 2).

2. Raise the vehicle and disconnect the return spring at the release lever. Disconnect the release lever rod from the equalizer lever.

3. Remove the equalizer bar center bolt.

4. Separate the equalizer bar and remove both sections from the vehicle.

5. Remove the bolts retaining the equalizer bar inner bracket to the flywheel housing and remove the bracket and bushing assembly.

6. Remove the equalizer bar outer bracket and bushing assembly.

7. Remove the snap ring, bushing, and felt washer from each bracket assembly.

8. Position a felt washer, and bushing on each bracket assembly and secure with the snap ring.

9. Install the outer bracket and bushing assembly to the frame (Fig. 2). Torque the bracket attaching bolts to specifications.

10. Position the outer section of the equalizer bar on the outer bracket pivot.

11. Connect the two sections of the equalizer bar. Insert the inner bracket pivot into the equalizer bar and install the assembly to the flywheel housing. Torque the attaching bolts to specifications.

12. Install the equalizer bar center bolt and torque to specifications. Make sure that both ends of the equalizer bar are against the felt washers.

13. Connect the release rod and the release lever return spring.

14. Adjust the clutch pedal free travel.

15. Lower the vehicle. Connect the clutch pedal equalizer rod to the equalizer bar and secure with the retaining clip.

16. Check the free travel at the pedal for conformance to specifications. Readjust if necessary.

3 REMOVAL AND INSTALLATION

CLUTCH REMOVAL

1. Raise the vehicle on a hoist.

2. Disconnect the drive shaft from the rear U-joint flange. Then, slide the drive shaft off the transmission output shaft. Insert the appropriate tool over the output shaft and into the extension housing oil seal.

3. Disconnect the speedometer cable from the extension housing.

4. Disconnect the gear shift rods from the transmission. If the vehicle is equipped with a four-speed transmission, remove the bolts that secure the four-speed transmission, disconnect the front brake cable from the crossmember and remove the crossmember from the vehicle.

5. Remove the bolts that attach the transmission to the flywheel housing.

6. Move the transmission rearward until the input shaft clears the flywheel housing, then remove it from the vehicle.

7. Disconnect the clutch release lever retaining spring from the release lever.

8. Remove the starter cable then remove the starter motor from the flywheel housing.

9. Remove the bolts that secure the engine rear plate to the front lower part of the flywheel housing.

10. Remove the flywheel housing lower cover (390 CID housing only).

11. Remove the bolts that attach the housing to the cylinder block.

12. Move the housing back just far enough to clear the pressure plate, then move it to the right to free the pivot from the clutch equalizer bar. Be careful not to disturb the linkage and assist spring.

13. Loosen the six pressure plate cover attaching bolts evenly to release the spring tension. **If the same pressure plate and cover is to be installed after the clutch is overhauled, mark the cover and flywheel so that the pressure plate can be installed in the same position.**

14. Remove the pressure plate and the clutch disc from the flywheel.

CLUTCH INSTALLATION

1. Install the clutch release lever if it was removed.

2. Place the clutch disc, and pressure plate assembly in position on the flywheel. Start the cover attaching bolts to hold the pieces in place, but do not tighten them. **Avoid touching the clutch disc facing, dropping the parts or contaminating them with oil or grease as clutch chatter may result.**

3. Align the clutch disc with the tool shown in Fig. 7, and alternately tighten the bolts a few turns at a time until they are all tight. Then torque the six pressure plate cover attaching bolts to specification before removing the tool.

4. Apply a light film of grease (C3VY-19586-A) to the outside diameter of the transmission front bearing retainer. Apply a light film of grease (C3VY-19586-A) to both sides of the release lever fork where it contacts the release bearing bore spring clips. Apply a light film of grease to the release bearing surface that contacts the pressure plate release fingers. Fill the grease groove of the release bearing hub with lithium base grease (C3VY-19586-A). Clean all excess grease from inside the bore of bearing hub. Excess grease will be forced onto the spline by the transmission input shaft bearing retainer and will contaminate the clutch disc. Also, place the release bearing and hub on the release lever.

5. Make certain that the flywheel housing and the cylinder block mounting surfaces are clean. Position the felt washer on the pivot in the flywheel housing. Slip the pivot into the clutch equalizer shaft being careful not to disturb the linkage and at the same time position the housing on the dowels in the cylinder block. Install and torque the attaching bolts to specification.

6. Install the starting motor and connect the cable.

7. The mounting surfaces of the transmission and the flywheel housing must be free of dirt, paint, and burrs. Install two guide pins in the flywheel housing lower mounting bolt holes. Move the transmission forward on the guide pins until it is tightly positioned against the flywheel housing.

8. Install the two upper mounting bolts. Then, remove the guide pins and install the two lower mounting bolts. Torque all the bolts to specification.

9. Raise the rear of the engine and install the crossmember. Install and torque the crossmember attaching bolts to specifications, then lower the engine.

10. Install the extension housing-to-engine rear support attaching bolts. Torque the bolts to specification.

11. Remove the transmission jack and connect the parking brake cable.

12. If the vehicle is equipped with a four-speed transmission, connect the gear shift linkage control bracket to the extension housing.

13. Connect the gear shift rods to the transmission. Adjust the shift linkage as required.

14. Connect the release lever retaining spring. Install the flywheel housing cover (390 CID housing only).

15. Remove the tool from the transmission output shaft and install the drive shaft.

16. Check the clutch pedal free travel.

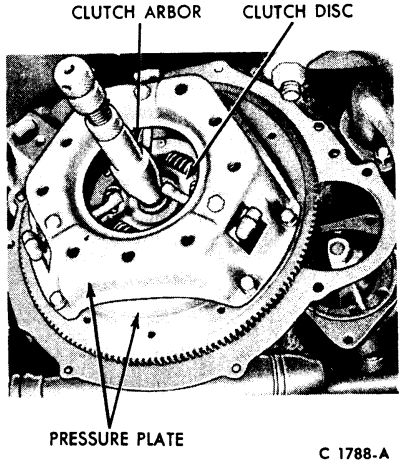


FIG. 7—Installing Clutch Disc — Typical

PART 5-4 Specifications

CLUTCH IDENTIFICATION

Car Line	Engine	Transmission	Pressure Plate			Disc		
			Diameter (Inches)	No. of Springs	Color Identification (Paint Daub)	Diameter (Inches)	No. of Springs	Color Identification (Paint Daub)
Ford Meteor	240-1V	3-Speed	9.5	6	Pressure Plate—No Color Cover—Green Springs—Aluminum	9.5	6	Clutch—Yellow Springs—2 Purple (Small) 4 Aluminum (Large)
Ford	240-1V	3-Speed Heavy Duty	11	9	Pressure Plate—White Cover—Pink and Blue Springs 8—Green	11	8	Clutch—No Color Springs—4 Aluminum 4 Pink
Ford Meteor	302-2V	3-Speed	10	9	Pressure Plate—Green Cover—White Springs—White on Bronze	10	12	Clutch—Blue Springs—6 Orange (Small) 6 Pink (Large)
Ford Meteor Mercury	390-2V, 4V	3-Speed 4-Speed	11	9	Pressure Plate—Orange Cover—Black Springs—Aluminum	11	12	Clutch—Pink Springs—6 Green (Small) 6 Orange (Large)
Ford	429-4V	4-Speed	11.5	12	Pressure Plate—Yellow Cover—Black Springs—Green	11.5	10	Clutch—Gray Springs—5 Red Stripe (Small) 5 No Color (Large)
Falcon	170-1V	3-Speed	9	6	Pressure Plate—Orange Cover—Purple Springs—Aluminum Stripe	9	6	Clutch—Pink Springs—Blue
Fairlane Falcon Montego	200-1V 250-1V	3-Speed	9	6	Pressure Plate—Orange Cover—Purple Springs—Aluminum Stripe	9	6	Clutch—Pink Springs—Blue
Fairlane Montego Falcon	302-2V	3-Speed 4-Speed	10	9	Pressure Plate—Green Cover—White Springs—Bronze	10	12	Clutch—Blue Springs—6 Pink 6 Orange
Mustang	200-1V 250-1V	3-Speed	9	6	Pressure Plate—Orange Cover—Purple Springs—Aluminum Stripe	9	6	Clutch—Blue Springs—Blue
Mustang Cougar	302-2V	3-Speed 4-Speed	10	9	Pressure Plate—Blue Cover—Purple Springs—Bronze	10	6	Clutch—Green Springs—Orange
Fairlane Montego	390-2V, 4V	3-Speed 4-Speed	11	9	Pressure Plate—Green Cover—Purple Springs—Purple	11	8	Clutch—Pink and Orange Springs—Aluminum
Fairlane Montego Mustang Cougar	390-4V GT	3-Speed 4-Speed	11.5	12	Pressure Plate—Green Cover—Purple Springs—Purple	11.5	8	Clutch—Pink and Orange Springs—Aluminum
Fairlane Montego Mustang Cougar	351-2V, 4V	3-Speed 4-Speed	11	9	Pressure Plate—Blue Cover—Yellow Springs—Silver	11	8	Clutch—Pink and Orange Springs—Aluminum
Fairlane Montego Mustang Cougar	428-4V	4-Speed	11.5	12	Pressure Plate—Yellow Cover—Black Springs—Green	11.5	10	Clutch—Gray Springs—Red Stripe

CLUTCH-DRIVELINE ADJUSTMENTS (INCHES)

Release Lever Rod Adjusting Nut to Swivel Sleeve	
Ford, Mercury Meteor	0.194
Fairlane, Montego, Falcon, Mustang, Cougar ex. with 390, 428 engine	0.136
390, 428 Engines	0.178

Clutch Pedal Free Travel (Engine Running)	7/8"-1 1/8"
Clutch Housing Alignment If Dia-L-Igner reading is greater than that indicated, the clutch housing alignment is unacceptable.	0.014
Maximum Shim to Correct Alignment	0.010

TORQUE LIMITS (FT-LBS)

Description	Meteor Ford, Mercury	Mustang, Cougar Fairlane, Montego, Falcon
Lower Access Clutch Cover Pan to Flywheel Housing Bolts (Cast Iron Housing)	17–20	–
Transmission Assembly to Flywheel Housing Bolts	37–42	–
Pressure Plate and Cover Assembly to Flywheel Attaching Bolts	12–20	12–20
Clutch Release Equalizer Frame Bracket Bolts	15–24	15–24
Clutch Pedal Free Travel Adjustment Nut	15–20	15–20
Flywheel Housing to Cylinder Block Bolts 6-Cylinder 8-Cylinder	– –	23–33 40–50
Clutch Pedal Assist Spring Bracket to Brake Pedal Support Bracket	12–17	12–17

SPECIAL TOOLS

Tool No.	Description		Tool No.	Description
A-37H	Clutch Disc Aligner-Universal		CJ91B	Universal Joint Bearing Replacer
T61L-7657-A or B T57L-7657-A T64P-7657-A	Transmission Extension Housing Oil Seal Replacer		T64L-6392-A	Dia-L-Igner Gauge
			T49P-7580-A	Clutch Release Bearing Replacer

06-01-01

Manual Shift Transmissions

GROUP 6

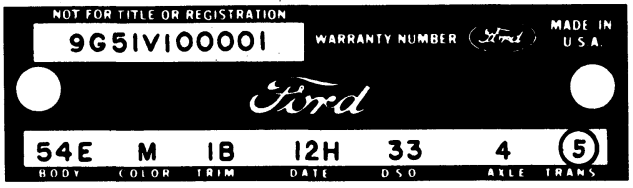
PART 6-1 PAGE
General Transmission Service 06-01-01
PART 6-2
Ford Design Three-Speed Transmission 06-02-01
PART 6-3 PAGE
Ford Design Four-Speed Transmission 06-03-01
PART 6-4
Specifications 06-04-01

Part 6-1 *General Transmission Service*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
REAR SEAL												
Removal and Installation		01-02	01-02	01-02	01-02	01-02	01-02	01-02	01-02	N/A	N/A	N/A
REAR BUSHING AND SEAL												
Removal and Installation		01-02	01-02	01-02	01-02	01-02	01-02	01-02	01-02	N/A	N/A	N/A
TRANSMISSION												
Cleaning		01-02	01-02	01-02	01-02	01-02	01-02	01-02	01-02	N/A	N/A	N/A
Inspection		01-02	01-02	01-02	01-02	01-02	01-02	01-02	01-02	N/A	N/A	N/A
Lubrication		01-02	01-02	01-02	01-02	01-02	01-02	01-02	01-02	N/A	N/A	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

1 COMMON ADJUSTMENTS AND REPAIRS



CODE	TRANSMISSION
1	THREE-SPEED
5	FOUR-SPEED (WIDE RATIO)
6	FOUR-SPEED (CLOSE RATIO)

C2086-A

FIG. 1—Typical Warranty Plate—Transmission Identification

REAR SEAL REPLACEMENT

1. Remove the drive shaft.
2. Remove the seal from the extension housing with the tool shown in Fig. 2.
3. Install the new seal in the extension housing with the tool shown in Fig. 3.
4. Install the drive shaft.

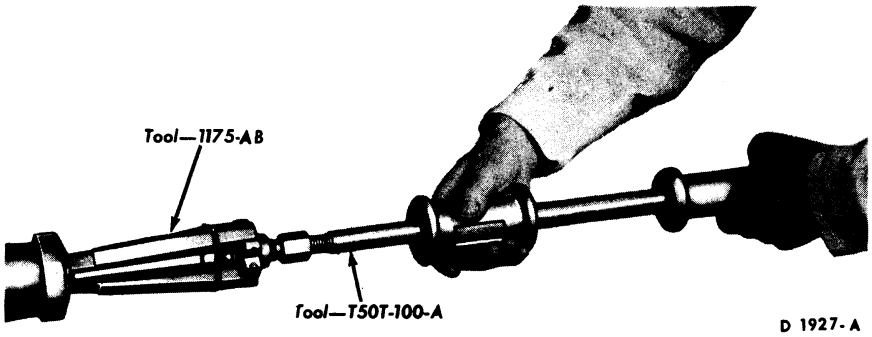


FIG. 2—Removing Extension Housing Seal

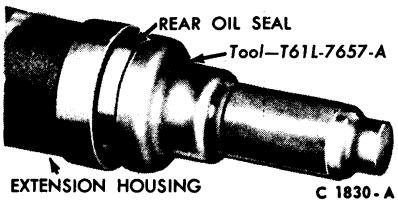


FIG. 3—Installing Extension Housing Seal

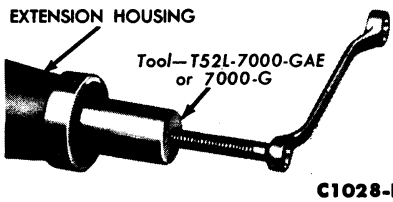


FIG. 4—Removing Extension Housing Bushing and Seal

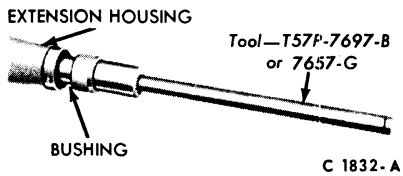


FIG. 5—Installing Extension Housing Bushing

REAR BUSHING AND SEAL REMOVAL AND INSTALLATION

1. Remove the drive shaft from the vehicle.
2. Insert the tool shown in Fig. 4 into the extension housing until it grips on the front side of the bushing.
3. Turn the screw clockwise until the seal and the bushing are free of the housing.
4. Drive a new bushing into the extension housing with the tool shown in Fig. 5.
5. Install a new seal in the housing as shown in Fig. 3.
6. Install the drive shaft.

LUBRICATION

Lubricant level should be even with the bottom of the filler hole at the right side of the transmission case.

2 CLEANING AND INSPECTION

CLEANING

1. Wash all parts, except the ball bearings and seals in a suitable cleaning solvent. Brush or scrape all foreign matter from the parts. Be careful not to damage any parts with the scraper. **Do not clean, wash or soak transmission seals in cleaning solvents.** Dry all parts with compressed air.
2. Rotate the ball bearings in a cleaning solvent until all lubricant is removed. Hold the bearing assembly to prevent it from rotating and dry it with compressed air.
3. Lubricate the bearings with approved transmission lubricant and wrap them in a clean, lint-free cloth or paper until ready for use.
4. Clean the magnet welded to the bottom of the case with kerosene or mineral spirits.

INSPECTION

1. Inspect the transmission case for cracks, worn or damaged bearings bores, damaged threads or any other damage that could affect the operation of the transmission.
2. Inspect the front face of the case for small nicks or burrs that could cause misalignment of the transmission with the flywheel housing. Remove all small nicks or burrs with a fine stone.
3. Replace a cover that is bent or distorted. Make sure that the vent hole in the cover is open.
4. Check the condition of the shift levers, forks, shift rails and the lever and shafts.
5. Examine the ball bearing races for cracks, wear or roughness. Inspect the balls for looseness, wear, end play or other damage. Check the bearings for looseness in the bores. If any of these conditions exist, replace the bearings.
6. Replace roller bearings that are broken, worn or rough.
7. Replace the countershaft (cluster) gear if the teeth are chipped, broken or worn. Replace the countershaft if it is bent, scored or worn.
8. Replace the reverse idler gear or sliding gear if the teeth are chipped, worn or broken. Replace the idler gear shaft if bent, worn or scored.
9. Replace the input shaft and gear if the splines are damaged or if the teeth are chipped, worn or broken. If the roller bearing surface in the bore of the gear is worn or rough, or if the cone surface is damaged, replace the gear and the gear rollers.
10. Replace all other gears that are

chipped, broken or worn.

11. Check the synchronizer sleeves for free movement on their hubs. Make sure that the alignment marks (etched marks) are properly indexed.

12. Inspect the synchronizer blocking rings for widened index slots, rounded clutch teeth and smooth internal surfaces (must have machined grooves). With the blocker ring on the cone, the distance between the face of the blocker ring and the clutch teeth on the gear must not be less than 0.010 inches.

13. Replace the speedometer drive gear if the teeth are stripped or damaged. Make certain to install the correct size replacement gear.

14. Replace the output shaft if there is any evidence of wear or if any of the splines are damaged.

15. Inspect the bushing and the seal in the extension housing. Replace them if they are worn or damaged. The bushing and/or seal should be replaced after the extension housing has been installed on the transmission.

16. Replace the seal in the input shaft bearing retainer.

17. Replace the seals on the cam and shafts.

PART 6-2 *Ford Design Three Speed Transmission*

Trans-mission Model	Engine Model	Shift Lever Location	MODEL APPLICATION											
			All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
RAN-AL	200-1V, 250-1V	Column						X	X	X				
RAN-AM	200-1V, 250-1V	Floor									X			
RAN-AN	170-1V	Column							X					
RAN-AZ	240-1V	Column		X	X									
RAT-AJ	351-2V-4V	Column						X		X				
RAT-AM	351-2V-4V	Floor					X				X			
RAT-A2	390-2V-4V	Column		X	X	X								
RAT-B2	390-4V-GT	Floor						X		X				
RAT-C2	390-4V-GT	Column						X		X				
RAT-N2	390-4V	Floor					X							
RAT-S1	302-2V	Column		X										
RAT-T	302-2V-4V	Column						X	X	X				
RAT-U1	302-2V	Floor									X			

COMPONENT INDEX	All Models
COUNTERSHAFT GEAR BEARINGS	
Removal and Installation	02-07
DESCRIPTION	02-02
GEAR SHIFT CONTROL ASSEMBLY—	
Floor Mounted	
Removal and Installation	02-07
GEAR SHIFT LEVERS AND SEALS	
Removal and Installation	02-06
GEAR SHIFT LINKAGE ADJUSTMENT	
Column Mounted	02-02
Floor Mounted	02-03
INPUT SHAFT BEARING	
Removal and Installation	02-06
SYNCHRONIZERS	
Disassembly and Assembly	02-06
TRANSMISSION (Complete)	
Cleaning and Inspection See Part 06-01	
Disassembly and Overhaul	02-04
Removal and Installation	02-03

1 DESCRIPTION

DESCRIPTION

The RAN and RAT Model three-speed transmission (Fig. 1) are used on models having 170, 200, 240, 250, 302, 351 and 390 C.I.D. engines. The specifications of this section, Part 6-4, lists the transmission model numbers and vehicles in which they are used.

A transmission service identification tag is located on the right side of the case at the front (Fig. 2). The first line on the tag will show the transmission model and service identification code when required. The second line will show the transmission serial number. Additionally, a driveline component identification tag is attached to the upper right side of the transmission case.

This transmission is of the fully synchronized type, with all gears except the reverse gear and sleeve being in constant mesh. All forward-speed changes are accomplished with synchronizer sleeves.

The forward-speed gears are helical-cut and are in constant mesh. Gears used in the reverse gear train are spur-cut and are not synchronized.

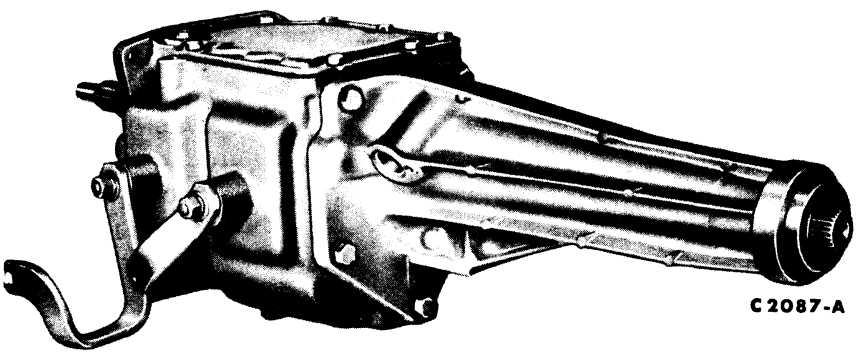


FIG. 1—Three-Speed Transmission—Typical

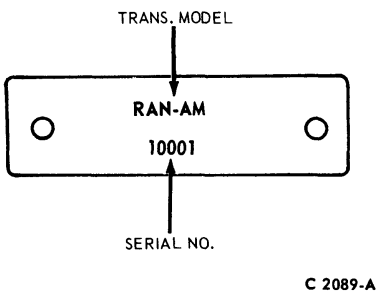


FIG. 2—Transmission Identification Tag

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

GEAR SHIFT LINKAGE ADJUSTMENT—COLUMN MOUNTED

1. Place the gear shift lever in the neutral position.
2. Loosen the two gear shift rod adjustment nuts.
3. Check shift levers on transmission to be in neutral position.
4. Insert a 3/16-inch diameter alignment tool through the first and reverse gear shift lever, the second and third gear shift lever and both holes in the lower casting (Fig. 3). An alignment tool can be made from 3/16 inch drill rod bent to an L shape. The extensions should be 1 inch and 2 inches from the elbow. The short end of the tool should be inserted into the alignment holes.
5. Tighten the two gear shift rod adjustment nuts.
6. Remove the alignment tool from the levers.
7. Start the engine and shift the selector lever to each position to make sure it operates freely.

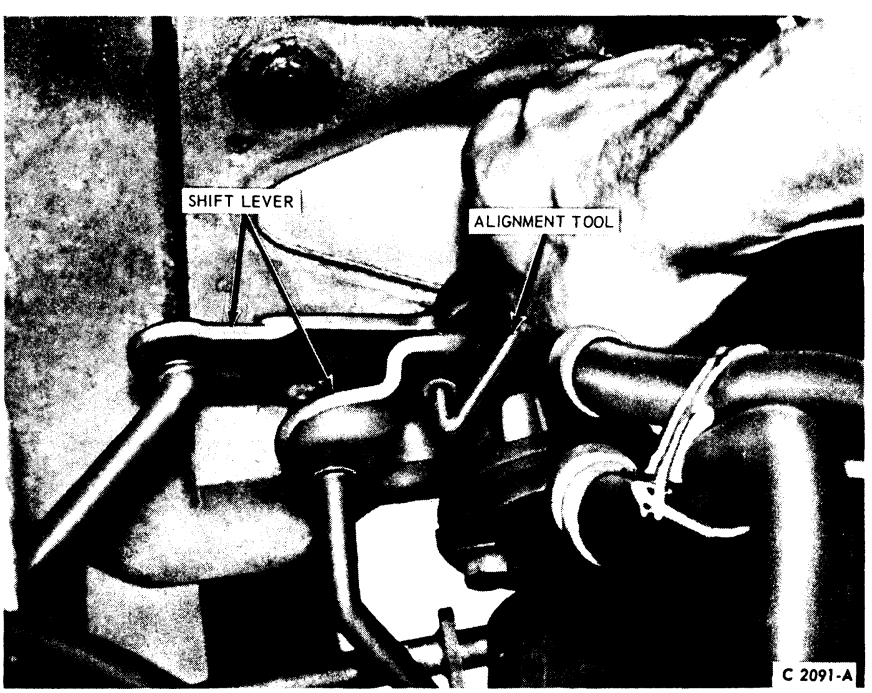


FIG. 3—Gearshift Linkage Adjustment—Typical

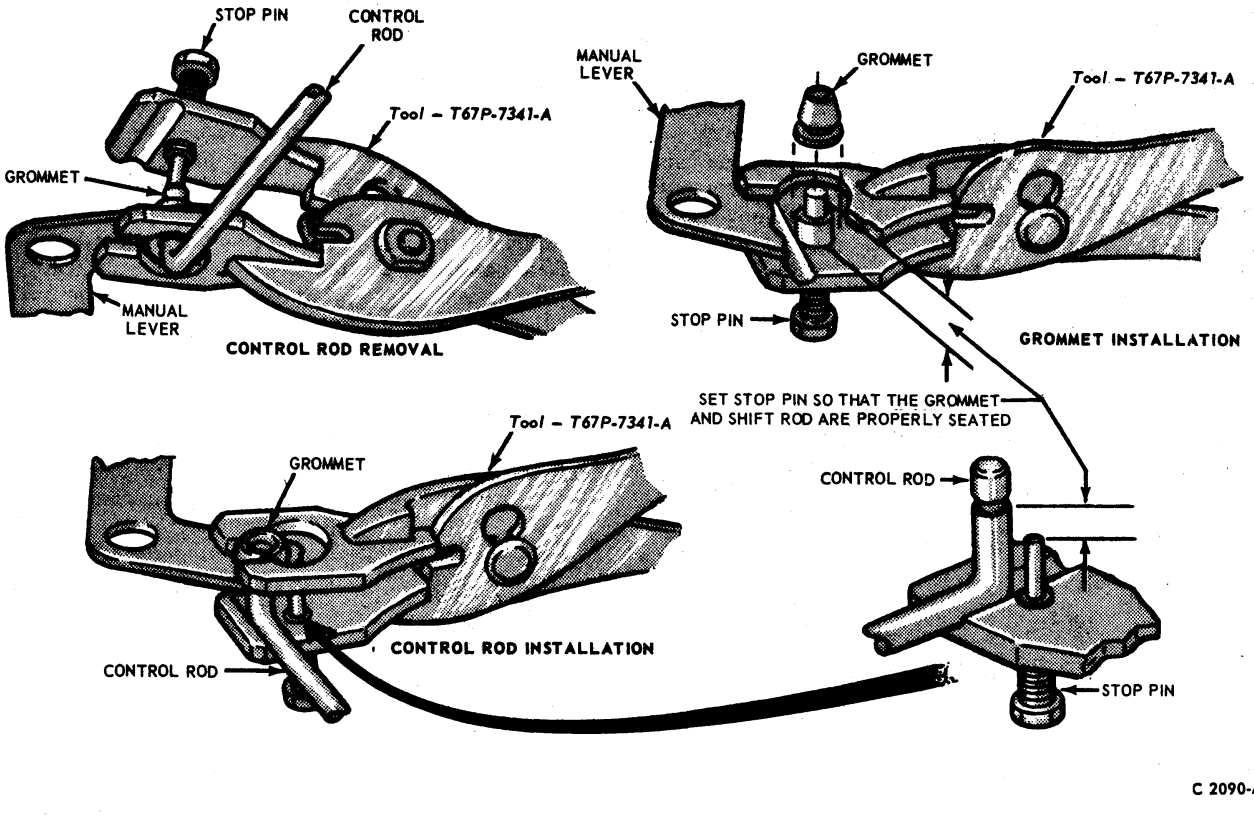


FIG. 4—Removing or Installing Shift Linkage Grommet

GEAR SHIFT LINKAGE ADJUSTMENT—FLOOR MOUNTED

1. Loosen the three shift linkage adjustment nuts. Install a 1/4 inch diameter alignment pin through the control bracket and lever alignment holes shown in Fig. 18.
2. Tighten the three linkage adjustment nuts and then remove the alignment pin.
3. Check the gear shift lever for a smooth crossover.

COLUMN-MOUNTED SHIFT LINKAGE GROMMET REMOVAL AND INSTALLATION

The column-mounted shift lever assembly incorporates an oil impregnated plastic grommet in the end of each lever arm. A special tool T67P-7341-A is required to install the grommet in the shift lever, and to install the shift linkage rod into the grommet. Remove and install the grommet as follows:

1. Place the lower jaw of the tool between the shift lever and the shift rod. Position the stop pin against the end of the shift rod (Fig. 4) and force the rod out of the grommet. Remove the grommet from the shift lever by cutting off the large shoulder with a sharp knife. **The grommet must be removed from the shift lever and a new one installed each time the rod is disconnected.**
2. Before installing a new grommet, adjust the stop pin as necessary to properly install the grommet and coat the outside of the grommet with lubricant. Then, place the grommet on the stop pin and force it into the shift lever hole. Turn the grommet several times to be sure it is properly seated.
3. Readjust the stop pin to a length which is sufficient to install the shift rod into the grommet (Fig. 4). If the pin height is not adjusted, the shift rod may be pushed too far through the grommet causing damage to the grommet retaining lip.
4. With the pin height properly adjusted, position the shift rod on the tool and force the rod into the grommet until the groove in the rod seats on the inner retaining lip of the grommet.

3 REMOVAL AND INSTALLATION

REMOVAL

1. Raise the vehicle on a hoist.
2. Mark the drive shaft so that it may be installed in the same relative position. Disconnect the drive shaft from the rear U-joint flange.
3. Slide the front of the drive shaft out of the transmission extension housing and off the output shaft. Insert the tool shown in (Fig. 2), Part 6-1 into the extension housing to prevent the lubricant from leaking out of the transmission.
4. Remove the cap screw and lock washer that secures the speedometer cable retainer to the extension housing. Pull the speedometer cable out of the extension housing.
5. On vehicles equipped with a column-mounted gear shift selector, remove the shift rods from the shift levers at the transmission. On vehicles equipped with a floor-mounted gear

shift selector, remove the shift selector assembly from the extension housing.

6. On Ford, Mercury and Meteor vehicles disconnect the parking brake cable from the equalizer lever and separate the lever from the crossmember.

7. On Ford, Mercury and Meteor models, remove the bolts that secure the extension housing to the engine rear support.

8. Raise the rear of the engine high enough to remove the weight from the crossmember.

9. Support the transmission with a transmission jack and remove the transmission from the flywheel housing.

10. Move the transmission and jack rearward until the input shaft is clear of the flywheel housing.

11. Remove the transmission from the jack and mount it in a holding fixture.

Do not depress the clutch pedal while the transmission is removed.

INSTALLATION

1. Make certain that the machined surfaces of the transmission case and the flywheel housing are free of dirt, paint, and burrs.

2. Install a guide pin in each lower mounting bolt hole.

3. Start the input shaft through the release bearing. Align the splines on the input shaft with the splines in the clutch disc. Move the transmission forward on the guide pins until the input shaft pilot enters the bearing or bushing in the crankshaft. If the transmission front bearing retainer binds up on the clutch release bearing hub, work the release bearing lever until the hub slides onto the transmission front bearing retainer. Install the two transmission-to-flywheel housing upper mounting bolts and lockwashers. Remove the two guide pins and install the lower mounting bolts and lock washers.

4. Raise the rear of the engine high enough to provide clearance for installing the crossmember. Bolt the crossmember assembly to the frame side supports.

5. On Ford, Mercury and Meteor models, lower the engine until the extension housing just contacts the rear support. Align the bolt holes in the extension housing with those in the support. Then lower the engine and remove the jack. Install the two extension housing-to-support attaching bolts and lock washers.

6. On Ford, Mercury and Meteor models, insert the parking brake front cable in the equalizer and install the equalizer in the bracket on the crossmember. Secure the parking brake rear cable to the equalizer.

7. On vehicles equipped with a column-mounted gear shift selector, secure the shift rods to the shift levers at the transmission. On vehicles equipped with a floor-mounted gear shift selector, attach the shift selector assembly to the extension housing.

8. Insert the speedometer cable and driven gear in the extension housing and secure it with a cap screw and lock washer.

9. Remove the tool shown in Fig. 2, Part 6-1, from the extension housing. Align the reference marks and slide the front universal joint yoke onto the output shaft and into the extension housing. Connect the rear universal joint to the axle pinion flange and torque the nuts to specifications.

10. Fill the transmission to the proper level with the approved lubricant.

11. Adjust the clutch pedal free travel and the shift linkage as required.

4 MAJOR REPAIR OPERATIONS

DISASSEMBLY

1. Mount the transmission in a holding fixture and drain the lubricant by removing the drain plug, if so equipped, or the lower extension housing bolt.

2. Remove the cap screws that attach the cover to the case. Remove the cover and the gasket (Fig. 5) from the case.

3. Remove a long spring that retains the detent plug in the case (Fig. 9). Remove the detent plug with a small magnet.

4. Remove the cap screws and lock washers that attach the extension housing to the case. Remove extension and gasket from the case.

5. Remove the cap screws and lock washers that attach the front bearing retainer to the case. Remove the front bearing retainer and gasket from the case.

6. Remove the lubricant filler plug from the right side of the case. Working through the plug opening, drive the roll pin out of the case and countershaft with a 1/4-inch punch (Fig. 6).

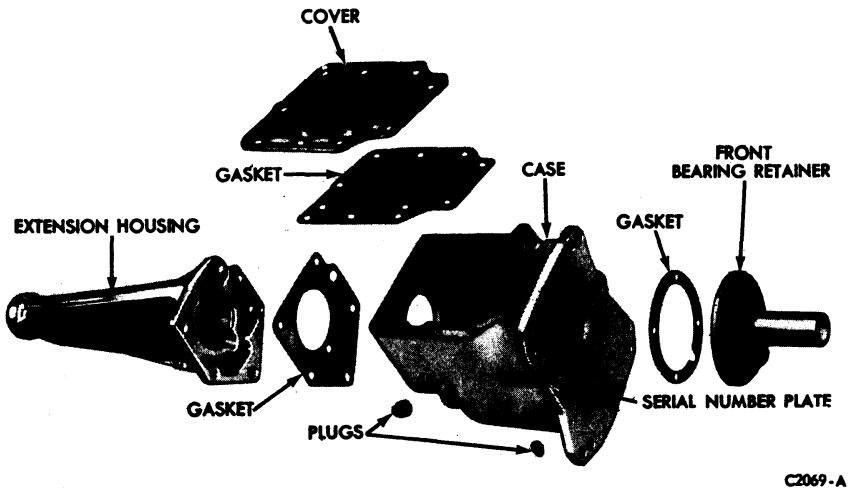


FIG. 5—Transmission Case and Related Parts—Typical

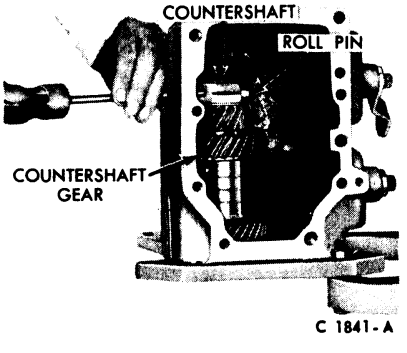


FIG. 6—Removing Countershaft Roll Pin

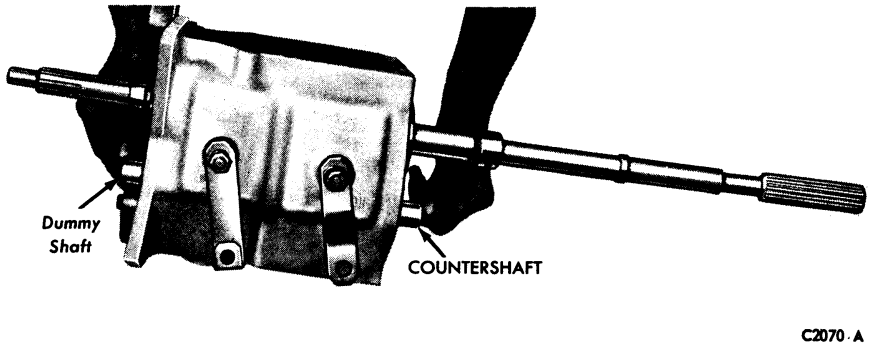


FIG. 7—Removing Countershaft

7. On 6-cylinder vehicles with a model RAN transmission except Ford, tap the countershaft from the rear of the case with a dummy shaft to remove the expansion plug from the countershaft bore at the front of the case.

8. Hold the countershaft gear with a hook and with the tool shown in Fig. 7, push the countershaft out the rear of the case.

The countershaft (cluster) gear and thrust washers (Fig. 21) can be lowered to the bottom of the case. Remove the countershaft from the rear of the case.

9. On some models, remove the snap ring that secures the speedometer drive gear on the output shaft. Slide the speedometer drive gear off the shaft. Remove the speedometer drive gear lock ball from the shaft. If the vehicle is equipped with the new design retainer, depress the tang on the speedometer drive gear retaining clip and slide the gear off the output shaft (Fig. 10).

10. Remove the snap ring that retains the output shaft bearing on the shaft. Remove the bearing from the case and shaft as shown in Fig. 8.

11. Place both shift levers in the neutral (center) position.

12. Remove the set screw that secures the first and reverse shift fork to the shift rail. Slide the first and reverse shift rail out through the rear of the case.

13. Slide the first and reverse synchronizer forward as far as possible, and rotate the first and reverse shift fork upward. Then lift it from the case.

14. Move the second and third-speed shift fork to the second-speed position to gain access to the set screw. Remove the set screw from the fork. Rotate the shift rail 90 degrees as shown in Fig. 11.

15. Lift the interlock plug (Fig. 9) from the case with a magnet.

16. Tap on the inner end of the second and third-speed shift rail to remove the expansion plug (Fig. 9) from the front of the case. Remove the shift rail.

17. Remove the second and third-speed shift rail detent plug and spring from the detent bore.

18. Pull the input gear and shaft forward until the gear contacts the case, and then remove the large snap ring. It is necessary to move the gear forward to provide clearance when removing the output shaft assembly from RAT model transmissions. On all other models, the input shaft and gear is removed from the front of the case at this time.

19. Rotate the second and third-speed shift fork upward, and lift it from the case.

20. Carefully lift the output shaft assembly out through the top of the case.

21. On an RAT model, work the input shaft bearing and gear back through the bore in the case and out through the top. Remove idler gear shaft, driving from the front of the case.

22. Lift the reverse idler gear and two thrust washer (Fig. 12) from the case. Lift the countershaft gear, thrust washer, and dummy shaft from the case.

23. Remove the snap ring from the front of the output shaft, and slide the synchronizer and the second-speed gear (Fig. 13) off the shaft.

24. Remove the next snap ring and tabbed thrust washer from the output shaft. Then slide the first gear and blocking ring off the shaft.

25. Remove the next snap ring from the output shaft. The first and reverse synchronizer hub is a press fit on the output shaft. To eliminate the possibility of damaging the synchronizer assembly, remove the synchronizer hub using an arbor press as shown in Fig. 21. **Do not attempt to remove or install the hub by hammering or prying.**

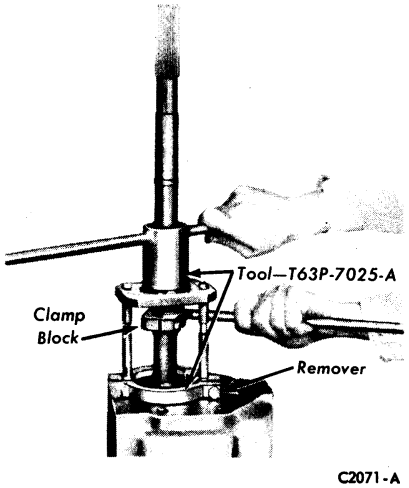


FIG. 8—Removing Output Shaft Bearing

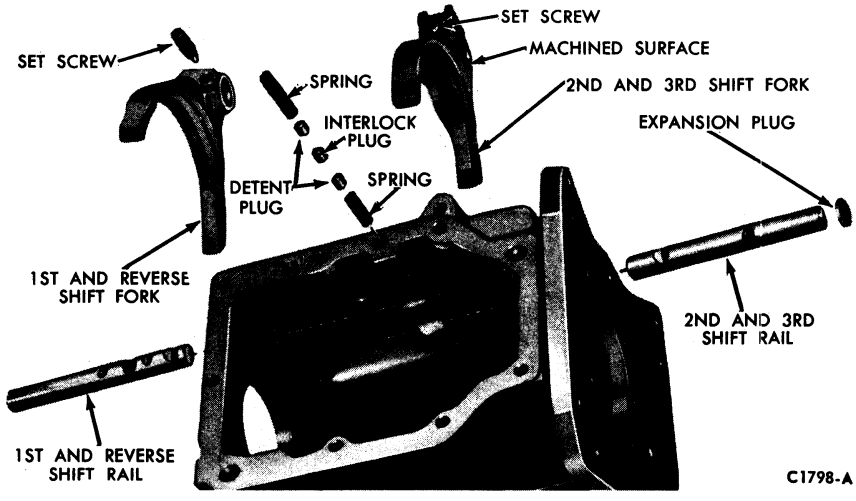


FIG. 9—Shift Rails and Forks Disassembled

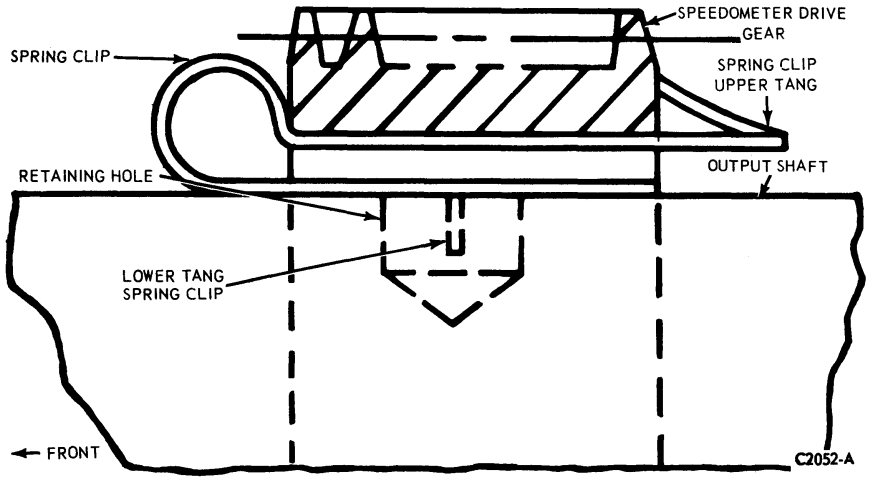


FIG. 10—Speedometer Drive Gear Installation—New Design

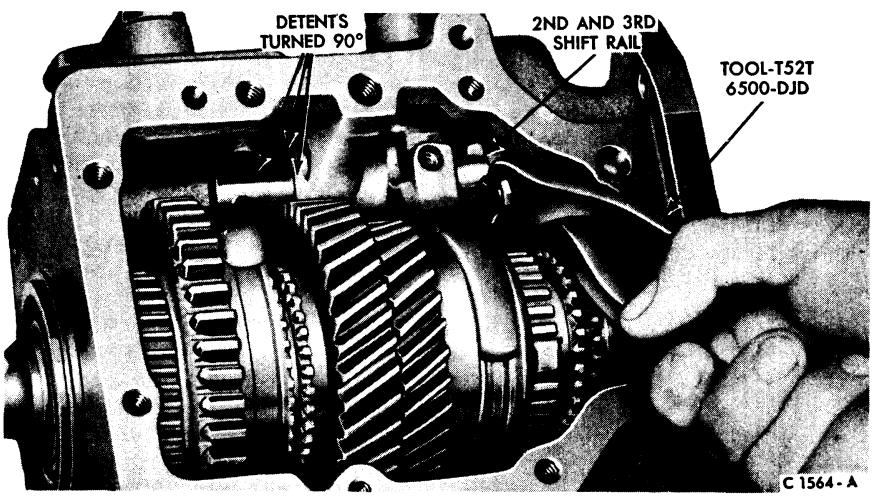


FIG. 11—Rotating Second and Third-Speed Shift Rail

PARTS REPAIR OR REPLACEMENT

SHIFT LEVERS AND SEALS

1. Remove the nut, lock washer, and flat washer that secure each shift lever (Fig. 14) to the lever and shaft in the transmission case. Lift the levers off the shaft. Slide each lever and shaft out of the case. Discard the O-ring from each shaft.

2. Lubricate the new seals with transmission lubricant and install them on the shafts.

3. Install the lever and shafts in the case.

4. Position a shift lever on each shaft and secure them with a flat washer, lock washer, and nut.

INPUT SHAFT BEARING

1. Remove the snap ring securing the input shaft bearing (Fig. 15), and press the input shaft out of the bearing.

2. Press the input shaft bearing onto the input shaft with the tool shown in Fig. 16, and install the snap ring on the shaft.

SYNCHRONIZERS

1. Push the sychronizer hub from each synchronizer sleeve.

2. Separate the inserts and insert springs from the hubs. Do not mix the parts from the second and third-speed synchronizer with the first and reverse synchronizer (Figs. 17 and 18).

3. Install the rear insert spring in the groove of the first and reverse syn-

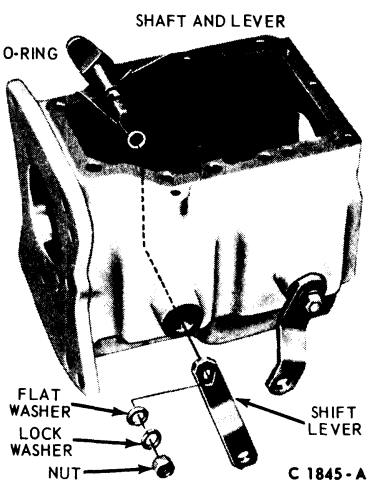


FIG. 14—Shift Lever and Shaft Disassembled

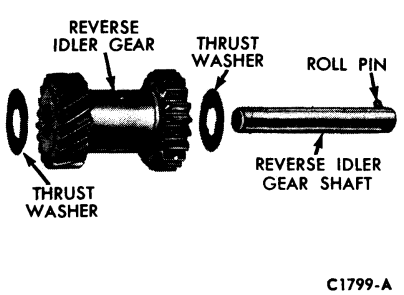


FIG. 12—Reverse Idler Shaft Disassembled

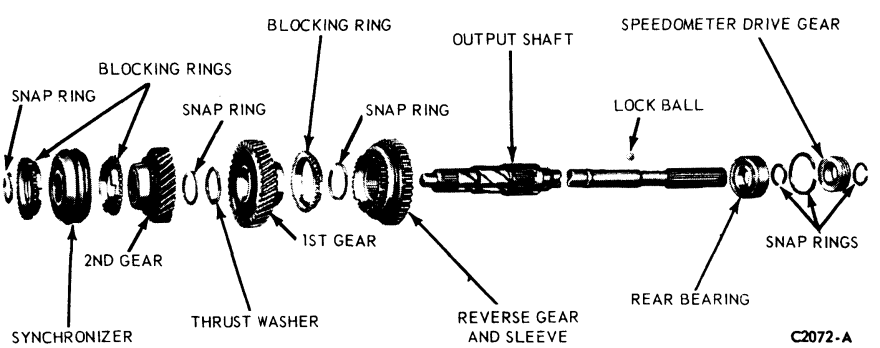


FIG. 13—Output Shaft Disassembled

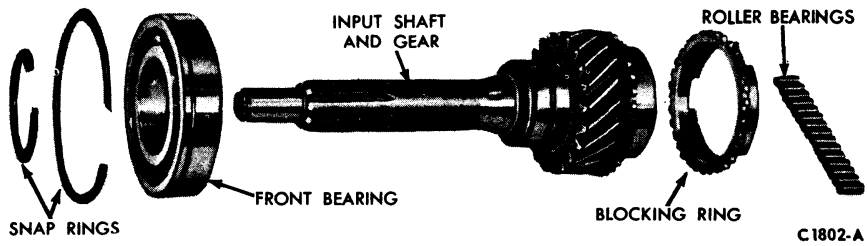


FIG. 15—Input Shaft Gear Disassembled

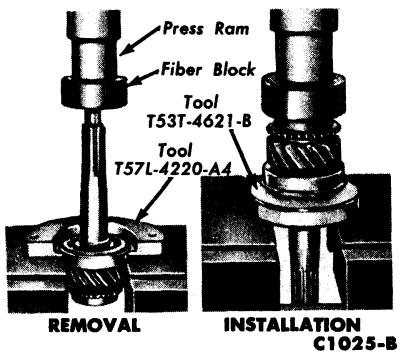


FIG. 16—Replacing Input Shaft Bearing

chronizer hub. Make sure that the spring covers all insert grooves. Start the hub in the sleeve making sure that the alignment marks are properly indexed. Position the three inserts in the hub making sure that the small end is over the spring and that the shoulder is on the inside of the hub. Slide the sleeve and reverse gear onto the hub until the detent is engaged. Install the front insert spring in the hub to hold the inserts against the hub. **Be sure the spring humps of the rear spring cover different inserts than the front spring humps (Fig. 20).**

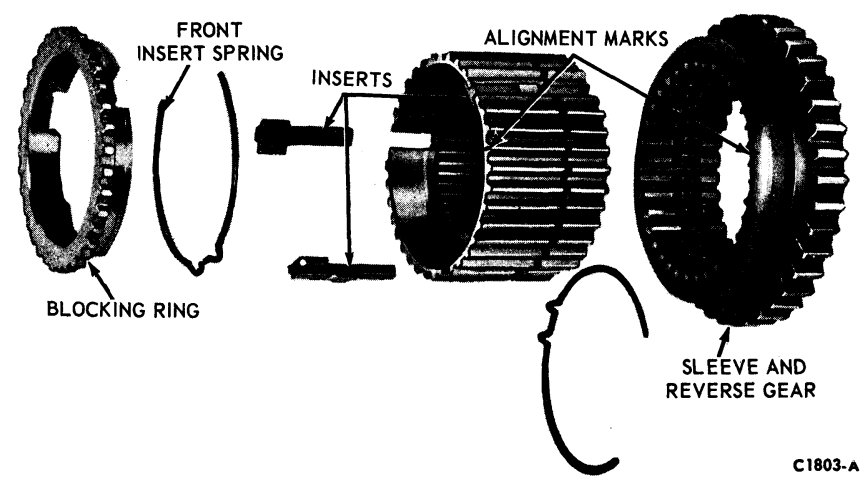


FIG. 17—First and Reverse Synchronizer Disassembled

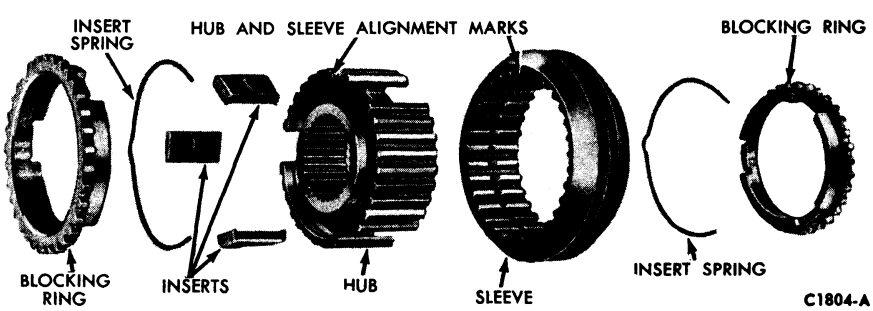


FIG. 18—Second and Third Synchronizer Disassembled

4. Install one insert spring (Fig. 18) into a groove of the second and third speed synchronizer hub, making sure that all three insert slots are fully covered. With the alignment marks on the hub and sleeve aligned, start the hub into the sleeve. Place the three inserts on top of the retaining spring and push the assembly together. Install the remaining insert spring so that the spring ends cover the same slots as does the other spring. Do not stagger the springs. Place a synchronizer blocking ring on each end of the synchronizer sleeve.

COUNTERSHAFT GEAR BEARINGS

1. Remove the dummy shaft, fifty roller bearings, and the two bearing retainer washers from the countershaft gear (Fig. 21).
2. Coat the bore in each end of the countershaft gear with grease.
3. Hold the dummy shaft in the gear and install the twenty-five roller bearings and a retainer washer in each end of the gear.
4. Position the countershaft gear, dummy shaft, and roller bearings in the case.
5. Place the case in a vertical position. Align the gear bore and the thrust washers with the bores in the case and install the countershaft.
6. Place the case in a horizontal position and check the countershaft gear end play with a feeler gauge. The end play should be within specification. If not within specification, replace the thrust washers.
7. After establishing the correct end play, install the dummy shaft in the countershaft gear and allow the gear to remain at the bottom of the case until the output and input shafts have been installed.

GEAR SHIFT LEVER AND CONTROL ASSEMBLY REMOVAL AND INSTALLATION—FLOOR-MOUNTED

1. Remove the four screws attaching the lower boot to the floor pan.
2. Remove the two bolts attaching the gear shift lever to the control assembly.
3. Remove the two piece lock nuts that connect the shift rods to the control assembly.
4. Remove the three bolts retaining the shift control assembly to the extension housing. Allow the back-up light switch to hang free.

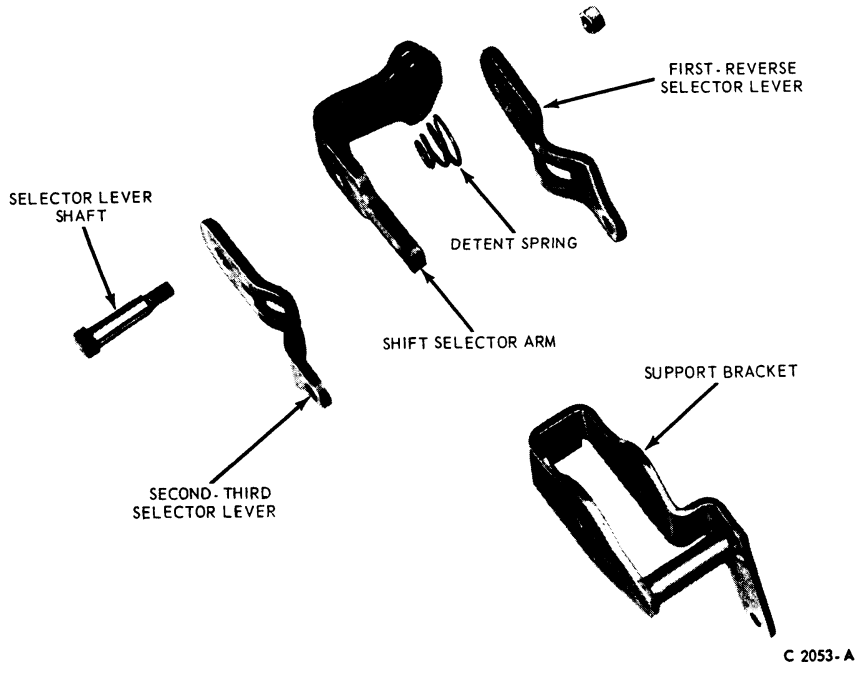


FIG. 19—Gear Shift Control Assembly Disassembled—3-Speed

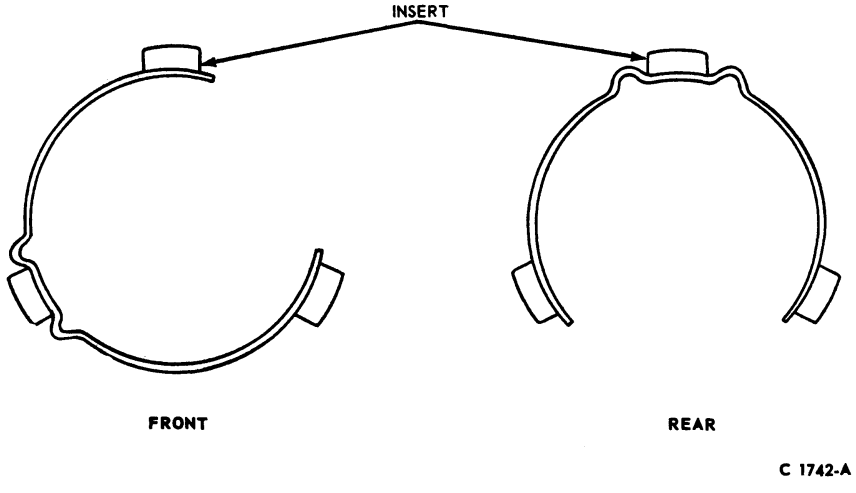


FIG. 20—First and Reverse Speed Synchronizer Insert Spring Installation

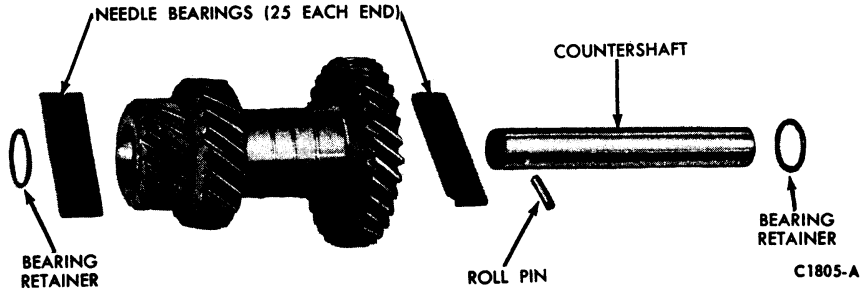


FIG. 21—Countershaft Gear Disassembled

5. Lower the control assembly from the vehicle and remove the boot.

6. Remove the nut from the selector lever shaft and remove the shaft from the assembly. Then, llift the selector arm and selector levers out of the support bracket. Do not lose the detent spring located between the first-reverse selector lever and the selector arm (Fig. 19).

7. Lubricate all mating surfaces with lithium grease before assembly.

8. Position the detent spring between the first-reverse selector lever and the selector arm. Be sure the wide base of the spring rests against the selector lever. Position the second-third selector lever against the selector arm and insert the entire assembly into the support bracket.

9. Install the selector lever shaft through the support bracket and selector lever assembly and install the retaining nut.

10. Slide the control assembly into the boot and attach the entire assembly to the extension housing. Do not lose the spacer located inside the assembly. Be sure the back-up light switch is properly installed.

11. Install the two bolts securing the gear shift lever to the shift control assembly.

12. Insert a 1/4 inch diameter alignment pin in the alignment holes of the control assembly.

13. Position the shift rods on the selector levers and install the lock nuts.

14. Remove the alignment pin.

15. Check the operation of the shift mechanism for smooth cross-over and adjust as required.

ASSEMBLY

1. Coat the reverse idler gear thrust surfaces in the case with a thin film of lubricant and position the two thrust washers in place.

2. Position the reverse idler gear and dummy shaft in place. Align the gear bore and thrust washers with the case bores and install the reverse idler shaft.

3. Measure the reverse idler gear end play with a feeler gauge. End play should be within specification. If the end play is not within specification, replace the thrust washers. If the end play is within limits, leave the reverse idler gear installed.

4. Lubricate the output shaft splines and machined surfaces with transmission lubricant.

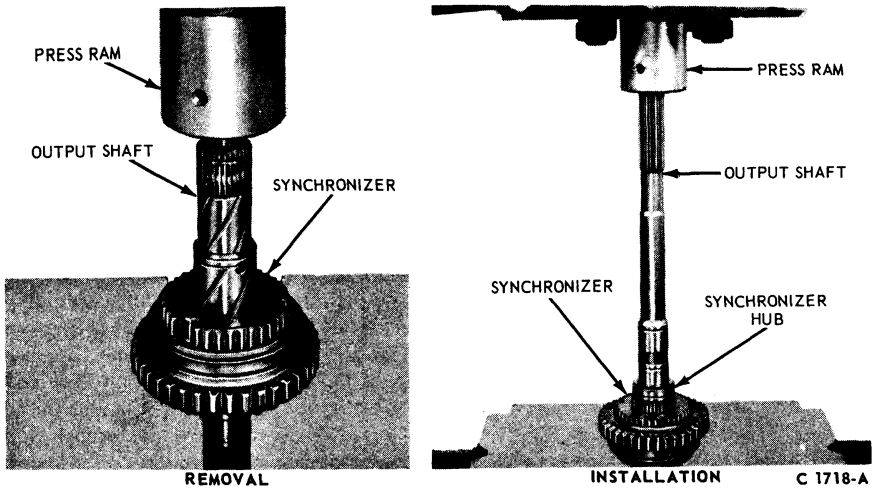


FIG. 22—Removing and Installing First and Reverse Synchronizer

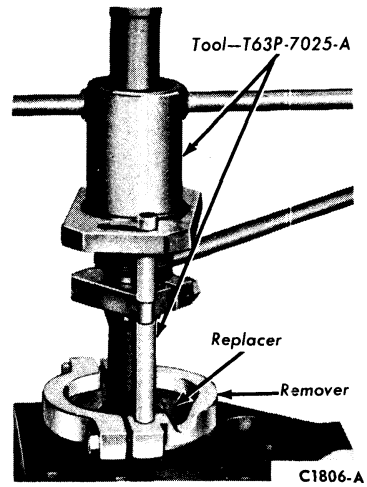


FIG. 23—Installing Output Shaft Rear Bearing

5. The first and reverse synchronizer hub is a press fit on the output shaft. To eliminate the possibility of damaging the sychronizer assembly, install the synchronizer hub with the teeth end of the gear facing toward the rear of the shaft, using an arbor press as shown in Fig. 22. **Do not attempt to remove or install the hub by hammering or prying.**

6. Place the blocking ring on the tapered machined surface of the first gear.

7. Slide the first gear onto the output shaft with the blocking ring toward the rear of the shaft. Rotate the gear as necessary to engage the three notches in the blocking ring with the synchronizer inserts. Secure the first gear with the thrust washer and snap ring.

8. Slide the blocking ring onto the tapered machined surface of the second gear. Slide the second gear with blocking ring and the second and third gear synchronizer onto the mainshaft. The tapered machined surface of the second gear must be toward the front of the shaft. Make sure that the notches in the blocking ring engage the synchronizer inserts. Secure the synchronizer with a snap ring.

9. Coat the bore of the input shaft and gear with a **thin** film of grease. **A thick film of grease will plug the lubricant holes and prevent lubrication to the bearings.** Install the 15 bearings (Fig. 15) in the bore.

10. If working on a RAT model transmission, install the input gear and bearing through the top of the case and through the bore in front of the case. On RAN models, the input shaft is installed through the front of the transmission. Install the snap ring in the bearing groove.

11. Position the output shaft assembly in the case. Position the second and third-speed shift fork on the second and third-speed synchronizer.

12. Place a detent plug spring and a plug in the case (Fig. 9). Place the second and third-speed synchronizer in the second speed position (toward rear of transmission). Align the fork and install the second and third-speed shift rail. It will be necessary to depress the detent plug to enter the rail in the bore. Move the rail inward until the detent plug engages the forward notch (second-speed position).

13. Secure the fork to the shaft with the set screw. Move the synchronizer to the neutral position.

14. Install the interlock plug in the case. If the second and third-speed shift rail is in the neutral position, the top of the interlock will be slightly lower than the surface of the first and reverse shift rail bore.

15. Move the first and reverse synchronizer forward to the first-speed position. Place the first and reverse shift fork in the groove of the first and reverse synchronizer. Rotate the fork into position and install the first and reverse shift rail. Move the rail inward until the center notch (neutral) is aligned with the detent bore. Secure the fork to the shaft with the set screw.

16. Install a new shift rail expansion plug in the front of the case.

17. Hold the input shaft and blocking ring in position. Then move the output shaft forward to seat the pilot in the roller bearings of the input gear.

18. Tap the input gear bearing into place in the case while holding the output shaft to prevent the roller bearings from dropping. Install the front bearing retainer and new gasket making sure that the oil return slot is at the bottom of the case. Install and torque the attaching screws to specification.

19. Install the large snap ring on the rear bearing. Place the bearing on the output shaft with the snap ring end toward the rear of the shaft. Press the bearing into place with the tool shown in Fig. 23. Secure the bearing to the shaft with a snap ring.

20. On some models, hold the speedometer drive gear lock ball in the detent and slide the speedometer drive gear into place. Secure the gear with a snap ring. On models equipped with the new design retainer, install the speedometer drive gear retaining clip on the shaft with the lower tang in the retaining hole. Align the groove in the gear with the clip and slide the gear forward until the upper tang on the clip locks the gear (Fig. 9).

21. Place the transmission in the vertical position. Working through the drain hole in the bottom of the case, align the bore of the countershaft gear and the thrust washers with the bore of the case with a screwdriver.

22. Working from the rear of the case, push the dummy shaft out of the countershaft gear with the countershaft. Before the countershaft is completely inserted in the bore, make sure that the hole that accommodates the roll pin is aligned with the hole in the case. Drive the shaft into place and install the roll pin. On all 8 cylinder vehicles and Ford 6 cylinder models, the countershaft is a press fit in the case. On 6 cylinder models with model RAN transmissions there is a countershaft-to-case clearance of 0.020 inch at the front bore and 0.010 at the rear

bore. On these 6 cylinder models, install a new expansion plug in the countershaft bore at the front of the case.

23. Coat a new extension housing gasket with sealer and position it on the case.

24. Install lock washers on the five attaching screws. Dip the threads of the cap screws in sealer. Secure the housing to the case and torque the cap screws to specification.

25. Install the filler and drain plugs (if equipped) in the case. Make sure that the magnetic plug is installed in the bottom of the case.

26. Place the transmission in gear. Pour lubricant over the entire gear train while rotating the input or output shaft.

27. Install the remaining detent plug in the case. Install the long spring (which is retained by the case) to secure the detent plug.

28. Coat a new cover gasket (Fig. 5) with sealer. Secure the cover with cap screws. Torque the screws to specification.

29. Check the operation of the transmission in all of the gear positions.

PART 6-3 *Ford Design Four Speed Transmission*

Transmission Model	Engine Model	Shift Lever Location	MODEL APPLICATION											
			All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
RUG-AD1	390-4V-GT	Floor					X				X			
RUG-AE1	428-4V-CJ	Floor					X				X			
RUG-AG	351-2V-4V	Floor					X				X			
RUG-AH	351-2V-4V	Floor						X	X					
RUG-AJ	428-4V	Floor						X	X					
RUG-AL	390-4V-GT	Floor						X	X					
RUG-C2	390-2V-4V	Floor						X	X					
RUG-D2	351-2V-4V	Floor						X	X					
RUG-E3	302-2V-4V, 351-2V-4V	Floor					X				X			
RUG-JZ	390-4V-GT	Floor						X	X					
RUG-M3	390-4V	Floor					X				X			
RUG-AK	351-2V-4V	Floor						X	X					
RUG-V1	429-4V	Floor		X										

① Used with 3.75:1 and lower axle ratios
② Used with 3.50:1 and higher axle ratios

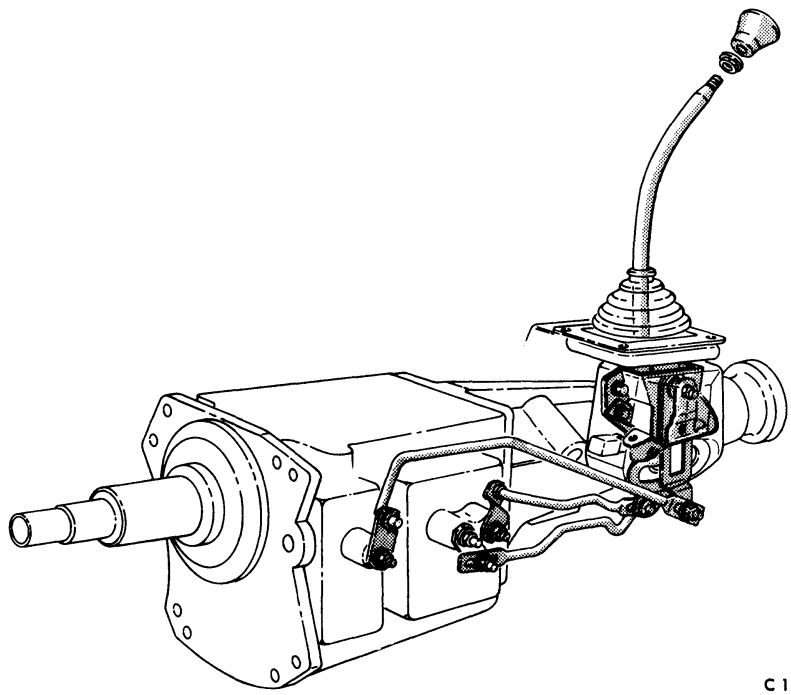
COMPONENT INDEX	All Models
COUNTERSHAFT GEAR BEARINGS	
Removal and Installation	03-06
DESCRIPTION	03-02
GEAR SHIFT CAMS AND SEALS	
Removal and Installation	03-04
GEAR SHIFT LINKAGE ADJUSTMENT	03-02
GEAR SHIFT CONTROL ASSEMBLY	
Removal and Installation	03-05
INPUT SHAFT BEARING	
Removal and Installation	03-06
INPUT SHAFT SEAL	
Removal and Installation	03-04
REVERSE IDLER GEAR BEARING	
Removal and Installation	03-06
SYNCHRONIZERS	
Disassembly and Assembly	03-06
TRANSMISSION (Complete)	
Cleaning and Inspection See Part 06-01	
Disassembly and Overhaul	03-03
Removal and Installation	03-02

1 DESCRIPTION

DESCRIPTION

The Ford designed 4-speed transmission (Fig. 1) is of the fully synchronized type with all gears except the reverse sliding gear being in constant mesh. All forward-speed changes are accomplished with synchronizer sleeves.

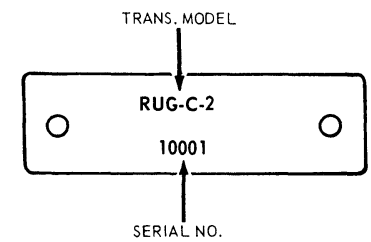
All forward-speed gears in the transmission are helical-type, however, the reverse sliding gear and the exterior of the first-and second-speed synchronizer sleeve are spur-type gears. The specifications of this section Part 6-4 lists the transmission model numbers and vehicles in which they are used.



C 1765-B

FIG. 1—Four-Speed Transmission— Typical

A transmission service identification tag is located on the right side of the case at the front (Fig. 2). The first line on the tag will show the transmission model and service identification code when required. The second line will show the transmission serial number. Additionally, a driveline component identification tag is attached to the upper right side of the transmission case.



C 2088-A

FIG. 2—Transmission Identification Tag

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

SHIFT LINKAGE ADJUSTMENT

1. Loosen the three shift linkage adjustment nuts. Install a 1/4 inch diameter alignment tool through the control bracket and lever holes as shown in Fig. 13.

An alignment tool can be made from 1/4 inch diameter drill rod bent to an "L" shape. The extensions should be 2 1/2 inch and 3 3/4 inch from the elbow. Short end of alignment pin should be inserted into control bracket and linkage holes until it bottoms.

2. Disconnect the reverse gear shift rod from the shift lever.

3. Shift the transmission into reverse gear.

4. Tighten the 1-2 and 3-4 shift rod adjustment nuts.

5. Connect the reverse gear shift rod to the shift lever. Shift the reverse lever to the neutral position and tighten the adjustment nut.

6. Remove the alignment pin.

7. Check the gear shift lever for a smooth crossover.

3 REMOVAL AND INSTALLATION

REMOVAL

1. Raise the vehicle on a hoist.

2. Mark the driveshaft so that it may be installed in the same relative position. Disconnect the drive shaft from the rear U-joint flange. Slide the drive shaft off the transmission output shaft and install the extension housing seal installation tool into the extension housing to prevent lubricant leakage. See Fig. 2, Part 6-1.

3. Disconnect the speedometer cable from the extension housing.

4. Disconnect the parking brake

cable from the equalizer lever and separate the lever from the crossmember.

5. Remove the hairpin retainer securing the cable to the transmission rear support crossmember, and then pull the cable assembly forward and out of the crossmember.

6. Remove the retaining clip, flat washer, and spring washer that secures the shift rods to the shift levers.

7. Remove the bolts that attach the shift linkage control bracket to the extension housing and position the assembly out of the way.

8. Support the engine with a transmission jack and remove the extension housing-to-engine rear support attaching bolts.

9. Raise the rear of the engine high enough to remove the weight from the crossmember. Remove the bolts retaining the crossmember to the frame side supports and remove the crossmember.

10. Support the transmission on a jack and remove the bolts that attach the transmission to the flywheel housing.

11. Move the transmission and jack rearward until the transmission input shaft clears the flywheel housing. If necessary, lower the engine enough to obtain clearance for transmission removal.

Do not depress the clutch pedal while the transmission is removed.

INSTALLATION

1. Make sure that the mounting surface of the transmission and the flywheel housing are free of dirt, paint, and burrs. Install two guide pins in the flywheel housing lower mounting bolt holes. Move the transmission forward on the guide pins until the input shaft splines enter the clutch hub splines and the case is positioned against the flywheel housing.

2. Install the two upper transmission to flywheel housing, mounting bolts snug, and then remove the two guide pins. Install the two lower mounting bolts. Torque all mounting bolts to specifications.

3. Raise the rear of the engine and install the crossmember. Install and torque the crossmember attaching bolts to specifications, then lower the engine.

4. With the transmission extension housing resting on the engine rear support, install the transmission extension housing attaching bolts. Torque the bolts to specifications.

5. Position the shift linkage control bracket to the extension housing and install the attaching bolts.

6. Secure each shift rod to its respective lever with the spring washer, flat washer, and retaining pin.

7. Guide the parking brake cable assembly through the hole in the transmission rear support crossmember. Secure the cable assembly to the crossmember with the hair pin retainer.

8. Insert the parking brake front cable in the equalizer and install the equalizer in the bracket on the crossmember. Secure the parking brake rear cable to the equalizer.

9. Connect the speedometer cable to the extension housing.

10. Remove the extension housing installation tool and slide the forward end of the drive shaft over the transmission output shaft. Connect the drive shaft to the rear U-joint flange.

11. Place both forward gear shift levers and the reverse shift lever in the neutral position and insert a 1/4 inch diameter alignment tool in the shift linkage alignment hole (Fig. 17). It may be necessary to loosen the adjustment nuts to install the alignment tool. Adjust the linkage as necessary and tighten the adjustment nuts to specifications. Remove the alignment tool.

12. Fill the transmission to the proper level with the specified lubricant.

13. Lower the car. Check the shift and crossover motion for full shift engagement and smooth crossover operation.

4 MAJOR REPAIR OPERATIONS

DISASSEMBLY

1. Mount the transmission in a holding fixture and drain the lubricant.

2. Remove the cover attaching screws from the case. Lift the cover and gasket from the case.

3. Remove the long spring that retains the detent plug in the case (Fig. 4). Remove the detent plug with a small magnet.

4. Remove the extension housing attaching screws and lock washers. Remove the housing and the gasket.

5. Remove the input shaft bearing retainer attaching screws. Slide the retainer off the input shaft.

6. Support the countershaft gear with a wire hook. Working from the front of the case, push the countershaft out the rear of the case as shown in Fig. 3. Lower the countershaft to the bottom of the case with the wire hook. Remove the hook.

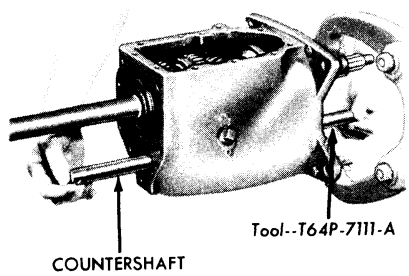


FIG. 3—Removing Countershaft From Case

7. Place the first and second-speed gear shift lever and the reverse shift lever in the neutral position. Place the third and fourth-speed gear shift lever in the third-speed position.

8. Remove the attaching screw from the third and fourth-speed shift fork. Tap on the inner end of the shift rail to unseal the expansion plug from the front of the case. Then withdraw the third and fourth-speed shift rail from the front of the case. Do not lose the interlock pin from the shift rail.

9. Remove the set screw from the first and second-speed shift fork. Slide the first and second-speed shift rail out the rear of the case.

10. Remove the interlock plug and the detent plug from the top of the case (Fig. 4) with a magnet.

11. On some models, remove the snap ring that secures the speedometer drive gear to the output shaft. Slide the gear off the shaft, then remove the speedometer gear drive ball. On models equipped with the new design retainers, depress the tang on the speedometer drive gear retaining clip and slide the speedometer gear off the shaft. (Fig. 5).

12. Remove the snap ring that secures the output shaft bearing to the shaft.

13. Remove the output shaft bearing as shown in Fig. 6.

14. Remove the input shaft and bearing and the blocking ring from the front of the case.

15. Move the output shaft to the right side of the case to provide clearance for the shift forks. Rotate the forks as shown in Fig. 7, then lift them from the case.

16. Support the thrust washer and first-speed gear to prevent them from sliding off the shaft, then lift the output shaft assembly from the case as shown in Fig. 8.

17. Remove the reverse gear shift fork set screw. Rotate the reverse shift rail 90 degrees as shown in Fig. 9. Slide the shift rail out of the rear of the case. Lift the reverse shift fork from the case.

18. Remove the reverse detent plug and spring from the case with a magnet.

19. Remove the reverse idler gear shaft from the case as shown in Fig. 10.

20. Lift the reverse idler gear and the thrust washers from the case. Be careful not to drop the bearings and the dummy shaft from the gear.

21. Lift the countershaft gear and the thrust washers from the case. Be careful not to drop the bearings or the dummy shaft from the counter-shaft gear.

22. Remove the snap ring from the front of the output shaft. Slide the third and fourth-speed synchronizer (Fig. 11) blocking ring and the third-speed gear off the shaft.

23. Remove the next snap ring and the second-speed gear thrust washer from the shaft. Slide the second-speed gear and the blocking ring off the shaft.

24. Remove the next snap ring.

25. Remove the thrust washer, first speed gear and blocking ring from the rear of the shaft. The first and second synchronizer hub is a press fit on the output shaft. To eliminate the possibility of damaging the synchronizer assembly, remove the synchronizer hub using an arbor press as shown in Part 6-2, Fig. 20. **Do not attempt to remove or install the hub by hammering or prying.**

PARTS REPAIR OR REPLACEMENT

CAM AND SHAFT SEALS

1. Remove the attaching nut, lock washer and the flat washer from each shift lever and remove the three levers.

2. Remove the three cam and shafts from inside the case.

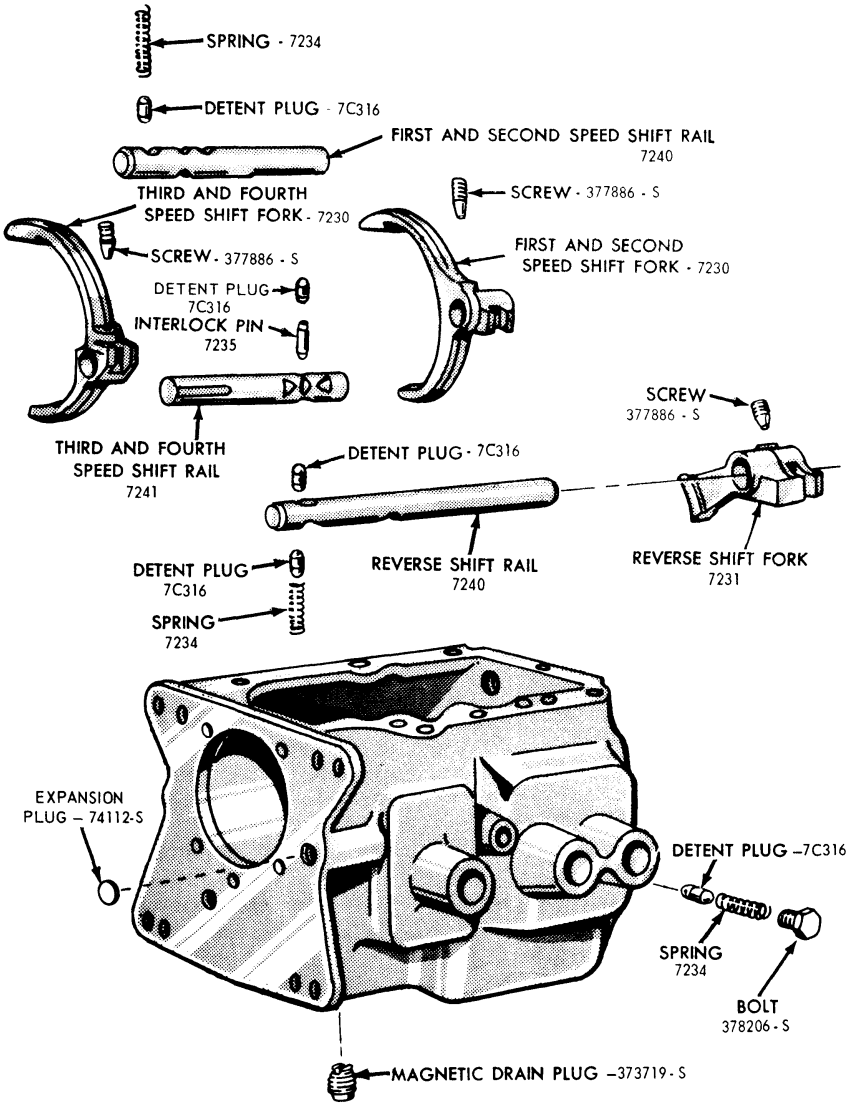


FIG. 4—Shift Rails and Forks Disassembled

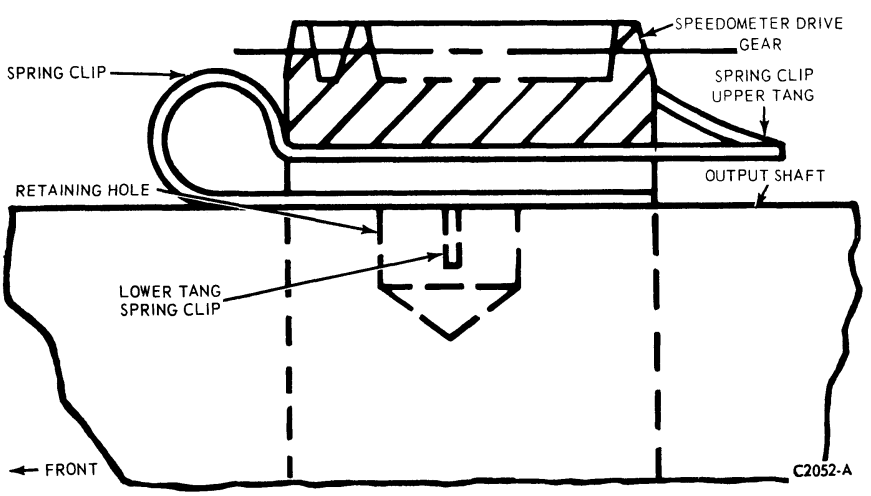


FIG. 5—Speedometer Drive Gear Installation

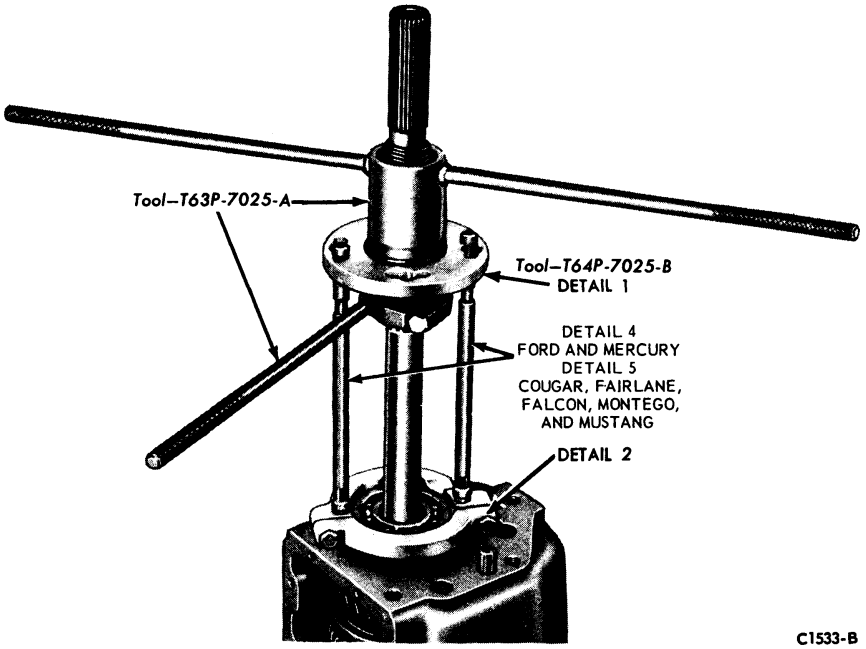


FIG. 6—Removing Output Shaft Bearing

3. Remove and discard the O-ring from each cam and shaft (Fig. 12).

4. Dip the new O-rings in gear lubricant and install them on the cam and shafts.

5. Slide each cam and shaft into its respective bore in the transmission case.

6. Secure each shaft lever with a flat washer, lock washer and nut.

GEAR SHIFT CONTROL ASSEMBLY

1. Remove the four screws attaching the lower boot to the floor pan.

2. Remove the two bolts that secure the gear shift lever to the shift control assembly.

3. Remove the two piece lock nuts that secure the shift rods to the shift levers.

4. Remove the three bolts attaching the control assembly to the extension housing. Lower the control assembly and boot and remove the control assembly from the boot.

5. Remove the back-up light switch.

6. Remove the outer nut from the selector lever shaft and slide the shaft from the control assembly.

7. Lift the outer support bracket, rubber washer, first-second, and third-fourth selector levers off the assembly (Fig. 13).

8. Remove the two bolts retaining the inner support bracket to the back plate. Lift the inner support bracket, selector arm, and reverse selector lever from the back plate.

9. Lubricate all mating surfaces with lithium grease before assembly.

10. Position the reverse gear selector lever, selector arm and the inner support bracket on the back plate. The reverse gear selector lever will have a flat spot on the top of the lever to distinguish it from the third-fourth selector lever. Install the two retaining bolts finger tight.

11. Insert a 1/4 inch gauge pin through the alignment holes of the selector levers and support brackets. **Line up the gauge pin perpendicular to the back plate.** Torque the two support bracket-to-back plate retaining nuts to specification and remove the gauge pin.

12. Position the rubber washer, first-second and third-fourth selector levers in the outer support bracket. Position this assembly against the inner support so that the selector lever shaft holes in the selector levers and support brackets are aligned.

13. Install the selector lever shaft

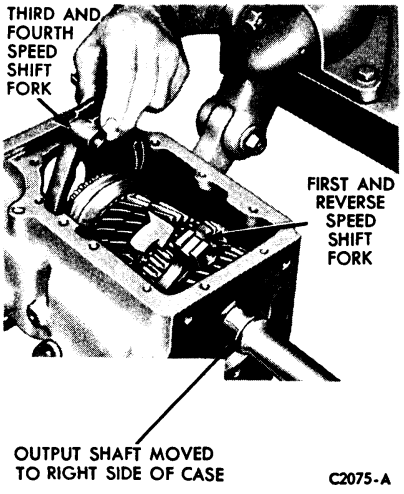


FIG. 7—Removing Shift Fork From Case

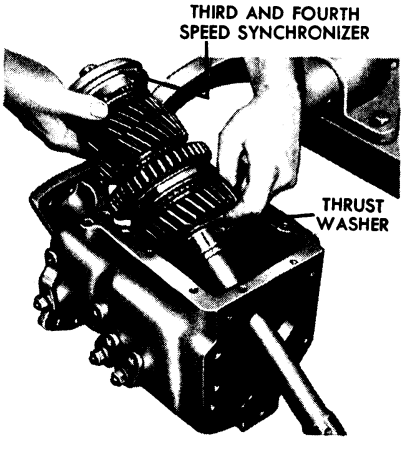


FIG. 8—Removing Output Shaft Assembly

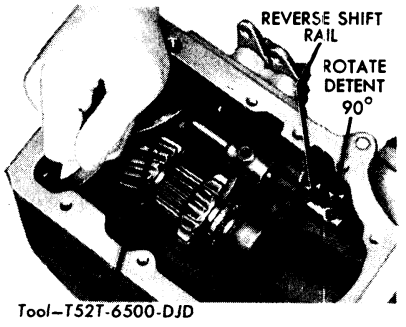


FIG. 9—Rotating Reverse Shift Rail

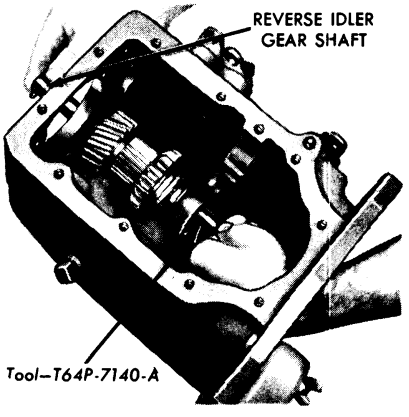


FIG. 10—Removing Reverse Idler Gear Shaft

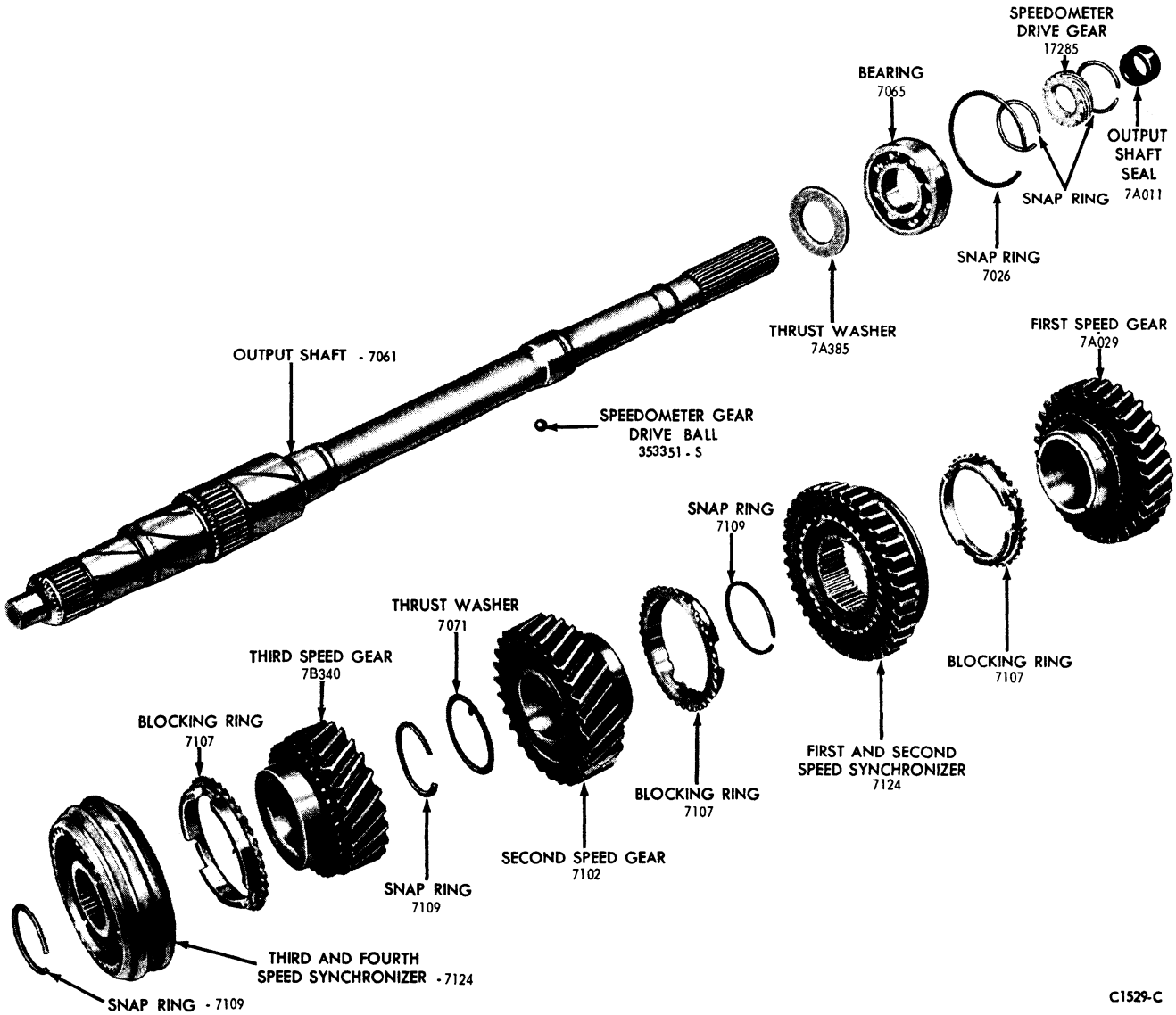


FIG. 11—Output Shaft Disassembled

and torque the retaining nuts to specification.

14. Install the back-up light switch on the control assembly.

15. Slide the lower boot over the shift control assembly and attach the entire assembly to the extension housing with the three bolts.

16. Install the two bolts securing the gear shift lever to the control assembly.

17. Pull the top lip of the lower boot over the edges of the floor pan and secure the upper boot to the lower boot and floor pan with the four retaining screws.

18. Position the shift rods in the selector levers and install the retainers.

19. Adjust the shift linkage as outlined previously in this section.

20. Check the operation of the shift mechanism for smooth cross-over. Adjust as required.

INPUT SHAFT BEARING

1. Remove the snap ring that secures the bearing to the shaft (Fig. 14).

2. Press the input shaft gear out of the bearing as shown in Fig. 15.

3. Press a new bearing onto the input shaft with the tool shown in Fig. 15.

4. Secure the bearing with a snap ring.

SYNCHRONIZERS

1. Push the synchronizer hub from each synchronizer sleeve (Fig. 16).

2. Separate the inserts and insert springs from the hubs. Do not mix the parts of the first and second-speed synchronizer with the third and fourth-speed synchronizer.

3. Position the hub in the sleeve, making sure that the alignment marks are properly indexed.

4. Place the three inserts into place on the hub. Install the insert springs making sure that the irregular surface (hump) is seated in one of the inserts. Do not stagger the springs.

COUNTERSHAFT GEAR BEARINGS

1. Remove the dummy shaft, two bearing retainer washers, and the 21 roller bearings (Fig. 17) from each end of the countershaft gear.

2. Coat the bore in each end of the countershaft gear with grease.

3. Hold the dummy shaft in the gear and install the 21 roller bearings

and a retainer washer in each end of the gear.

REVERSE IDLER GEAR BEARINGS

1. Slip the reverse idler sliding gear off the reverse idler gear (Fig. 18).
2. Remove the dummy shaft, two bearing retainer washers and the 44 roller bearings from the reverse idler gear.
3. Coat the bore in each end of the reverse idler gear with grease.
4. Hold the dummy shaft in the gear and install the 22 roller bearings and the retainer washer in each end of the gear.
5. Install the reverse idler sliding gear on the reverse idler gear making sure that the shift fork groove is toward the front (Fig. 18).

INPUT SHAFT SEAL

1. Remove the seal from the input shaft bearing retainer as shown in Fig. 19.
2. Coat the sealing surface with lubricant.
3. Install the seal as shown in Fig. 20

ASSEMBLY

1. Coat the countershaft gear thrust surfaces in the case with a thin film of lubricant and position a thrust washer (Fig. 17) at each end of the case.
2. Position the countershaft gear, dummy shaft, and roller bearings in the case.
3. Place the case in a vertical position. Align the gear bore and the thrust washers with the bores in the case and install the countershaft.
4. Place the case in a horizontal position and check the countershaft gear end play with a feeler gauge. The end play should be 0.004-0.0018 within specification. If not within these limits, replace the thrust washers.
5. After establishing the correct end play, install the dummy shaft in the countershaft gear and allow the gear to remain at the bottom of the case.
6. Coat the reverse idler gear thrust surfaces in the case with a thin film of lubricant and position the two thrust washers (Fig. 18) in place.
7. Position the reverse idler gear, sliding gear, dummy shaft and the roller bearings in place making sure that the shift fork groove in the sliding gear is toward the front of the case.
8. Align the gear bore and thrust washers with the case bores and install the reverse idler shaft.
9. Measure the reverse idler gear

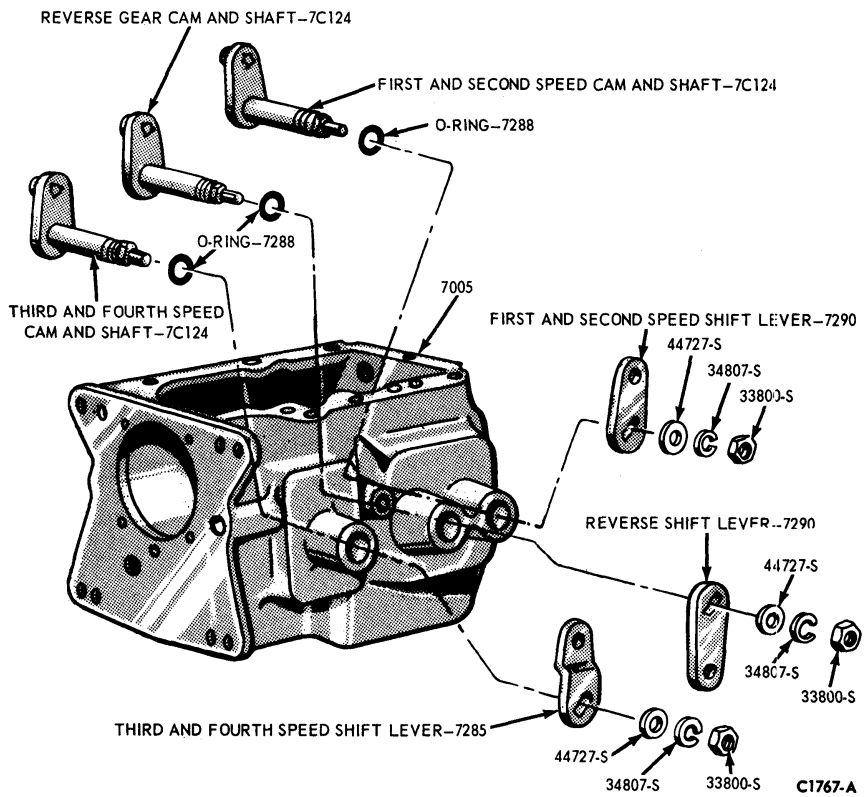


FIG. 12—Cam and Shafts and Shift Levers Disassembled

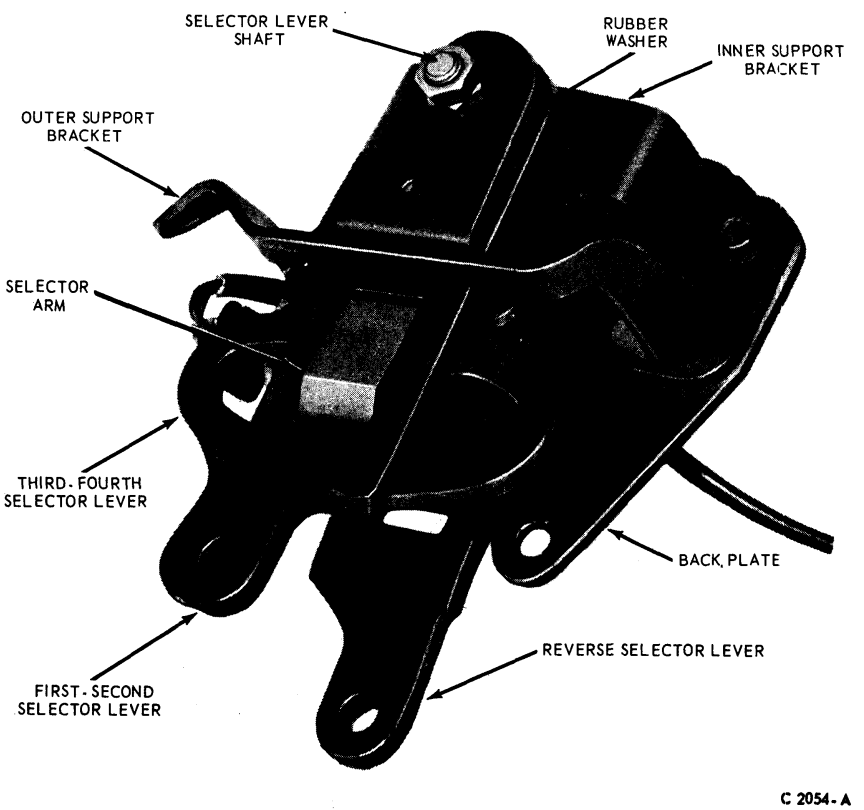


FIG. 13—Gear Shift Control Assembly

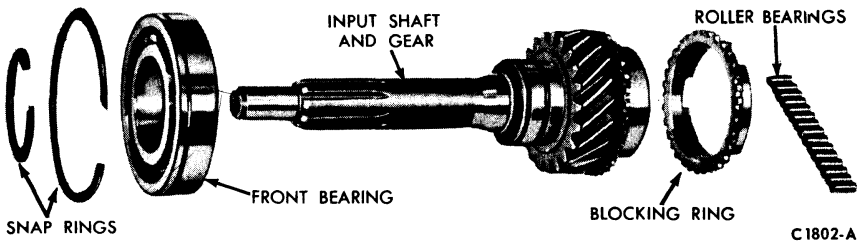


FIG. 14—Input Shaft Gear Disassembled

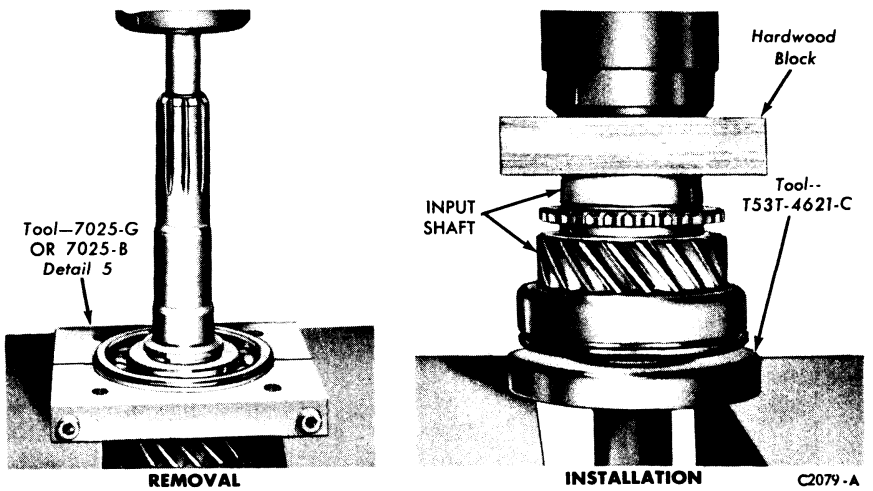


FIG. 15—Replacing Input Shaft Bearing

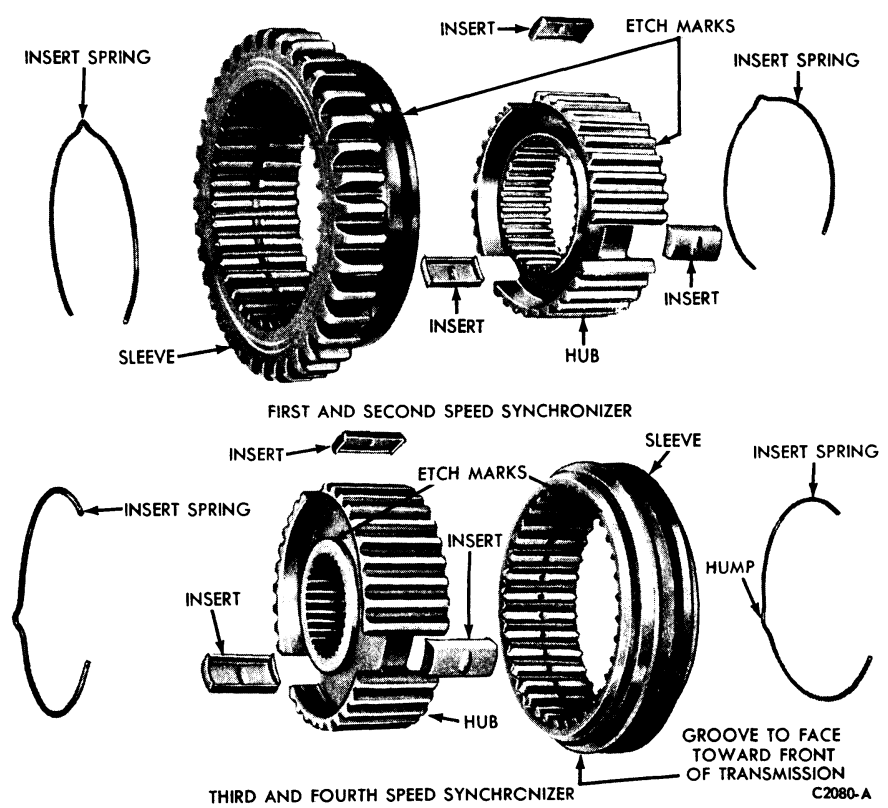


FIG. 16—Synchronizers Disassembled

end play with a feeler gauge. End play should be within specification. If the end play is not within limits, replace the thrust washers. If the end play is within limits, leave the reverse idler gear installed.

10. Position the reverse gear shift rail detent spring and detent plug in the case. Hold the reverse shift fork in place on the reverse idler sliding gear and install the shift rail from the rear of the case. Secure the fork to the rail with the Allen head set screw.

11. Install the first and second-speed synchronizer onto the front of the output shaft (Fig. 11) making sure that the shift fork groove is toward the rear of the shaft. The first and reverse synchronizer hub is a press fit on the output shaft. To eliminate the possibility of damaging the synchronizer assembly, install the synchronizer hub with the teeth end of the gear facing toward the rear of the shaft, using an arbor press as shown in Part 6-2, Fig. 20. **Do not attempt to remove or install the hub by hammering or prying.**

12. Position the blocking ring on the second-speed gear.

13. Slide the second-speed gear onto the front of the shaft, making sure that the inserts in the synchronizer engage the notches in the blocker ring.

14. Install the second-speed gear thrust washer and snap ring.

15. Slide the third-speed gear onto the shaft with the synchronizer coned surface toward the front.

16. Place a blocking ring on the third-speed gear.

17. Slide the third and fourth-speed gear synchronizer onto the shaft making sure that the inserts in the synchronizer engage the notches in the blocking ring.

18. Install the snap ring on the front of the output shaft.

19. Position the blocking ring on the first-speed gear.

20. Slide the first-speed gear onto the rear of the output shaft making sure that the notches in the blocking ring engage the synchronizer inserts.

21. Install the heavy thrust washer on the rear of the output shaft.

22. Support the thrust washer and first-speed gear to prevent them from sliding off the shaft and carefully lower the output shaft assembly into the case as shown in Fig. 8.

23. Position the first and second-speed shift fork and the third and fourth-speed shift fork in place on their respective gears and rotate them into place.

24. Place a detent plug (Fig. 5) in the detent bore. Place the reverse shift rail into neutral position.

25. Coat the third and fourth-speed shift rail interlock pin with grease and position it in the shift rail.

26. Align the third and fourth-speed shift fork with the shift rail bores and slide the shift rail into place making sure that the three detents are facing toward the outside of the case. Place the front synchronizer into third-speed position and install the set screw in the third and fourth-speed shift fork. Move the synchronizer to the neutral position. Install the third and fourth-speed shift rail detent plug, spring and bolt in the left side of the transmission case (Fig. 5). Place the interlock plug (tapered ends) in the detent case.

27. Align the first and second-speed shift fork with the case bores and slide the shift rail into place. Secure the fork with the set screw.

28. Coat the input gear bore with a thin film of grease, then install the 15 roller bearings in the bore. **A thick film of grease could plug the lubricant holes and restrict lubrication of the bearings.**

29. Position the front blocking ring in the third and fourth-speed synchronizer.

Place the input shaft gear in the transmission case making sure that the output shaft pilot enters the roller bearings in the input gear.

30. Place a new gasket on the input shaft bearing retainer. Dip the attaching bolts in sealer and install and tighten them to specifications.

31. Install the output shaft bearing as shown in Fig. 21. Install the snap ring to retain the bearing.

32. On some transmissions, position the speedometer gear iometer drive gear retaining clip on the output shaft with the lower tang in the retaining hole. Align the groove in the gear with the clip and slide the gear forward until the upper tang on the clip locks the gear (Fig. 4).

33. Place the transmission in a vertical position as shown in Fig. 22. Align the countershaft gear bore and thrust washers with the bore in the case. Install the countershaft.

34. Use a new gasket and secure the extension housing to the case with the attaching screws. Use a sealer on the extension housing attaching screws. Torque the screws to specifications.

35. Install the filler plug and drain plug (if so equipped) in the case if they were removed. Make sure that the magnetic plug (if so equipped) is installed in the bottom of the case.

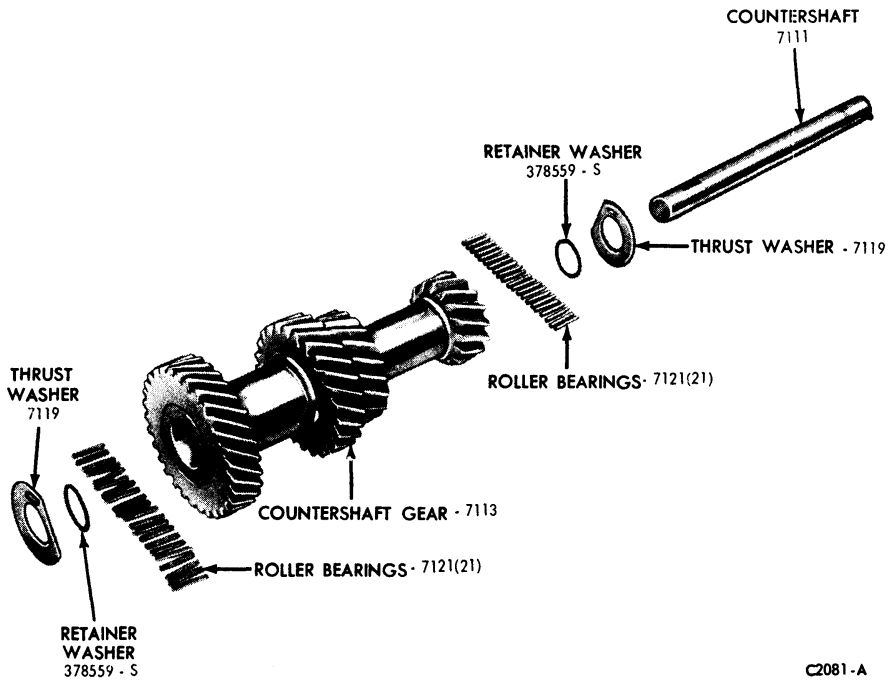


FIG. 17—Countershaft Gear Disassembled

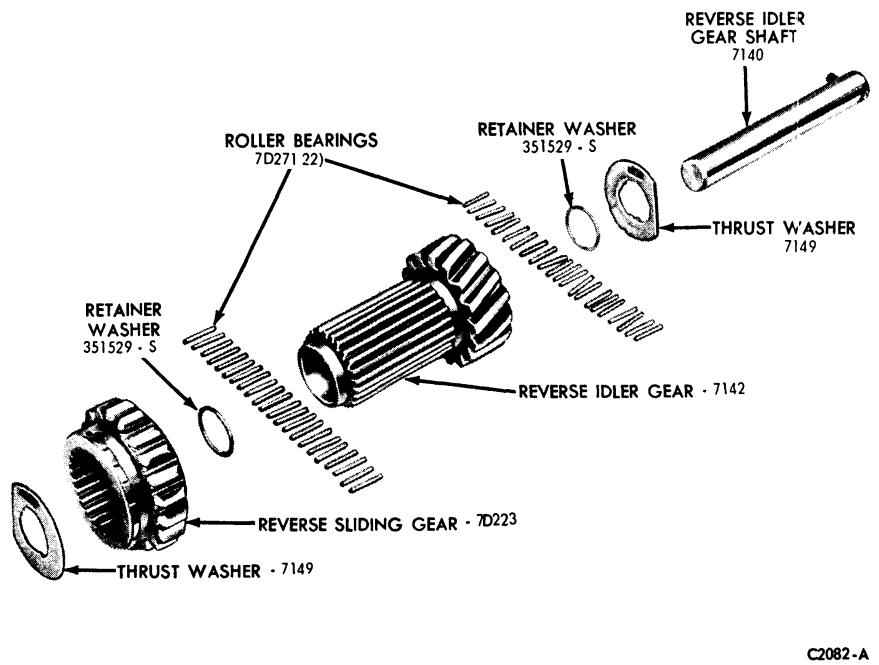


FIG. 18—Reverse Idler Gear Disassembled

36. Pour the specified lubricant over the entire gear train while rotating the input shaft.

37. Place each shift fork in all positions to make sure that they operate properly.

38. Install the remaining detent plug in the case. Install the long spring (which is retained by the case) to secure the detent plug.

39. Use a new cover gasket and install the cover. Coat the cover attaching screws with sealer and install and tighten them to specifications.

40. Coat the third- and fourth-speed shift rail plug bore with a sealer and install a new expansion plug.

41. If the extension housing bushing and seal are to be replaced, refer to Section 1.

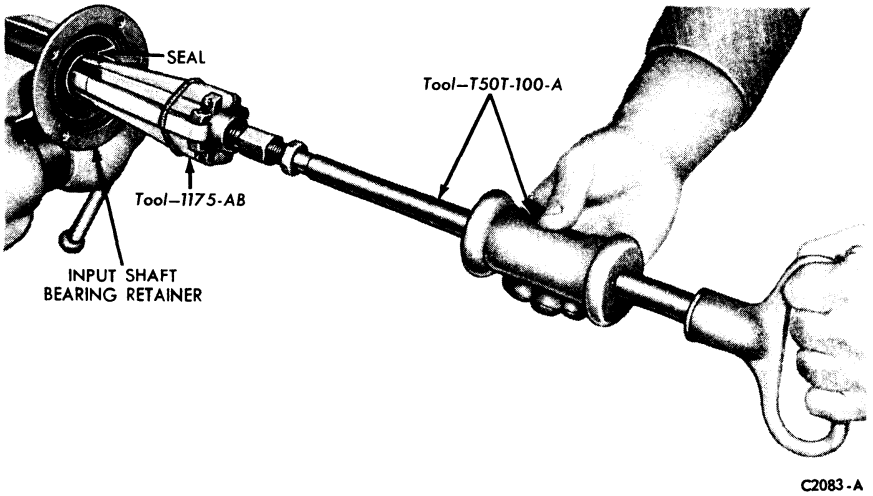


FIG. 19—Removing Input Shaft Seal

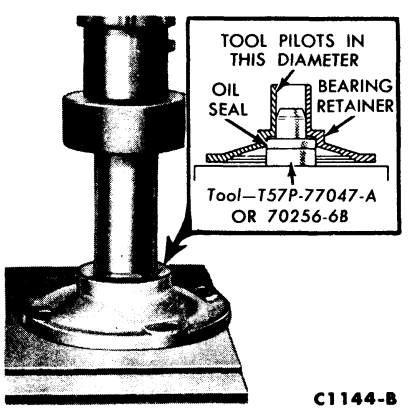


FIG. 20—Installing Input Shaft Seal

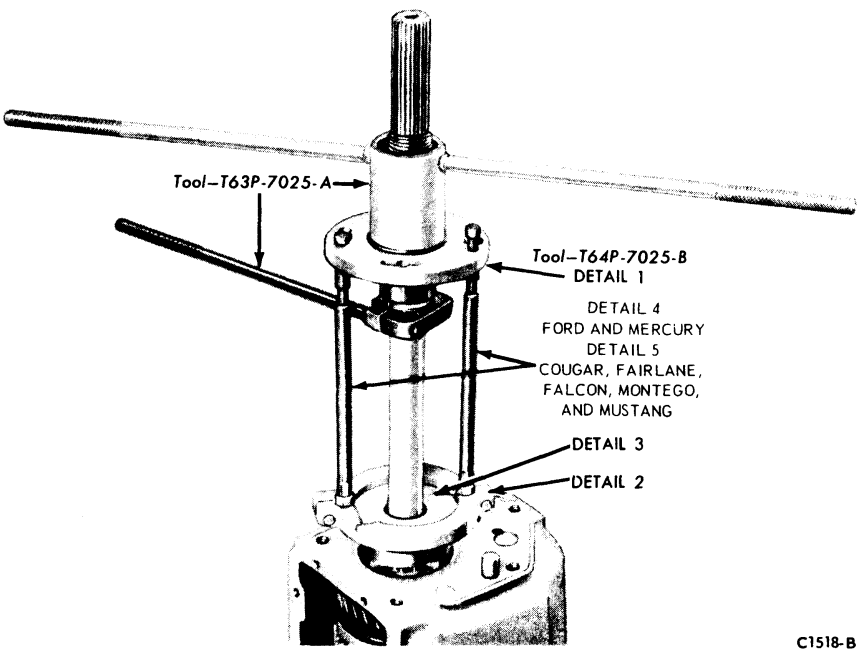


FIG. 21—Installing Output Shaft Bearing

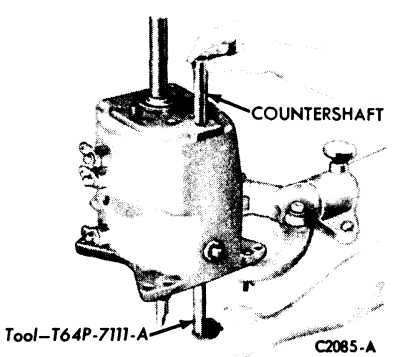


FIG. 22—Installing Countershaft

PART 6-4 *Specifications*

TRANSMISSION IDENTIFICATION 3-SPEED TRANSMISSION

Car Model	Engine	Trans. Model	Gear Ratios		
			1st	2nd	Rev.
Ford, Mercury, Meteor	390-2V-4V	RAT-A2	2.42	1.61	2.33
Ford, Meteor	240-1V	RAN-A2	2.99	1.75	3.17
Ford, Meteor	302-2V	RAT-S1	2.99	1.75	3.17

Car Model	Engine	Trans. Model	Gear Ratios			Car Model	Engine	Trans. Model	Gear Ratios		
			1st	2nd	Rev.				1st	2nd	Rev.
Fairlane, Montego	390-4V	RAT-B2, RAT-C2	2.42	1.61	2.33	Mustang	200-1V, 250-1V	RAN-AM	2.99	1.75	3.17
Cougar	390-4V	RAT-N2				Fairlane, Montego Falcon	302-4V	RAT-T			
Falcon	170-1V	RAN-AN	3.41	1.86	3.51	Mustang, Cougar	351-2V-4V	RAT-AM	2.42	1.61	2.33
Mustang	302-2V	RAT-U1	2.99	1.75	3.17						
Fairlane, Montego Falcon	250-1V 200-1V,	RAN-AL									
Fairlane, Montego	351-2V-4V	RAT-AJ	2.42	1.61	2.33						

4-SPEED TRANSMISSIONS

Car Model	Engine	Trans. Model	Gear Ratios				Car Model	Engine	Trans. Model	Gear Ratios			
			1st	2nd	3rd	Rev.				1st	2nd	3rd	Rev.
Montego, Fairlane, Ranchero	390-2V-4V	RUG-C2 ①	2.32	1.69	1.29	2.32	Mustang, Cougar	351-2V-4V 302-2V-4V	RUG-E3 ①	2.78	1.93	1.36	2.78
Montego, Fairlane, Ranchero	351-2V-4V	RUG-D2 ①					Mustang, Cougar	390-4VGT	RUG-M3 ①				
Fairlane, Ranchero Montego GT	390-4V	RUG-J2 ①					Mustang, Cougar	351-2V-4V 302-4V	RUG-AG	2.32	1.69	1.29	2.32
Mustang, Cougar	390-4V, GT	RUG-AD1					Fairlane, Montego, Ranchero	351-2V-4V	RUG-AH ①				
Mustang, Cougar	428-4V-CJ	RUG-AE1③					Fairlane, Montego, Ranchero	351-2V-4V	RUG-AK ②				
Fairlane, Montego, Ranchero	428-4V-CJ	RUG-AJ ②					Ford, Meteor	429-4V	RUG-V1				
Fairlane, Montego, Ranchero	390-4V-GT	RUG-AL ②					Fairlane, Montego	428-4V-6V	RUG-AF				

① With 3.25:1 and lower axle ratios. ② With 3.50:1 and higher axle ratios.

CLEARANCES (INCHES)

Countershaft Gear End Play—3-and 4-Speed Ford	0.004–0.018
Reverse Idler Gear End Play—3- and 4-Speed Ford	0.004–0.018

MANUAL TRANSMISSION REFILL CAPACITIES

Manual Transmission	Approximate Capacity	
	U.S. Measure	Imperial Measure
3-Speed	3-1/2 pts.	3 pts.
4-Speed	4 pts.	3 pts.

TORQUE LIMITS (FT-LBS)

	3-Speed Transmissions	4-Speed Transmissions
Extension Housing Bolts	42–50	42–50
Input Shaft Bearing Retainer-to-Transmission Case Bolts	30–36	19–25
Speedometer Cable Retainer-to-Transmission Extension	3.0–4.5	3.0–4.5
Transmission-to-Flywheel Housing Bolts	37–42	37–42
Gearshift Control Levers to Cam and Shaft Assembly Lock Nuts	18–23	18–23
Transmission Cover Bolts	14–19	14–19
Filler Plug-to-Case	10–20	10–20
Drain Plug-to-Case	20–30	20–30
Shift Fork-to-Shift Rail	10–18	10–18
Third and Fourth Shift Rail Detent Bolt	–	10–18
Gear Shift Control Assembly to Transmission Extension	8–12	8–12
Shift Selector Levers to Shift Rods	10–20	10–20
Gear Shift Control Support Bracket to Back Plate	–	8–13 ①
① Inch-pounds		

SPECIAL TOOLS

Tool Numbers	Description
T50T-100A	Impact Hammer–Long
T59L-100B	Impact Hammer–Short
Tool-1175AB	Grease Seal Remover
T53T-4621-B or (4621-F)	Drive Pinion Bearing Cone Replacer Front & Rear
T57L-4220-A4	Differential Side Bearing Cone Replacer or Input Shaft Bearing Remover
T52L-7000-GAE	Extension Housing Bushing and Seal Remover
T63P-7025-A	Output Shaft Bearing Remover & Replacer
T64P-7025-B	Output Shaft Bearing Remover & Replacer
T53T-4621-C	Drive Pinion Bearing Cone Replacer

SPECIAL TOOLS (Continued)

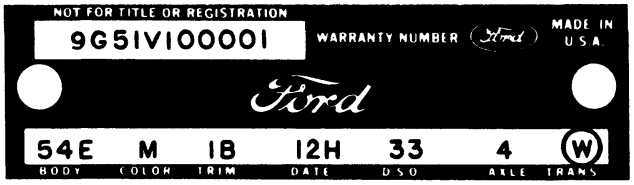
Tool Numbers	Description
Tool-7025-B	Rear Main Shaft Bearing Remover
Tool-7025-G	Main Shaft Bearing Remover & Replacer
T64P-7111-A	Cluster Gear Roller Retainer Shaft
T63P-7111-A	Cluster Gear Roller Retainer Shaft
T64P-7140-A	Reverse Idler Shaft Remover
T61L-7657-A	Transmission Extension Housing Oil Seal Replacer
T57P-7697-B	Extension Housing Bushing Replacer
T57P-7657-G	Extension Housing Bushing Replacer
T67P-7341-A	Shift Linkage Grommet Replacer

07-01-01

Automatic Transmission

GROUP 7

PART 7-1 **PAGE**
General Transmission Service **07-01-01**
PART 7-2
C4 Automatic Transmission **07-02-01**
PART 7-3
FMX Transmission **07-03-01**
PART 7-4 **PAGE**
C6 Automatic Transmission **07-04-01**
PART 7-5
Specifications **07-05-01**



TRANSMISSION CODE	TRANSMISSION TYPE
W	AUTOMATIC (C4)
U	AUTOMATIC (C6)
X	AUTOMATIC (FMX)
Z	AUTOMATIC (C6 SPECIAL)

D2040-A

FIG. 1—Typical Warranty Plate—Transmission Identification

PART 7-1 *General Transmission Service*

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
AIR PRESSURE CHECKS	01-06											
ANTI-STALL DASHPOT CLEARANCE CHECK (Engine Compartment)	01-04											
CASE (Transmission) Inspection	01-17											
CONTROL PRESSURE CHECK	01-05											
CONTROL VALVE BODY Inspection	01-17											
CONVERTER Checking	01-04											
Cleaning	01-11											
DRAIN AND REFILL (Transmission)	01-08											
ENGINE IDLE SPEED CHECK	01-04											
EXTENSION HOUSING INSPECTION	01-15											
FLUID AERATION CHECK	01-03											

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
FLUID LEAKAGE CHECK	01-03											
FLUID LEVEL CHECK	01-03											
FRONT CLUTCH (Forward) INSPECTION												
C4 Transmission		01-16	N/A	01-16	N/A	01-16	01-16	01-16	01-16	N/A	N/A	N/A
C6 Transmission		01-16	01-16	01-16	01-16	01-16	N/A	01-16	01-16	01-16	01-16	01-16
FMX Transmission		01-16	N/A	01-16	01-16	01-16	N/A	01-16	01-16	N/A	N/A	N/A
FRONT PUMP AND STATOR SUPPORT												
Inspection	01-16											
FRONT SERVO (Intermediate) INSPECTION												
C4 Transmission		01-17	N/A	01-17	N/A	01-17	01-17	01-17	01-17	N/A	N/A	N/A
C6 Transmission		01-17	01-17	01-17	01-17	01-17	N/A	01-17	01-17	01-17	01-17	01-17
FMX Transmission		01-17	N/A	01-17	01-17	01-17	N/A	01-17	01-17	N/A	N/A	N/A
GOVERNOR INSPECTION	01-17											
HYDRAULIC SYSTEM BENCH TESTS (FMX)												
Pressure Tests		01-08	N/A	01-08	01-08	01-08	N/A	01-08	01-08	N/A	N/A	N/A
Testing Tool Installation		01-07	N/A	01-07	01-07	01-07	N/A	01-07	01-07	N/A	N/A	N/A
MANUAL LINKAGE CHECKS	01-04											
MANUAL SHIFT LINKAGE GROMMET COLUMN SHIFT												
Removal and Installation		01-11	01-11	01-11	N/A	01-11	01-11	01-11	N/A	01-11	01-11	01-11
NEUTRAL START SWITCH-COLUMN SHIFT												
Adjustment		01-09	01-09	01-09	N/A	01-09	01-09	01-09	N/A	01-09	01-09	01-09
Removal and Installation		01-10	01-10	01-10	N/A	01-10	01-10	01-10	N/A	01-10	01-10	01-10
OIL COOLER CLEANING	01-11											
OIL COOLER TUBES												
Removal and Installation	01-08											
ONE-WAY CLUTCH INSPECTION	01-17											
OUTPUT SHAFT AND PRIMARY SUN GEAR Shaft (FMX)												
Inspection		01-12	N/A	01-12	01-12	01-12	N/A	01-12	01-12	N/A	N/A	N/A
PINION CARRIER, ONE-WAY CLUTCH AND CENTER SUPPORT (FMX)												
Inspection		01-15	N/A	01-15	01-15	01-15	N/A	01-15	01-15	N/A	N/A	N/A
PINION CARRIERS INSPECTION												
C4 Transmission		01-15	N/A	01-15	N/A	01-15	01-15	01-15	01-15	N/A	N/A	N/A
C6 Transmission		01-15	01-15	01-15	01-15	01-15	N/A	01-15	01-15	01-15	01-15	01-15
PRESSURE REGULATOR (FMX)												
Inspection		01-17	N/A	01-17	01-17	01-17	N/A	01-17	01-17	N/A	N/A	N/A
REAR CLUTCH (Reverse-High) INSPECTION												
C4 Transmission		01-16	N/A	01-16	N/A	01-16	01-16	01-16	01-16	N/A	N/A	N/A
C6 Transmission		01-16	01-16	01-16	01-16	01-16	N/A	01-16	01-16	01-16	01-16	01-16
FMX Transmission		01-16	N/A	01-16	01-16	01-16	N/A	01-16	01-16	N/A	N/A	N/A
REAR SERVO (Low-Reverse) INSPECTION		01-17	N/A	01-17	N/A	01-17	01-17	01-17	01-17	N/A	N/A	N/A
C4 Transmission		01-17	N/A	01-17	01-17	01-17	N/A	01-17	01-17	N/A	N/A	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

COMPONENT INDEX	MODEL APPLICATION											
	All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
FMX Transmission		01-17	N/A	01-17	01-17	01-17	N/A	01-17	01-17	N/A	N/A	N/A
REAR SUPPORT (FMX) Inspection		01-16	N/A	01-16	01-16	01-16	N/A	01-16	01-16	N/A	N/A	N/A
SHIFT POINT CHECKS	01-06											
STATOR ONE-WAY CLUTCH CHECK	01-12											
STATOR TO IMPELLOR INTERFERENCE CHECK	01-12											
STATOR TO TURBINE INTERFERENCE CHECK	01-12											
TRANSMISSION CLEANING	01-11											
TURBINE AND STATOR END PLAY CHECK	01-12											
VACUUM DIAPHRAGM ADJUSTMENT												
Altitude Compensating Type		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	01-09	01-09	01-09
Non-Altitude Compensating Type		01-08	01-08	01-08	01-08	01-08	01-08	01-08	01-08	N/A	N/A	N/A
VACUUM UNIT CHECK												
Altitude Compensating Type		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	01-06	01-06	01-06
Non-Altitude Compensating Type		01-05	01-05	01-05	01-05	01-05	01-05	01-05	01-05	N/A	N/A	N/A

A page number indicates that the item is for the vehicle listed at the head of the column.
N/A indicates that the item is not applicable to the vehicle listed.

Three different three-speed transmissions are used. The C4 Automatic, C6 Automatic and the FMX Automatic. Part 7-1 covers testing, common adjustments and repairs, and cleaning and inspection for the three types of transmissions. Where there are differences in procedures or specifications, the type of transmission affected will be designated.

1 AUTOMATIC TRANSMISSION TESTS

When diagnosing transmission problems, refer to the Ford Car and Truck Diagnosis Manual for the detailed information on the items that could be causing the problem.

The following preliminary checks should be made before proceeding with other diagnosis checks.

TRANSMISSION FLUID LEVEL CHECK

1. Make sure that the vehicle is standing level. Then firmly apply the parking brake.

2. Run the engine at normal idle speed. If the transmission fluid is cold run the engine at fast idle speed (about 1200 rpm) until the fluid reaches its normal operating temperature. When the fluid is warm, slow the engine down to normal idle speed.

3. On a vehicle equipped with a vacuum brake release, disconnect the release line and plug the end of the line; otherwise the parking brake will not hold the transmission in any drive position.

4. Shift the selector lever through all positions, and place the lever at P. Do not turn off the engine during the fluid level checks.

5. Clean all dirt from the transmission fluid dipstick cap before removing the dipstick from the filler tube.

6. Pull the dipstick out of the tube, wipe it clean, and push it all the way back into the tube. Be sure it is properly seated.

7. Pull the dipstick out of the tube again, and check the fluid level. The fluid level should be above the ADD mark. If necessary, add enough fluid to the transmission through the filler tube to bring the level between the ADD and FULL marks on the dipstick. **Do not overfill the transmission.** Install the dipstick, making sure it is fully seated in the tube.

8. Connect the vacuum brake release line if so equipped, and test it for proper operation.

FLUID AERATION CHECK

A fluid level that is too high will cause the fluid to become aerated: Aerated fluid will cause low control pressure, and the aerated fluid may be forced out the vent.

Check the transmission fluid level. Low fluid level can affect the operation of the transmission, and may indicate fluid leaks that could cause transmission damage.

TRANSMISSION FLUID LEAKAGE CHECKS

Check the speedometer cable connection at the transmission. Replace the rubber seal if necessary.

Leakage at the oil pan gasket often can be stopped by tightening the at-

taching bolts to the proper torque. If necessary, replace the gasket.

Check the fluid filler tube connection at the transmission case or pan. If leakage is found here, install a new O-ring or tighten the fitting to the specified torque.

Check the fluid lines and fittings between the transmission and the cooler in the radiator tank for looseness, wear, or damage. If leakage cannot be stopped by tightening a fitting, replace the damaged parts.

Check the engine coolant in the radiator. If transmission fluid is present in the coolant, the cooler in the radiator is probably leaking.

The cooler can be further checked for leaks by disconnecting the lines from the cooler fittings and applying 50-75 psi air pressure to the fittings. Remove the radiator cap to relieve the pressure build at the exterior of the oil cooler tank. If the cooler is leaking and will not hold this pressure the cooler must be replaced. Cooler replacement is described in the Cooling System Section of Group 11.

If leakage is found at either the downshift control lever shaft or the manual lever shaft, replace either or both seals.

Inspect the pipe plug on the left side of the transmission case at the front. If the plug shows leakage, torque the plug to specifications. If tightening does not stop the leaks, replace the plug. On a C6 transmission, a TV pressure plug is also provided on the right rear side of the case.

When converter drain plugs leak, remove drain plugs with a six-point wrench. Coat the threads with FoMoCo Perfect Seal Sealing Compound or its equivalent, and install the plugs. Torque the drain plugs to specification. **Fluid leakage from the converter housing may be caused by engine oil leaking past the rear main bearing or from oil gallery plugs, or power steering oil leakage from steering system. Be sure to determine the exact cause of the leak before repair procedures are started.**

Oil-soluble aniline or fluorescent dyes premixed at the rate of 1/2 teaspoon of dye powder to 1/2 pint of transmission fluid have proved helpful in locating the source of the fluid leakage. Such dyes may be used to determine whether an engine oil or transmission fluid leak is present or if the fluid in the oil cooler leaks into the engine coolant system. A black light, however, must be used with the fluorescent dye solution.

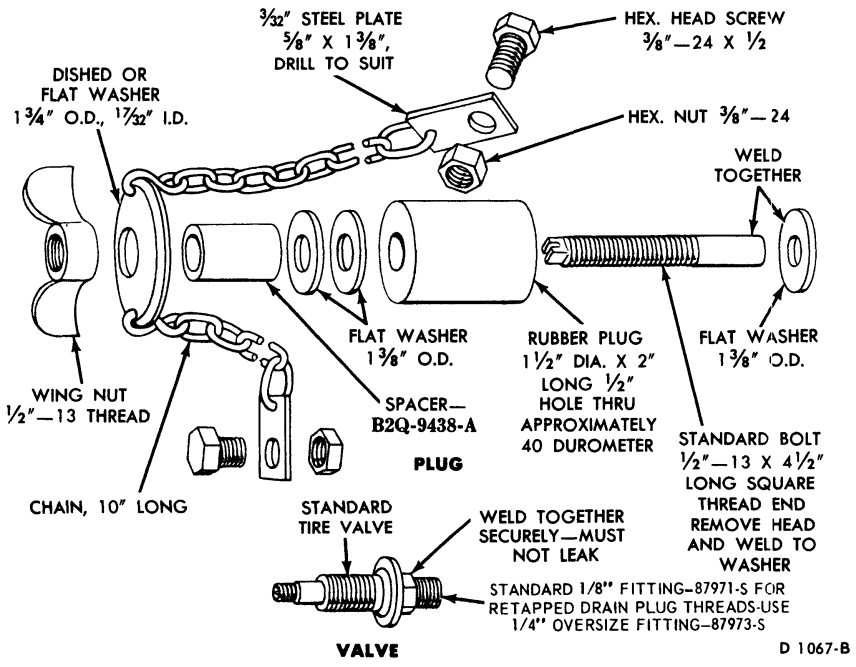


FIG. 2—Converter Leak Checking Tool

CONVERTER LEAKAGE CHECK

If there are indications that the welds on the torque converter are leaking, the converter will have to be removed and the following check made before the unit is replaced.

A leak checking tool (Fig. 2) can be made from standard parts. The tool can be used to check all converters.

1. Install the plug in the converter (Fig. 3) and expand it by tightening the wing nut. Attach the safety chains.
2. Install the air valve in one of the drain plug holes.
3. Introduce air pressure into the converter. Check the pressure with a tire gauge and adjust it to 20 psi.
4. Place the converter in a tank of water. Observe the weld areas for bubbles. If no bubbles are observed, it may be assumed that the welds are not leaking.

ENGINE IDLE SPEED CHECK

Check and, if necessary, adjust the engine idle speed, using the procedure given in Group 10.

If the idle speed is too low, the engine will run roughly. An idle speed that is too high will cause the vehicle to creep, have harsh engagements and harsh closed-throttle downshifts.

ANTI-STALL DASHPOT CLEARANCE CHECK

After the engine idle speed has been properly adjusted, check the anti-stall dashpot clearance. Follow the procedure given in Group 10 for checking and adjusting this clearance.

MANUAL LINKAGE CHECKS

Correct manual linkage adjustment is necessary to position the manual valve for proper fluid pressure direction to the different transmission components. Improperly adjusted manual

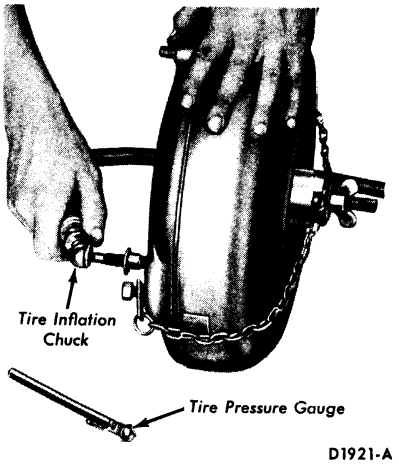


FIG. 3—Converter Leak Checking Tool Installation

linkage may cause crossleakage and subsequent transmission failure. Refer to Linkage Adjustments in Part 7-2, 7-3 or 7-4 for detailed manual linkage adjustment procedures.

CONTROL PRESSURE CHECK

When the vacuum diaphragm unit is operating properly and the downshift linkage is adjusted properly, all the transmission shifts (automatic and kickdown) should occur within the road speed limits specified in Part 7-5.

If the shifts do not occur within limits or the transmission slips during shift point, the following procedure is suggested to determine engine, transmission, linkage, vacuum diaphragm unit or valve body problems.

1. Using the automatic transmission tester (Fig. 4), attach the tachometer to the engine and the vacuum gauge to the transmission vacuum line at the vacuum unit (Fig. 5).

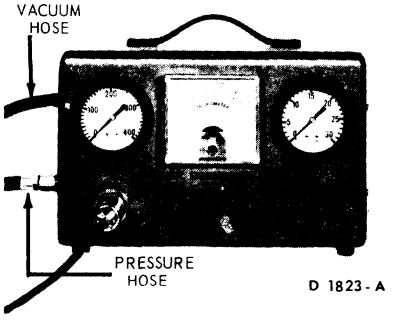


FIG. 4—Rotunda ARE-2905 Automatic Transmission Tester

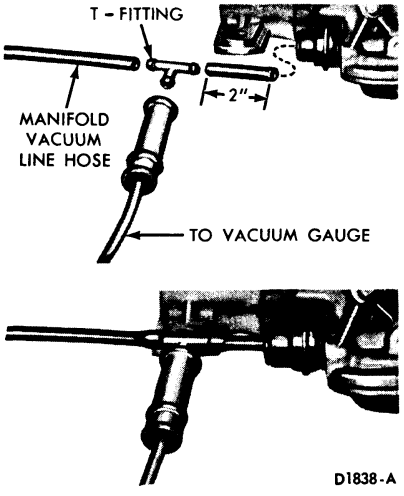


FIG. 5—Typical Vacuum Test Line Connections

2. Attach the pressure gauge to the control pressure outlet at the transmission (Figs. 6 and 7).

3. Firmly apply the parking brake and start the engine.

On a vehicle equipped with a vacuum brake release, apply the service brakes. The parking brake can not be used because the brake automatically releases when the transmission selector lever is moved to a drive position.

4. Adjust the engine idle speed to the specified rpm. If the engine idle speed cannot be brought within limits by adjustment at the carburetor idle adjustment screw, check the throttle and downshift linkage for a binding condition. If the linkage is satisfactory, check for vacuum leaks in the transmission diaphragm unit (Fig. 8 or 9) and its connecting tubes and hoses. Check all other vacuum operated units (such as the power brake) for vacuum leaks.

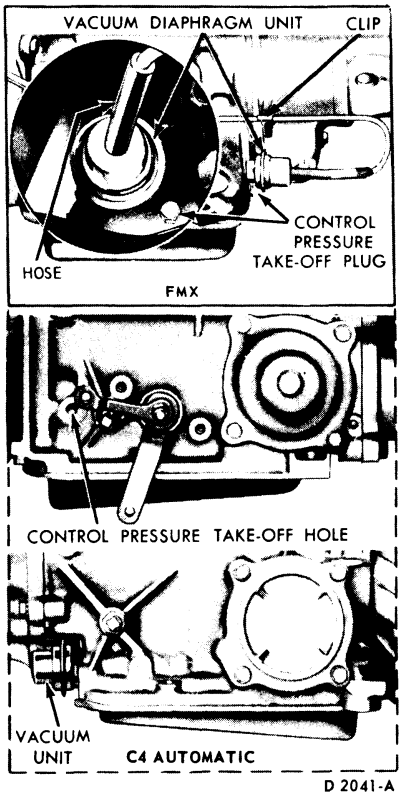


FIG. 6—Typical Vacuum Diaphragm and Control Pressure Connecting Point

VACUUM UNIT CHECK

NON-ALTITUDE COMPENSATING TYPE

To check the vacuum unit for diaphragm leakage, remove the unit from the transmission. Use a distributor

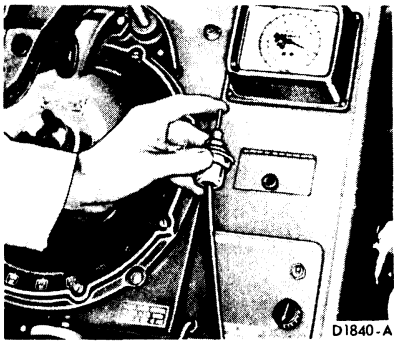


FIG. 8—Testing Transmission Vacuum Unit for Leakage

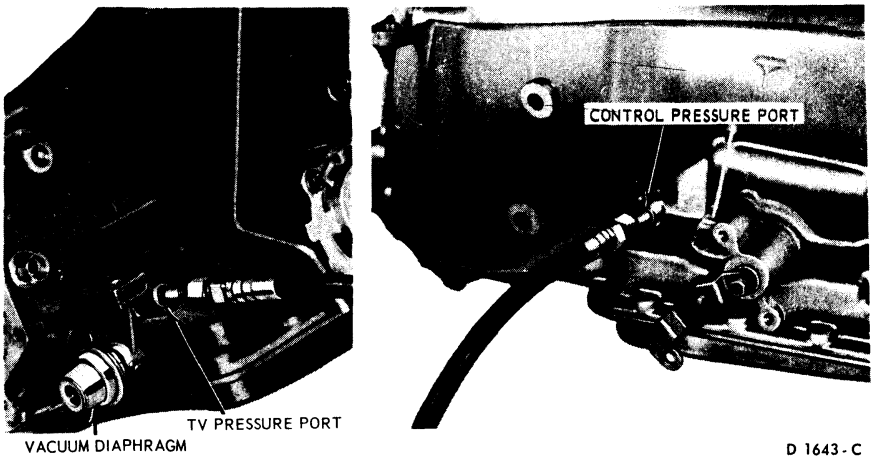


FIG. 7—Vacuum Diaphragm and Control and TV Pressure Connecting Points—C6 Transmission

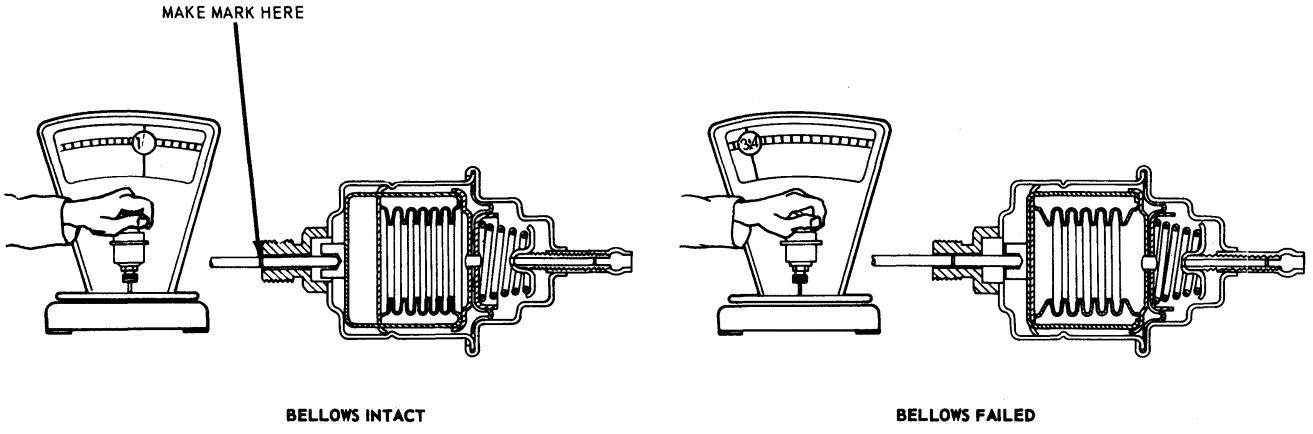


FIG. 9—Checking Vacuum Unit Bellows

tester equipped with a vacuum pump (Fig. 8). Set the regulator knob so that the vacuum gauge reads 18 inches with the end of the vacuum hose blocked off.

Then connect the vacuum hose to the transmission vacuum unit. If the gauge still reads 18 inches, the vacuum unit diaphragm **is not leaking.** As the hose is removed from the transmission vacuum unit, hold a finger over the end of the control rod. When the hose is removed, the internal spring of the vacuum unit should push the control rod outward.

ALTITUDE COMPENSATING-TYPE

The vacuum diaphragm should be checked for ruptured or damaged bellows. Check the diaphragm assembly as follows:

1. Remove the diaphragm and throttle valve rod from the transmission.
2. Insert a rod into the diaphragm, making sure that the rod is buttoned in the hole. Make a reference mark on the rod where it enters the diaphragm hole.
3. Hold the assembly in such a way that the end of the rod is resting on the weighing surface of a scale (Fig. 9).
4. Gradually press down on the diaphragm assembly until the rod is pressed into the diaphragm body. If the reference mark on the rod is still visible with 12 pounds of force registered on the scale, the bellows are intact. If the mark disappears before 4 pounds of force is exerted, the bellows have failed and the diaphragm must be replaced. If the bellows are intact, then perform various pressure checks.

SHIFT POINT CHECKS

Check the minimum throttle upshifts in D. The transmission should start in first gear, shift to second, and then shift to third, within the shift points specified in the specification section.

While the transmission is in third gear, depress the accelerator pedal through the detent (to the floor). The transmission should shift from third to second or third to first, depending on the vehicle speed.

Check the closed throttle downshift from third to first by coasting down from about 30 mph in third gear. The shift should occur within the limits specified in the specification section.

When the selector lever is at 2, the transmission can operate only in second gear.

With the transmission in third gear and road speed over 30 mph, the transmission should shift to second gear when the selector lever is moved from D to 2 to 1. The transmission will downshift from second or third to first gear when this same manual shift is made below approximately 25 mph with a C4 transmission, 30 mph with a C6 transmission or 35 mph with an FMX transmission. **This check will determine if the governor pressure and shift control valves are functioning properly.**

During the shift point check operation, if the transmission does not shift within specifications or certain gear ratios cannot be obtained, refer to the Ford Car and Truck Diagnosis Manual to resolve the problem.

AIR PRESSURE CHECKS

A NO DRIVE condition can exist, even with correct transmission fluid pressure, because of inoperative clutches or bands. Erratic shifts could be caused by a stuck governor valve. The inoperative units can be located through a series of checks by substituting air pressure for the fluid pressure to determine the location of the malfunction.

To make the air pressure checks, drain the transmission fluid and remove the oil pan and the control valve body assembly. The inoperative units can be located by introducing air pressure into the transmission case passages leading to the clutches, servos, and governor (Figs. 10, 11 or 12).

HYDRAULIC SYSTEM BENCH TESTS (FMX TRANSMISSION)

After the transmission has been assembled and is ready for installation

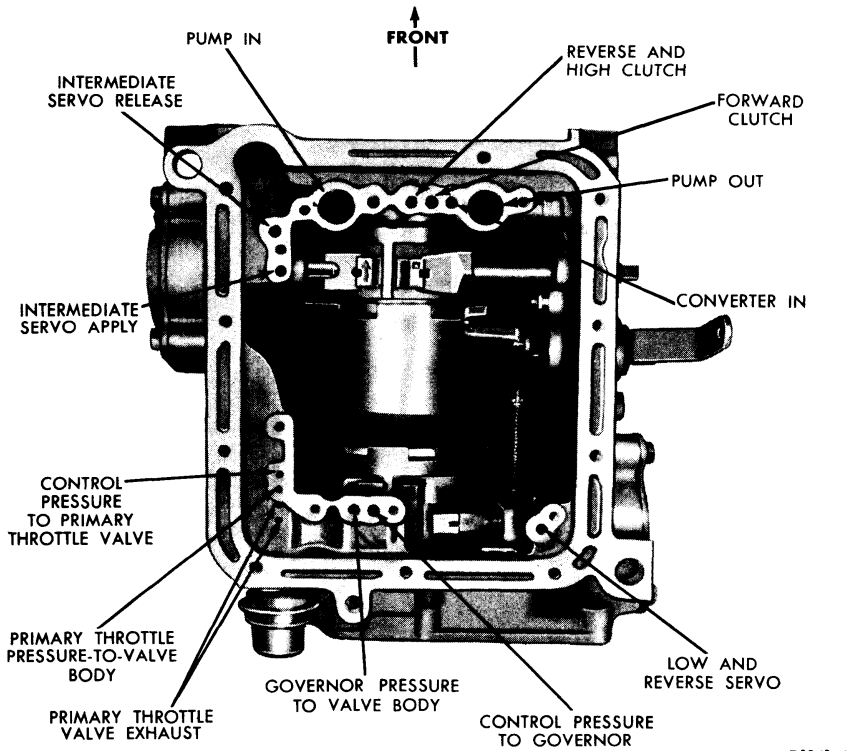


FIG. 10—Case Fluid Passage Hole Identification—C4 Automatic

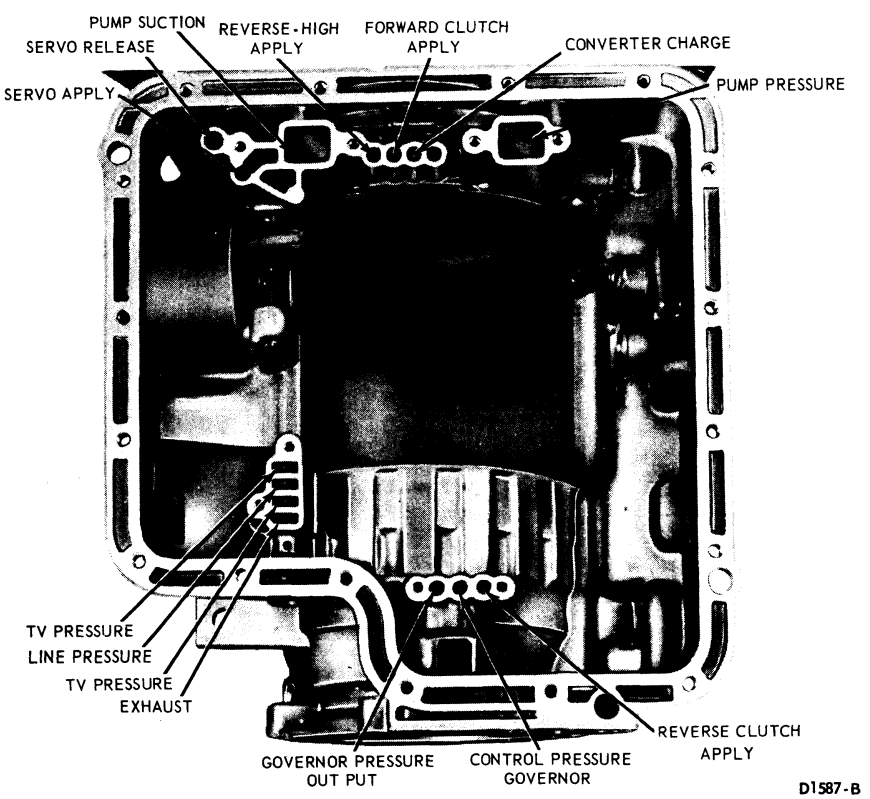


FIG. 11—Case Fluid Passage Hole Identification—C6 Automatic

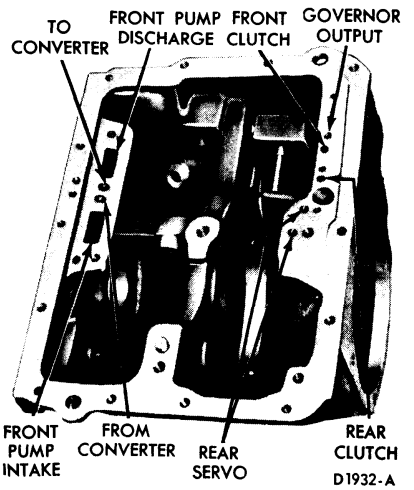


FIG. 12—Case Fluid Hole Identification—FMX Transmission

in the vehicle, check the hydraulic system to make sure it is operating properly. These hydraulic tests can be made on the bench so that most malfunctions of the system can be corrected before the transmission is installed in the vehicle.

TESTING TOOL INSTALLATION

1. Install a plug in the filler tube hole in the case or pan, and pour about four quarts of clean transmission fluid into the transmission through the speedometer gear opening.

2. Remove the vacuum diaphragm unit and the diaphragm unit control rod, and reinstall the vacuum unit if these parts had been previously installed.

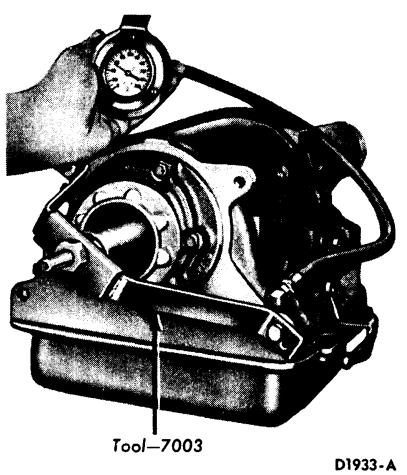


FIG. 13—Bench Testing Tool Installation—Typical

3. Install the bench testing tool on the transmission.

4. Remove the 1/8-inch pipe plug at the transmission case. Turn the front pump in a clockwise direction at 75-100 rpm until a regular flow of transmission fluid leaves the hole in the transmission case. This operation bleeds the air from the pump.

5. Install the pressure gauge (77820 or T57L-77820-A) as shown in Fig. 13.

PRESSURE TESTS

Turn the front pump at 75-100 rpm and note the gauge readings. The pressure readings on the bench test must be within the limits as outlined in Figure 13, for the engine idle check.

If pressure gauge readings are within limits in all selector lever positions, install the vacuum diaphragm control rod unit.

2 COMMON ADJUSTMENTS AND REPAIRS

TRANSMISSION FLUID DRAIN AND REFILL

Normal maintenance and lubrication requirements do not necessitate periodic automatic transmission fluid changes.

If a major repair, such as a clutch band, bearing, etc., is required in the transmission, it will have to be removed for service. At this time the converter, transmission cooler and cooler lines must be thoroughly flushed to remove any dirt.

When filling a dry transmission and converter, install five quarts of fluid. Start the engine, shift the selector lever as outlined below, and check and add fluid as necessary.

Following are the procedures for partial drain and refill due to in-vehicle repair operation.

C4 TRANSMISSION

1. On PEA models, disconnect the fluid filler tube from the transmission oil pan to drain the fluid.

On PEB and PEE models, loosen the pan attaching bolts to drain the fluid from the transmission.

2. When the fluid has stopped draining from the transmission, remove and thoroughly clean the pan and the screen. Discard the pan gasket.

3. Place a new gasket on the pan, and install the pan on the transmission.

4. On PEA models, connect the filler tube to the pan and tighten the fitting securely.

5. Add three quarts of fluid to the transmission through the filler tube.

6. Run the engine at idle speed for about two minutes, and then run it at fast idle speed (about 1200 rpm) until it reaches it's normal operating temperature. **Do not race the engine.**

7. Shift the selector lever through all the positions, place it at P, and check the fluid level. The fluid level should be above the ADD mark. If necessary, add enough fluid to the transmission to bring the level between the ADD and FULL marks on the dipstick. **Do not overfill the transmission.**

FMX OR C6 TRANSMISSION

1. Raise the vehicle on a hoist or jack stands.

2. Place a drain pan under the transmission.

3. Loosen the pan attaching bolts to drain the fluid from the transmission.

4. After the fluid has drained to the level of the pan flange, remove the rest of the pan bolts working from the rear and both sides of the pan to allow it to drop and drain slowly.

5. When the fluid has stopped draining from the transmission, remove and thoroughly clean the pan and the screen. Discard the pan gasket.

6. Place a new gasket on the pan, and install the pan on the transmission.

7. Add three quarts of fluid to the transmission through the filler tube.

8. Run the engine at idle speed for about two minutes, and then run it at fast idle speed (about 1200 rpm) until it reaches normal operating temperature. **Do not race the engine.**

9. Shift the selector lever through all the positions, place it at P, and check the fluid level. The fluid level should be above the ADD mark. If necessary, add enough fluid to the transmission to bring the level between the ADD and FULL marks on the dipstick. **Do not overfill the transmission.**

OIL COOLER TUBE REMOVAL AND INSTALLATION

When fluid leakage is found at the oil cooler, the cooler must be replaced. Cooler replacement is described in the Cooling System Section of Group 11.

When one or more of the fluid cooler steel tubes must be replaced, each replacement tube must be fabricated from the same size steel tubing as the original line.

Using the old tube as a guide, bend the new tube as required. Add the necessary fittings, and install the tube.

After the fittings have been tightened, add fluid as needed, and check for fluid leaks.

VACUUM DIAPHRAGM

ADJUSTMENT NON-ALTITUDE COMPENSATING TYPE

The C4 and C6 transmissions are equipped with an adjustable vacuum diaphragm assembly. A similar adjustable diaphragm has been released for service with the FMX transmission. However, the FMX service diaphragm is not interchangeable with that used on C4 and C6 models.

The vacuum diaphragm assembly has an adjusting screw in the vacuum hose connecting tube (Fig. 14).

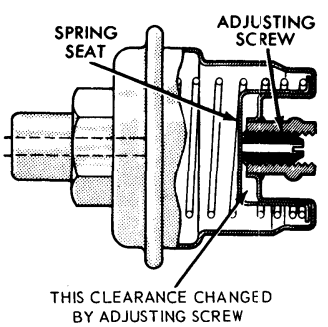


FIG. 14—Adjustable Vacuum Unit

The inner end of the screw bears against a plate which in turn bears against the vacuum diaphragm spring.

All readings slightly high or all readings slightly low may indicate the vacuum unit needs adjustment to correct a particular shift condition.

For example, on a C4 transmission, if the pressure at 10 inches of vacuum was 120 psi and the pressure at 1.0 inch of vacuum was 170 psi, and upshifts and downshifts were harsh, a diaphragm adjustment to reduce the diaphragm assembly spring force would be required.

If the pressure readings are low, an adjustment to increase diaphragm spring force is required.

To increase control pressure, turn the adjusting screw in clockwise to reduce control pressure, back the adjusting screw out by turning it counterclockwise. **One complete turn** of the adjusting screw (360 degrees) will change idle line control pressure approximately 2-3 psi. After the adjustment is made, install the vacuum line and make all the pressure checks as outlined in the Specification Section.

The diaphragm should not be adjusted to provide pressure below the ranges shown in the Specification Section in order to change shift feel. To do so could result in soft or slipping shift points and damage to the transmission.

ALTITUDE COMPENSATING TYPE

The altitude—compensating diaphragm is provided with an adjustment screw located in the vacuum connecting tube (Fig. 15). The adjustable feature allows control and TV pressures to be adjusted (within limits) to correct soft or harsh shift feel. Control and TV pressures are increased or decreased by turning the adjusting screw.

Before replacing or adjusting the diaphragm, it must first be determined that the pressure or vacuum is actually out of specification and that the cause of the problem is not due to other items within the transmission or vacuum connecting lines.

If the tests outlined in the Specification Section have been performed and pressures are within specification but shift feel is unsatisfactory, or if the pressure is too high or too low at 10 inches of vacuum, the vacuum diaphragm may be adjusted to improve the shift feel.

If shifts are excessively harsh, the diaphragm should be adjusted to reduce control pressure by backing off the adjusting screw (counterclockwise). If shift quality is extremely soft, control pressure should be increased by turning the adjusting screw inward (clockwise).

To adjust the vacuum diaphragm to compensate for harsh shift quality, first check control pressure in D, 2 and 1 at 10 inches manifold vacuum and note the pressure reading obtained. Remove the T-fitting from the vacuum hose and back off the adjusting screw (counterclockwise) by one full turn. Each full turn will reduce control pressure by approximately 2 1/2 psi at 10 inches of vacuum. Test the vehicle for shift feel. If shift quality is still harsh, a further adjustment should be made to reduce control pressure. However, control pressure should not be reduced below the specification shown for 10 inches of vacuum. If control pressure has been reduced to the low limit and shift feel is still excessively harsh, the clutches and band should be checked for correct operation.

To adjust the vacuum diaphragm to compensate for extremely soft shifts, record the control pressure reading at 10 inches of vacuum in D, 2 and 1, then make an initial adjustment of one full turn inward (clockwise). Test the vehicle for shift feel and again adjust the diaphragm, if necessary. Control pressure at 10 inches of vacuum must not exceed the high limit shown in the Specification Section.

When the necessary adjustments have been completed and shift feel is satisfactory, repeat all the tests outlined in the Specification Section. All tests must be within specifications. The adjustable vacuum unit must not be used to allow for adjusting control or TV pressures that are out of specifications. If these pressures are found to be out of specifications the cause must be determined and corrected before making any adjustment.

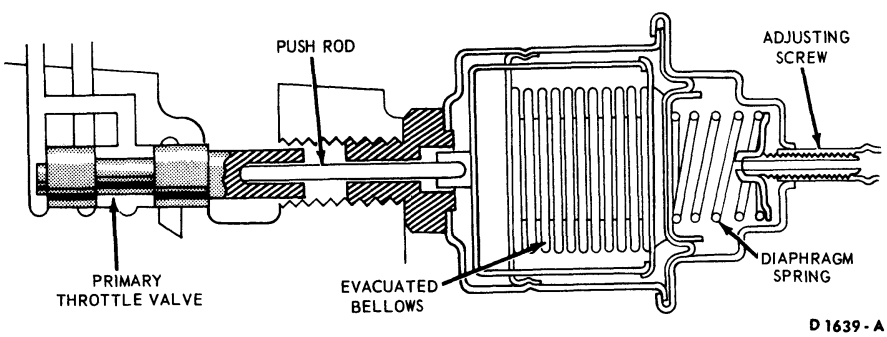


FIG. 15—Altitude Compensating Type Vacuum Diaphragm

NEUTRAL START SWITCH ADJUSTMENT AND REPLACEMENT—COLUMN SHIFT

There are two types of column-mounted neutral start switches: A and B. Type A switch has a parking brake brake-release vacuum valve. Type B switches do not have a vacuum valve. The switches differ in appearance but not in operation. Both switches are actuated by a removable steel lever, which is installed in the shifter tube within the steering column assembly. The following procedures outline the steps necessary to correctly adjust and replace the neutral start switch.

SWITCH ADJUSTMENT

Neutral Position

1. With the selector lever held lightly against the neutral stop, attempt to start the engine. If the engine starts while holding the lever but does not start when the lever is released, the shift linkage should be adjusted. If the engine does not start in either condition, adjust the switch.
2. To adjust the switch in neutral, place the transmission selector lever against the stop of the neutral detent position.
3. Loosen the two retaining screws that locate the switch on the steering column (Fig. 16).
4. With the selector lever against the neutral stop, rotate the switch until a start in the neutral position is obtained. Then, tighten the switch attaching screws to 20 in-lbs torque.
5. With the switch properly adjusted in neutral, place the selector lever in the 1 position and push the park reset button (Fig. 16) to the left (counterclockwise) until it stops. **The park reset must be performed whenever the switch has been adjusted.**

Park Position

1. Place the selector lever in the park position, release the lever and attempt to start. If the engine does not start, reset the park adjustment.

2. To adjust the switch for the park position, place the transmission selector lever in 1 and push the park reset button (Fig. 16) to the left (counterclockwise) until it stops.

3. Check the operation of the switch in each selector lever position. The starter should engage in only the neutral and park positions. **Be sure to perform the park reset if for any reason the neutral switch is adjusted.**

If, after performing the switch adjustments, the starter still will not engage in the neutral or park positions, replace the switch. Never replace the neutral switch until the switch adjustments have been made.

SWITCH REPLACEMENT

1. Disconnect the neutral start switch wires at the plug connector.

2. Disconnect the vacuum hoses, if so equipped.

3. Remove the two screws securing the neutral start switch to the steering column and lift the switch from the column.

Check the column to be sure the metal switch actuator is secure to the shift tube and that it is seated as far forward against the shift tube bearing as is possible. Also check for a broken or damaged actuator. If it is broken or damaged, replace it as shown in Figure 17.

4. Before installing a new switch to the column, check to see that the red neutral position gauge inserted in the neutral pinning hole. If the pin is missing, align the two holes at the neutral pinning hole on top of the switch and install a No. 43 drill or 0.092-0.093 inch gauge pin.

5. While holding the selector lever against the stop in the neutral detent position, place the switch on the column and install the two attaching screws. Tighten the screws to 20 in-lbs torque.

6. Remove the gauge pin (or No. 43 drill if used).

7. Connect the switch wires to the plug connector and check for a start in the neutral position. The starter should engage with the selector lever against the neutral stop. If not, loosen the attaching screws and move the switch just enough to engage the starter. Tighten the screws to 20 in-lbs torque.

8. With the switch properly adjusted in neutral, push the park reset button (Fig. 16) to the left (counterclockwise) until it stops. **The park reset must be performed whenever the switch has been adjusted or replaced.**

9. To adjust the switch for the park position, place the transmission selector lever in 1 and push the park reset button (Fig. 16) to the left (counterclockwise) until it stops.

10. Connect the vacuum hoses to the switch, if so equipped.

11. Check the operation of the switch in each selector lever position. The starter should engage in only the neutral and park detent positions.

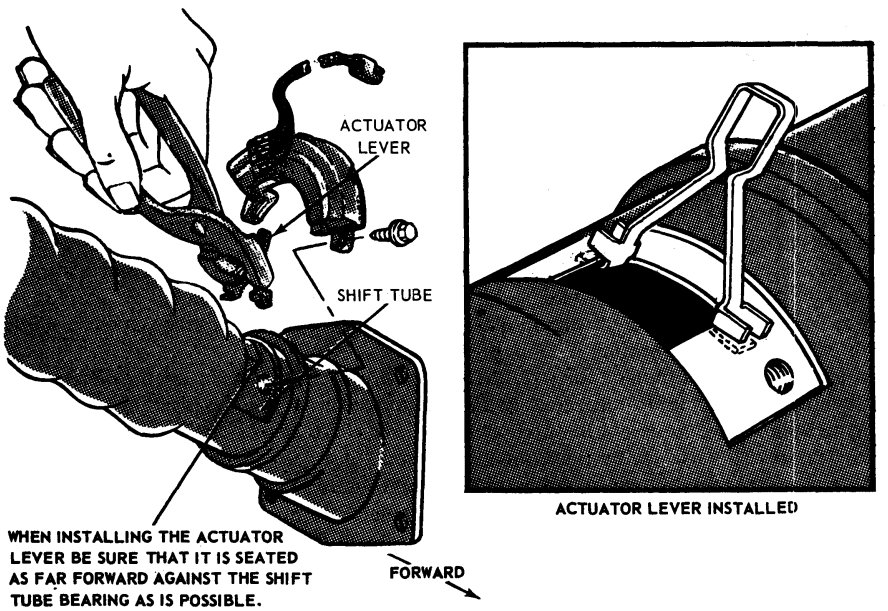


FIG. 17—Removing or Installing Neutral Start Switch Actuator Lever

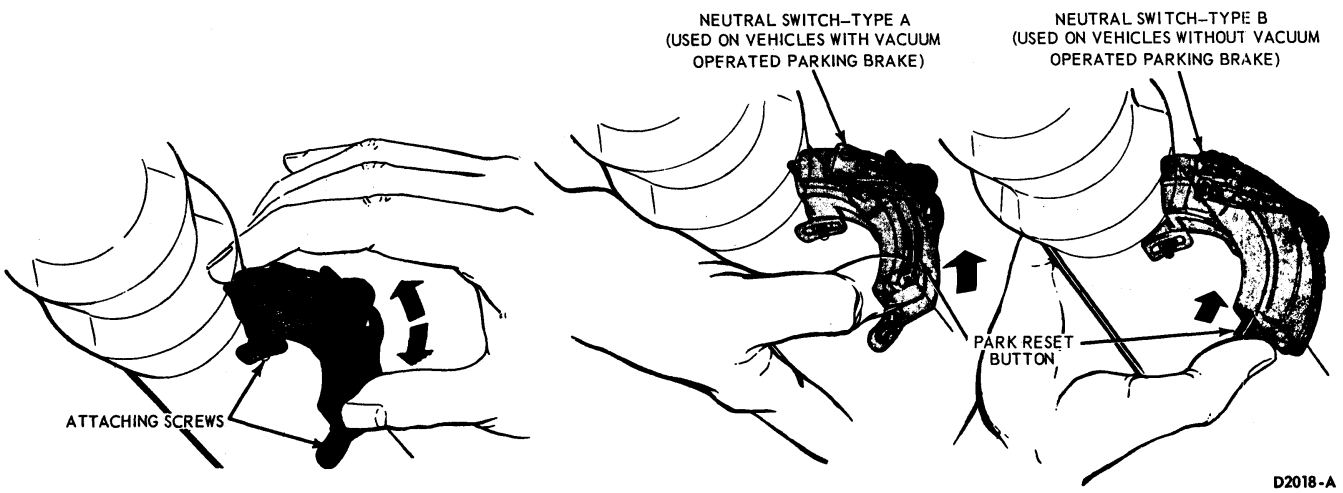


FIG. 16—Adjusting Neutral Switch—Column Shift

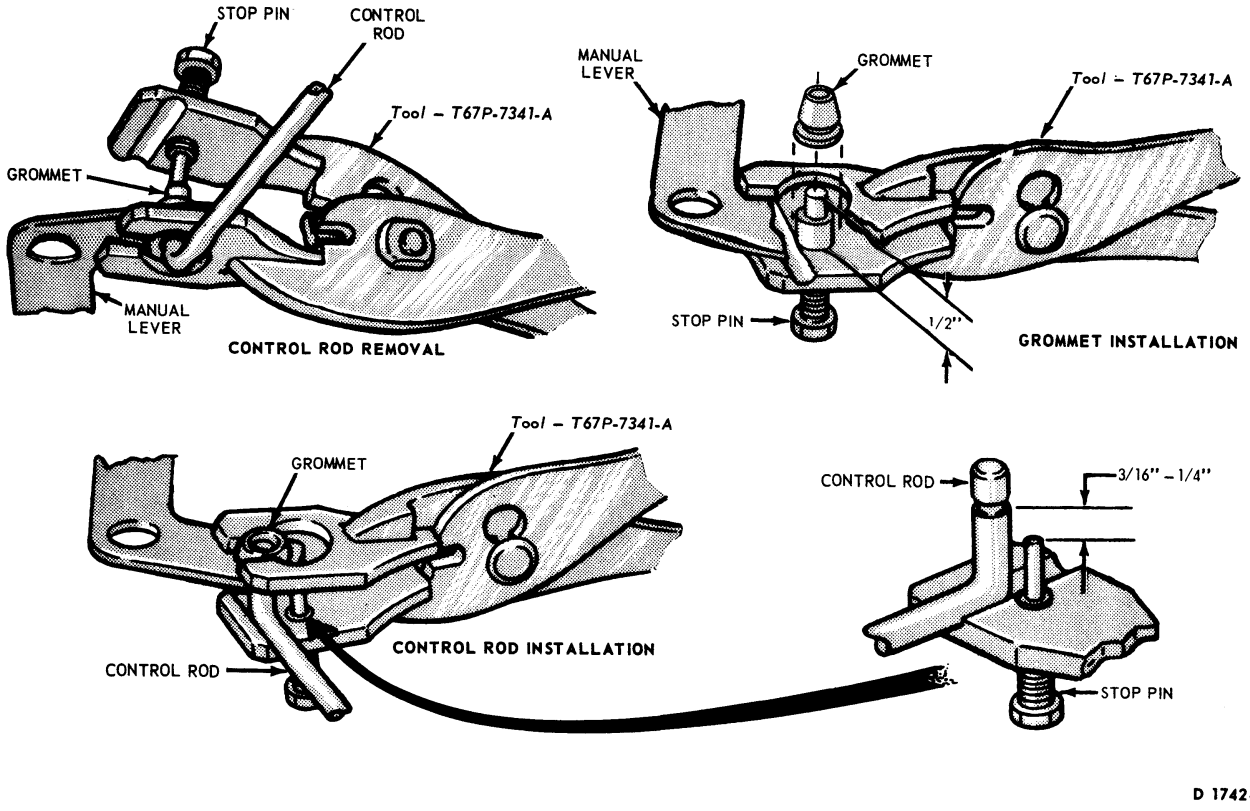


FIG. 18—Removing or Installing Shift Linkage Grommet

MANUAL SHIFT LINKAGE GROMMET REPLACEMENT—COLUMN SHIFT

The manual lever assembly on vehicles equipped with a column shift incorporates an oil impregnated plastic grommet in the end of the lever arm. A special tool T67P-7341-A is required to install the grommet in the manual lever, and to install the manual linkage rod into the grommet. Remove and install the grommet as follows:

1. Place the lower jaw of the tool between the manual lever and the control rod. Position the stop pin against the end of the control rod (Fig. 18) and force the rod out of the grommet. Remove the grommet from the manual lever by cutting off the large shoulder with a sharp knife. **The grommet must be removed from the manual lever and a new one installed each time the rod is disconnected.**

2. Before installing a new grommet, adjust the stop pin to 1/2 inch and coat the outside of the grommet with lubricant. Then, place the grommet on the stop pin and force it into the manual lever hole. Turn the grommet several times to be sure it is properly seated.

3. Readjust the stop pin to the height shown in Fig. 18. The pin height is determined by the length of the rod end which is to be installed into the grommet. If the pin height is not adjusted, the control rod may be pushed too far through the grommet causing damage to the grommet retaining lip.

4. With the pin height properly adjusted, position the control rod on the tool and force the rod into the grommet until the groove in the rod seats on the inner retaining lip of the grommet. Be sure the rod protrudes through the grommet approximately 1/4 inch after installation.

3 CLEANING AND INSPECTION

CLEANING

TRANSMISSION

Clean the parts with suitable solvent and use moisture-free air to dry off all the parts and clean out oil passages.

The composition clutch plates, bands and synthetic seals should not be cleaned in a vapor degreaser or with any type of detergent solution. To clean these parts, wipe them off with a lint-free cloth. New clutch plates or bands should be soaked in transmission fluid for fifteen minutes before the plates or bands are assembled.

CONVERTER

The converter cannot be disassembled for cleaning. If there is reason to believe that the converter contains an excessive amount of foreign material, it should be thoroughly cleaned. See the instructions provided with the Rotunda Automatic Transmission Torque Converter and Cooler Cleaner LRE-60081.

OIL COOLER

When a clutch or band failure or other internal trouble has occurred in

the transmission, any metal particles or clutch plate or band material that may have been carried into the cooler should be removed from the system by flushing the cooler and lines before the transmission is put back into service. In no case should an automatic transmission having a clutch or band failure or other internal trouble resulting in fluid contamination, be put back into service without first flushing the transmission oil cooler.

To flush the oil cooler, follow the instructions provided with the Rotunda Automatic Transmission Torque Converter and Cooler Cleaner LRE-60081.

INSPECTION

TURBINE AND STATOR END PLAY CHECK

A special tool (Fig. 19) must be used to check the condition of the converter. This special tool is used to check the turbine and stator end play and the operation of the one-way stator clutch.

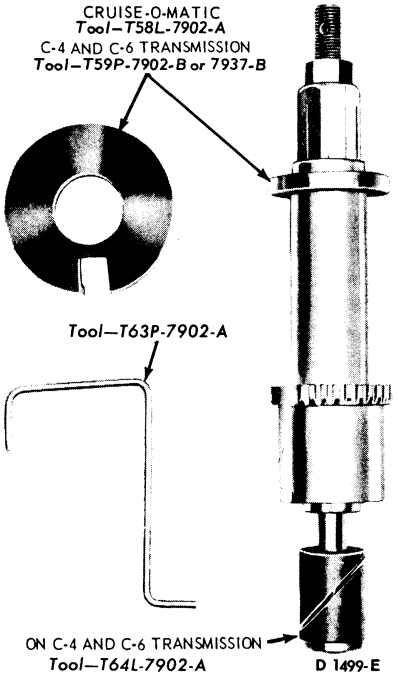


FIG. 19—Converter Checking Tool

1. Insert the tool (Fig. 19) into the converter pump drive hub until it bottoms.
2. Install the guide over the converter pump drive hub.
3. Expand the split fiber bushing in the turbine spline by tightening the adjusting nut. Tighten the adjusting nut until the tool is securely locked into the spline.
4. Attach a dial indicator to the tool (Fig. 20 or 21). Position the indicator button on a converter pump drive hub, and set the dial face at 0 (zero).
5. Lift the tool upward as far as it will go and note the indicator reading. The indicator reading is the total end play which the turbine and stator share. If the total end play exceeds the limits specified in Part 7-5, replace the converter unit.
6. Loosen the adjusting nut to free the split bushing, and then remove the tool from the converter.

STATOR ONE-WAY CLUTCH CHECK

1. Install the stator outer race holding tool in one of the four holes provided in the stator (Fig. 20 or 21).
2. Insert the tool in the converter pump drive hub. As the tool enters the converter, the pins will engage the stator clutch inner race spline.
3. Place a torque wrench on the tool (Fig. 20 or 21). The tool (and stator inner race) should turn freely clockwise (from the pump drive hub inside the converter). It should lock up and hold a 10 ft-lb pull when the wrench is turned counterclockwise. Try the clutch for lockup and hold in at least five different locations around the converter. **On the C4 or C6 Automatics, the metal ring holding the locking tool will have to be held by hand during this check.**
4. If the clutch fails to lock up and hold a 10 ft-lb torque, replace the converter unit.

STATOR TO IMPELLER INTERFERENCE CHECK

1. Position the front pump assembly on a bench with the spline end of the stator shaft pointing up (Fig. 22).
2. Mount a converter on the pump so that the splines on the one-way clutch inner race engage the mating splines of the stator support, and the converter hub engages the pump drive gear.
3. While holding the pump stationary, try to rotate the converter counterclockwise. The converter should rotate freely without any signs of interference or scraping within the converter assembly.
4. If there is an indication of scraping, the trailing edges of the stator blades may be interfering with the leading edges of the impeller blades. In such cases, replace the converter.

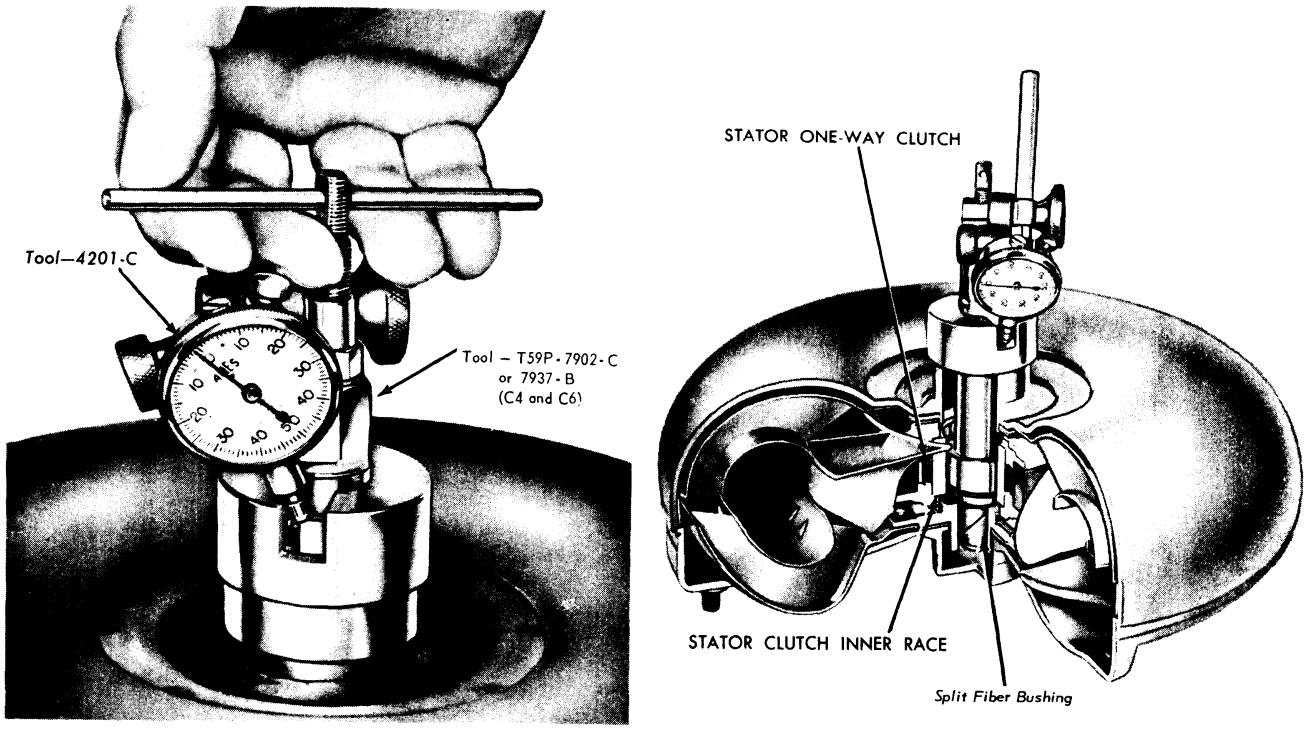
STATOR TO TURBINE INTERFERENCE CHECK

1. Position the converter on the bench front side down.
2. Install a front pump assembly to engage the mating splines of the stator support and stator, and pump drive gear lugs.
3. Install the input shaft, engaging the splines with the turbine hub (Fig. 23).
4. While holding the pump stationary, attempt to rotate the turbine with the input shaft. The turbine should rotate freely in both directions without any signs of interference or scraping noise.
5. If interference exists, the stator front thrust washer may be worn, allowing the stator to hit the turbine. In such cases, the converter must be replaced.

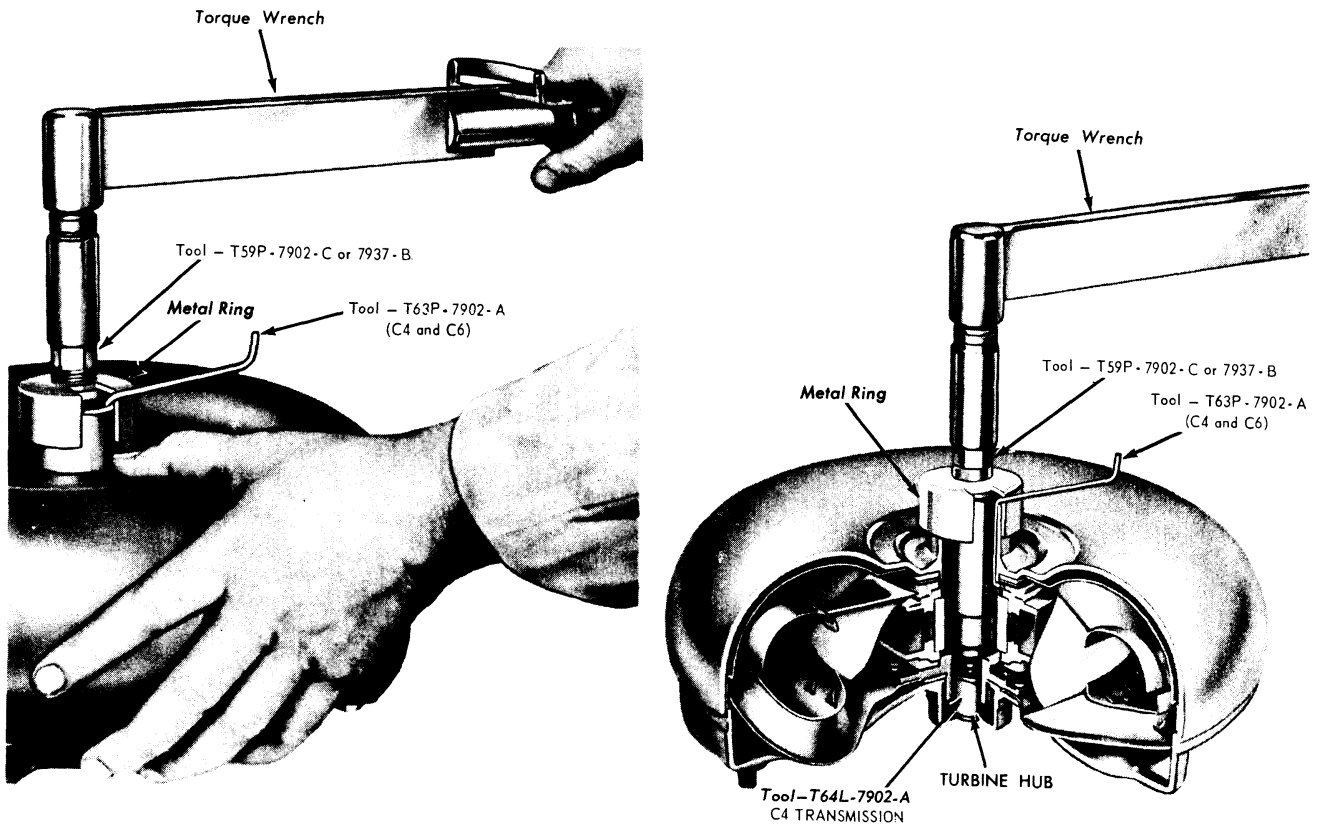
The converter crankshaft pilot should be checked for nicks or damaged surfaces that could cause interference when installing the converter into the crankshaft. Check the converter front pump drive hub for nicks or sharp edges that would damage the pump seal.

OUTPUT SHAFT AND PRIMARY SUN GEAR SHAFT (FMX TRANSMISSION)

1. Inspect the thrust surfaces and journals for scores. Inspect the internal gear for broken or worn teeth.
2. Inspect the aluminum sleeve for scores or leakage. Inspect the ring grooves for burrs.
3. Inspect the keyway and drive ball pocket for wear, and inspect the splines for burrs, twist or wear.
4. Inspect the output shaft sleeve for alignment with the governor drive ball (Fig. 24).
5. Inspect the external parking gear teeth for damage and the speedometer drive gear teeth for burrs.
6. If either the output shaft or ring gear has been replaced, place the assembled unit with the gear face down on the bench, push the shaft downward, and check the clearance between the top of the snap ring and its groove (Fig. 25). If this clearance exceeds 0.002 inch, replace the snap ring with a thicker ring to reduce the clearance to less than 0.002 inch. Selective



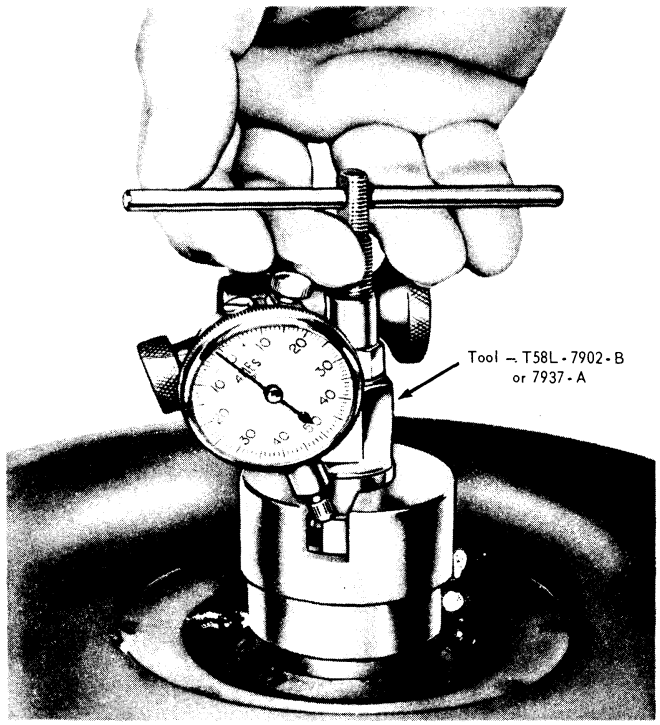
END PLAY CHECK

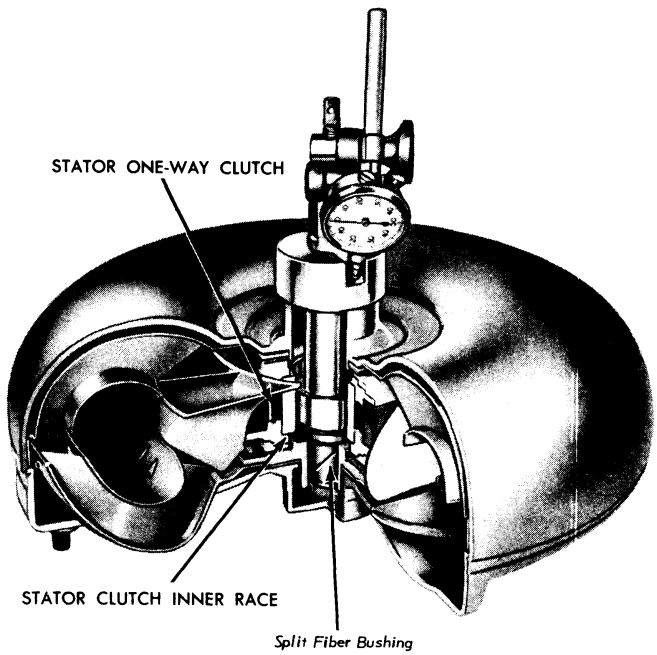


STATOR CLUTCH CHECK

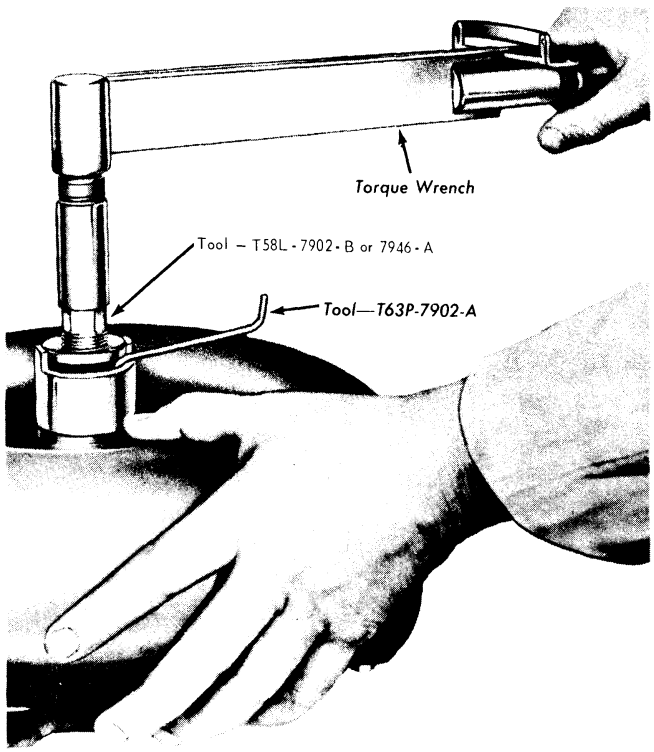
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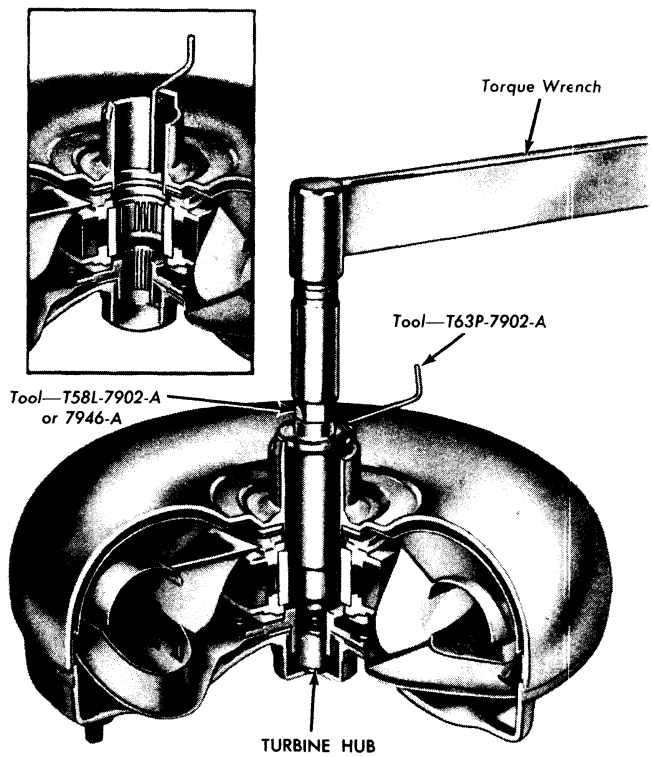
FIG. 20—Typical Converter Checking Tool—C4 and C6 Transmissions





END PLAY CHECK





STATOR CLUTCH CHECK

D1934-A

FIG. 21—Typical Converter Checking Tool—FMX Transmission

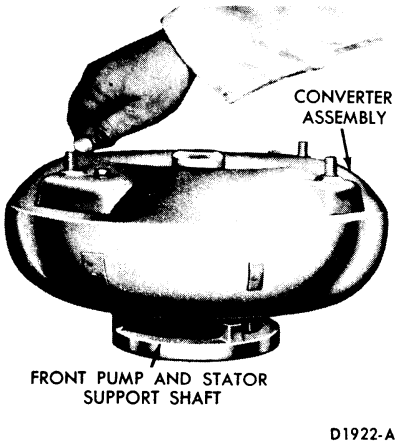


FIG. 22—Stator to Impeller Interference Check

snap rings are available in several thicknesses for this purpose.

7. Inspect the rubber seal and stop ring at the front of the output shaft spline. If wear or damage is evident, replace the parts.

8. Inspect the primary sun gear for broken or worn teeth. Inspect all thrust surfaces and journals for scores. Check all fluid passages (Fig. 26) for obstructions and leakage. Inspect the seal ring grooves for burrs.

9. Inspect the sun gear shaft splines for burrs and wear.

10. Check the fit of the seal rings in the grooves of the shaft. The rings should enter the grooves freely without bind.

11. Check the fit of the seal rings in their respective bores. If equipped with cast iron seal rings, a clearance of 0.002-0.009 inch should exist between the ends of the rings.

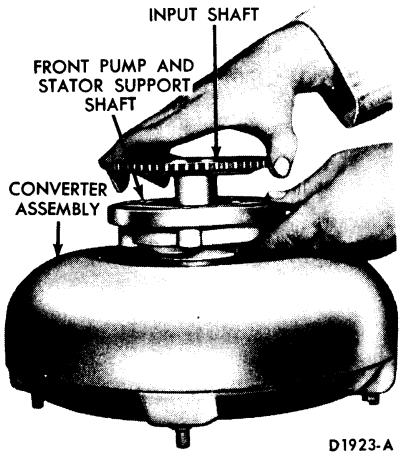


FIG. 23—Stator to Turbine Interference Check

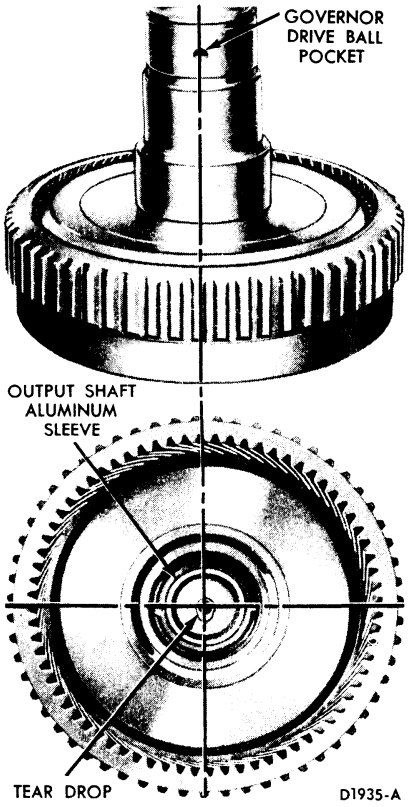


FIG. 24—Correct Position of Output Shaft Aluminum Sleeve

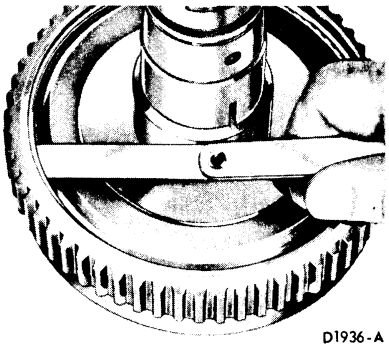


FIG. 25—Checking Output Shaft Snap Ring Clearance

12. Install the seal rings on the shaft, and check for free movement in the grooves.

PINION CARRIER, ONE-WAY CLUTCH AND CENTER SUPPORT (FMX TRANSMISSION)

1. Inspect the clutch outer race, inner race, band surface, pinion gears, bearings, and thrust washer (Fig. 27) for roughness.

2. Inspect the center support bushing for roughness.

3. Inspect the one-way clutch cage rollers and springs for excessive wear or damage.

PINION CARRIERS (C4 or C6 TRANSMISSIONS)

Individual parts of the planet carriers are not serviceable.

1. The pins and shafts in the planet assemblies should be checked for loose fit and/or complete disengagement. Use a new planet assembly if either condition exists. Before installing a planet assembly, the shaft retaining pins should be checked for adequate staking. If staking does not appear adequate, the pins should be restaked before installation. When restaking, the retaining pins must not be driven into the carrier any further than 0.040 inch below the surface of the carrier.

2. Inspect the pinion gears for damaged or excessively worn teeth.

3. Check for free rotation of the pinion gears.

EXTENSION HOUSING

1. Inspect the housing for cracks. Inspect the gasket surface for burrs or warpage.

2. Inspect the bushing for scores or wear.

3. Inspect the rear seal for hardness, cracks, or wear. If the seal

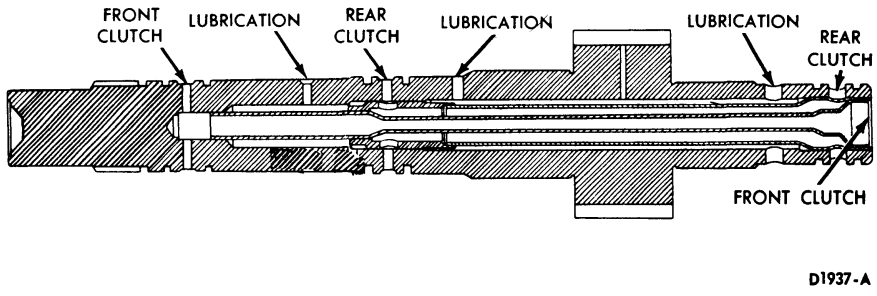


FIG. 26—Primary Sun Gear Shaft—Cross Sectional View

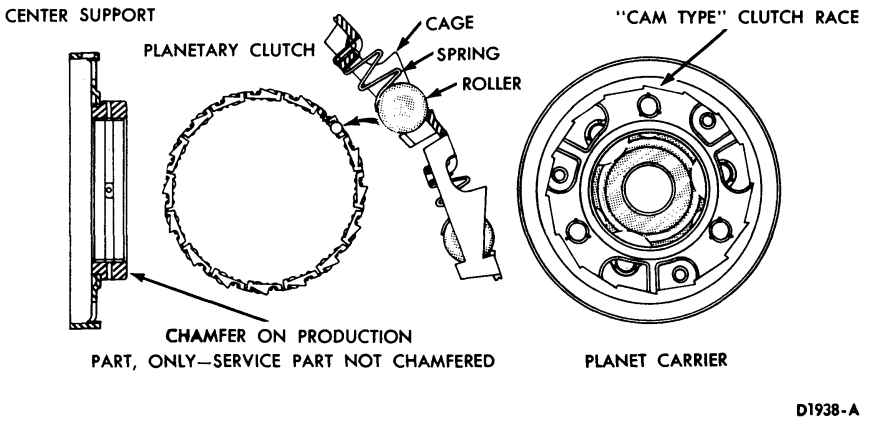


FIG. 27—Roller Type Planetary Clutch, Carrier and Center Support

shows wear or deterioration, replace the seal.

4. Inspect the seal counterbore and remove all burrs and scores with crocus cloth.

REAR CLUTCH (FMX) AND REVERSE-HIGH CLUTCH (C4 AND C6 AUTOMATIC)

1. Inspect the drum band surface, the bushing, and thrust surfaces for scores. Minor scores may be removed with crocus cloth. **Badly scored parts must be replaced.**

Inspect the clutch piston bore and the piston inner and outer bearing surfaces for scores. Check the air bleed ball valve in the clutch piston for free movement. Check the orifice to make sure it is not plugged.

2. Check the fluid passages for obstructions. All fluid passages must be clean and free of obstructions.

3. Inspect the clutch plates for wear and scoring and check the plates for fit on the clutch hub serrations. Replace all plates that are badly scored, worn or do not fit freely in the hub serrations.

4. Inspect the clutch pressure plate for scores on the clutch plate bearing surface. Check the clutch release spring(s) for distortion.

5. On an FMX transmission, inspect the needle bearing for worn rollers.

FRONT CLUTCH (FMX) AND FORWARD CLUTCH (C4 OR C6 TRANSMISSIONS)

1. Inspect the clutch cylinder thrust surfaces, piston bore, and clutch plate serrations for scores or burrs. Minor scores or burrs may be removed with crocus cloth. Replace the clutch cylinder if it is badly scored or damaged.

2. Check the fluid passage in the clutch cylinder for obstructions. Clean out all fluid passages. Inspect the clutch piston for scores and replace if necessary. Inspect the piston check ball for freedom of movement and proper seating (Fig. 28).

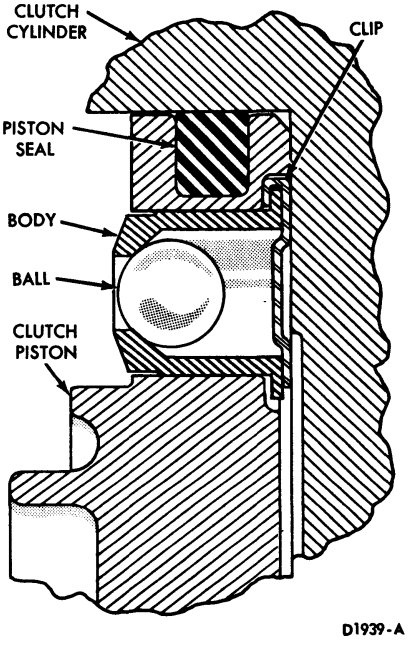


FIG. 28—Clutch Piston Check Valve

3. Check the clutch release spring for distortion and cracks. Replace the spring if it is distorted or cracked.

4. Inspect the composition and the steel clutch plates and the clutch pressure plate for worn or scored bearing surfaces. Replace all parts that are deeply scored.

5. On FMX and C4 transmissions, check the clutch plates for flatness and fit on the clutch hub serrations. Discard any plate that does not slide freely on the serrations or that is not flat.

6. Check the clutch hub thrust surfaces for scores and the clutch hub splines for wear.

7. On an FMX transmission, inspect the turbine shaft bearing surfaces for scores. If excessive clearance or scores are found, discard the unit.

Check the splines on the turbine shaft for wear and replace the shaft if the splines are excessively worn. Inspect the bushing in the turbine shaft for scores. On a C4 or C6 Automatic transmission, check the input shaft for damaged or worn splines.

FRONT PUMP AND STATOR SUPPORT

1. Inspect the mating surfaces of the pump body and cover for burrs.

2. Inspect the drive and driven gear bearing surface for scores, and check the gear teeth for burrs. Inspect the stator support splines for burrs and wear.

3. Check the fluid passages for obstructions.

4. If any parts other than the stator support are found defective, replace the pump as a unit. Minor burrs and scores may be removed with crocus cloth. The stator support is serviced separately.

5. On a C4 or C6 Automatic transmission, check the oil ring grooves in the stator support for nicks, burrs or damaged edges. On a C6 transmission, check the large seal ring groove of the pump body for damage. Check the gasket mating surface of the pump body for damage.

REAR SUPPORT (FMX TRANSMISSION)

1. Inspect the gasket mating surfaces for damage.

2. Inspect the support bushing for scores.

3. Inspect the rear support fluid passages for obstructions.

4. Check the fit of the fluid tubes in the support.

PRESSURE REGULATOR (FMX TRANSMISSION)

1. Inspect the regulator body and cover mating surface for burrs.
2. Check all fluid passages for obstructions.
3. Inspect the control pressure and converter pressure valves and bores for burrs and scores. Remove all burrs carefully with crocus cloth.
4. Check free movement of the valves in their bores. The valves should fall freely into the bores when both the valve and bore are dry.
5. Inspect the valve springs and spacers for distortion.

CONTROL VALVE BODY

1. Clean all parts thoroughly in clean solvent, and then blow them dry with moisture-free compressed air.
2. Inspect all valve and plug bores for scores. Check all fluid passages for obstructions. Inspect the check valve for free movement. Inspect all mating surfaces for burrs or distortion. Inspect all plugs and valves for burrs and scores. **Crocus cloth can be used to polish valves and plugs if care is taken to avoid rounding the sharp edges of the valves and plugs.**
3. Inspect all springs for distortion. Check all valves and plugs for free movement in their respective bores. Valves and plugs, when dry, must fall from their own weight in their respective bores.
4. Roll the manual valve on a flat surface to check it for a bent condition.

GOVERNOR

1. Inspect the governor valves and bores for scores. Minor scores may be removed from the valves with crocus cloth. Replace the governor if the valves or body is deeply scored.
2. Check for free movement of the valves in the bores. The valves should slide freely of their own weight in the bores when dry. Inspect fluid passages in the valve body and counterweight for obstructions. **All fluid passages must be clean.**
3. Inspect the mating surfaces of the governor body and governor distributor (C4 or C6 Automatic) for burrs and distortion. Mating surfaces must be smooth and flat.
4. Check the mating surface of the governor valve and the counterweight on a FMX transmission for burrs or scratches.
5. When cleaning the governor assembly (C4 Automatic), the oil screen should be removed from the collector body and thoroughly blown out with compressed air.

FRONT SERVO (FMX) AND INTERMEDIATE SERVO (C4 AND C6 AUTOMATIC)

1. Inspect the servo bore for cracks and the piston bore and the servo piston stem for scores. Check fluid passages for obstructions. Replace seals that are damaged.
2. On an FMX transmission, check the actuating lever for free movement, and inspect it for wear. If necessary to replace the actuating lever or shaft, remove the retaining pin and push the shaft out of the bracket.

Inspect the adjusting screw threads and the threads in the lever for damage.

3. Check the servo spring and servo band strut(s) for distortion.
4. Inspect the cover seal and gasket cover sealing surface for defects.

REAR SERVO (FMX) AND LOW-REVERSE SERVO (C4 TRANSMISSION)

1. Inspect the servo body for cracks and the piston bore for scores.
2. Check the fluid passages for obstructions.
3. Inspect the band and the struts for distortion. Inspect the band ends for cracks.
4. Inspect the servo spring for distortion.
5. Inspect the band lining for excessive wear and bonding to the metal band.
6. On an FMX transmission, check the servo body to case mating surface for burrs. Check the accumulator piston and the check valve for freedom of movement. Check the actuating lever socket for scores.
7. Replace seals that are damaged.

CASE

Inspect the case for cracks and stripped threads. Inspect the gasket surfaces and mating surfaces for burrs. Check the vent for obstructions, and check all fluid passages for obstructions and leakage (Figs. 10, 11 and 12).

Inspect the case bushing for scores. Check all parking linkage parts for wear or damage.

ONE-WAY CLUTCH

1. Inspect the outer and inner races for scores or damaged surface area where the rollers contact the races. If the outer race on the C6 transmission is damaged, the low-reverse clutch hub must be replaced.
2. Inspect the rollers and springs for excessive wear or damage.
3. Inspect the spring and roller case for bent or damaged spring retainers.

PART 7-2 C4 Automatic Transmission

			MODEL APPLICATION										
			All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
PEA-A2	240-1V	Column		X	X									
PEA-M1	302-2V	Column		X	X									
PEA-N1	302-2V	Console		X	X									
PEB-B2	200-1V	Console									X			
PEB-C2	170-1V,200-1V	Column							X					
PEE-M	302-2V	Console						X		X				
PEE-V	302-2V	Column						X	X	X				
PEE-AC	302-2V	Console									X			
PEE-AD	250-1V	Console									X			
PEE-AE	250-1V	Column						X		X				
PEE-AF	250-1V	Console						X		X				

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1 DESCRIPTION

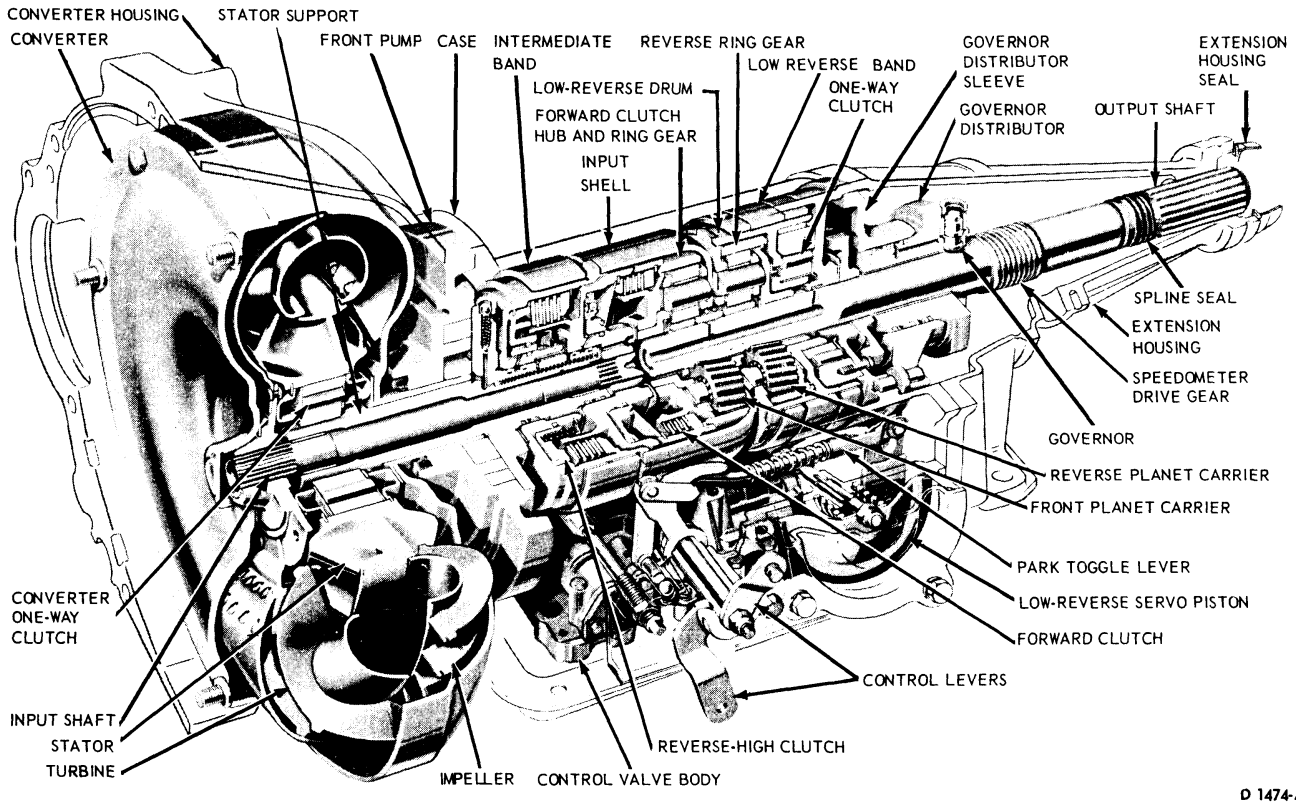


FIG. 1—C4 Automatic Transmission

DESCRIPTION

Figure 1 shows the location of the converter, front pump, clutches, gear train and most of the internal parts used in the C4 transmission. The identification tag (Fig. 2) is located under the lower front intermediate servo cover bolt. The tag shows the model prefix and suffix, assembly part numbers, and the built date code. The service identification number indicates changes to service details which affect interchangeability **when the transmission model is not changed.** For interpretation of this number, see the Master Parts Catalog.

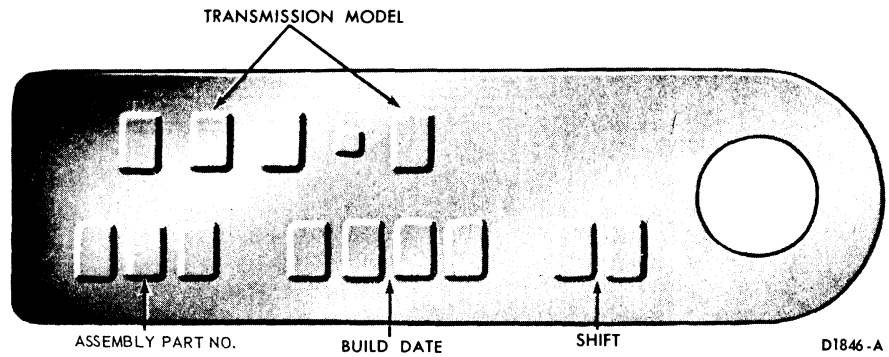
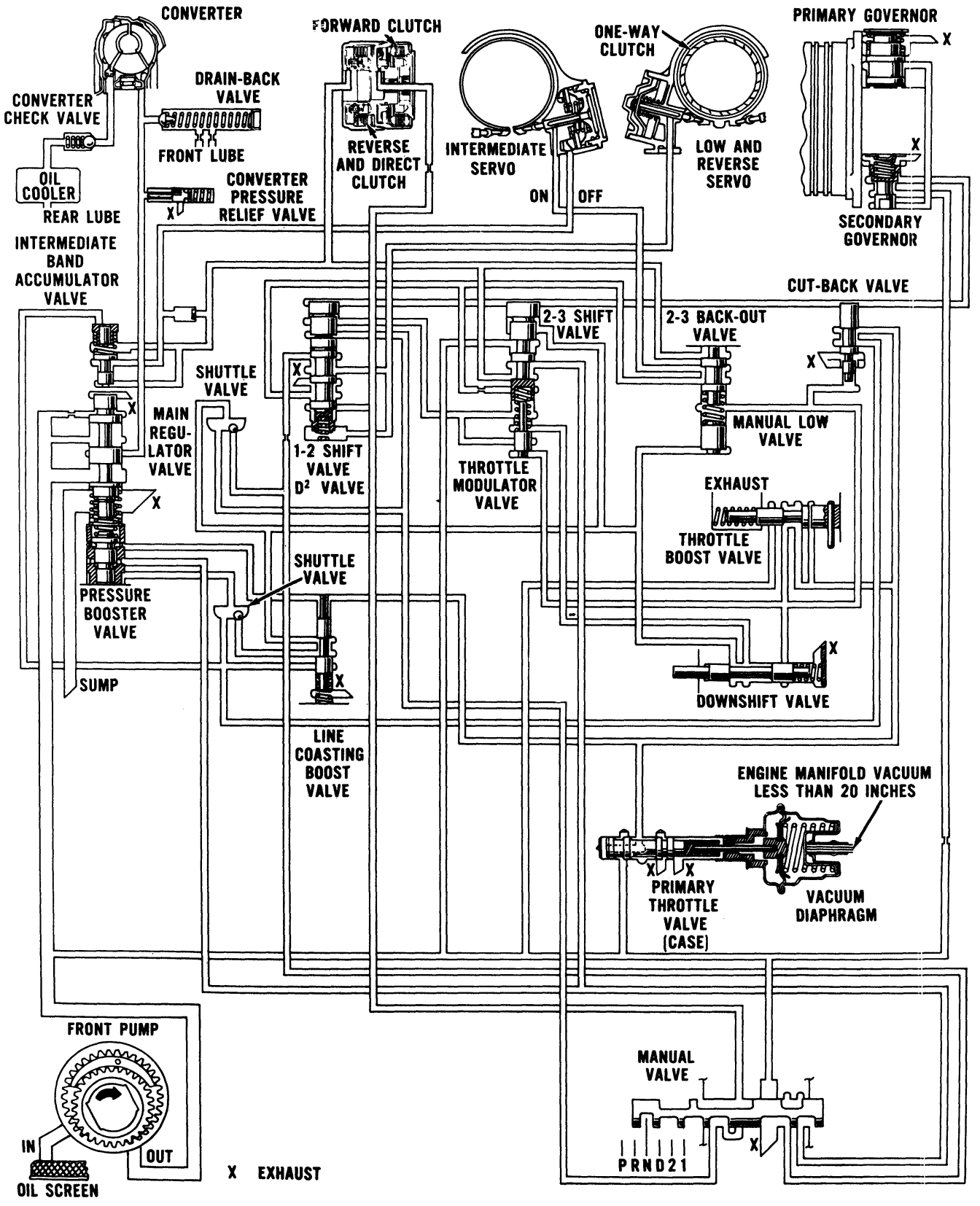


FIG. 2—Identification Tag

The C4 transmission is a three speed unit capable of providing automatic upshifts and downshifts through the three forward gear ratios, and also capable of providing manual selection of first and second gears.



D 1724-E

FIG. 3—Hydraulic Control System

The transmission consists essentially of a torque converter, planetary gear train, two multiple disc clutches. a one-way clutch and a hydraulic control system (Fig. 3).

The only adjustments on the transmission proper are the intermediate and low-reverse bands.

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

CONTROL LINKAGE ADJUSTMENTS

The transmission control linkage adjustments should be performed in the order in which they appear in this section of the manual.

THROTTLE AND DOWNSHIFT LINKAGE ADJUSTMENTS

Adjusting the throttle linkage is important to be certain the throttle and kickdown systems are properly adjusted. The kickdown system should come in when the accelerator is pressed through detent, and not before detent. Refer to Group 10 for detailed throttle and downshift linkage adjustment procedures.

MANUAL LINKAGE ADJUSTMENTS

Column Shift

1. Place the selector lever in the D position tight against the D stop.
2. Loosen the shift rod adjusting nut at point A (Fig. 4 or 5).
3. Shift the manual lever at the transmission into the D detent position, third from the rear.
4. Make sure that the selector lever has not moved from the D stop; then, tighten the nut at point A to 10-20 ft-lbs.
5. Check the transmission operation for all selector lever detent positions.

Console Shift

1. Position the transmission selector lever in D position.
2. Raise the vehicle and loosen the manual lever shift rod retaining nut (Fig. 6, 7 or 8). Move the transmission manual lever to the D position, fourth detent position from the back of the transmission.
3. With the transmission selector lever and manual lever in the D positions, torque the attaching nut 10 to 20 ft-lbs.
4. Check the operation of the transmission in each selector lever position.

NEUTRAL START SWITCH ADJUSTMENT—CONSOLE SHIFT

On vehicles equipped with a column-mounted neutral start switch, refer to Part 7-1, Section 2, for the adjustment procedures.

FORD-METEOR

1. With the manual linkage properly adjusted, check the starter engagement circuit in all positions. The circuit must be open in all drive positions and closed only in park and neutral.
2. Remove the four screws and plates securing the selector lever handle to the lever. Remove the handle and detent control.
3. Remove two screws from the rear of the console top panel. Pull the panel back to unhook it from the front of the console and remove the panel.
4. Loosen the two combination starter neutral and back-up light switch attaching screws (Fig. 9).
5. Move the selector lever back and forth until the gauge pin (No. 43 drill) can be fully inserted into the gauge pin holes (Fig. 9).
6. Place the transmission selector lever firmly against the stop of the neutral detent position.
7. Slide the combination starter neutral and back-up light switch forward or rearward as required, until the switch lever contacts the selector lever actuator. If an adjustment can not be made by rotating the switch, loosen the actuator lever attaching bolt and adjust the lever (Fig. 9).
8. Tighten the neutral start switch attaching screws. If the actuator lever was adjusted, tighten the actuator lever bolt to 6-10 ft-lbs.

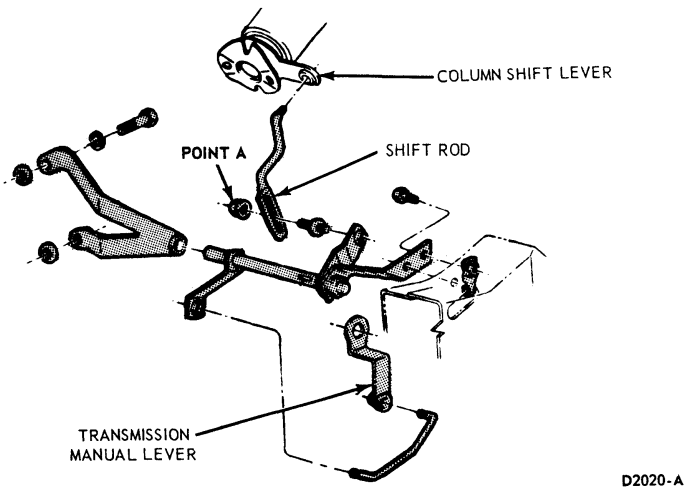


FIG. 4—Manual Linkage—Column Shift—Ford and Meteor

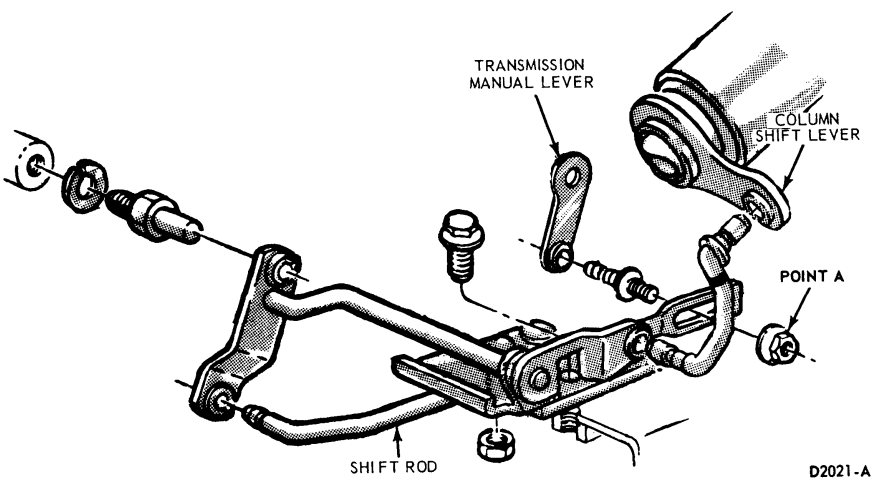


FIG. 5—Typical Manual Linkage—Column Shift—Fairlane, Falcon and Montego

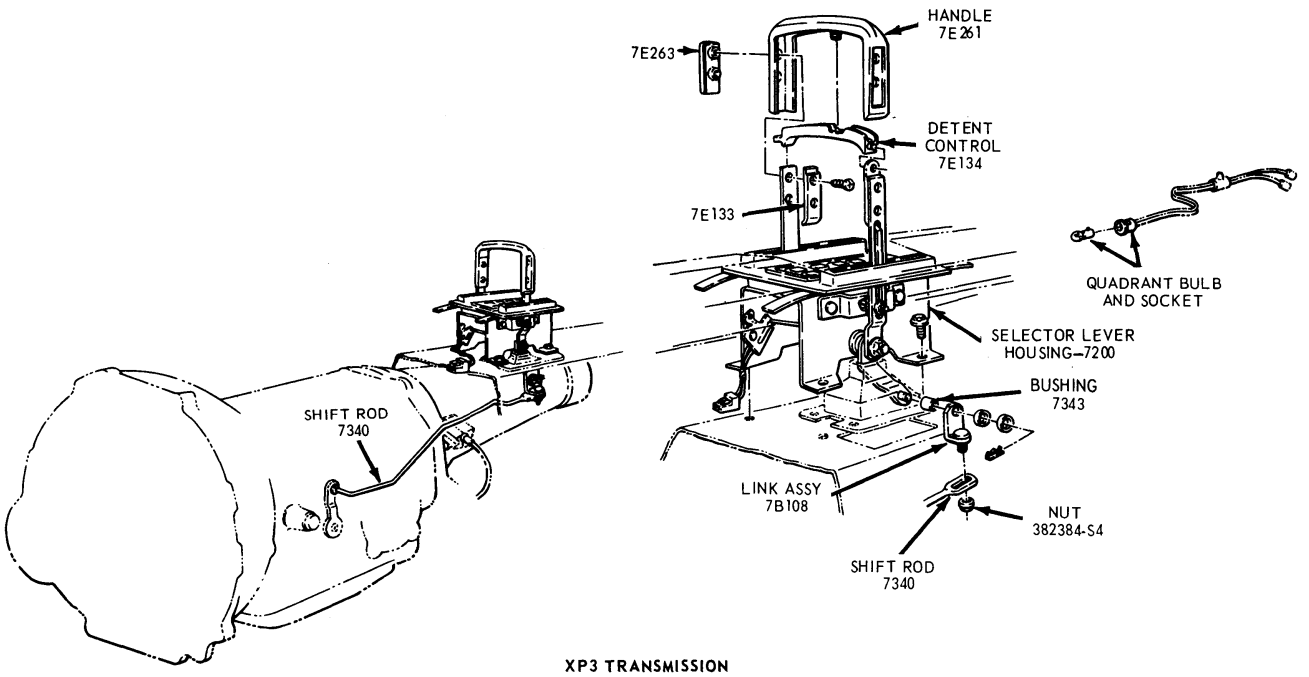


FIG. 6—Manual Linkage—Console Shift—Ford and Meteor

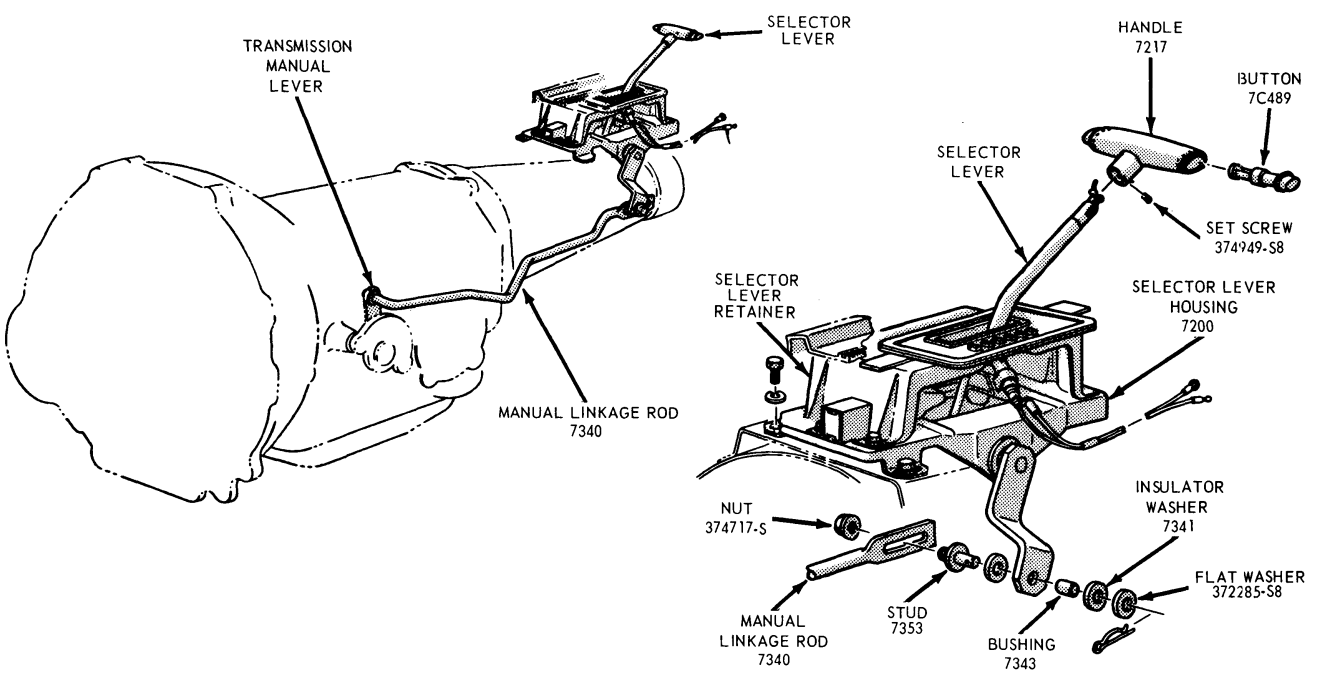


FIG. 7—Manual Linkage—Console Shift—Fairlane and Montego

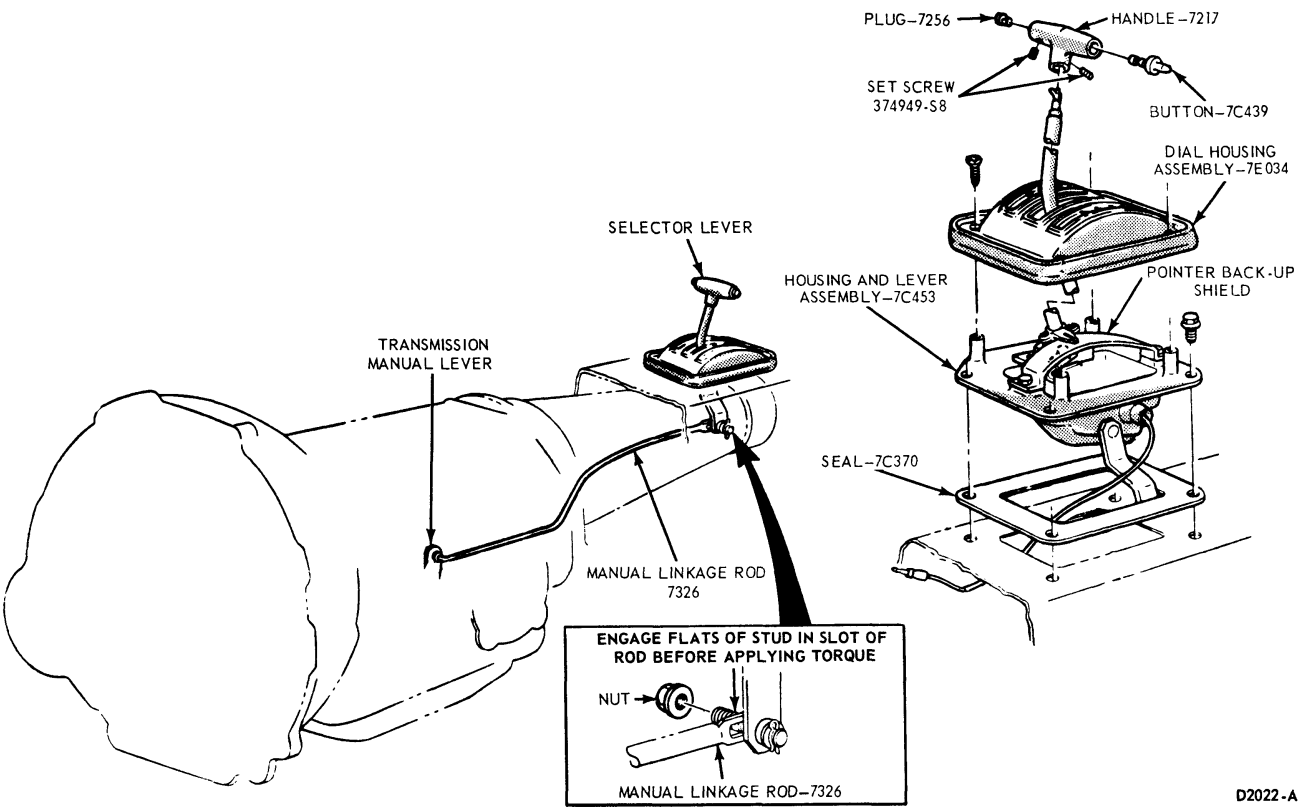


FIG. 8—Manual Linkage—Console Shift—Mustang

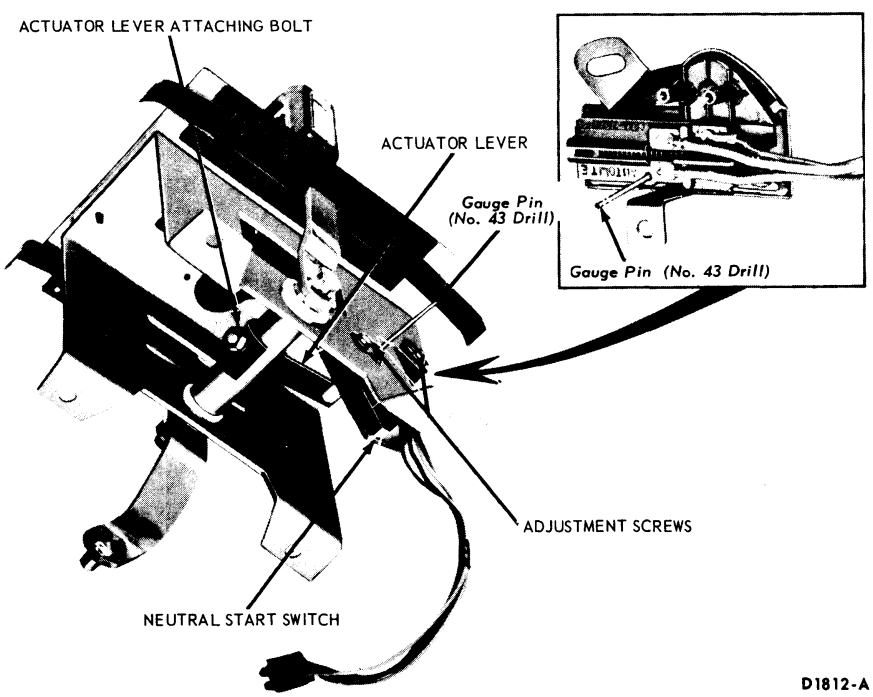


FIG. 9—Neutral Start Switch Adjustments—Console Shift—Ford-Meteor

9. Turn the ignition key to the ACC position and place the selector lever in the reverse position and check the operation of the back-up lights. Turn the key off.

10. Place the console top panel on the console and install the retaining screws.

11. Position the selector lever detent control and handle on the selector lever and secure with the four plates and attaching screws.

FAIRLANE-MONTEGO

1. With the manual linkage properly adjusted, check the starter engagement circuit in all positions. The circuit must be open in all drive positions and closed only in park and neutral.

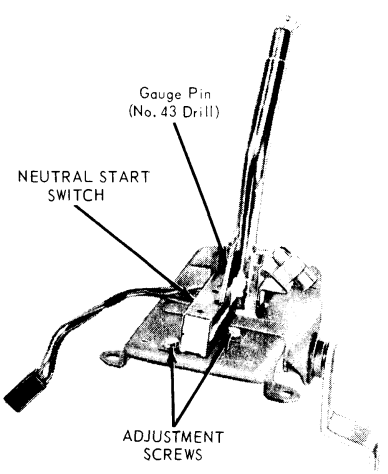


FIG. 10—Neutral Start Switch Adjustments—Console Shift—Fairlane-Montego

2. Remove the selector lever handle from the lever.
3. Remove the trim panel from the top of the console.
4. Remove the cover and dial indicator as an assembly.
5. Remove the four screws that secure the selector lever retainer to the selector lever housing. Lift the retainer from the housing.
6. Loosen the two combination starter neutral and back-up light switch attaching screws (Fig. 10).
7. Move the selector lever back and forth until the gauge pin (No. 43 drill) can be fully inserted into the gauge pin holes (Fig. 10).
8. Place the transmission selector lever firmly against the stop of the neutral detent position.
9. Slide the combination starter neutral and back-up light switch forward or rearward as required, until the switch actuating lever contacts the selector lever.
10. Tighten the switch attaching screws and remove the gauge pin. Check for starting in the park position.
11. Turn the ignition key to the ACC position and place the selector lever in the reverse position and check the operation of the back-up lights. Turn the key off.
12. Position the selector lever retainer to the selector lever housing. Install the four attaching screws.
13. Install the cover and dial indicator.
14. Install the trim panel on the top of the console. Install the selector lever handle.

MUSTANG

1. With the manual lever properly adjusted, loosen the two switch attaching bolts (Fig. 11).
2. With the transmission manual lever in neutral, rotate the switch and insert the gauge pin (No. 43 drill shank end) into the gauge pin holes of the switch. **The gauge pin has to be inserted to a full 31/64 inch into the three holes of the switch (Fig. 11).**
3. Torque the two switch attaching bolts to specification. Remove the gauge pin from the switch.
4. Check the operation of the switch. The engine should start only with the transmission selector lever in Neutral and Park.

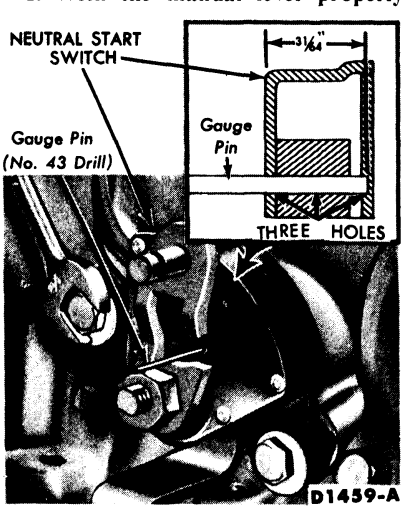


FIG. 11—Neutral Start Switch Adjustments—Console Shift—Mustang

NEUTRAL START SWITCH REPLACEMENT—CONSOLE SHIFT

On vehicles equipped with a column mounted neutral start switch, refer to Part 7-1, Section 2, for the replacement procedures.

FORD-METEOR

1. Remove the four screws and plates securing the selector lever handle to the lever. Remove the handle and detent control.
2. Remove the two screws from the rear of the console top panel. Pull the panel back to unhook it from the front of the console and remove the panel.
3. Remove the two screws securing the dial indicator assembly to the selector lever housing and remove the indicator assembly.
4. Disconnect the neutral start switch wires at the plug connector. Remove the wires from under the retaining clip.
5. Remove the two screws securing the neutral start switch to the selector lever housing and remove the switch (Fig. 9).
6. Position the neutral start switch to the selector lever housing and install the two attaching screws.
7. Adjust the neutral start switch as outlined under the Neutral Start Switch Adjustment procedures in this section.
8. Connect the neutral start switch wires to the plug connector. Position the wires in the retaining clip and close the clip.
9. Place the console top panel on the console and install the retaining screws.
10. Position the selector lever detent control and handle on the selector lever and secure with the four plates and attaching screws.

FAIRLANE-MONTEGO

1. Remove the selector lever handle from the lever.
2. Remove the trim panel from the top of the console.
3. Remove the cover and dial indicator as an assembly.
4. Remove the four screws that secure the selector lever retainer to the selector lever housing. Lift the retainer from the housing.
5. Remove the two screws securing the neutral start switch to the selector lever housing. Disconnect the neutral start switch wires at the plug connector and remove the switch.
6. Position the neutral start switch to the selector lever housing and install the two attaching screws.
7. With the selector lever in neutral, move the selector lever back and forth until the gauge pin (No. 43 drill) can be fully inserted into the gauge pin holes (Fig. 10).
8. Place the transmission selector lever firmly against the stop of the neutral detent position.
9. Slide the combination starter neutral and back-up light switch forward or rearward as required, until the switch actuating lever contacts the selector lever.
10. Tighten the switch attaching screws and remove the gauge pin.
11. Connect the neutral start switch wires to the plug connector and check for starting in the park position.
12. Position the selector lever retainer to the selector lever housing. Install the attaching screws.
13. Install the cover and dial indicator.
14. Install the trim panel on the top of the console. Install the selector lever handle

MUSTANG

1. Remove the downshift linkage rod from the transmission downshift lever.
2. Apply penetrating oil to the downshift lever shaft and nut. Remove the transmission downshift outer lever retaining nut and lever (Fig. 11).
3. Remove the two neutral start switch attaching bolts.
4. Disconnect the multiple wire connector. Remove the neutral switch from the transmission.
5. Install the neutral start switch on the transmission. Install the two attaching bolts.
6. With the transmission manual lever in neutral, rotate the switch and install gauge pin (No. 43 drill) into the gauge pin hole (Fig. 11).
7. Tighten the switch attaching bolts to specification and remove the gauge pin.

8. Install the outer downshift lever and attaching nut, and torque the nut to specification. Install the downshift linkage rod to the downshift lever.

9. Install the switch wires. Connect the wire multiple connector. Check the operation of the switch in each detent position. The engine should start only with the transmission selector lever in N (neutral) and P (park).

SELECTOR LEVER REPLACEMENT—CONSOLE SHIFT

FORD-METEOR

1. Raise the vehicle and disconnect the link assembly from the selector lever arm (Fig. 6).

2. Lower the vehicle. Remove the four screws and plates securing the selector lever handle to the lever. Remove the handle and detent control.

3. Remove the two screws from the rear of the console top panel. Pull the panel back to unhook it from the front of the console and remove the panel.

4. Disconnect the neutral start switch wires at the plug connector. Disconnect the bulb socket from the quadrant.

5. Remove the four bolts that attach the selector lever housing to the floor pan and remove the selector lever and housing.

6. Position the new selector lever and housing assembly on the floor pan and install the attaching bolts.

7. Connect the bulb socket to the quadrant and the neutral start switch wires to the plug connector.

8. Raise the vehicle and secure the link assembly to the selector lever arm with the bushing, insulator, flat washer and cotter pin (Fig. 6). Lower the vehicle.

9. Place the console top panel on the console and install the retaining screws.

10. Position the selector lever detent control and handle on the selector lever and secure with the four plates and attaching screws.

FAIRLANE-MONTEGO

1. Raise the vehicle on a hoist or jack stands.

2. Remove the retainer that secures the manual linkage rod to the lower end of the manual lever (Fig. 7).

3. Remove the flat washer and two insulator washers and disconnect the rod from the arm.

4. Working from inside of the vehicle, remove the selector lever handle attaching screw. Lift the handle off the selector lever.

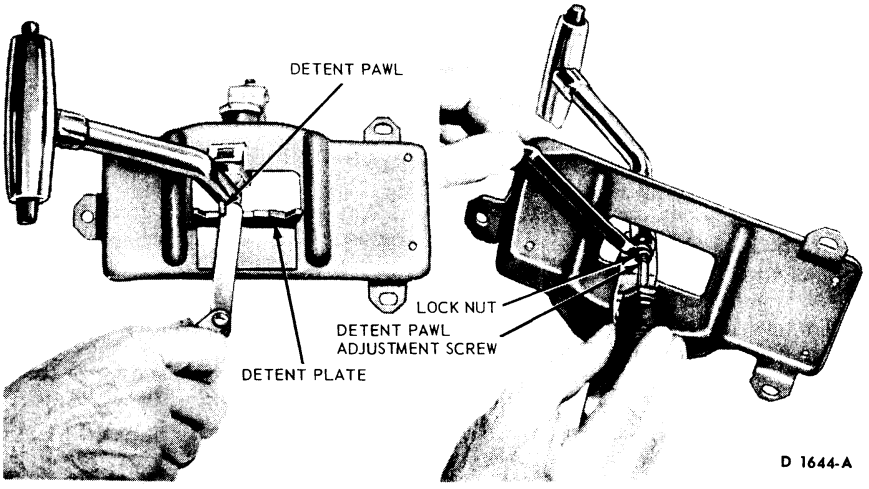


FIG. 12—Typical Selector Lever Detent Pawl Adjustment

5. Remove the console trim panel from the top of the console. Remove the console retaining screws and remove the console.

6. Remove the cover and dial indicator as an assembly.

7. Remove the four screws that secure the selector lever retainer to the selector lever housing. Lift the retainer from the housing.

8. Disconnect the neutral start switch wires at the plug connector. Disconnect the bulb socket from the selector lever housing.

9. Remove the three bolts that secure the selector lever control housing to the console. Lift the selector lever housing from the console.

10. Remove the selector lever to housing attaching nut. Remove the lever from the housing.

11. Install the selector lever in the housing and install the attaching nut. Torque the nut to 20 to 25 ft-3lbs.

12. Install the selector lever handle.

13. Position the selector lever as shown in Figure 12. With a feeler gauge, check the clearance between the detent pawl and plate. The clearance should be 0.005 to 0.010 inch. If necessary adjust the height of the detent pawl as shown in Figure 12.

14. Remove the handle from the selector lever.

15. Position the selector lever housing in the console and install the three attaching bolts. Do not tighten the attaching bolts at this time.

16. Connect the bulb socket to the selector lever housing and the neutral start switch wires to the plug connector.

17. Position the selector lever retainer to the selector lever housing. Install the four attaching screws.

18. Install the cover and dial indicator.

19. Place the console in position and install the retaining bolts. Tighten the selector lever housing attaching bolts.

20. Position the console trim panel and secure it with the attaching screws.

21. Install the handle and the button on the selector lever. Secure the handle with the set screw.

22. Secure the manual linkage rod to the arm with two insulating washers, a flat washer and a retainer (Fig. 7).

23. Adjust the linkage as required. Lower the vehicle.

MUSTANG

1. Raise the vehicle and remove the manual lever control rod attaching nut (Fig. 8).

2. Lower the vehicle, remove the selector lever handle attaching screw.

3. Remove the dial housing attaching screws and the housing.

4. Remove the two pointer back-up shield attaching screws and remove the shield.

5. Disconnect the dial indicator light.

6. Remove the selector housing and lever assembly attaching bolts. Remove the selector lever and housing.

7. Remove the selector lever to housing attaching nut. Remove the lever from the housing.

8. Install the selector lever in the housing and install the attaching nut. Torque the nut to 20 to 25 ft-lbs.

9. Install the selector lever handle.

10. Position the selector lever as shown in Figure 12. With a feeler gauge check the clearance between the detent pawl and plate. The clearance should be 0.005 to 0.010 inch. If necessary adjust the height of the detent pawl as shown in Figure 12.

11. Remove the handle from the selector lever.
12. Install the selector housing and lever assembly as shown in Figure 8. Torque the attaching bolts 4-6 ft-lbs.
13. Connect the dial indicator light.
14. Install the pointer back-up shield on the housing and lever assembly.
15. Install the dial housing and tighten the attaching screws.
16. Install the selector lever handle and tighten the attaching screw.
17. Position the selector lever in the D position.
18. Raise the vehicle. Install the transmission manual lever rod to the selector lever. Adjust the manual linkage.
19. Lower the vehicle and check the transmission operation in each selector lever detent position.

BAND ADJUSTMENT

INTERMEDIATE BAND

1. Clean all the dirt from the band adjusting screw area. Remove and discard the locknut.
2. Install a new locknut on the adjusting screw. With the tool shown in Fig. 13, tighten the adjusting screw until the tool handle clicks. The tool is a pre-set torque wrench which clicks and overruns when the torque on the adjusting screw reaches 10 ft-lbs.

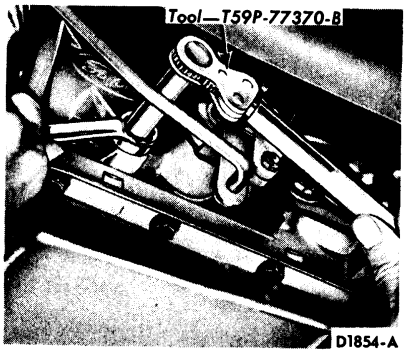


FIG. 13—Adjusting Intermediate Band

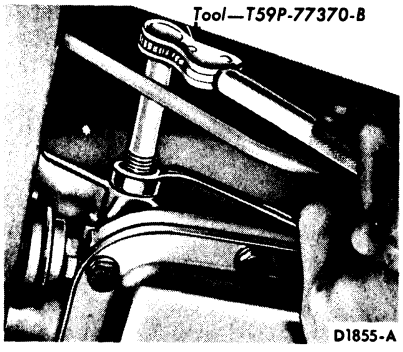


FIG. 14—Adjusting Low-Reverse Band

3. Back off the adjusting screw exactly 1 3/4 turns.
4. Hold the adjusting screw from turning and torque the lock nut to specification.

LOW-REVERSE BAND

1. Clean all the dirt from the band adjusting screw area. Remove and discard the locknut.
2. Install a new locknut on the adjusting screw with the tools shown in Fig. 14, tighten the adjusting screw until the tool handle clicks. The tool is a pre-set torque wrench which clicks and overruns when the torque on the adjusting screw reaches 10 ft-lbs.
3. Back off the adjusting screw exactly 3 full turns.
4. Hold the adjusting screw from turning and torque the lock nut to specification.

OIL PAN AND CONTROL VALVE BODY REPLACEMENT

1. Raise the vehicle so the transmission oil pan is accessible.
2. Drain the transmission fluid.
If the same fluid is to be used again, filter the fluid through a 100 mesh screen. Re-use the fluid only if it is in good condition.
3. Remove the transmission fluid pan attaching bolts, pan and gasket.
4. Remove the valve body-to-case attaching bolts (Fig. 25). Remove the valve body from the case and the transmission inner control levers.
5. Refer to the Major Repair Operation for control valve body repair operation.
6. Thoroughly clean and remove all the gasket material from the pan and the pan mounting face of the case. Install the valve body to the case, engaging the transmission inner control levers with the valve body manual and downshift valves.
7. Install the eight valve body to case attaching bolts. Torque the bolts to specification. **Operate the external manual and downshift levers to check for proper travel of the valve body manual and downshift valves.**
8. Place a new gasket on the pan. Install the pan and attaching bolts. Torque the bolts to specification. Install the fluid filler tube if it was removed. Torque the attaching nut to specifications.
9. Lower the vehicle and fill the transmission with fluid. Check the transmission pan area for fluid leakage.

INTERMEDIATE SERVO REPLACEMENT

1. Raise the vehicle and remove the four servo cover-to-case attaching bolts.
2. Remove the servo cover, gasket, piston, and piston return spring. Remove the piston from the cover (Fig. 45).
3. Remove the piston seals and cover gasket.
4. Install new piston seals on the piston. Lubricate the piston seals with clean transmission fluid. Install the servo piston in the cover.
5. Install the piston return spring in the case. Place a new gasket on the cover. Install the piston and cover into the transmission case. Use two 5/16 18 x 1 1/4 bolts, 180 degrees apart to position the cover against the case.
6. Install the two servo cover attaching bolts. Remove the two 1 1/4 inch bolts and install two attaching bolts. Torque the bolts to specification.
7. Adjust the intermediate band. Lower the vehicle and check the transmission fluid level.
8. If the band can not be adjusted properly, the struts are not in position. Remove the pan and valve body. Install the struts, valve body, pan, and adjust the band. Refill the transmission with fluid.

LOW-REVERSE SERVO PISTON REPLACEMENT

1. Raise the vehicle on a hoist.
2. Loosen the reverse band adjusting screw lock nut. Tighten the reverse band adjusting screw to 10 ft-lbs torque. (Tightening the screw will insure that the band strut will be held against the case by the band, preventing it from falling down when the reverse servo piston assembly is removed).
3. Remove the four servo cover to case attaching bolts. Remove the identification tag and vent tube retaining clip. Remove the servo cover and seal from the case.
4. Remove the servo piston from the case. **The piston seal cannot be replaced, without replacing the piston. The seal is bonded to the piston.**
5. To remove the piston from the stem, insert a small screw driver in the hole of the piston (Fig. 44). Remove the piston attaching nut.
6. Position the accumulator spring and spacer (Fig. 43) on the piston stem. **Make sure the crowned side of the spring is facing toward the rod.** Install a new piston on the piston retaining shaft. Install the attaching nut. Torque the nut to specification.

7. Install the piston into the case. Install a new seal on the cover. Install the cover by using two 5/16—18 bolts, 1 1/4 inch long, at 180 degrees apart to position the servo cover on the case. Install the vent tube retaining clip and identification tag. Install two cover attaching bolts. Remove the two installing bolts and install the last two attaching bolts. Torque the cover-to-case attaching bolts to specification.

8. Adjust the low-reverse band. Lower the vehicle and check the transmission fluid level.

9. If the band can not be adjusted properly, the struts are not in position. Remove the fluid pan and valve body. Install the struts, valve body, pan and adjust the band. Refill the transmission with fluid.

EXTENSION HOUSING BUSHING AND REAR SEAL REPLACEMENT

1. Disconnect the drive shaft from the transmission.

2. When only the rear seal needs replacing, carefully remove it with a tapered chisel or the tools shown in Fig. 15. Remove the bushing as shown in Fig. 16. **Use the bushing remover carefully so that the spline seal is not damaged.**

3. When installing a new bushing use the special tool shown in Fig. 17.

4. Before installing a new seal, inspect the sealing surface of the universal joint yoke for scores. If scores are found, replace the yoke.

5. Inspect the counterbore of the housing for burrs and remove with crocus cloth.

6. Install the seal into the housing with the tool shown in Fig. 18. The seal should be firmly seated in the bore. Coat the inside diameter of the fiber portion of the seal with B8A-19589-A lubricant.

7. Coat the front universal joint spline with B8A-19589-A lubricant and install the drive shaft.

EXTENSION HOUSING AND GOVERNOR REPLACEMENT

1. Raise the vehicle on the hoist.

2. Remove the drive shaft. Position the transmission jack to support the transmission.

3. Remove the speedometer cable from the extension housing.

4. Remove the extension housing to crossmember mount attaching bolts. Raise the transmission and remove the mounting pad between the extension housing and the crossmember.

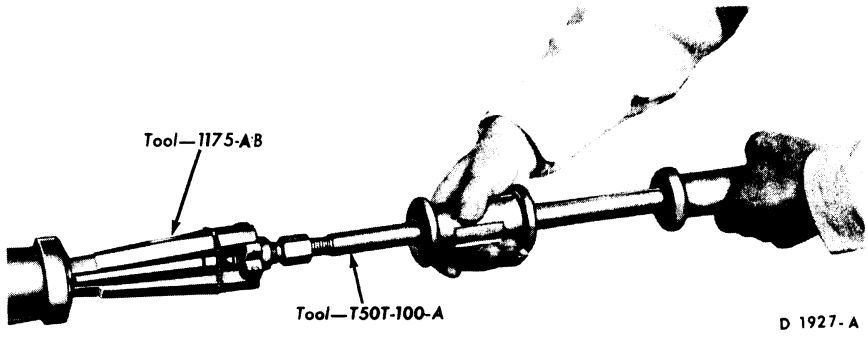


FIG. 15—Removing Extension Housing

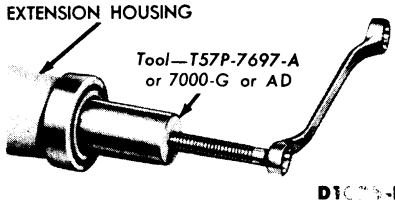


FIG. 16—Removing Extension Housing Bushing

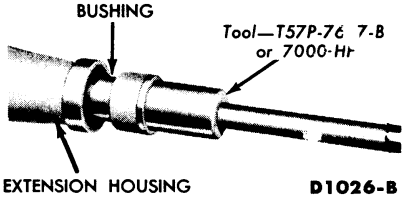


FIG. 17—Installing Extension Housing Bushing

5. Loosen the extension housing attaching bolts to drain the transmission fluid. Disconnect the exhaust inlet pipes at the manifold and lower the inlet pipes.

6. Remove the six extension housing-to-case attaching bolts and remove the extension housing.

7. Remove the governor housing to governor distributor attaching bolts (Fig. 19). Remove the governor housing from the distributor.

8. Refer to Major Repair Operations for governor repair operations.

9. Install the governor housing on the governor distributor (Fig. 19). Install the attaching bolts and torque the bolts to specification.

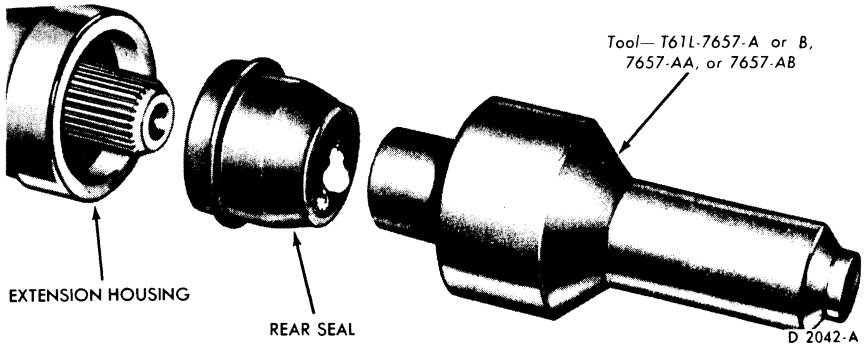


FIG. 18—Installing Extension Housing Seal

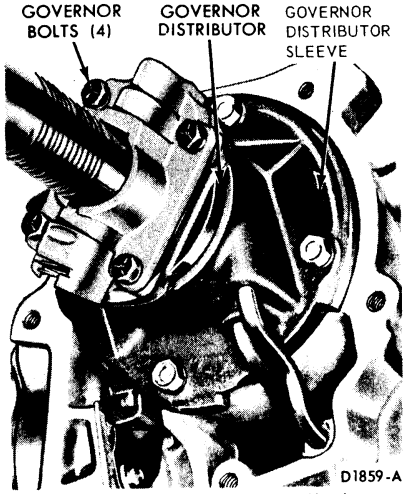


FIG. 19—Governor Installed

10. Install a new extension housing gasket on the case. Install the extension housing and six attaching bolts. Torque the bolts to specification.

11. Install the transmission mounting pad on the crossmember. Lower the transmission and install the extension housing to crossmember attaching bolts. Torque the bolts to specification. Remove the transmission jack.

12. Install the speedometer cable in the extension housing. Install the drive shaft.

13. Install the inlet pipes on the manifold.

14. Lower the vehicle and fill the transmission with fluid.

15. Check the extension housing area for fluid leakage.

3 REMOVAL AND INSTALLATION

An oil impregnated plastic grommet is incorporated in the end of the manual shift linkage lever arm on all column shift vehicles. A special tool T67P-7341-A is required to install the grommet in the manual lever, and to install the manual linkage rod into the grommet. Refer to Part 7-1, Section 2, for the grommet replacement procedures.

TRANSMISSION REMOVAL

1. Raise the vehicle and remove the converter cover attaching bolts, at the lower front side of the converter housing. Remove the cover.
2. Remove the two conveter drain plugs (Fig. 20). Drain the fluid from the converter. Install the two converter drain plugs.
3. Remove the drive shaft and install the extension housing seal replacer tool in the extension housing.
4. Remove the vacuum line hose from the transmission vacuum unit. Disconnect the vacuum line from the retaining clip.
5. Remove the two extension housing-to-crossmember attaching bolts.
6. Remove the speedometer cable from the extension housing.
7. Disconnect the exhaust pipe flange from the manifolds.
8. Remove the parking brake cable from the equalizer lever.
9. Remove the fluid filler tube from the pan and drain the transmission fluid on PEA models. On PEB and PEE models, loosen the transmission pan bolts and drain the fluid at one corner of the pan. Tighten the attaching bolts after the fluid has drained.
10. Disconnect the fluid cooler lines from the transmission case.
11. Remove the manual and kickdown linkage rods from the transmission control levers.

On vehicles equipped with a column shift, use tool T67P-7341-A to remove the selector rod from the manual lever.

12. On a Mustang, disconnect the neutral start switch wires from the retaining clamps and connectors.
13. Disconnect the starter cable. Remove the starter attaching bolts and remove the starter from the converter housing.
14. On PEB and PEE models, lift the fluid filler tube from the case.
15. Remove the four converter-to-flywheel attaching nuts.
16. Position the transmission jack to support the transmission and secure the transmission to the jack with a safety chain.
17. Remove the four crossmember attaching bolts and lower the crossmember.
18. Remove the five converter housing-to-engine attaching bolts. Lower the transmission (Fig. 21) and remove it from under the vehicle.

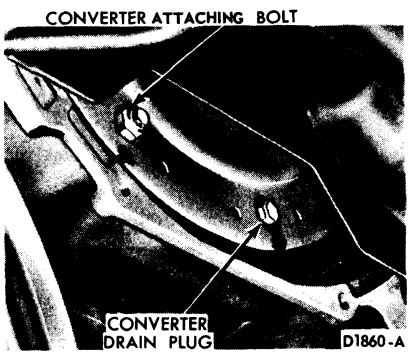


FIG. 20—Converter Drain Plug Location

TRANSMISSION INSTALLATION

1. With the converter properly installed, place the transmission on the jack (Fig. 21). Secure the transmission to the jack with the safety chain.

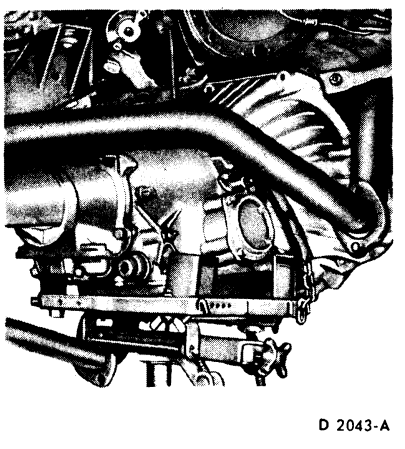


FIG. 21—Transmission Mounted on Jack

2. Raise the transmission into position and install the five converter housing-to-engine attaching bolts. Torque the bolts to specification. Remove the safety chain from the transmission.
3. Position the crossmember and install the four attaching bolts. Torque the bolts to specifications.
4. Lower the transmission and install the extension housing and crossmember attaching bolts. Torque the bolts to specification.
5. Install the four flywheel to converter attaching nuts. Torque the nuts to specification.
6. Remove the transmission jack. Install the fluid filler tube in the transmission case or pan. Install the vacuum hose on the transmission vacuum unit. Install the vacuum line retaining clip.
7. Connect the fluid cooling lines to the transmission case.
8. On a Mustang, connect the neutral start switch wires to their respective connectors and secure the harness in the retaining clamps.
9. Install the linkage rods on the transmission downshift and manual control levers.

On vehicles equipped with a column shift, use tool T67P-7341-A to install a new grommet in the manual lever, and to install the manual linkage rod into the grommet.

10. Connect the speedometer cable to the extension housing.
11. Connect the exhaust inlet pipes to the manifolds.
12. Install and adjust the parking brake cable at the equalizer lever.
13. Install the converter housing cover and torque the attaching bolts to specification.
14. Install the starter and torque the attaching bolts to specification. Connect the starter cable.
15. Install the drive shaft. Torque the companion flange U-bolts attaching nuts to specification.
16. Lower the vehicle. Fill the transmission to the proper level with the specified fluid. Adjust the manual and downshift linkage.

4 MAJOR REPAIR OPERATIONS

Before removing any of the subassemblies, thoroughly clean the outside of the transmission to prevent dirt from entering the mechanical parts. During the repair operations, refer to Part 7-1 for common adjustments and repairs or cleaning and inspection procedures.

During the transmission disassembly or assembly operations, ten thrust washers located between the subassemblies must be removed and installed. It is important that each thrust washer be in the correct position during the assembly operation. To properly locate and identify the thrust washers, the various positions of the thrust washers are shown in the illustrations and are numbered 1 through 10. No. 1 is at the first thrust washer located at the front pump. The last thrust washer, No. 10, is located at the parking pawl ring gear.

DISASSEMBLY OF TRANSMISSION

1. Remove the converter from the transmission front pump and converter housing.

2. Remove the transmission vacuum unit with the tool shown in Fig. 22.

Remove the vacuum unit gasket and the control rod.

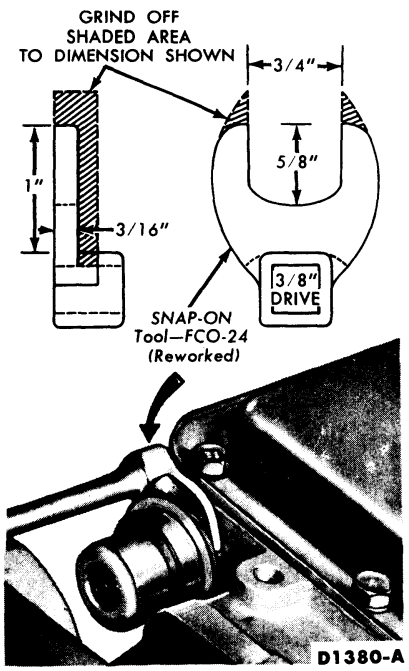


FIG. 22—Removing Vacuum Unit

3. Remove the primary throttle valve (Fig. 23) from the opening at the rear of the case.

4. Remove the two extension housing-to-case bolts shown in Fig. 24 and mount the transmission in the holding fixture.

5. Remove the transmission pan attaching bolts, pan and gasket.

6. Remove the control valve body attaching bolts (Fig. 25). Remove the control valve body from the case.

7. Loosen the intermediate band adjusting screw (Fig. 26) and remove the intermediate band struts from the case. Loosen the low-reverse band adjusting screw and remove the low-reverse band struts.

TRANSMISSION END PLAY CHECK

1. To keep the output shaft in alignment during the end play check, install the extension housing oil seal replacer tool or a front universal joint yoke in the extension housing.

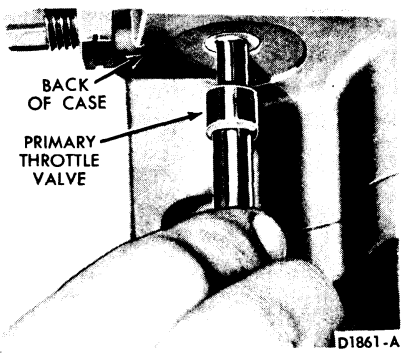


FIG. 23—Removing or Installing Primary Throttle Valve

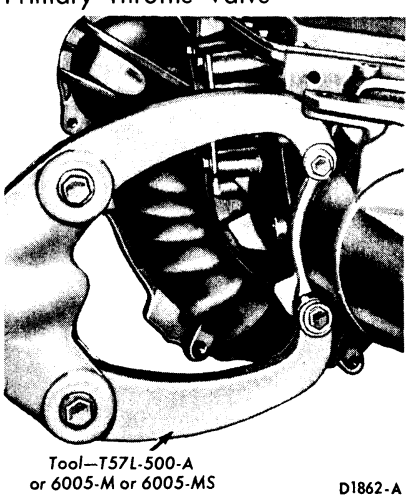


FIG. 24—Transmission Mounted in Holding Fixture

2. Remove one of the converter housing-to-case attaching bolts and mount the dial indicator as shown in Fig. 27.

3. **The input shaft is a loose part and has to be properly engaged with the spline of the forward clutch hub during the end play checking procedure.** Move the input shaft and gear train toward the rear of the transmission case.

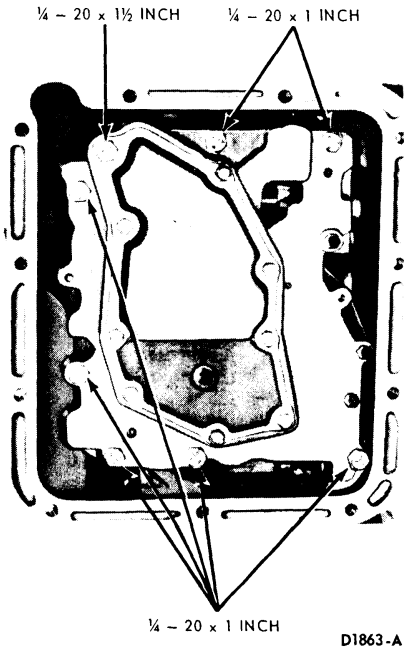


FIG. 25—Control Valve Body Attaching Bolts

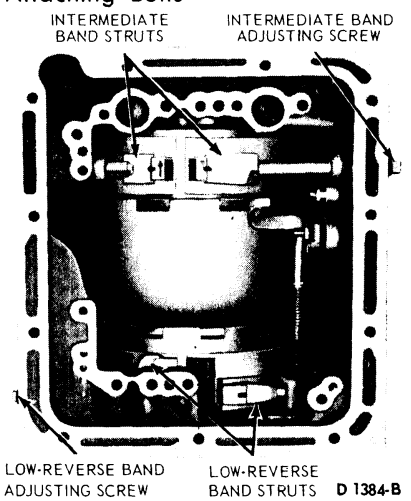


FIG. 26—Band Adjusting Screws and Struts—Typical

4. With the dial indicator contacting the end of the input shaft, set the indicator at zero (Fig. 27).

5. Insert a screwdriver behind the input shell (Fig. 27). Move the input shell and the front part of the gear train forward.

6. Record the dial indicator reading. The end play should be 0.008 to 0.042 inch. If the end play is not within specification, the selective thrust washers (Fig. 28) must be replaced as required. The selective thrust washers can be replaced individually to obtain the specified end play.

7. Remove the dial indicator and remove the input shaft from the front pump stator support (Fig. 29).

REMOVAL OF CASE AND EXTENSION HOUSING PARTS

1. Rotate the holding fixture to put the transmission in a vertical position with the converter housing up.

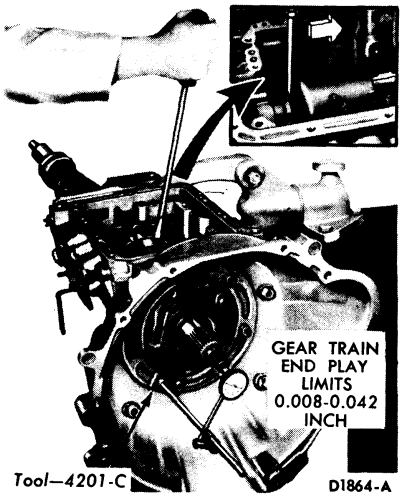


FIG. 27—Checking End Play

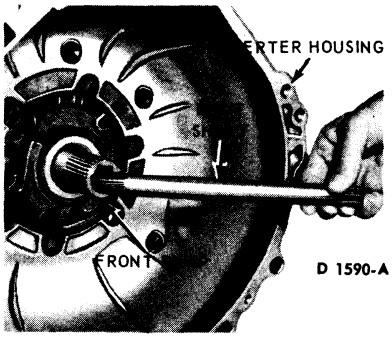


FIG. 29—Removing or Installing Input Shaft

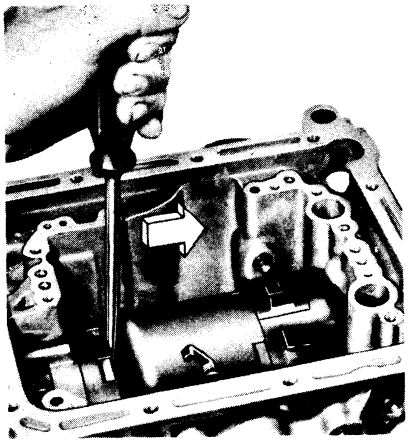


FIG. 30—Removing Front Pump



FIG. 31—Position of Intermediate Band for Removal or Installation

SELECTIVE THRUST WASHERS
(FOR END-PLAY CORRECTION)

THRUST WASHER NO. 1		THRUST WASHER NO. 2	
0.053-0.0575	Red	No. Stamped Washer	Metal Thrust Washer
0.070-0.074	Green		
0.087-0.091	Natural		
0.104-0.108	Black		
0.121-0.125	Yellow	5	0.109-0.107
		4	0.092-0.090
		3	0.075-0.073
		2	0.058-0.056
		1	0.043-0.041
		Metal Thrust Washers are Same	

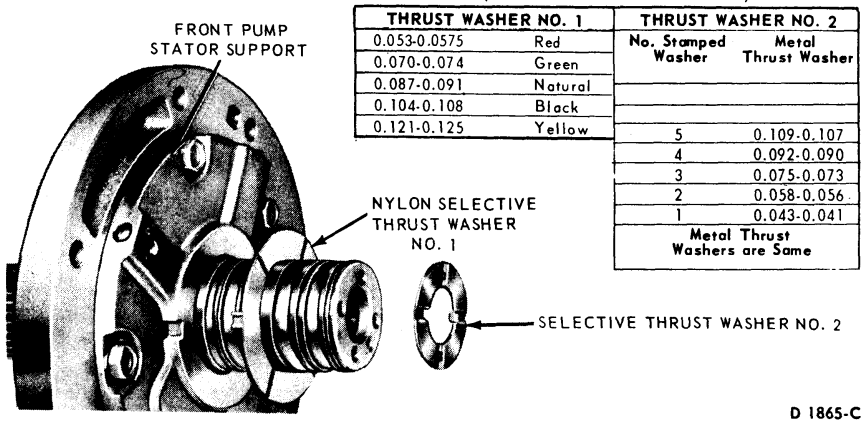


FIG. 28—Selective Thrust Washer Locations

2. Remove the five converter housing-to-case attaching bolts (Fig. 29). Remove the converter housing from the transmission case.

3. Remove the seven front pump at-

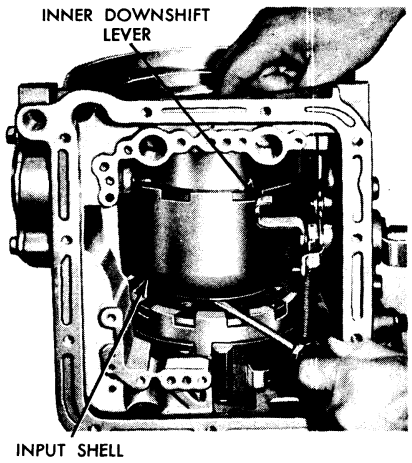


FIG. 32—Lifting Input Shell and Gear Train

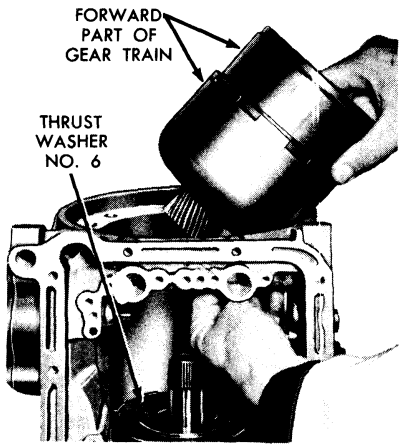


FIG. 33—Removing or Installing Forward Part of Gear Train



FIG. 34—Forward Part of Gear Train Positioned in Holding Fixture

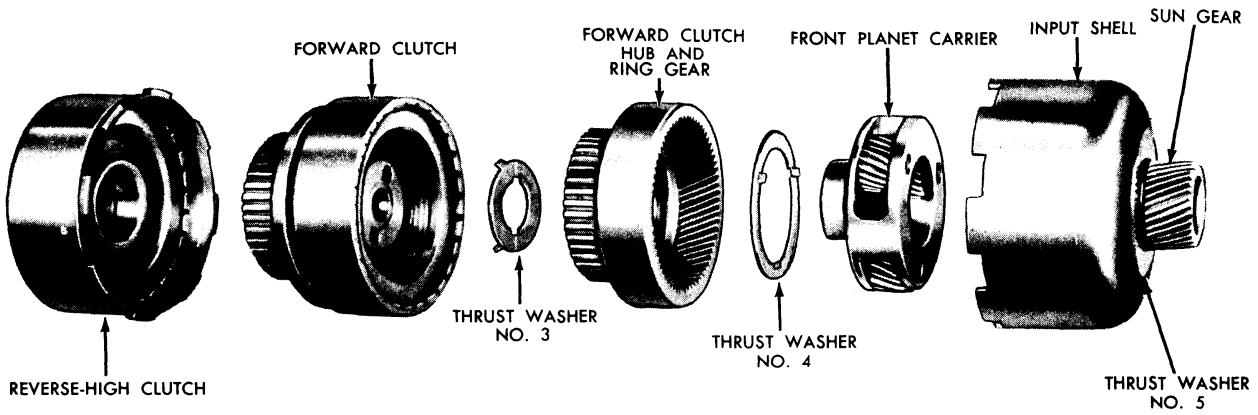


FIG. 35—Forward Part of Gear Train Disassembled

taching bolts. Remove the front pump by inserting a screwdriver behind the input shell (Fig. 30). Move the input shell forward until the front pump seal is above the edge of the case.

Remove the front pump and gasket from the case. If the selective thrust washer No. 1 did not come out with the front pump, remove it from the top of the reverse-high clutch.

4. Remove the intermediate and low-reverse band adjusting screws from the case. Rotate the intermediate band to align the band ends with the clearance hole in the case (Fig. 31). Remove the intermediate band from the case.

5. Using a screwdriver between the input shell and rear planet carrier (Fig. 32), lift the input shell upward and remove the forward part of the gear train as an assembly (Fig. 33).

6. Place the forward part of the gear train in the holding fixture shown in Fig. 34.

7. From the gear train in the holding fixture, remove the reverse-high clutch and drum from the forward clutch (Fig. 35).

8. If thrust washer No. 2 (Fig. 28) did not come out with the front pump, remove the thrust washer from the forward clutch cylinder. Remove the forward clutch from the forward clutch hub and ring gear (Fig. 35).

9. If thrust washer No. 3 (Fig. 35) did not come out with the forward clutch, remove the thrust washer from the forward clutch hub.

10. Remove the forward clutch hub and ring gear from the front planet carrier (Fig. 35).

11. Remove thrust washer No. 4 and the front planet carrier from the input shell.

12. Remove the input shell, sun gear and thrust washer No. 5 from the holding fixture.

13. From inside the transmission case (Fig. 33) remove thrust washer No. 6 from the top of the reverse planet carrier.

14. Remove the reverse planet carrier and thrust washer No. 7 from the reverse ring gear and hub (Fig. 36).

15. Move the output shaft forward and with the tool shown in Fig. 37 remove the reverse ring gear hub-to-output shaft retaining ring.

16. Remove the reverse ring gear and hub from the output shaft. Remove thrust washer No. 8 from the low and reverse drum.

17. Remove the low-reverse band from the case (Fig. 38).

18. Remove the low-reverse drum from the one-way clutch inner race (Fig. 36).

19. Remove the one-way clutch inner race by rotating the race clockwise as it is removed.

20. Remove the 12 one-way clutch rollers, springs and the spring retainer from the outer race (Fig. 36). **Do not lose or damage any of the 12 springs**

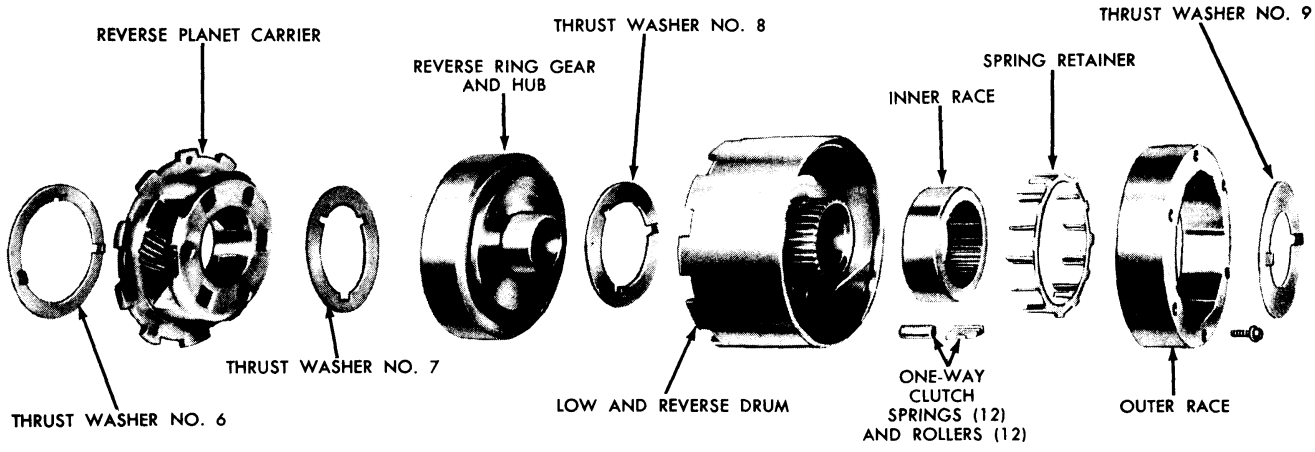


FIG. 36—Lower Part of Gear Train Disassembled

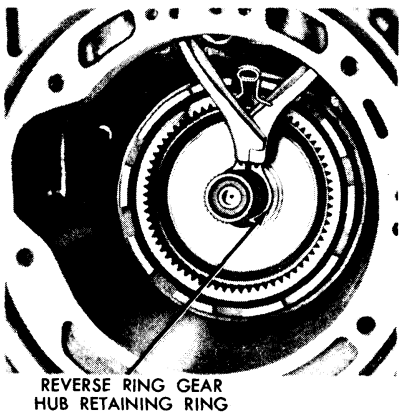


FIG. 37—Removing or Installing Reverse Ring Gear Hub Retaining Ring

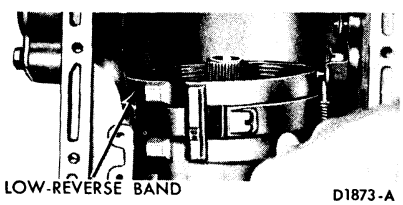


FIG. 38—Removing or Installing Low-Reverse Band

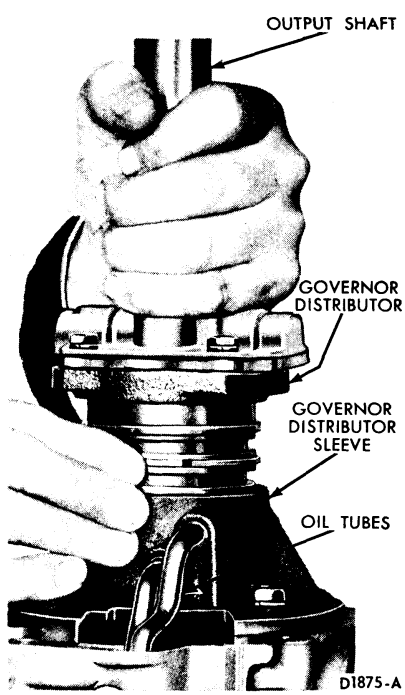


FIG. 39—Removing or Installing Output Shaft and Governor Distributor

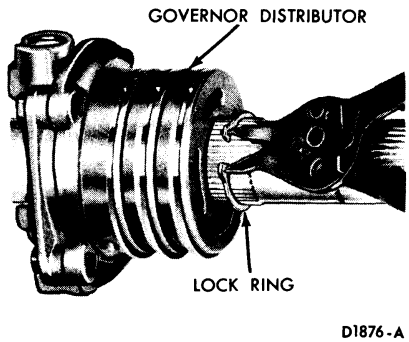


FIG. 40—Removing or Installing Governor Distributor Snap Ring

or rollers. The outer race of the one-way clutch cannot be removed from the case until the extension housing, output shaft and governor distributor sleeve are removed.

21. Remove the transmission from the holding fixture. Position the transmission on the bench in a vertical position with the extension housing up. Remove the four extension housing-to-case attaching bolts. Remove the extension housing and gasket from the case.

22. Pull outward on the output shaft and remove the output shaft and governor distributor assembly from the governor distributor sleeve (Fig. 39).

23. Remove the governor distributor lock ring from the output shaft (Fig. 40). Remove the governor distributor from the output shaft.

24. Remove the four distributor sleeve-to-case attaching bolts. Remove the distributor sleeve from the case. **Do not bend or distort the fluid tubes as the tubes are removed from the case with the distributor sleeve.**

25. Remove the parking pawl return spring, pawl, and pawl retaining pin from the case (Fig. 41).

26. Remove the parking gear and thrust washer No. 10 from the case.

27. Remove the six one-way clutch outer race-to-case attaching bolts with the tool shown in Fig. 42. As the bolts are removed, hold the outer race located inside the case in position. Remove the outer race and thrust washer No. 9 from the case (Fig. 36).

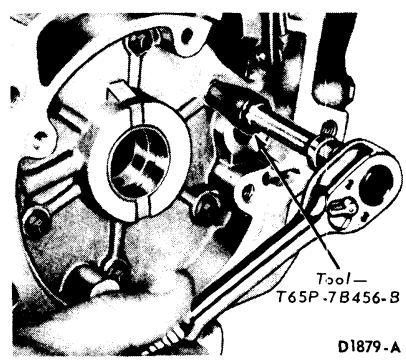


FIG. 42—Removing One-Way Clutch Outer Race Attaching Bolts

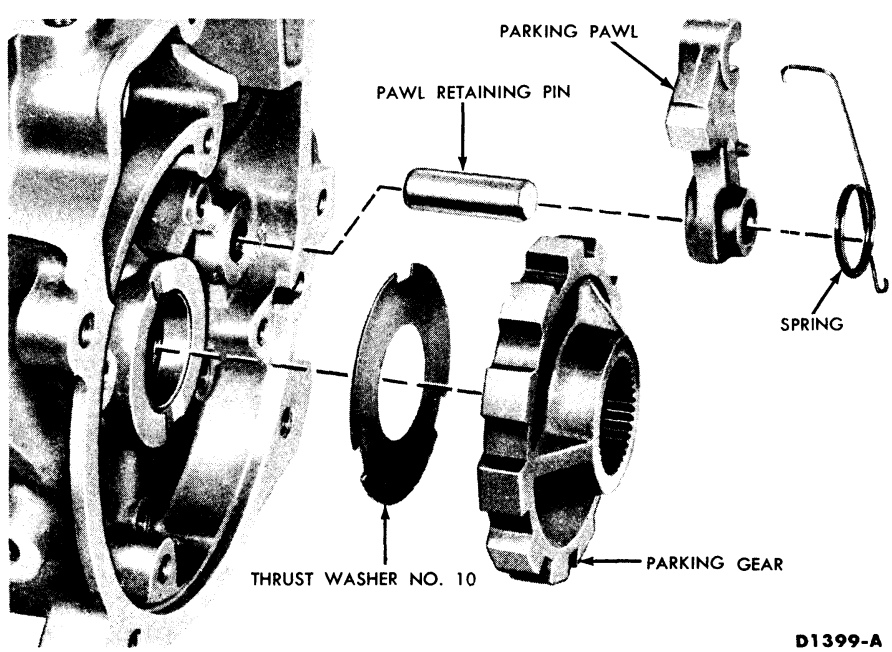


FIG. 41—Parking Pawl, Return Spring Retaining Pin and Gear

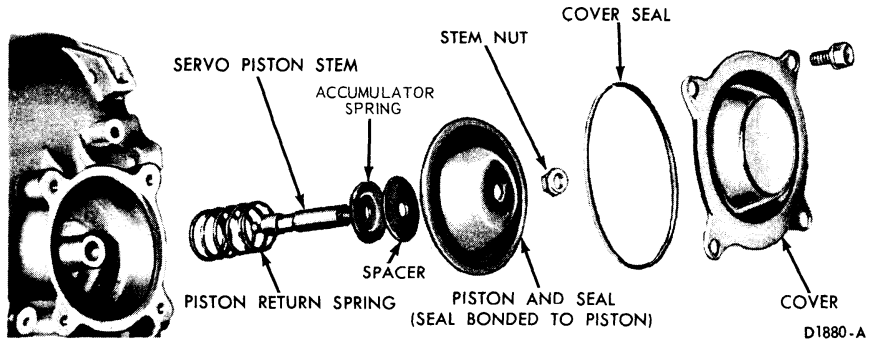


FIG. 43—Low-Reverse Servo Disassembled

PARTS REPAIR OR REPLACEMENT

During the repair of the sub-assemblies, certain general instructions which apply to all units of the transmissions must be followed. These instructions are given here to avoid unnecessary repetition.

Handle all transmission parts carefully to avoid nicking or burring the bearing or mating surfaces.

Lubricate all internal parts of the transmission before assembly with clean automatic transmission fluid. **Do not use any other lubricants except on gaskets and thrust washers which may be coated with vaseline to facilitate assembly.** Always install new gaskets when assembling the transmission.

Tighten all bolts and screws to the recommended torque as outlined in the Specification Section.

TRANSMISSION CASE AND LINKAGE REPAIR

Low-Reverse Servo

1. Remove the four servo cover-to-case attaching bolts. Remove the vent tube and retaining clip from the case.

2. Remove the servo cover, cover seal, servo piston and piston return spring from the case (Fig. 43).

3. The servo piston seal is bonded to the piston. If the seal has to be replaced, replace the piston assembly which includes the seal. Disassemble the servo piston from the piston stem by inserting a small screwdriver in the hole of the piston stem and removing the piston attaching nut (Fig. 44).

Position the accumulator spring and spacer (Fig. 43) on the piston stems. **Make sure the crowned side of the spring is facing toward the rod.** Install the new servo piston and attaching nut on the stem, torque the nut to specification.

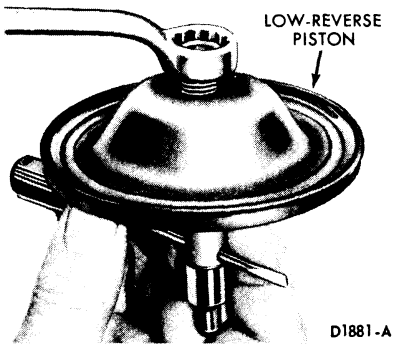


FIG. 44—Removing or Installing Low-Reverse Servo Piston

4. Place the piston return spring in the servo bore of the case. Lubricate the piston seal with clean transmission fluid and install the servo pistion into the bore of the case.

5. Place a new cover seal on the cover and install the servo cover. Install the vent tube and retaining clip. Install the four cover attaching bolts. Torque the cover-to-case retaining bolts to specifications.

Intermediate Servo

1. Remove the transmission identification tag and the four servo cover to case attaching bolts.

2. Remove the servo cover, gasket, servo piston, and piston return spring from the case (Fig. 45).

3. Remove the intermediate servo piston from the cover.

4. Remove the seal rings from the servo piston and cover.

5. Install a new seal on the cover and servo piston. Figure 46 shows the correct servo piston and cover for each transmission model. Lubricate the seals with clean transmission fluid. Install the piston into the cover. Be careful not to damage the piston seal.

6. Install the piston return spring in the servo bore of the case.

7. Place a new gasket on the servo cover. Position the servo piston and cover assembly into the case with the piston stem slot in a horizontal position to engage the strut. Use two 5/16-18 bolts, 1 1/4 inch long, 180 degrees apart, to position the cover against the case. Install two cover attaching bolts. Remove the two 1 1/4

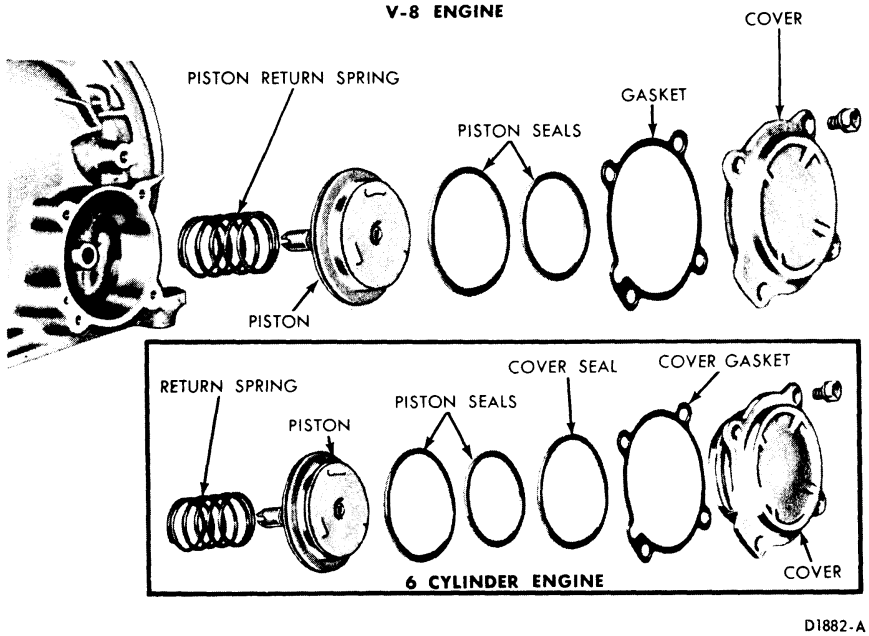
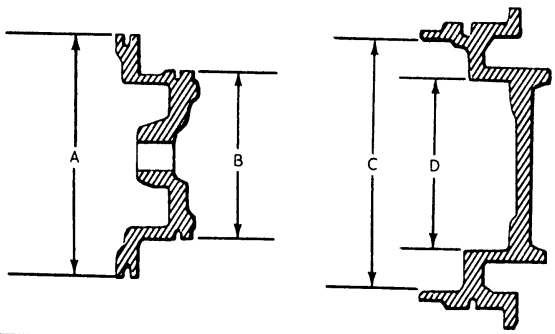


FIG. 45—Intermediate Servo Disassembled



Vehicle	Engine	Transmission	Servo Piston		Servo Cover		Spring	
			Dia. A	Dia. B	Dia. C	Dia. D	Free Length (Inches)	Color Code
Ford, Meteor	302–2V	PEA–M1, N1	3.7875	2.8265	None	2.840	2.480	White
Fairlane, Montego, Falcon, Mustang	302–2V	PEE–M, V, AC						
Ford, Meteor	240–1V	PEA–A2	3.7875	2.7065	None	2.975	2.480	White
Fairlane, Montego, Mustang	250–1V	PEE–AD, AE, AF						
Mustang	200–1V	PEB–B2	3.3265	2.4865	3.340	2.500	2.480	White
Falcon	170–1V 200–1V	PEB–C2						

D 1800-D

FIG. 46—Intermediate Servo Piston, Cover and Spring Identification

inch bolts and install the transmission identification tag and the other two cover attaching bolts. Torque the bolts to specifications.

Downshift and Manual Linkage

1. Apply penetrating oil to the outer lever attaching nut to prevent breaking the inner lever shaft. Remove the downshift outer lever nut. Remove the downshift outer and inner lever. From inside the transmission case, remove the upper retaining ring from the manual lever link (Fig. 47). Remove the upper end of the lever link from the case retaining pin.

2. From the back of the transmission case, remove the upper retaining ring and flat washer from the parking pawl link (Fig. 48). Remove the pawl link from the case retaining pin.

3. From the back of the transmission case, remove the parking pawl link, toggle rod, and manual lever link as an assembly (Fig. 49).

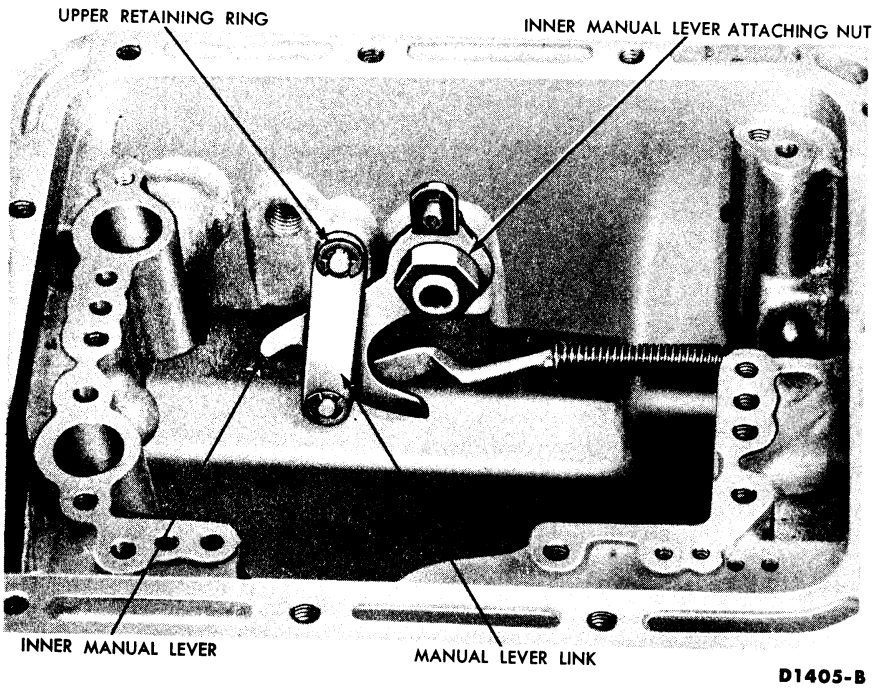


FIG. 47—Case Internal Linkage

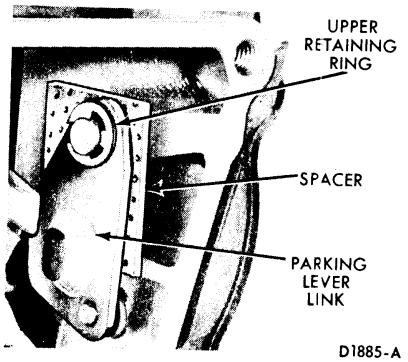


FIG. 48—Parking Pawl Link

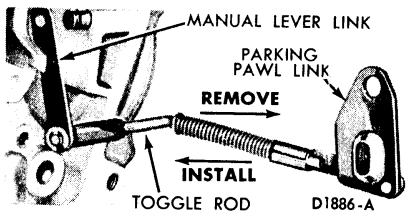


FIG. 49—Removing or Installing Parking Pawl Link

4. Remove the rear parking pawl link lower retaining ring, flat washer and link from the toggle rod (Fig. 50).

5. Remove the manual lever link, lower retaining ring, flat washer, and link from the toggle rod.

6. Install the manual and parking pawl links, flat washers and retaining rings to the toggle rods.

7. Remove the inner manual lever attaching nut and lever. Remove the outer manual lever from the case.

8. To remove the manual lever seal, use the tools shown in Fig. 51. To install the new seal, use a driver that fits the ID of the seal.

9. Install the outer manual lever in the case. Install the inner manual lever and attaching nut with the chamfer facing toward the lever (Fig. 47). Torque the nut to specification.

10. From the back of the transmission case, install the parking toggle rod and link assembly into the case (Fig. 49).

11. Install the parking pawl link on the case retaining pin. Install the flat washer and link retaining ring (Fig. 48).

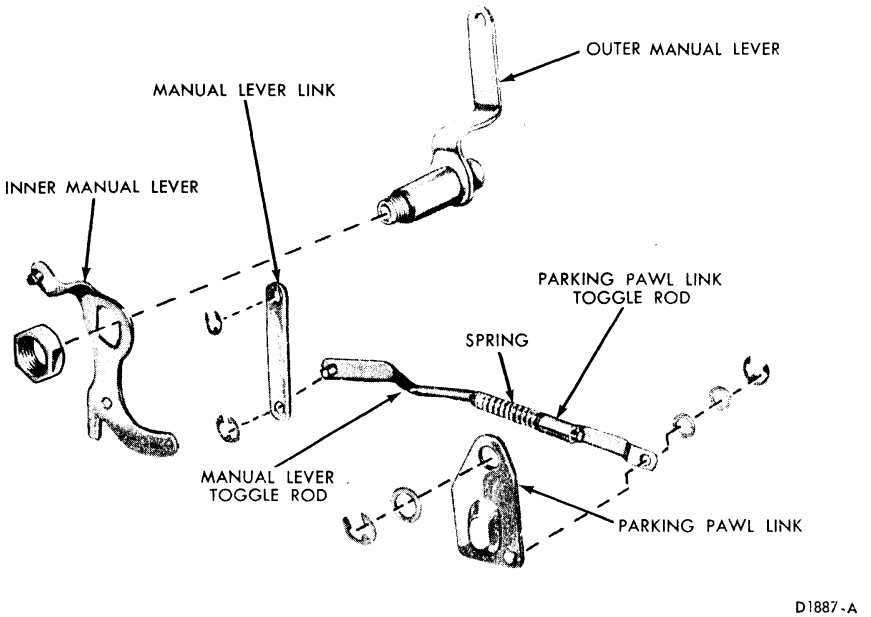


FIG. 50—Case Linkage

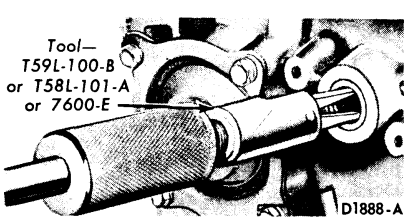


FIG. 51—Removing Manual Lever Seal

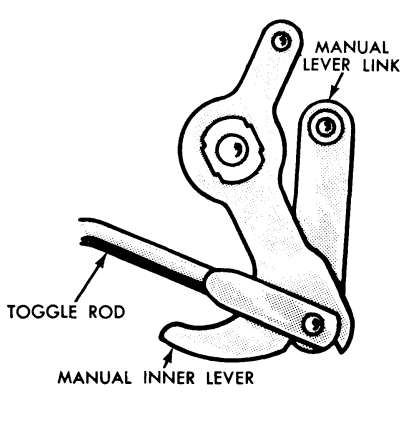


FIG. 52—Inner Manual Lever Location—As Viewed from the Control Lever Side of Case

12. Position the inner manual lever behind the manual lever link, **with the cam on the lever contacting the lower link pin (Fig. 52).**

13. Install the upper end of the manual lever link on the case retaining pin. Install the retaining ring.

14. Operate the manual lever and check for correct linkage operation.

15. Install the inner and outer downshift levers. Torque the attaching nut to specification.

Bushing Replacement—Case

1. Remove the transmission case bushing as shown in Fig. 53.

2. Install the transmission case bushing with the tool shown in Fig. 53.

Thread Repair-Case

Thread service kits may be purchased from local jobbers or the Heli-Coil Corporation. To repair a damaged thread, the following procedures should be carefully followed.

1. Drill out the damaged threads, **using the same drill size as the thread OD.** For example, use a 5/16-inch drill for a 5/16-18 thread.

2. Select the proper **special** tap and tap the drilled hole. The tap is marked for the size of the thread being repaired. Thus, the special tap marked 5/16-18 will not cut the same thread as a standard 5/16-18 tap. It does cut a thread large enough to accommodate the insert, and after the insert is installed the original thread size (5/16-18) is restored.

3. Select the proper coil inserting tool. These tools are marked with the thread size being repaired. Place the insert on the tool and adjust the sleeve to the length of the insert being used.

Press the insert against the face of the tapped hole. Turn the tool clockwise and wind the insert into the hole until the insert is 1/2 turn below the face.

4. Working through the insert, bend the insert tang straight up and down until it breaks off at the notch.

5. If the inserts are not properly installed, they can be removed with the extractor tool. Place the extractor tool in the insert so that the blade rests against the top coil 1/4 to 1/2 turn away from the end of the coil. Tap the tool sharply with a hammer so that the blade cuts into the insert.

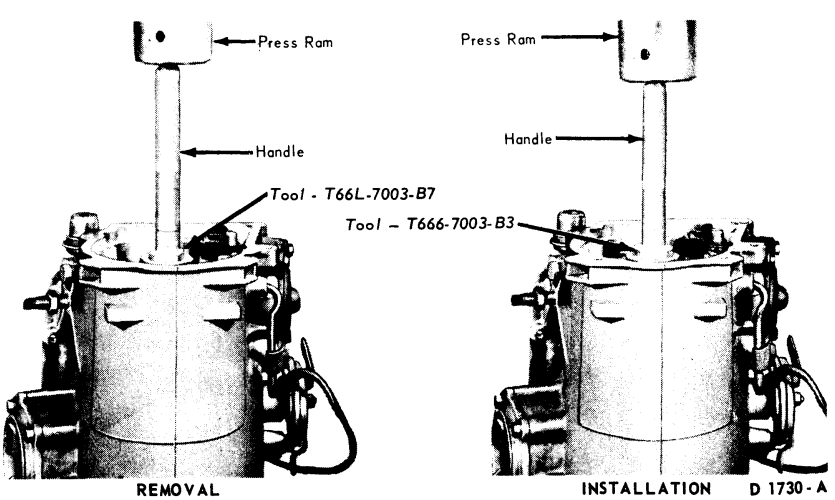


FIG. 53—Replacing Transmission Case Bushing

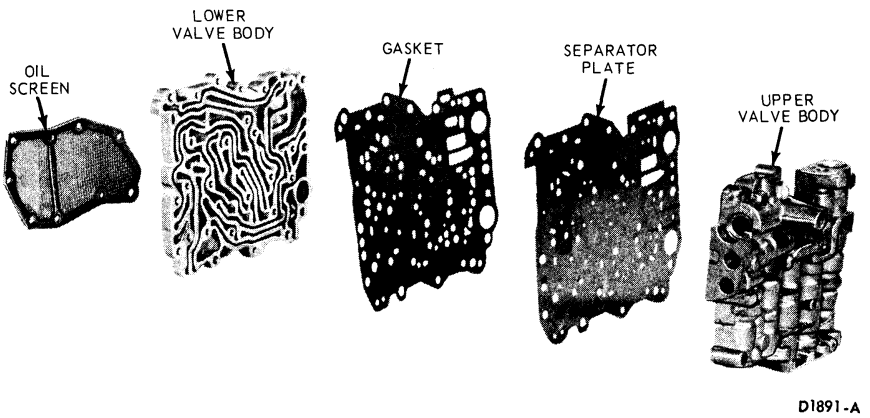


FIG. 54—Upper and Lower Valve Bodies Disassembled

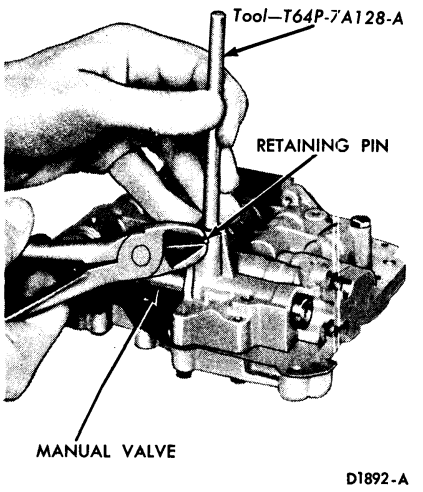


FIG. 56—Removing Manual Valve

Exert downward pressure on the tool and turn it counterclockwise until the insert is removed.

CONTROL VALVE BODY

Disassembly

1. Remove the eight screws that attach the oil screen to the body and remove the screen (Fig. 54).

2. Remove the seven attaching screws from the underside of the lower valve body. Separate the lower valve body, gasket, separator plate and hold-down plates (Fig. 55) from the upper valve body. Be careful not to lose the upper valve body steel ball shuttle valve and spring when separating the upper and lower valve bodies.

3. Depress the manual valve detent spring with the tool shown in Fig. 56. Remove the spring retaining pin (roll pin) from the upper valve body. Remove the spring and detent plunger.

4. Slide the manual valve out of the body.

5. Remove the cut-back and the back-out valve cover plate from the valve body (Fig. 57).

6. Remove the cut-back valve from the body.

7. Remove the 2-3 back-out valve, spring and the manual low valve from the body.

8. Remove the 1-2 shift valve and 2-3 shift valve cover plate from the valve body.

9. Remove the 2-3 shift valve and the throttle modulator valve from the body.

10. Remove the 1-2 shift valve, D2 valve and the spring from the body.

11. Remove the intermediate band accumulator valve cover plate from the valve body.

12. Remove the intermediate accumulator sleeve, 3-2 control valve, spring and the intermediate servo accumulator valve.

13. Remove the pressure booster valve, cover plate (Fig. 57).

14. Remove the pressure booster valve, sleeve, springs and the main regulator valve.

15. Remove the spring and the line pressure coasting boost valve (Fig. 57).

16. Carefully pry the downshift valve retainer from the body, then remove the spring and valve.

17. Hold the upper valve body as shown in Fig. 58 and depress the throttle booster valve plug to release the retaining pin. Remove the plug, valve and the spring.

18. Remove the two hold-down plates and the separator plate from the lower body. Be careful not to lose the rubber ball shuttle valve when removing the separator plate and gasket from the lower valve body.

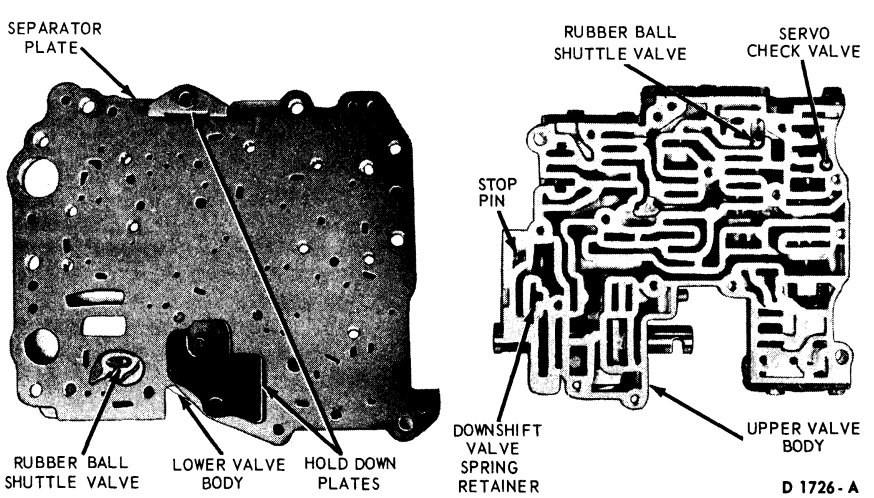


FIG. 55—Separating Upper and Lower Valve Bodies

Assembly

1. Place the rubber ball shuttle valve in the lower body as shown in Fig. 55. Position the separator plate and the two hold-down plates on the lower valve body and install the four attaching screws and torque them to specification.

2. Place the throttle booster valve spring, valve (long end into spring) and the plug (Fig. 57). Depress the plug and install the retaining pin.

3. Insert the downshift valve into the body with the large diameter facing inward. Install the downshift valve spring and the retainer (Fig. 57).

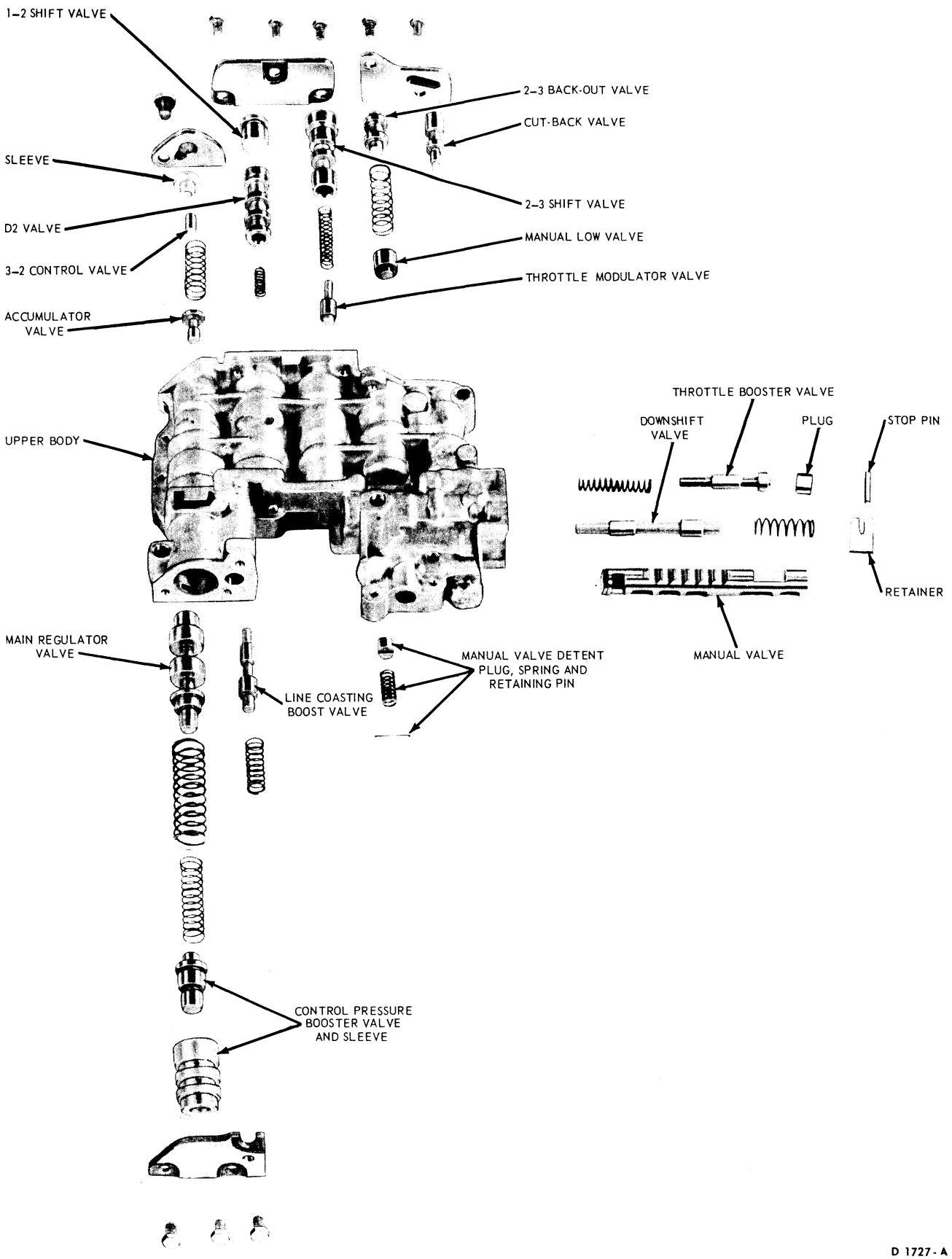


FIG. 57—Upper Valve Body Disassembled

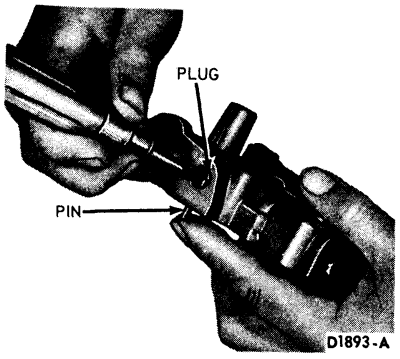


FIG. 58—Removing or Installing Throttle Booster Valve

4. Insert the line pressure coasting boost valve and spring in the body (Fig. 57).

5. Place the main regulator valve in the body (Fig. 57) with the large diameter facing inward. Install the two springs and the pressure booster valve and sleeve.

6. Hold the pressure booster valve cover plate in place and install the three attaching screws and torque them to specification.

7. Place the intermediate servo accummulator valve and spring in the body. Install the intermediate accummulator sleeve and 3-2 control valve. Secure the cover to the body with the attaching screw. Torque the screw to specifications.

8. Position the spring, D2 valve and the 1-2 shift valve in the body.

9. Place the throttle modulator valve, spring, and 2-3 shift valve in the body.

10. Secure the 1-2 shift valve and the 2-3 valve cover plate to the body and torque the screws to specifications.

11. Place the manual low valve, spring, and the 2-3 back-out valve in the body.

12. Place the cut-back valve in the body.

13. Secure the cut-back and the back-out cover plate to the body with two screws. Torque the screws to specifications.

14. Slide the manual valve into the body making sure that the notch for the manual lever is toward the inside and that the detent notches are facing upward.

15. Place the detent plunger and spring in the body. Depress the spring and install a new roll pin.

16. Position a new rubber check valve in the upper valve body (Fig. 55).

17. Position the check valve and spring in the upper valve body (Fig. 55). Place a new gasket, the separator plate and the lower valve body in place on the upper valve body and secure it with the seven attaching screws. Torque the screws to specifications.

18. Secure the oil screen to the body with the eight attaching screws. Torque the screws to specifications.

FRONT PUMP

Disassembly

1. Remove the four seal rings from stator support.

2. Remove the five bolts that attach the stator support to the front pump housing. Remove the stator support from the pump housing (Fig. 59).

3. Remove the front and rear stator bushings if they are worn or damaged. Use the cape chisel (Fig. 60) and cut along the bushing seam until the chisel breaks through the bushing wall. Pry the loose ends of the bushing up with an awl and remove the bushing.

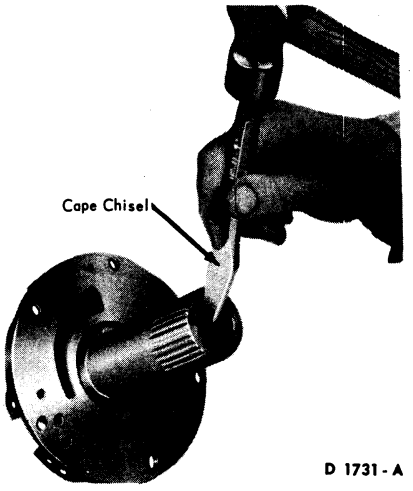


FIG. 60—Removing Stator Support Bushing

4. Remove the drive and driven gears from the front pump housing.

5. Press the bushing from the front pump housing as shown in Fig. 61.

Assembly

1. Press a new bushing into the pump housing with the handle and tool shown in Fig. 61. Make sure the bushing is installed with the slot and groove positioned to the rear of the pump body and 60 degrees below the horizontal center line.

2. Install the drive and driven gears in the pump housing. Each gear has an identification mark on the side of the gear teeth that are chamfered. The chamfered side with the identification

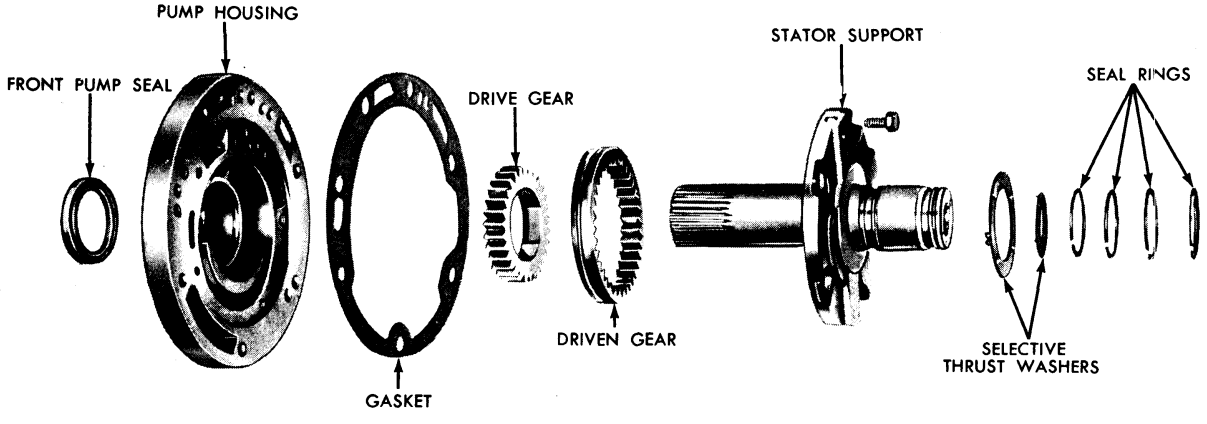


FIG. 59—Front Pump and Stator Support Disassembled

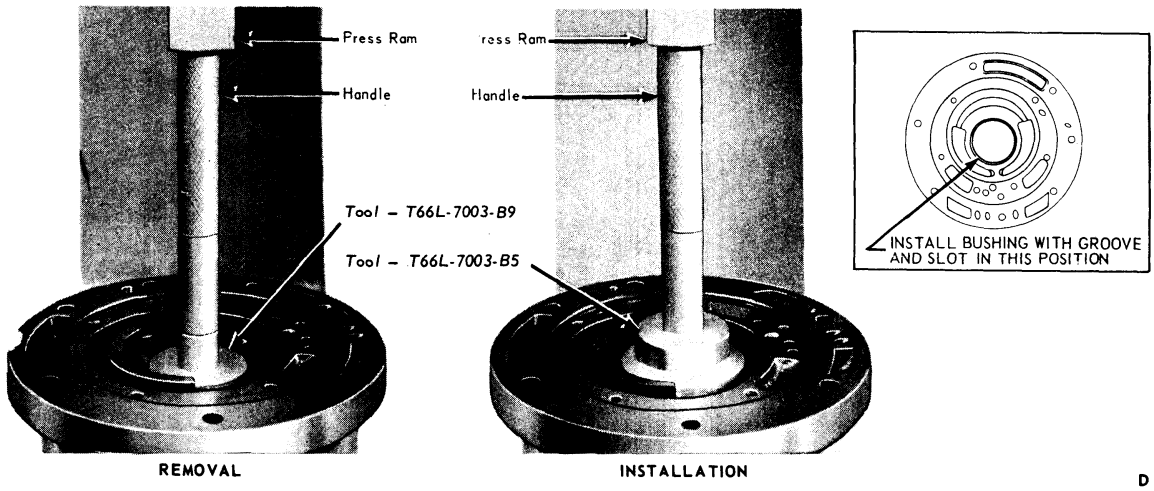


FIG. 61—Replacing Front Pump Housing Bushing

mark has to be positioned downward against the face of the pump housing.

3. Press new bushings into the stator support with the tool shown in Fig. 62. Use the end with the 1/8 inch step for the front bushing and the end with the 1/4 inch step for the rear bushing. **When installing the rear bushing, be sure the hole in the bushing is lined up with the lube hole in the stator support.**

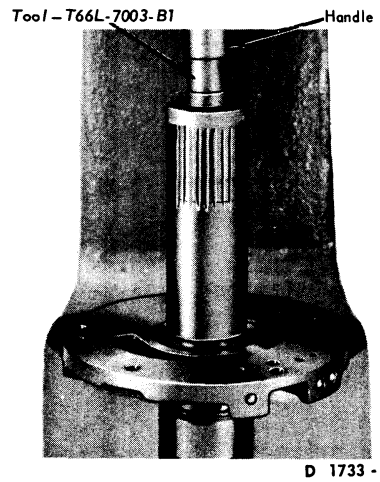


FIG. 62—Installing Stator Support Bushings

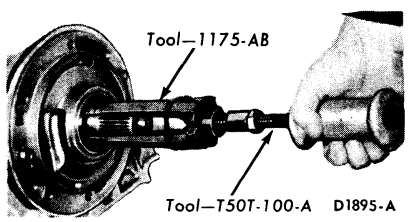


FIG. 63—Removing Front Pump Seal

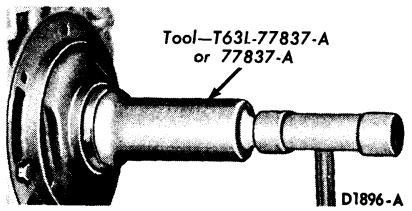


FIG. 64—Installing Front Pump Seal

4. Place the stator support in the pump housing and install the five attaching bolts. Torque the bolts to specifications.

5. Install the four seal rings on the stator support. The two large oil rings are assembled first in the oil ring grooves toward the front of the stator support (Fig. 59).

6. Check the pump for free rotation by placing the pump on the converter drive hub in its normal running position and turning the pump housing.

7. If the front pump seal must be replaced, mount the pump in the transmission case and remove the seal with the tool shown in Fig. 63. To install the new seal, use the tool shown in Fig. 64.

REVERSE-HIGH CLUTCH

Disassembly

1. Remove the pressure plate retaining snap ring (Fig. 65).

2. Remove the pressure plate, and the drive and driven clutch plates (Fig. 66). If the composition clutch plates are to be reused, do not clean them in a vapor degreaser or with a detergent solution. Wipe the plates with a lint-free cloth.

3. To remove the piston spring retainer snap ring, place the clutch hub in the arbor press. With the tools shown in Fig. 67, compress the piston return springs and remove the snap ring. When the arbor press ram is released, guide the spring retainer to clear the snap ring groove of the drum.

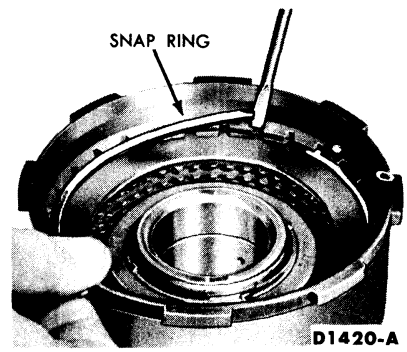


FIG. 65—Removing or Installing Reverse-High Pressure Plate Snap Ring

4. Remove the spring retainer and 10 piston return springs.

5. Remove the piston by inserting air pressure in the piston apply hole of the clutch hub (Fig. 68).

6. Remove the piston outer seal from the piston and the piston inner seal from the clutch drum (Fig. 66).

7. Remove the drum bushing if it is worn or damaged. Use the cape chisel (Fig. 69) and cut a shallow groove 3/4 inch in length along the bushing seam until the chisel breaks through the bushing wall. Pry the loose ends of the bushing up with an awl and remove the bushing. **To prevent leakage**

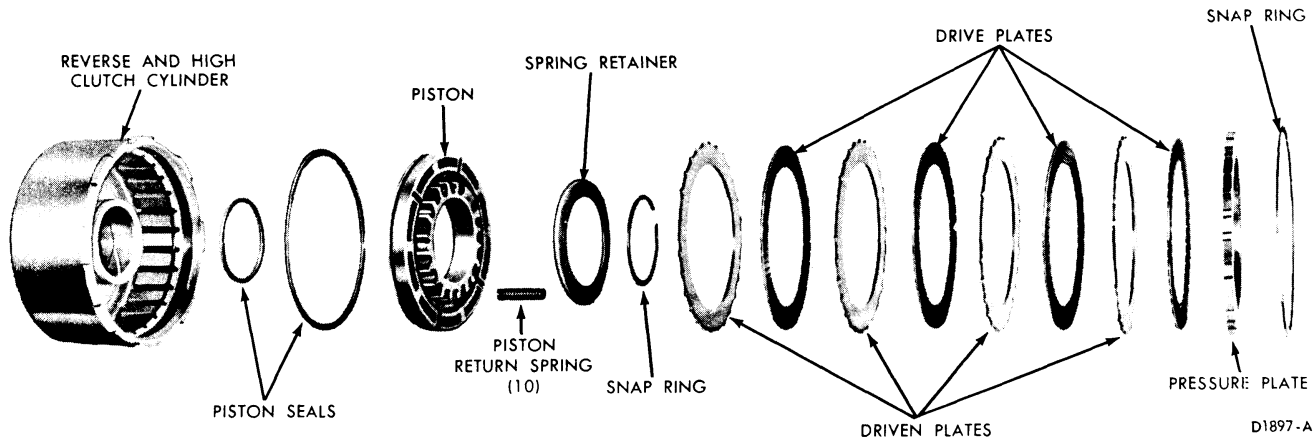


FIG. 66—Reverse-High Clutch Disassembled

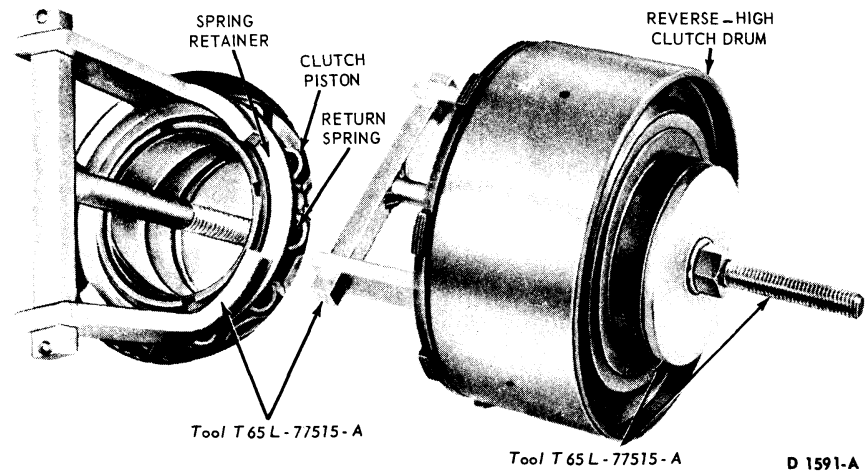


FIG. 67—Removing or Installing Reverse-High Clutch Piston Spring Snap Ring

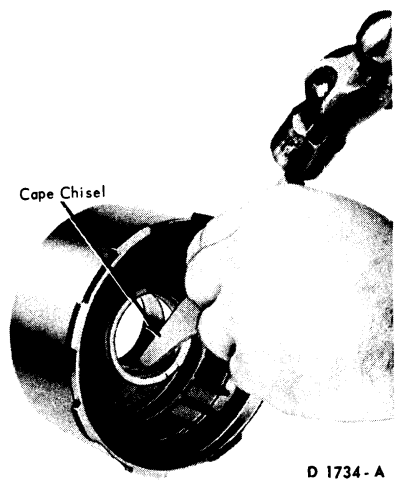


FIG. 69—Removing Reverse-High Clutch Bushing

at the stator support O-rings, be careful not to nick or damage the hub surface with the chisel.

Assembly

1. Position the drum in a press and press a new bushing into the drum with the handle and tool shown in Fig. 70.

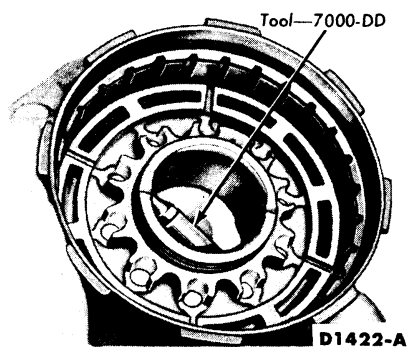


FIG. 68—Removing Reverse-High Clutch Piston

2. Install a new inner seal in the clutch drum and a new outer seal on the clutch piston. Lubricate the seals with clean transmission fluid and install the piston into the clutch drum.

3. Place the 10 clutch piston springs into position on the clutch piston. Place the spring retainer on top of the springs. To install the snap ring use the tools shown in Fig. 67.

As the press ram is moved downward, make sure the spring retainer is centered to clear the drum. Install the snap ring. **Before the press ram is released make sure the snap ring is positioned inside of the four snap ring guides on the spring retainer.**

4. When new composition clutch plates are used, soak the plates in transmission fluid for fifteen minutes

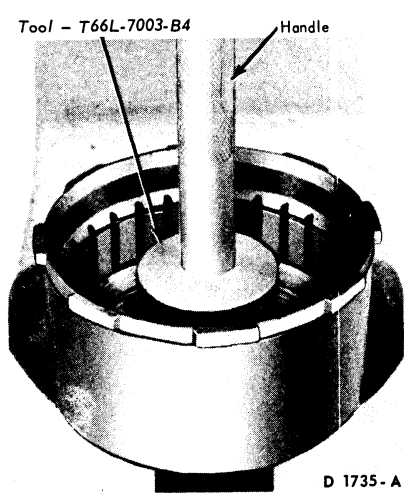


FIG. 70—Installing Reverse-High Clutch Bushing

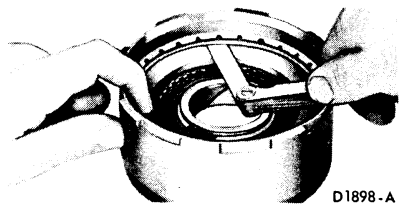


FIG. 71—Checking Reverse-High Clutch Snap Ring Clearance

before installing them. Install the clutch plates alternately starting with a steel plate, then a non-metallic plate (Fig. 66). The last plate installed is the pressure plate. For the correct number of clutch plates required for each transmission model, refer to Part 7-5.

5. Install the pressure plate retaining snap ring (Fig. 66). Make sure the snap ring is fully seated in the snap ring groove of the clutch hub.

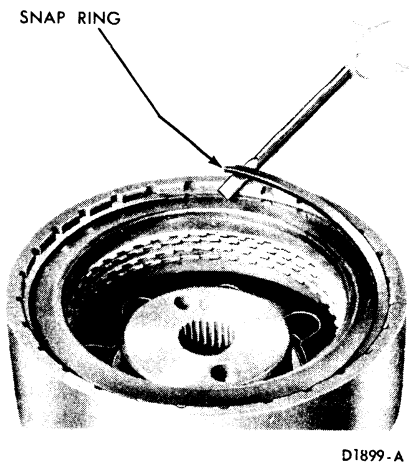


FIG. 72—Removing or Installing Forward Clutch Pressure Plate Snap Ring

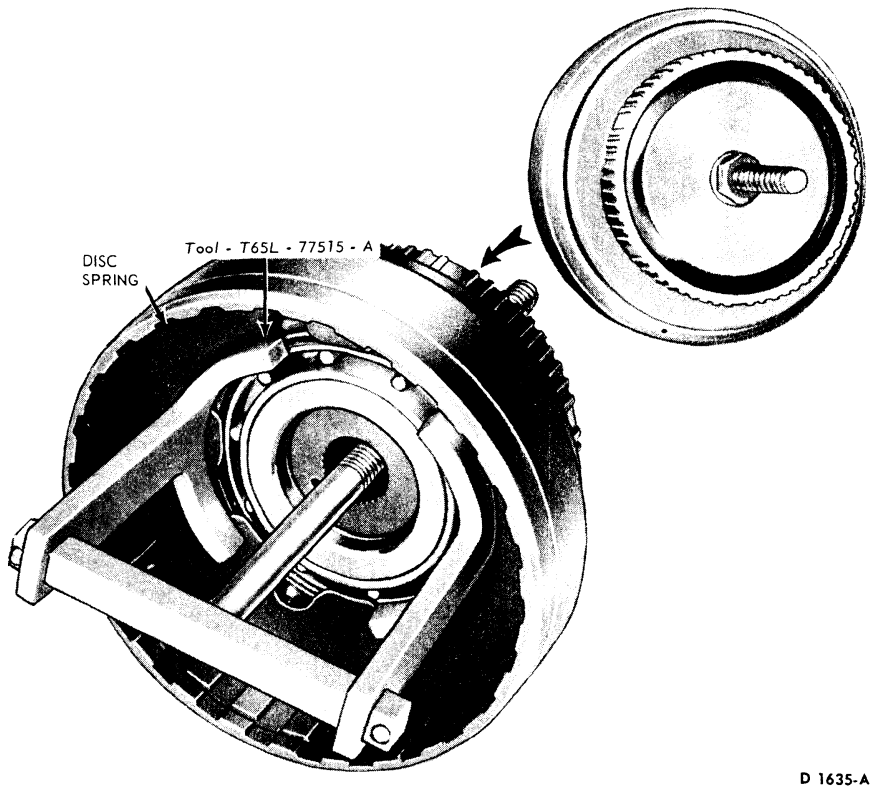


FIG. 74—Removing Disc Spring

6. With a feeler gauge, check the clearance between the snap ring and the pressure plate (Fig. 71).

7. The pressure plate should be held downward as the clearance is checked. The clearance should be 0.050 to 0.066 inch. If the clearance is not within specifications, selective thickness snap rings are available in these thicknesses, 0.060-0.064, 0.074-0.078, 0.088-0.092, and 0.102-0.106 inch. Install the correct size snap ring and recheck the clearance.

FORWARD CLUTCH

Disassembly

1. Remove the clutch pressure plate retaining snap ring (Fig. 72).

2. Remove the pressure plate, and the drive and driven clutch plates from the clutch hub (Fig. 73).

3. Remove the disc spring retaining snap ring (Fig. 74).

4. Apply air pressure at the clutch piston pressure hole (Fig. 75) to re-

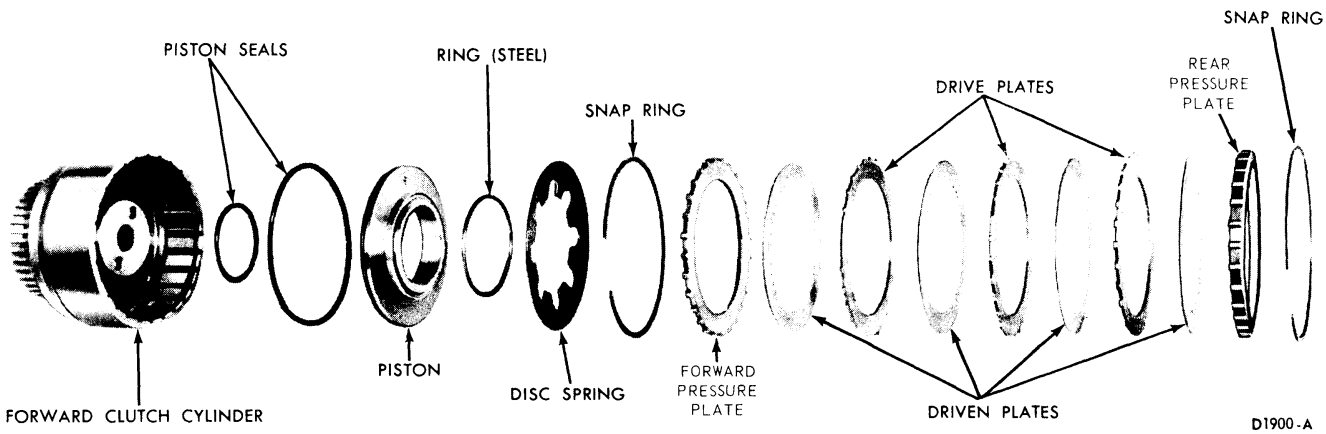


FIG. 73—Forward Clutch Disassembled

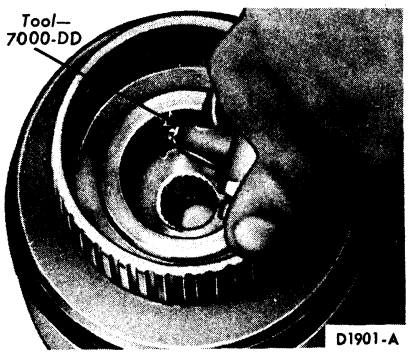


FIG. 75—Removing Forward Clutch Piston

move the piston from the clutch hub.

5. Remove the clutch piston outer seal and the inner seal from the clutch hub (Fig. 73).

Assembly

1. Install new clutch piston seals on the clutch piston and drum. Lubricate the seals with clean transmission fluid.

2. Install the clutch piston into the clutch hub. Install the disc spring and retaining snap ring (Fig. 73).

3. **Install the lower pressure plate with the flat side up and the radius side downward.** Install one non-metallic clutch plate and alternately install the drive and driven plates. Before installing new composition clutch plates, soak them in transmission fluid for fifteen minutes. The last plate installed will be the upper pressure plate. Refer to Part 7-5 for the correct number of clutch plates for the applicable model transmission.

4. Install the pressure plate retaining snap ring (Fig. 73). Make sure the snap ring is fully seated in the ring groove of the clutch hub.

5. With a feeler gauge, check the clearance between the snap ring and the pressure plate (Fig. 76). Downward pressure on the plate should be used when making this check. The clearance should be 0.026 to 0.042 inch for PEA and PEE models, or 0.020 to 0.036 inch for PEB models.

6. If the clearance is not within specifications, selective snap rings are available in these thicknesses: 0.060-0.064, 0.074-0.078, 0.088-0.092, and 0.102-0.106 inch. Insert the correct size snap ring and recheck the clearance.

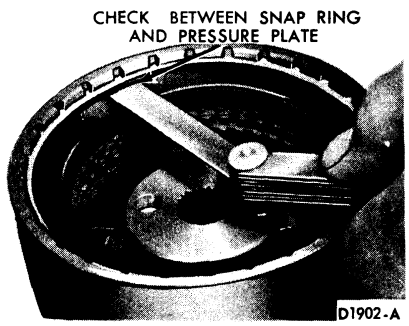


FIG. 76—Checking Forward Clutch Snap Ring Clearance

FORWARD CLUTCH HUB AND RING GEAR

Disassembly

1. Remove the forward clutch hub retaining snap ring (Fig. 77).

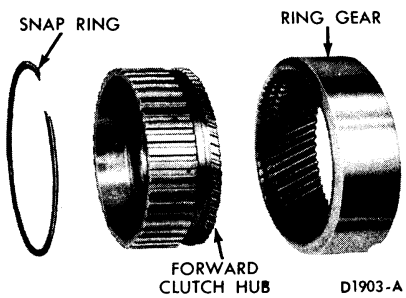


FIG. 77—Forward Clutch Hub and Ring Gear Disassembled

2. Remove the forward clutch hub from the ring gear.

3. Press the bushing from the clutch hub as shown in Fig. 78.

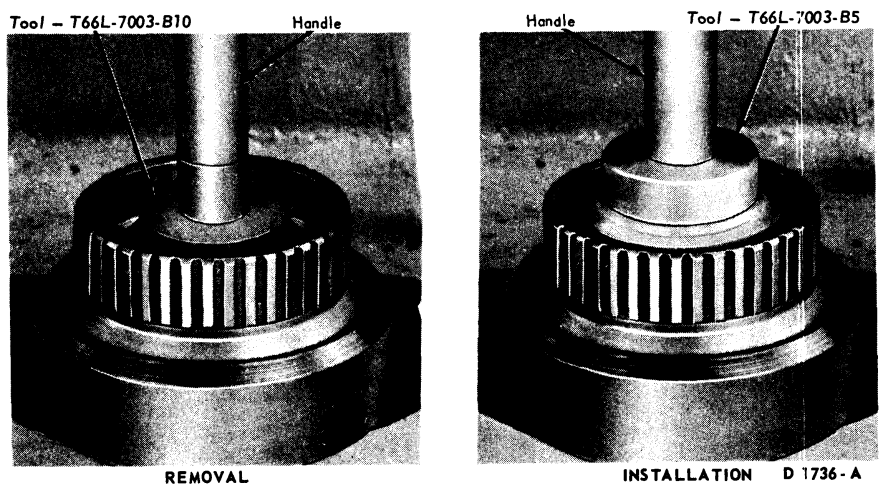


FIG. 78 — Replacing Forward Clutch Hub Bushing

Assembly

1. Install a new bushing into the clutch hub as shown in Fig. 78.

2. Install the forward clutch hub in the ring gear. Make sure the hub is bottomed in the groove of the ring gear.

3. Install the front clutch hub retaining snap ring. Make sure the snap ring is fully seated in the snap ring groove of the ring gear.

INPUT SHELL AND SUN GEAR

Disassembly

1. Remove the external snap ring from the sun gear (Fig. 79).

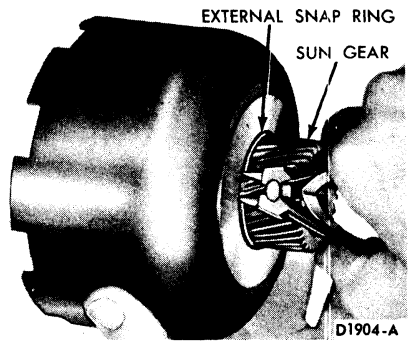


FIG. 79—Removing or Installing Sun Gear External Snap Ring

2. Remove thrust washer No. 5 from the input shell and sun gear (Fig. 80).

3. From inside the input shell, remove the sun gear. Remove the internal snap ring from the sun gear.

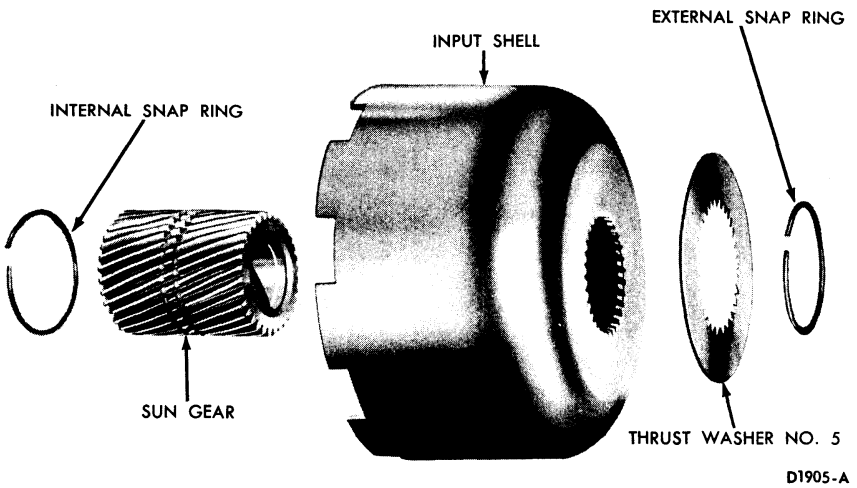


FIG. 80—Input Shell and Sun Gear Disassembled

4. If the sun gear bushings are to be replaced, use the tool shown in Fig. 81 and press both bushings through the gear.

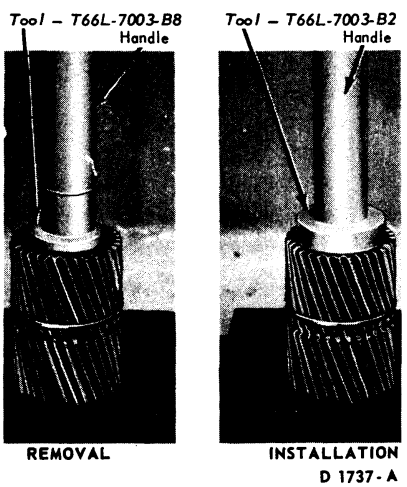


FIG. 81—Replacing Sun Gear Bushing

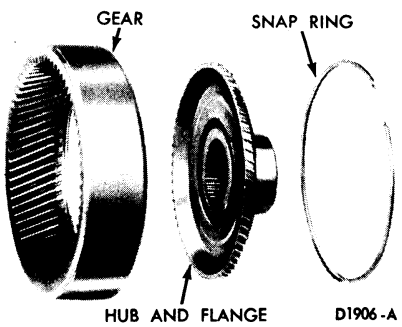


FIG. 82—Reverse Ring Gear and Hub Disassembled

Assembly

1. Press a new bushing into each end of the sun gear with the tool shown in Fig. 81.

2. Install the internal snap ring on the sun gear. Install the sun gear in the input shell.

3. Install thrust washer No. 5 on the sun gear and input shell (Fig. 80).

4. Install the external snap ring on the sun gear (Fig. 79).

REVERSE RING GEAR AND HUB

Disassembly

1. Remove the hub retaining snap ring from the reverse ring gear.

2. Remove the hub from the reverse ring gear (Fig. 82).

Assembly

1. Install the hub in the reverse ring gear. Make sure the hub is fully seated in the groove of the ring gear.

2. Install the snap ring in the reverse ring gear. Make sure the snap ring is fully seated in the snap ring groove of the ring gear.

LOW-REVERSE BRAKE DRUM BUSHING REPLACEMENT

1. Replace the low reverse brake drum bushing if it is worn or damaged. To remove the bushing, use the cape chisel and cut along the bushing seam until the chisel breaks through the bushing wall. Pry the loose ends of the bushing up with an awl and remove the bushing.

2. Install a new bushing with the tool shown in Fig. 83.



FIG. 83—Installing Low and Reverse Brake Drum Bushing

GOVERNOR AND OIL DISTRIBUTOR

Disassembly

1. Remove the oil rings from the governor oil distributor (Fig. 84).

2. Remove the governor housing-to-distributor attaching bolts. Remove the governor from the oil distributor. Remove the governor oil screen.

3. Remove the primary governor valve retaining ring (Fig. 85). Remove the washer, spring, and primary governor valve from the housing.

4. Remove the secondary governor valve spring retaining clip, spring, and governor valve from the housing.

5. Install the secondary governor valve in the housing. Install the spring and retaining clip. **Make sure the clip is installed with the small concaved area facing downward, to hold the spring in the correct position.**

Assembly

1. Install the primary governor valve in the housing. Install the spring, washer and retaining ring. **Make sure the washer is centered in the housing on top of the spring and the retaining ring is fully seated in the ring groove of the housing.**

2. Install the governor oil screen.

3. Install the governor assembly on the oil distributor and torque the attaching bolts to specification.

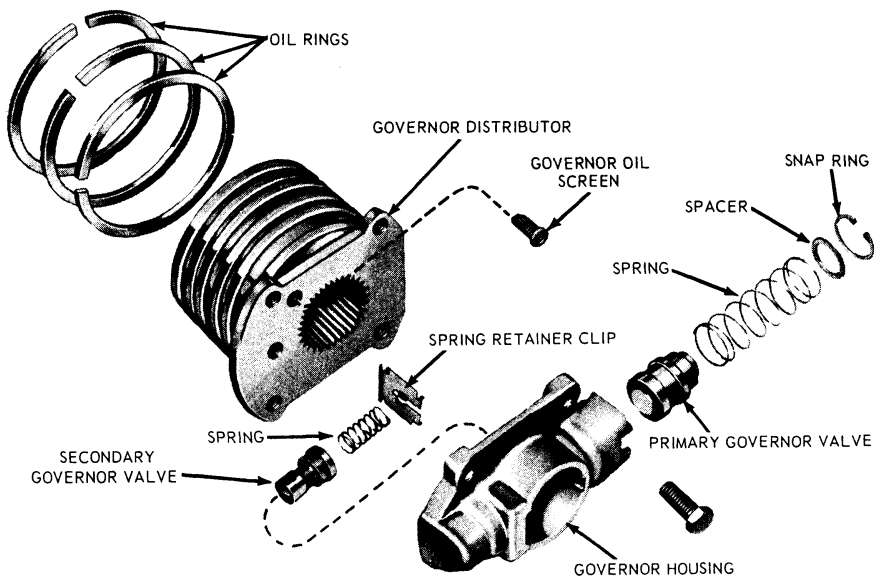


FIG. 84—Governor and Oil Distributor

4. Install the oil rings on the distributor. Check the oil rings for free rotation in the ring grooves on the oil distributor.

ASSEMBLY OF TRANSMISSION

When assembling the transmission sub-assemblies (Fig. 86), make sure that the correct thrust washer is used between certain sub-assemblies. Lubricate remaining surfaces with transmission fluid. Vaseline should be used to hold the thrust washers in their proper location. If the end play is not within specifications after the transmission is assembled, either the wrong selective thrust washers were used, or a thrust washer came out of position during the transmission assembly operation.

1. Install thrust washer No. 9 inside the transmission case (Fig. 87).

2. Place the one-way clutch outer race inside the case. From the back of the case install the six outer race-to-case attaching bolts. **Torque the bolts to specification with the tools shown in Fig. 88.**

3. Place the transmission case in a vertical position with the back face of the case upward. Install the parking pawl retaining pin in the case (Fig. 89).

4. Install the parking pawl on the case retaining pin. Install the parking pawl return spring as shown in Fig. 89.

5. Install thrust washer No. 10 on the parking gear (Fig. 90). Place the gear and thrust washer on the back face of the case (Fig. 89).

6. Place the two distributor tubes in the governor distributor sleeve. Install the distributor sleeve on the case. As the distributor sleeve is installed, the tubes have to be inserted in the two holes in the case and the parking pawl retaining pin has to be inserted in the alignment hole in the distributor sleeve.

7. Install the four governor distributor sleeve-to-case attaching bolts and torque the bolts to specification.

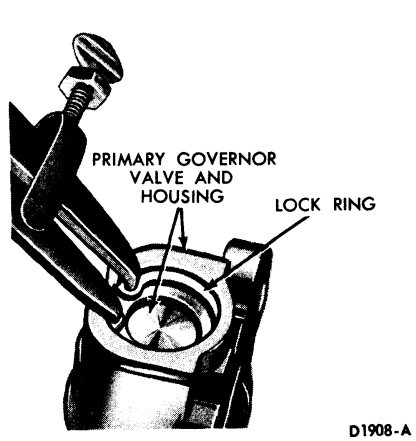


FIG. 85—Removing or Installing Retaining Ring

8. Install the governor distributor assembly on the output shaft. Install the distributor retaining snap ring (Fig. 40). Figure 91 shows the correct snap ring to be used.

9. Check the rings in the governor distributor, making sure the rings are fully inserted in the ring grooves and will rotate freely. Install the output shaft and governor distributor assembly in the distributor sleeve (Fig. 39).

10. Place a new extension housing gasket on the case. Install the extension housing, vacuum tube clip, and the extension housing-to-case attaching bolts. Torque the bolts to specification.

11. Place the transmission in the holding fixture with the front pump mounting face of the case up. **Make sure thrust washer No. 9 is still located at the bottom of the transmission (Fig. 86).**

12. Install the one-way clutch spring retainer into the outer race (Fig. 92).

13. Install the inner race inside of the spring retainer.

14. Install the individual springs between the inner and outer race as shown in Fig. 92.

15. Starting at the back of the transmission case, install the one-way clutch rollers by slightly compressing each spring and positioning the roller between the spring and the spring retainer.

16. After the one-way clutch has been assembled, rotate the inner race clockwise to center the rollers and springs. Install the low and reverse drum (Fig. 86). The splines of the drum have to engage with the splines of the one-way clutch inner race. Check the one-way clutch operation by rotating the low and reverse drum. The drum should rotate clockwise but should not rotate counterclockwise.

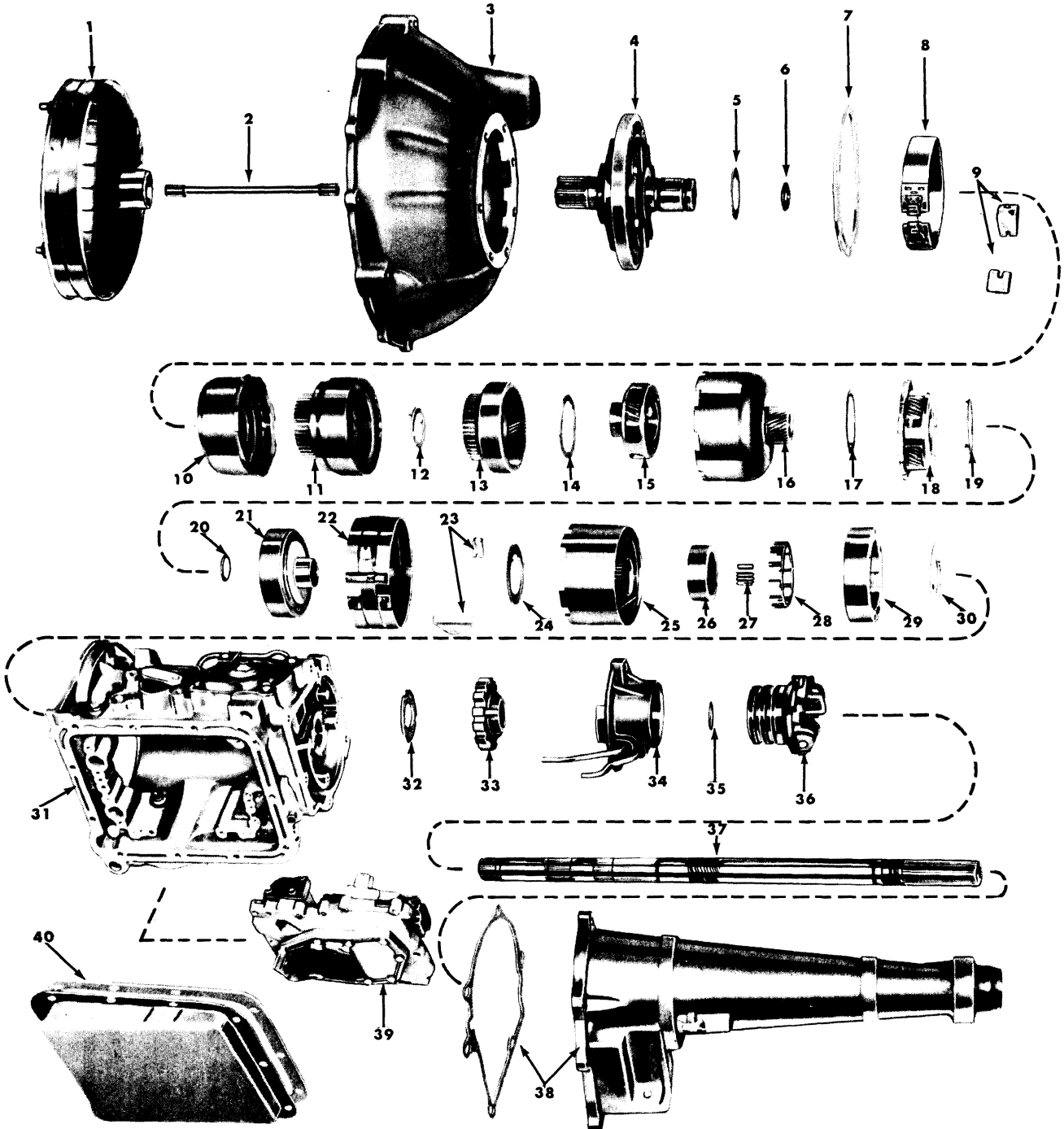
17. Install thrust washer No. 8 on top of the low and reverse drum (Fig. 93). Install the low-reverse band in the case, with the end of the band for the small strut toward the low-reverse servo (Fig. 38).

18. Install the reverse ring gear and hub on the output shaft.

19. Move the output shaft forward and install the reverse ring gear hub-to-output shaft retaining ring (Fig. 37). 37).

20. Place thrust washers Nos. 6 and 7 on the reverse planet carrier (Fig. 94).

21. Install the planet carrier in the reverse ring gear and engage the tabs of the carrier with the slots in the low-reverse drum.



1. CONVERTER
2. INPUT SHAFT
3. CONVERTER HOUSING
4. FRONT PUMP
5. THRUST WASHER NO. 1
6. THRUST WASHER NO. 2
7. FRONT PUMP GASKET
8. INTERMEDIATE BAND
9. BAND STRUTS
10. REVERSE AND HIGH CLUTCH DRUM
11. FORWARD CLUTCH AND CYLINDER
12. THRUST WASHER NO. 3
13. FORWARD CLUTCH HUB AND RING GEAR
14. THRUST WASHER NO. 4
15. FRONT PLANET CARRIER
16. INPUT SHELL, SUN GEAR AND THRUST WASHER NO. 5
17. THRUST WASHER NO. 6
18. REVERSE PLANET CARRIER
19. THRUST WASHER NO. 7
20. SNAP RING
21. REVERSE RING GEAR AND HUB
22. LOW AND REVERSE BAND
23. BAND STRUTS
24. THRUST WASHER NO. 8
25. LOW AND REVERSE DRUM
26. ONE-WAY CLUTCH INNER RACE
27. ROLLER (12) AND SPRING (12)
28. SPRING AND ROLLER CAGE
29. ONE-WAY CLUTCH OUTER RACE
30. THRUST WASHER NO. 9
31. CASE
32. THRUST WASHER NO. 10
33. PARKING GEAR
34. GOVERNOR DISTRIBUTOR SLEEVE
35. SNAP RING
36. GOVERNOR VALVES & DISTRIBUTOR
37. OUTPUT SHAFT
38. EXTENSION HOUSING AND GASKET
39. CONTROL VALVE BODY
40. OIL PAN AND GASKET

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FIG. 86—Transmission Sub-Assemblies

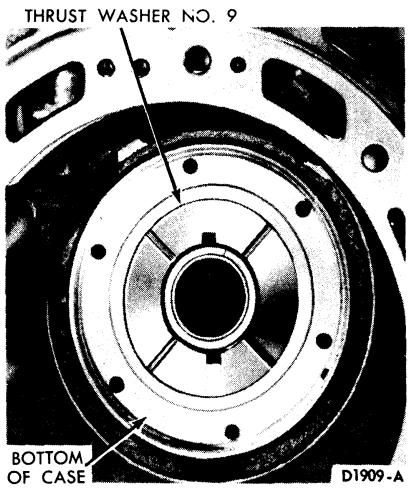


FIG. 87—Number 9 Thrust Washer Location

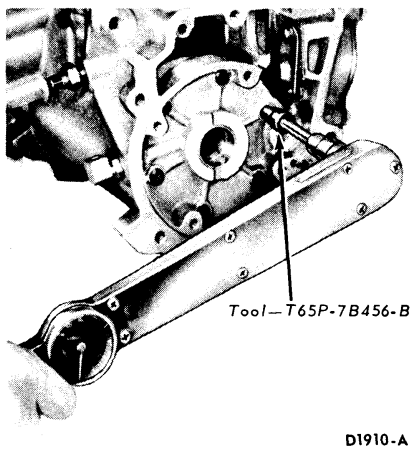


FIG. 88—Installing One-Way Clutch Outer Race Attaching Bolts

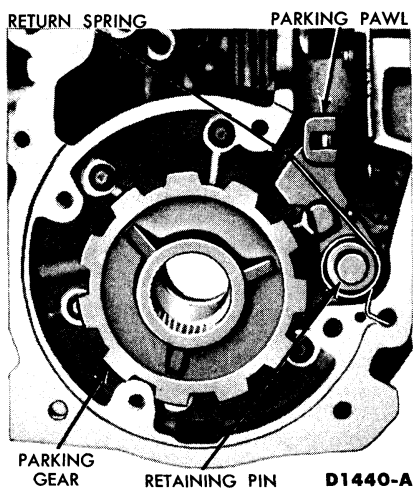


FIG. 89—Parking Pawl and Gear

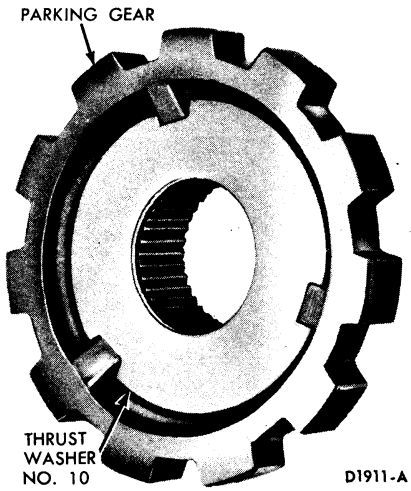


FIG. 90—Number 10 Thrust Washer Location

22. On the bench, install the forward clutch in the reverse-high clutch by rotating the units to mesh the reverse-high clutch plates with the splines of the forward clutch (Fig. 95).

23. Using the end play check reading that was obtained during the transmission disassembly to determine which No. 2 steel backed thrustwasher is required, proceed as follows:

a. Position the stator support vertically on the work bench and install the correct No. 2 thrustwasher to bring the end play within specifications.

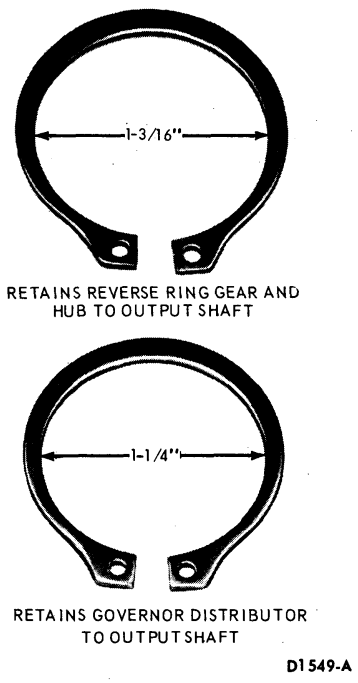


FIG. 91—Governor and Reverse Ring Hub-Retaining Snap Ring Identification

b. Install the reverse-high clutch and the forward clutch on the stator support.

c. Invert the complete unit making sure that the intermediate brake drum bushing is seated on the forward clutch mating surface.

d. Select the thickest fiber washer (No. 1) that can be inserted between the stator support and the intermediate brake drum thrust surfaces and still maintain a slight clearance. **Do not select a washer that must be forced between the stator support and intermediate brake drum.**

e. Remove the intermediate brake drum and forward clutch unit from the stator support.

f. Install the selected Nos. 1 and 2 thrustwashers on the front pump stator support (Fig. 28) using enough vaseline to hold the thrust washers in position during the front pump installation.

24. Install thrust washer No. 3 on the forward clutch (Fig. 96).

25. Install the forward clutch hub and ring in the forward clutch by rotating the units to mesh the forward clutch plates with the splines on the forward clutch hub (Fig. 97).

26. Install thrust washer No. 4 on the front planet carrier (Fig. 98). Install the front planet carrier into the forward clutch hub and ring gear. **Check the forward thrust bearing race inside the planet carrier for proper location against the thrust bearing. Make sure the race is centered for alignment with the sun gear on the input shell (Fig. 99).**

27. Install the input shell and sun gear on the gear train (Fig. 100). Rotate the input shell to engage the drive lugs of the reverse-high clutch. If the drive lugs will not engage, the outer race inside the forward planet carrier is not centered to engage the end of the sun gear inside the input shell. Center the thrust bearing race and install the input shell.

28. Hold the gear train together and install the forward part of the gear train assembly in the case (Fig. 33).

The input shell sun gear must mesh with the reverse pinion gears. The front planet carrier internal splines must mesh with the splines on the output shaft.

29. A new band should be soaked in transmission fluid for fifteen minutes before it is installed. Install the intermediate band through the front of the case (Fig. 31).

30. Install a new front pump gasket on the case. Line up the bolt holes in

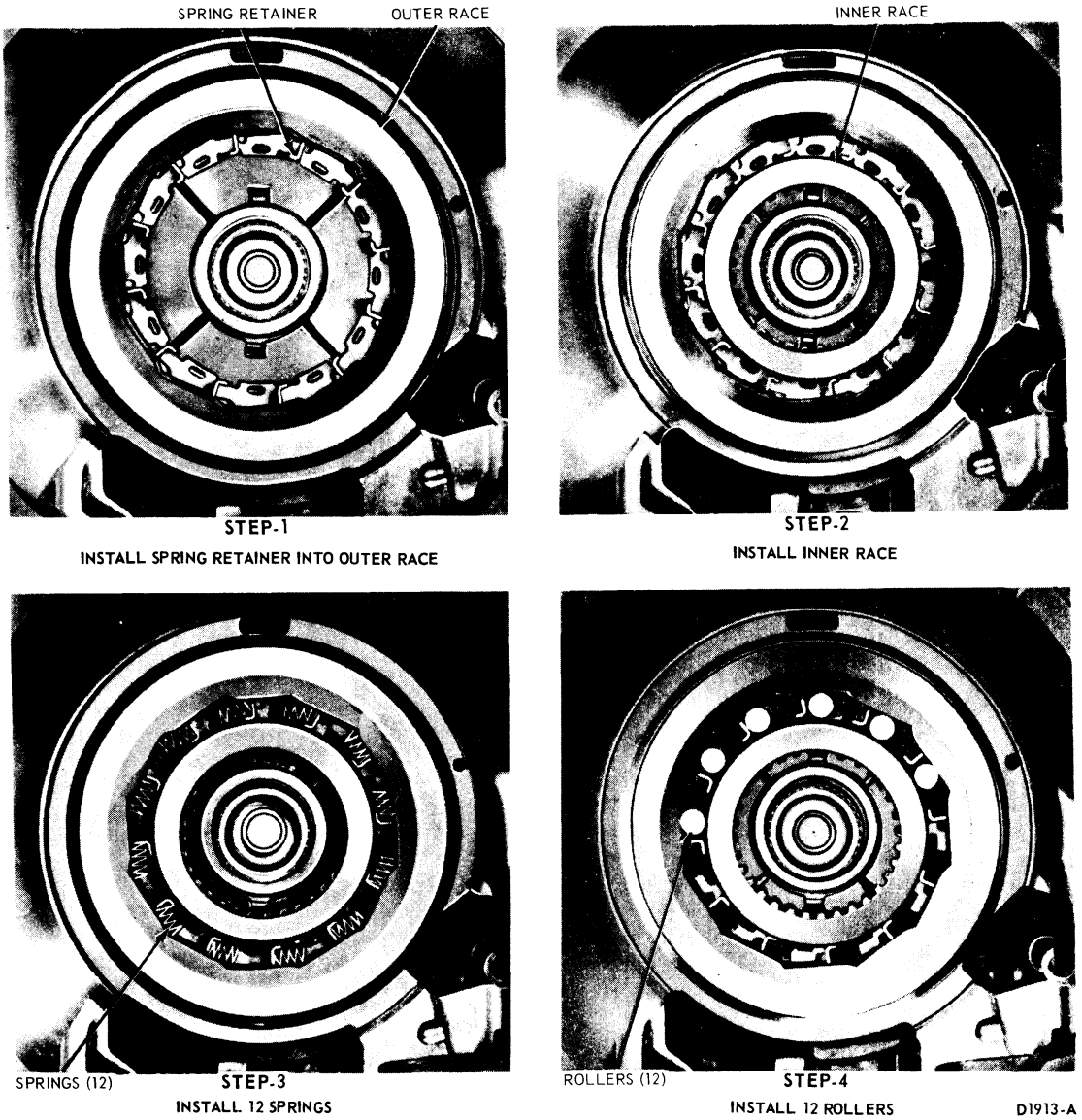


FIG. 92—One-Way Clutch

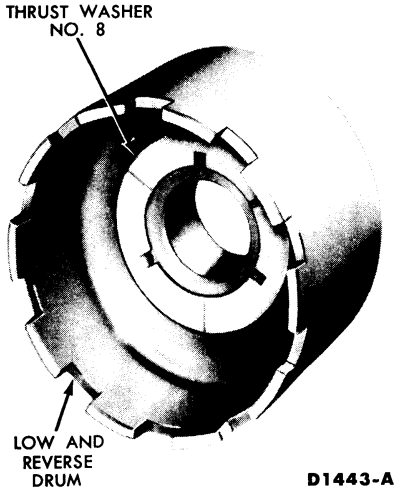


FIG. 93—Number 8 Thrust Washer Location

the gasket with the holes in the case.

31. Install the front pump stator support into the reverse-high clutch. Align the pump-to-case attaching bolt holes. Install the front pump-to-case attaching bolts and torque them to specification.

32. Install the input shaft (Fig. 29). Rotate the holding fixture to place the transmission in a horizontal position. Check the transmission end play as shown in Fig. 27. If the end play is not within specification, either the wrong selective thrust washers (Fig. 28) were used, or one of the 10 thrust washers (Fig. 86) is not properly positioned.

33. Remove the dial indicator used for checking the end play and install the one front pump-to-case attaching bolt. Torque the bolt to specification.

34. Place the converter housing on the transmission case. Install the five converter housing-to-case attaching bolts. Torque the bolts to specification.

35. Install the intermediate and low-reverse band adjusting screws in the case. Install the struts for each band (Fig. 26).

36. Adjust the intermediate and low-reverse band. Refer to In-Vehicle Adjustments and Repair for band adjusting procedures.

37. Install a universal joint yoke on the output shaft. Rotate the input and output shafts in both directions to check for free rotation of the gear train.

38. Install the control valve body (Fig. 25). As the valve body is installed engage the manual and down-

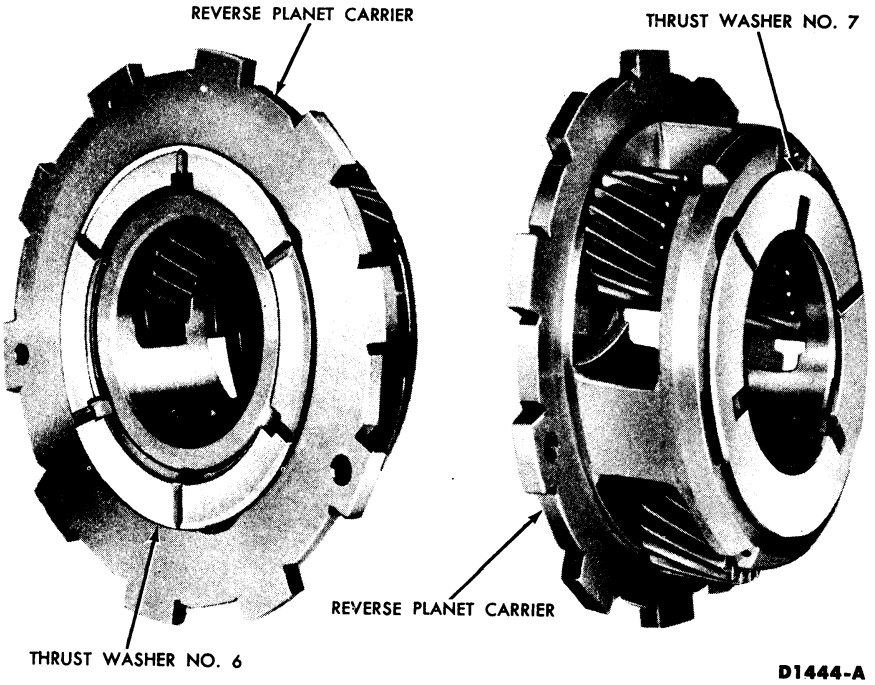


FIG. 94—Number 6 and 7 Thrust Washer Location

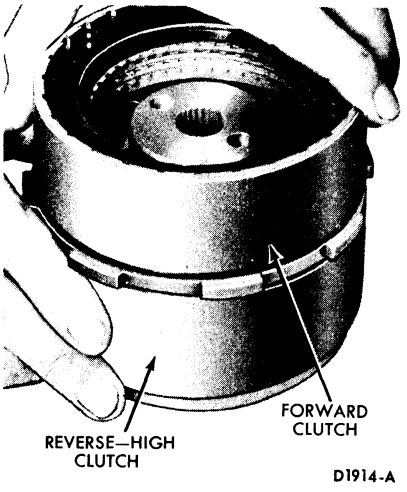


FIG. 95—Installing Clutch Units

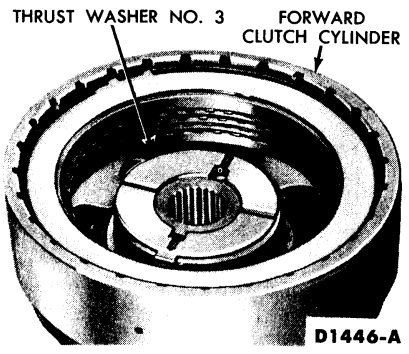


FIG. 96—Number 3 Thrust Washer Location

shift valves with the inner control levers. Torque the control valve body-to-case attaching bolts to specification.

39. Place a new pan gasket on the case and install the pan and pan-to-case attaching bolts. Torque the attaching bolts to specification.

40. Remove the transmission from the holding fixture. Install the two extension housing-to-case attaching bolts. Torque the bolts to specification.

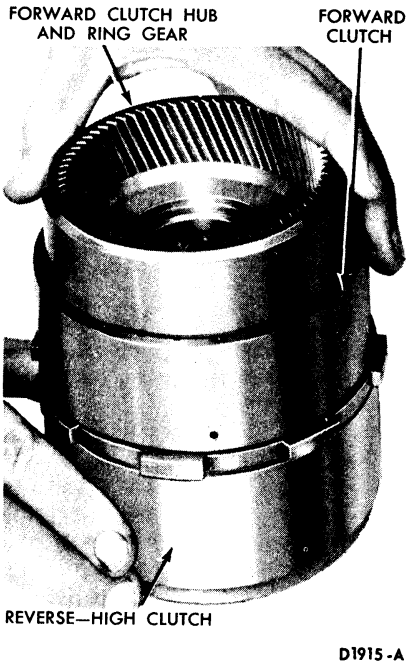


FIG. 97—Installing Forward Clutch Hub and Ring Gear

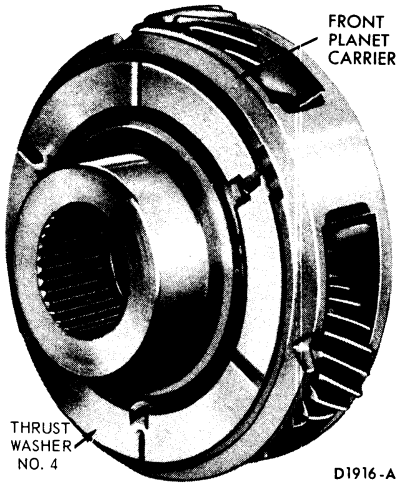


FIG. 98—Number 4 Thrust Washer Location

41. Install the primary throttle valve in the transmission case (Fig. 23).

42. Install the vacuum unit, gasket, and control rod in the case. Using the tools shown in Fig. 101, torque the vacuum unit to 15-23 ft-lbs.

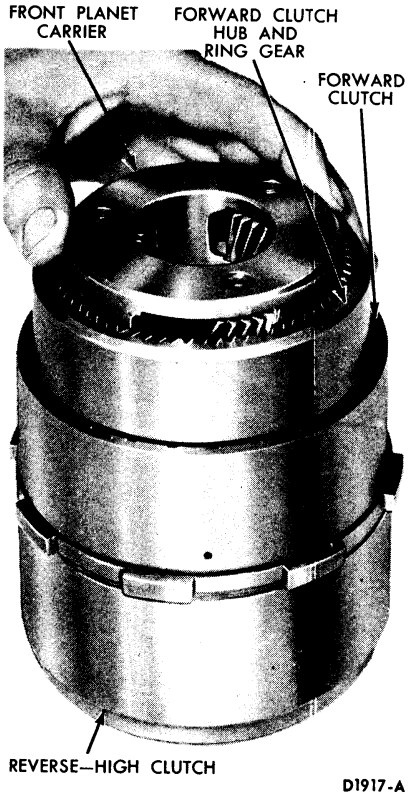


FIG. 99—Installing Front Planet Carrier

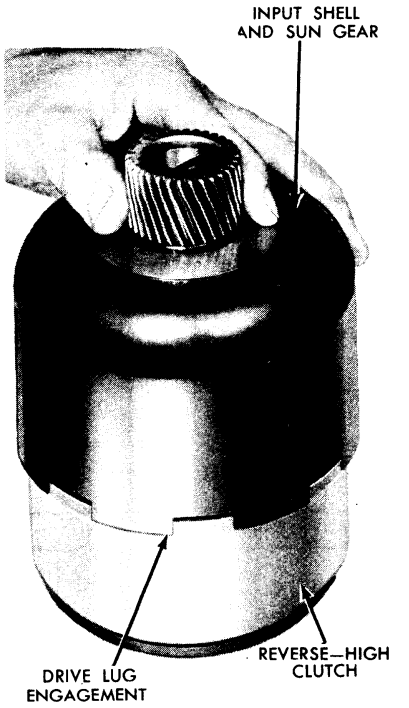


FIG. 100—Installing Input Shell

43. Make sure the input shaft is properly installed in the front pump stator support and gear train. Install the converter in the front pump and the the converter housing.

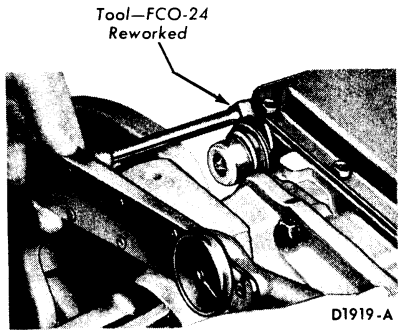


FIG. 101—Installing Vacuum Unit

PART 7-3 FMX Transmission

TRANSMISSION MODEL	ENGINE MODEL	SELECTOR LEVER LOCATION	MODEL APPLICATION											
			All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
PHB-A	390-2V	Column		X		X								
PHB-C	351-2V	Column						X		X				
PHB-D	351-2V	Console						X		X				
PHB-E	351-2V	Console					X				X			
PHB-F	351-4V	Column						X		X				
PHB-G	351-4V	Console						X		X				
PHB-H	351-4V	Console					X				X			
PHD-A	240-1V	Column		X		X								
PHD-B	302-2V	Column		X		X								

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1 DESCRIPTION

DESCRIPTION

Figure 1 shows the location of the converter, front pump, clutches, bands, gear train and most of the internal parts used in the FMX Transmission

The identification tag (Fig. 2) on an FMX transmission is attached under the oil pan by a pan to case bolt. The tag includes the model prefix and suffix, assembly part number and the build date code.

The service identification number indicates changes to service details which affect interchangeability **when the transmission model is not changed.** For interpretation of this number, see the Master Parts Catalog.

The tag must be kept with the individual transmission it was originally installed on. If the tag was removed during disassembly, reinstall it on the same unit.

The FMX transmission is a three speed unit capable of providing automatic upshifts and downshifts through the three forward gear ratios, and also capable of providing manual selection of first and second gears.

The transmission consists essentially of a torque converter, planetary gear train, two multiple disc clutches and a hydraulic control system (Fig. 3).

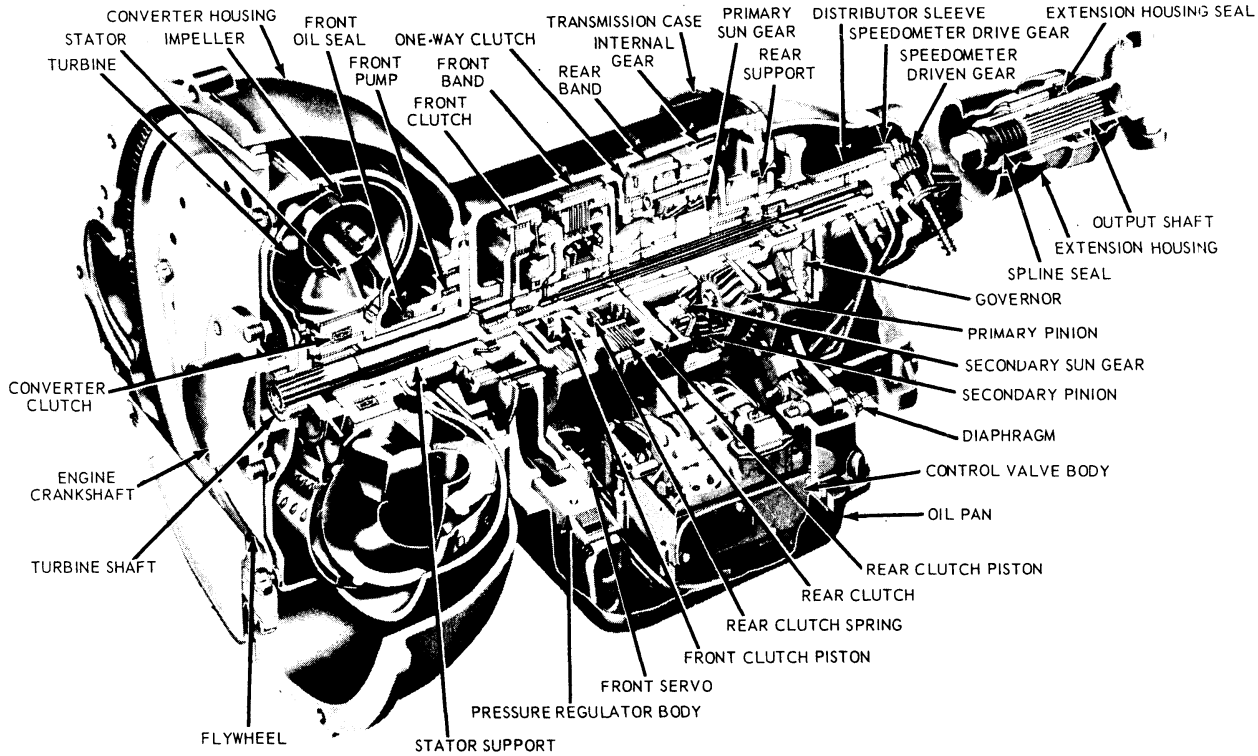


FIG. 1—Typical FMX Transmission

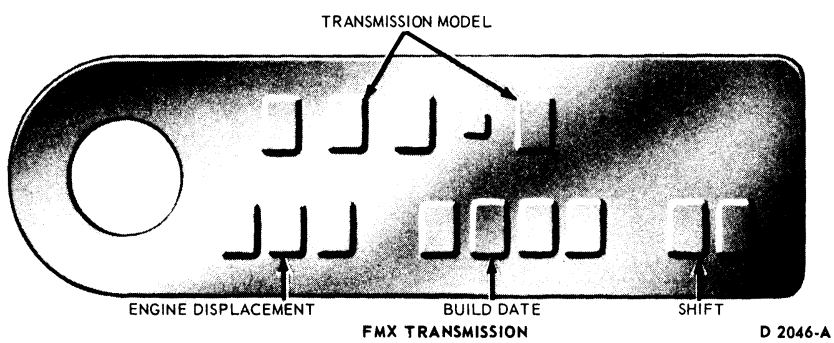


FIG. 2—Identification Tags

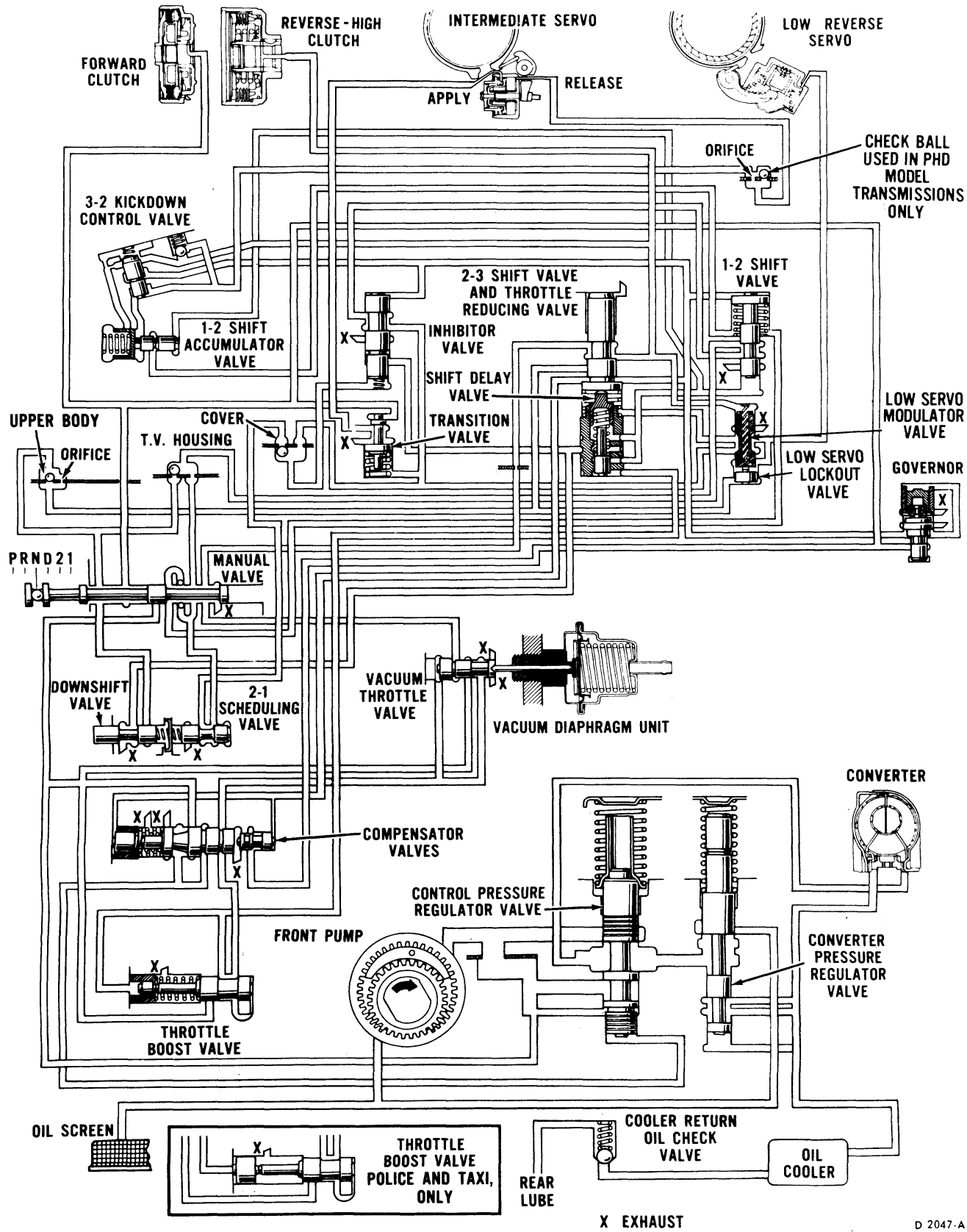


FIG. 3—Hydraulic Control System—FMX Transmission

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

CONTROL LINKAGE ADJUSTMENTS

The transmission control linkage adjustments should be performed in the order in which they appear in this section of the manual.

THROTTLE AND DOWNSHIFT LINKAGE ADJUSTMENTS

Adjusting the throttle linkage is important to be certain the throttle and kickdown systems are properly adjusted. The kickdown system should come in when the accelerator is pressed through detent, and not before detent. Refer to Group 10 for detailed throttle and downshift linkage adjustment procedures.

MANUAL LINKAGE ADJUSTMENT

COLUMN SHIFT

1. Place the selector lever in the D position tight against the stop.
2. Loosen the shift rod adjusting nut at point A (Fig. 4 or 5).
3. Shift the manual lever at the transmission into the D detent position, third from the rear.
4. Make sure that the selector lever has not moved from the D stop, then tighten the nut at point A to 10-20 ft-lbs.
5. Check the pointer alignment and the transmission operation for all selector lever detent positions.

CONSOLE SHIFT

1. Position the transmission selector lever in D position.
2. Raise the vehicle and loosen the manual lever shift rod retaining nut (Fig. 6 or 7). Move the transmission manual lever to the D position, fourth detent position from the back of the transmission.
3. With the transmission selector lever and manual lever in the D positions, torque the attaching nut 10 to 20 ft-lbs.
4. Check the operation of the transmission in each selector lever position.

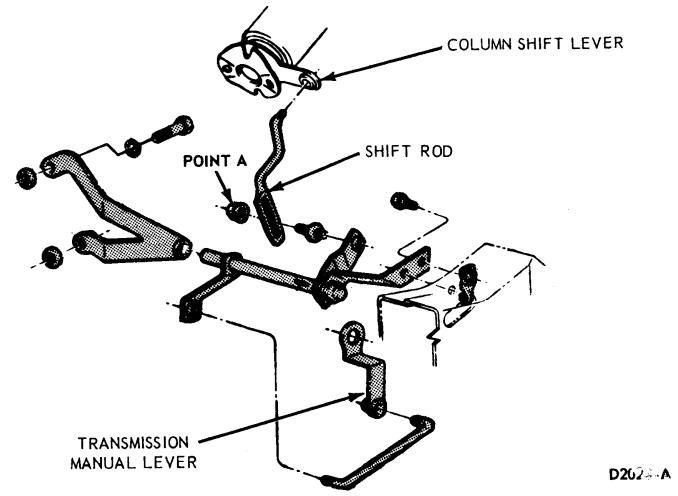


FIG. 4—Manual Linkage—Column Shift—Ford-Meteor

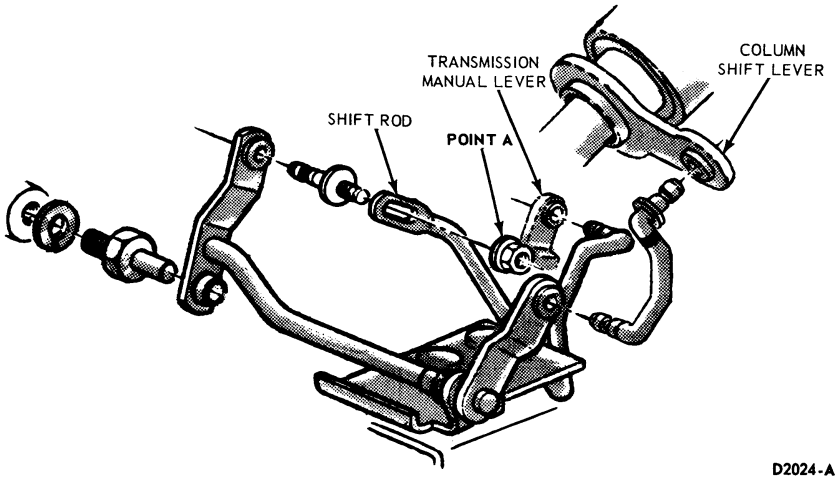


FIG. 5—Manual Linkage—Column Shift—Fairlane-Montego

NEUTRAL START SWITCH ADJUSTMENT

CONSOLE SHIFT

On vehicles equipped with a column-mounted neutral start switch, refer to Part 7-1, Section 2, for the adjustment procedures.

FAIRLANE-MONTEGO

1. With the manual linkage properly adjusted, check the starter engagement circuit in all positions. The circuit must be open in all drive positions and closed only in park and neutral.
2. Remove the selector lever handle from the lever.
3. Remove the trim panel from the top of the console.
4. Remove the cover and dial indicator as an assembly.
5. Remove the four screws that secure the selector lever retainer to the selector lever housing. Lift the retainer from the housing.
6. Loosen the two combination starter neutral and back-up light switch attaching screws (Fig. 8).
7. Move the selector lever back and forth until the gauge pin (No. 43 drill) can be fully inserted into the gauge pin holes (Fig. 8).
8. Place the transmission selector lever firmly against the stop of the neutral detent position.

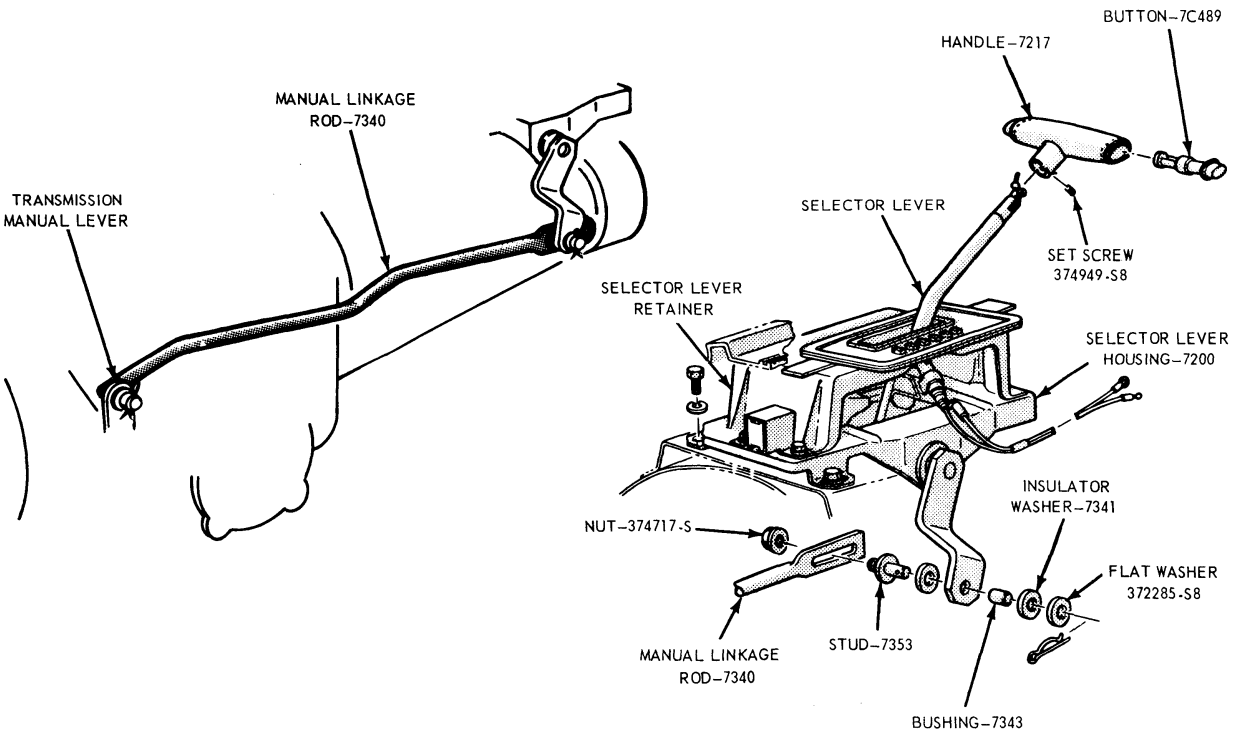


FIG. 6—Manual Linkage—Console Shift—Fairlane-Montego

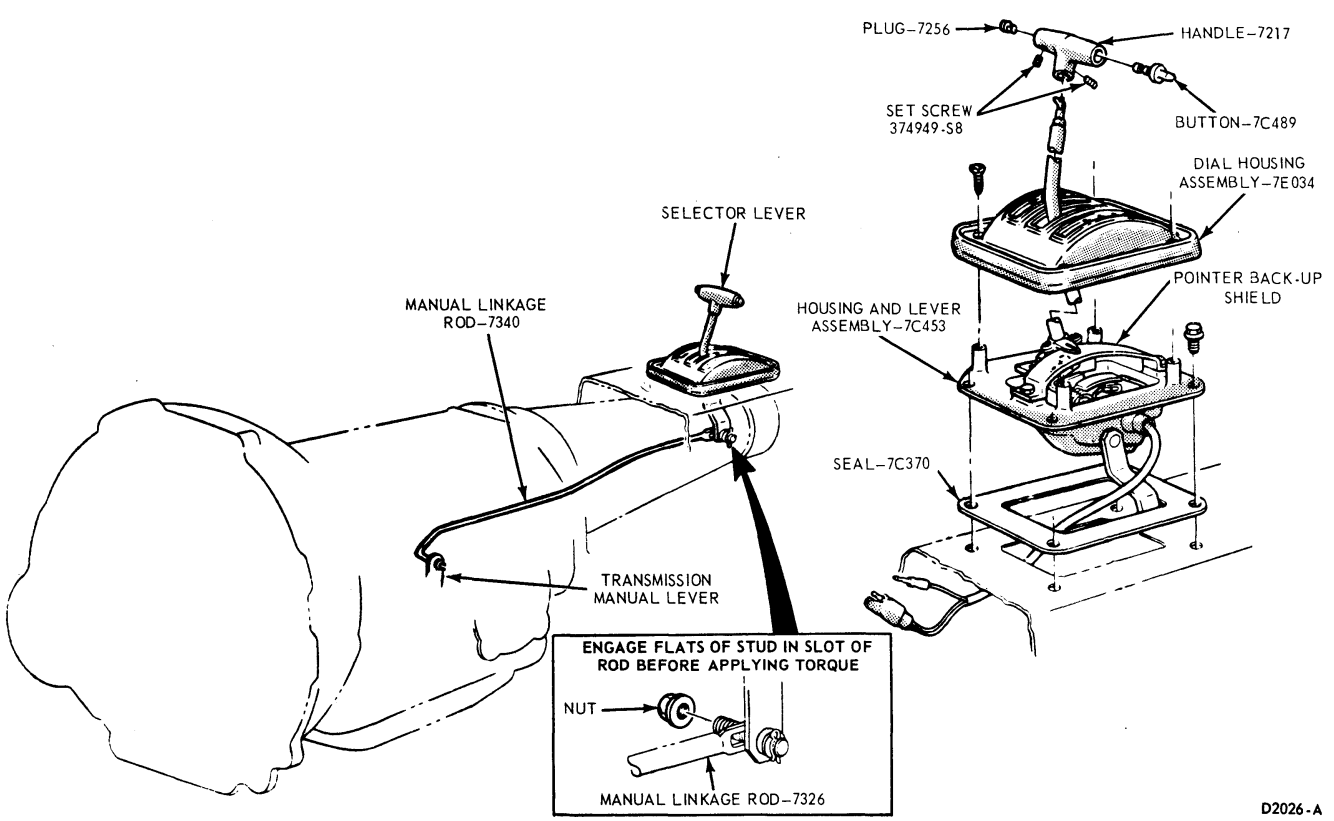


FIG. 7—Manual Linkage—Console Shift—Mustang-Cougar

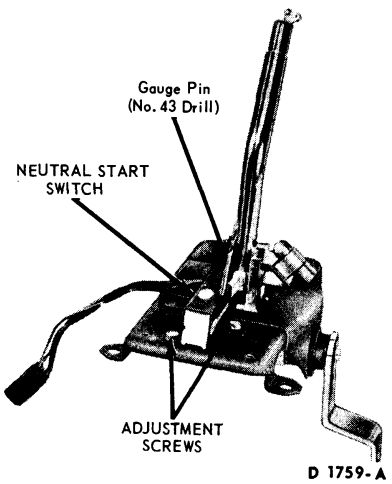


FIG. 8—Neutral Start Switch—Console Shift—Fairlane-Montego

9. Slide the combination starter neutral and back-up light switch forward or rearward as required, until the switch actuating lever contacts the selector lever.

10. Tighten the switch attaching screws and remove the gauge pin. Check for starting in the park position.

11. Turn the ignition key to the ACC position and place the selector lever in the reverse position and check the operation of the back-up lights. Turn the key off.

12. Position the selector lever retainer to the selector lever housing. Install the four attaching screws.

13. Install the cover and dial indicator.

14. Install the trim panel on the top of the console. Install the selector lever handle.

MUSTANG-COUGAR

1. With the manual linkage properly adjusted and the engine turned off, place the selector lever in the N (Neutral) position. Then, shift the selector lever from neutral to 1, to P (park) and back to neutral. Shifting the selector lever through this shift pattern should adjust the switch automatically. If not, adjust it manually as follows:

2. With the selector lever in neutral, remove the selector lever handle attaching screw and remove the handle (Fig. 7).

3. Remove the dial housing attaching screws and remove the housing.

4. Remove the two pointer back-up shield attaching screws and remove the shield.

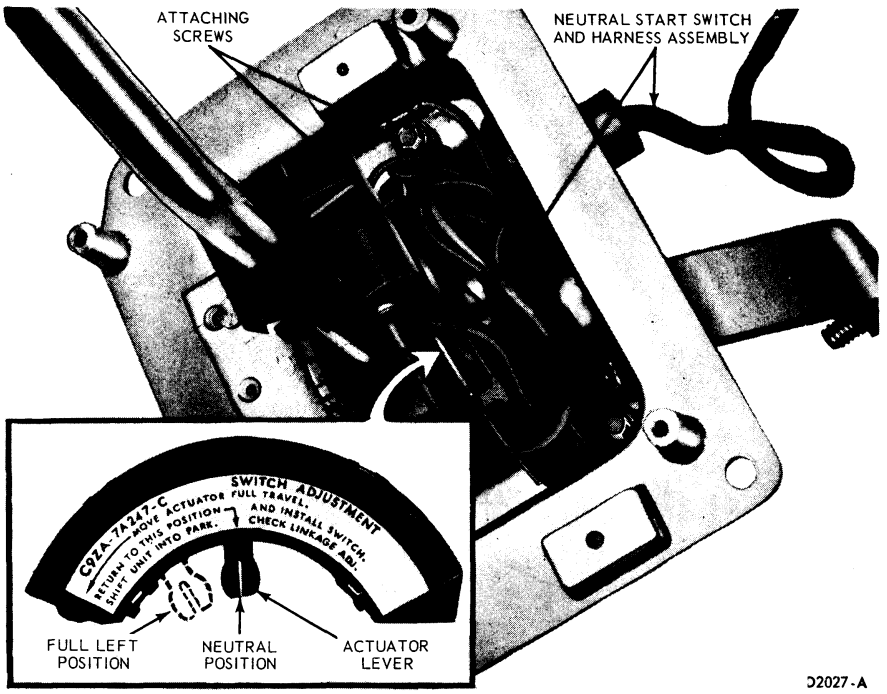


FIG. 9—Neutral Start Switch—Console Shift—Mustang-Cougar

5. Remove the two screws securing the neutral start switch to the selector lever housing.

6. Lift the switch from the housing and move the actuator lever all the way to the left. Then, return the actuator lever to the neutral position as shown in Figure 9.

7. Position the neutral switch assembly to the selector lever housing, and secure with the two attaching screws.

8. Place the selector lever in the P (Park) position and check the operation of the switch. The engine should start with the selector lever in the park position. If the engine does not start, replace the switch. Refer to the Neutral Start Switch Replacement procedures in this section.

9. Install the pointer back-up shield on the housing and lever assembly.

10. Install the dial housing on the selector lever housing assembly.

11. Install the selector lever handle.

NEUTRAL START SWITCH REPLACEMENT—CONSOLE SHIFT

On vehicles equipped with a column-mounted neutral start switch, refer to Part 7-1, Section 2, for the replacement procedures.

FAIRLANE-MONTEGO

1. Remove the selector lever handle from the lever.

2. Remove the trim panel from the top of the console.

3. Remove the cover and dial indicator as an assembly.

4. Remove the four screws that secure the selector lever retainer to the selector lever housing. Lift the retainer from the housing.

5. Remove the two screws securing the neutral start switch to the selector lever housing. Disconnect the neutral start switch wires at the plug connector and remove the switch.

6. Position the neutral start switch to the selector lever housing and install the two attaching screws.

7. With the selector lever in neutral, move the selector lever back and forth until the gauge pin (No. 43 drill) can be fully inserted into the gauge pin holes (Fig. 8).

8. Place the transmission selector lever firmly against the stop of the neutral detent position.

9. Slide the combination starter neutral and back-up light switch forward or rearward as required, until the switch actuating lever contacts the selector lever.

10. Tighten the switch attaching screws and remove the gauge pin.

11. Connect the neutral start switch wires to the plug connector and check for starting in the park position.

12. Position the selector lever retainer to the selector lever housing. Install the attaching screws.

13. Install the cover and dial indicator.

14. Install the trim panel on the top of the console. Install the selector lever handle.

MUSTANG-COUGAR

1. Place the transmission selector lever in the N (Neutral) position.
2. Raise the vehicle and remove the manual lever control rod attaching nut (Fig. 7).
3. Lower the vehicle and remove the selector lever handle attaching screw and the handle.
4. Remove the dial housing attaching screws and the housing.
5. Disconnect the dial indicator light.
6. Disconnect the neutral start switch and dial indicator light wires from their connectors at the dash panel.
7. Remove the four selector housing and lever assembly attaching bolts. Remove the selector lever and housing assembly.
8. Remove the two pointer back-up shield attaching screws and remove the shield.
9. Remove the two screws securing the neutral start switch to the selector lever housing. Push the neutral start switch harness plug inward and remove the switch and harness assembly (Fig. 9).
10. Before installing the new switch, hold it with the wires facing downward and move the actuator lever all the way to the left. Then, return the actuator lever to the neutral position as shown in Figure 9.
11. Position the harness and neutral switch assembly in the selector lever housing. Secure with the two attaching screws.
12. Install the pointer back-up shield on the housing and lever assembly.
13. Position the selector lever and housing assembly on the console and install the attaching bolts.
14. Connect the dial indicator light.
15. Connect the neutral start switch and dial indicator light wires to their respective connectors at the dash panel.
16. Install the dial housing on the selector lever housing assembly.
17. Install the selector lever handle.
18. Raise the vehicle and secure the manual lever control rod to the selector lever arm.
19. Lower the vehicle.
20. Place the selector lever in the park position and check the operation of the switch.

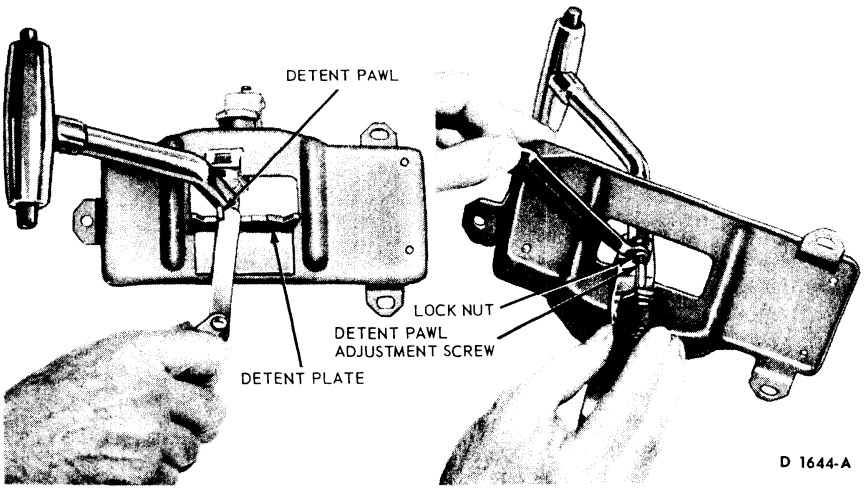


FIG. 10—Typical Selector Lever Detent Pawl Adjustment

SELECTOR LEVER REPLACEMENT—CONSOLE SHIFT—FAIRLANE AND MONTEGO

1. Raise the vehicle on a hoist or jack stands.
2. Remove the retainer that secures the manual linkage rod to the lower end of the manual lever (Fig. 6).
3. Remove the flat washer and two insulator washers and disconnect the rod from the arm.
4. Working from inside of the vehicle, remove the selector lever handle attaching screw. Lift the handle off the selector lever.
5. Remove the console trim panel from the top of the console. Remove the console retaining screws and remove the console.
6. Remove the cover and dial indicator as an assembly.
7. Remove the four screws that secure the selector lever retainer to the selector lever housing. Lift the retainer from the housing.
8. Disconnect the neutral start switch wires at the plug connector. Disconnect the bulb socket from the selector lever housing.
9. Remove the three bolts that secure the selector lever control housing to the console. Lift the selector lever housing from the console.
10. Remove the selector lever to housing attaching nut. Remove the lever from the housing.
11. Install the selector lever in the housing and install the attaching nut. Torque the nut to 20 to 25 ft-lbs.
12. Install the selector lever handle.
13. Position the selector lever as shown in Figure 10. With a feeler gauge, check the clearance between the detent pawl and plate. The clearance should be 0.005 to 0.010 inch. If necessary adjust the height of the detent pawl as shown in Figure 10.
14. Remove the handle from the selector lever.
15. Position the selector lever housing in the console and install the three attaching bolts. Do not tighten the attaching bolts at this time.
16. Connect the bulb socket to the selector lever housing and the neutral start switch wires to the plug connector.
17. Position the selector lever retainer to the selector lever housing. Install the four attaching screws.
18. Install the cover and dial indicator.
19. Place the console in position and install the retaining bolts. Tighten the selector lever housing attaching bolts.
20. Position the console trim panel and secure it with the attaching screws.
21. Install the handle and the button on the selector lever. Secure the handle with the set screw.
22. Secure the manual linkage rod to the arm with two insulating washers, a flat washer and a retainer (Fig. 6).
23. Adjust the linkage as required. Lower the vehicle.

MUSTANG-COUGAR

1. Raise the vehicle and remove the manual lever control rod attaching nut (Fig. 7).
2. Lower the vehicle, remove the selector lever handle attaching screw.
3. Remove the dial housing attaching screws and the housing.

4. Remove the pointer back-up shield attaching screws and the shield.
5. Disconnect the dial indicator light.
6. Disconnect the neutral start switch and dial indicator light wires from their connectors at the dash panel.
7. Remove the selector housing and lever assembly attaching bolts. Remove the selector lever and housing.
8. Remove the selector lever to housing attaching nut. Remove the lever from the housing.
9. Install the selector lever in the housing and install the attaching nut. Torque the nut to 20 to 25 ft-lbs.
10. Install the selector lever handle.
11. Position the selector lever as shown in Figure 10. With a feeler gauge check the clearance between the detent pawl and plate. The clearance should be 0.005 to 0.010 inch. If necessary, adjust the height of the detent pawl as shown in Figure 10.
12. Remove the handle from the selector lever.
13. Install the selector housing and lever assembly as shown in Figure 4. Torque the attaching bolts 4-6 ft-lbs.
14. Connect the dial indicator light.
15. Connect the neutral start switch and dial indicator light wires to their respective connectors at the dash panel.
16. Install the pointer back-up shield and tighten the attaching screws.
17. Install the selector lever handle and tighten the attaching screw.
18. Position the selector lever in the D position.
19. Raise the vehicle. Install the transmission manual lever rod to the selector lever. Adjust the manual linkage.
20. Lower the vehicle and check the transmission operation in each selector lever detent position.

BAND ADJUSTMENTS

FRONT BAND ADJUSTMENT

1. Drain the fluid from the transmission by loosening the pan attaching bolts starting at the rear of the pan and working toward the front. When most of the fluid has drained from the pan, remove the remainder of the attaching bolts. Use a clean drain can equipped with a 100-mesh screen if the fluid is to be reused.

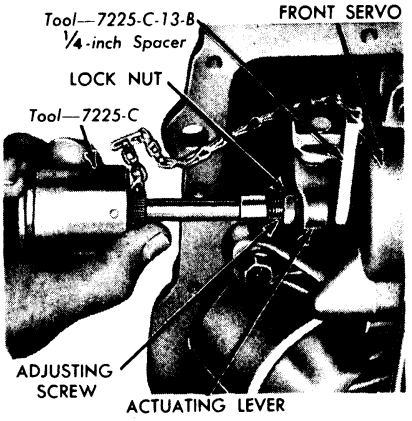


FIG. 11—Adjusting Front Band—Typical

2. Remove the pan, then remove the fluid filter and clip from the transmission. Clean the inside of the pan. Remove all gasket material from the pan and pan mounting face of the case.
3. Loosen the front servo adjusting screw lock nut.
4. Pull back on the actuating rod, and insert the 1/4 inch spacer between the adjusting screw and servo piston stem (Fig. 11). Tighten the adjusting screw to 10 in-lbs. torque. Remove the spacer and tighten the adjusting screw an additional 3/4 turn. Hold the adjusting screw stationary and tighten the lock nut securely.
5. Install the transmission fluid screen and clip. Install the pan using a new gasket.
6. Refill the transmission to the FULL mark on the dipstick.
7. Start the engine and engage the transmission in each drive range to fill all fluid passages, then place the selector lever in the P position. Check the fluid level and add enough fluid to bring the level above the ADD mark on the dipstick.

ALTERNATE FRONT BAND ADJUSTMENT

1. Drain the fluid from the transmission. **If the same fluid is to be used again in the transmission after the band adjustment, filter the fluid through a 100-mesh screen as it drains from the transmission. Re-use the fluid only if it is in good condition.**
2. Remove and thoroughly clean the pan and screen. Discard the pan gasket.
3. Loosen the front servo adjusting screw locknut two full turns with a

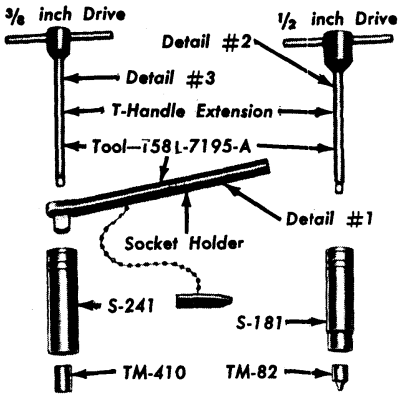


FIG. 12—Front and Rear Band Adjusting Tools

9/16-inch wrench. Check the adjusting screw for free rotation in the actuating lever after the lock nut is loosened, and free the screw if necessary.
4. Pull the adjusting screw end of the actuating lever away from the servo body, and insert the 1/4 inch spacer (Fig. 12) between the servo piston stem and the adjusting screw.
5. Install the socket handle on the 9/16-inch socket.
6. Insert the T-handle extension through the socket handle and socket, and install the screwdriver socket on the T-handle extension.
7. Place the tool on the adjusting screw so that the screwdriver socket engages the screw and the 9/16-inch socket engages the lock nut.
8. With a torque wrench on the T-handle extension, tighten the adjusting screw to 10 in-lbs torque.
9. Remove the spacer and tighten the adjusting screw an additional 3/4 turn. Hold the adjusting screw stationary, and torque the lock nut to specification.
10. Place a new gasket on the pan, and install the screen and pan on the transmission.
11. Fill the transmission with fluid.

REAR BAND ADJUSTMENT—FORD-METEOR

1. Fold back the floor mat to expose the right side of the floor pan.
2. Remove the access hole cover from the floor pan. Remove all dirt from the adjusting screw threads, then oil the threads.
3. Loosen the rear band adjusting screw lock nut with the tool shown in Fig. 13. Using the T-handle portion of the tool, tighten the adjusting screw until the wrench overruns.

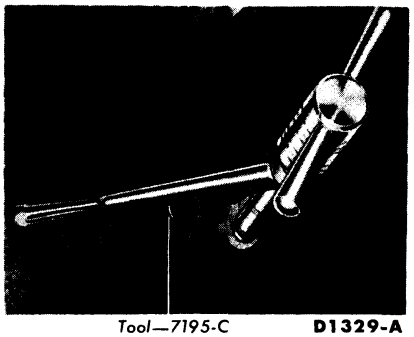


FIG. 13—Adjusting Rear Band—Ford-Meteor

If the screw is found to be tighter than wrench capacity (10 ft-lbs torque), loosen the screw and tighten until the wrench overruns.

4. Back off the adjusting screw 1 1/2 turns. Hold the adjusting screw stationary, and tighten the adjusting screw lock nut to specifications.

Severe damage may result if the adjusting screw is not backed off exactly 1 1/2 turns.

ALTERNATE REAR BAND ADJUSTMENT—FORD-METEOR

The tool shown in Fig. 12 may be used to adjust the rear band.

1. Place the socket holder on the 3/4-inch socket (Fig. 12). Insert the T-handle extension through the handle and socket.

2. Place the 5/ 16-inch 8-point socket on the extension. Place a torque wrench on the T-handle extension.

3. Insert the assembled tool in the access hole so that it engages the adjusting screw and the lock nut.

4. Loosen the adjusting screw lock nut.

5. Torque the adjusting screw to 10 ft-lbs.

6. Remove the torque wrench from the T-handle extension and back off the adjusting screw exactly 1 1/2 turns. **Severe damage may result to the transmission if the adjusting screw is not backed off exactly 1 1/2 turns.**

7. Hold the adjusting screw stationary and tighten the lock nut securely.

REAR BAND ADJUSTMENT—FAIRLANE, MONTEGO MUSTANG AND COUGAR

Adjustment of the rear band may be performed either internally or externally. Use the internal band adjustment procedures when making a normal (in-vehicle) band adjustment. Use the external adjustment procedure only when the transmission has been removed from the vehicle, or when all available internal adjustment has been taken up and a further band adjustment is required.

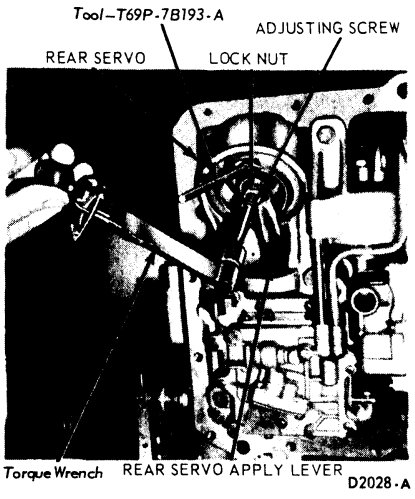


FIG. 14—Adjusting Rear Band—Fairlane, Montego, Mustang and Cougar

Internal Band Adjustment

1. Drain the fluid from the transmission. If the same fluid is to be used again in the transmission after the band adjustment, filter the fluid through a 100-mesh screen as it drains from the transmission. Re-use the fluid only if it is in good condition.

2. Remove and thoroughly clean the pan and filter. Discard the pan gasket.

3. Loosen the rear servo adjusting screw lock nut.

4. Pull the adjusting screw end of the actuating lever away from the servo body, and insert the spacer tool shown in Fig. 14 between the servo accumulator piston and the adjusting screw. **Be sure the flat surfaces of the tool are positioned squarely between the adjusting screw and the accumulator piston. The tool must not touch the servo piston and the tool handle must not touch the servo piston spring retainer.**

5. Using a torque wrench with an Allen head socket (Fig. 14), tighten the adjusting screw to 24 in-lbs torque.

6. Back off the adjusting screw 1-1/2 turns. Hold the adjusting screw stationary and tighten the adjusting screw lock nut sequrely. Remove the spacer tool.

7. Install the transmission fluid filter and clip. Install the pan using a new gasket.

8. Fill the transmission with fluid.

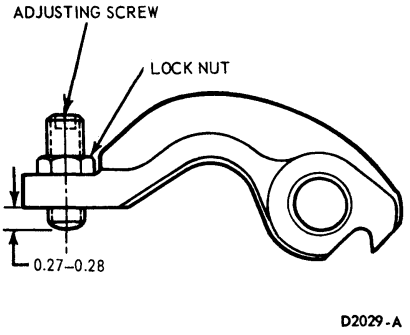


FIG. 15—Rear Servo Lever Adjusting Screw Dimension—Fairlane, Montego, Mustang and Cougar

External Band Adjustment

1. With the transmission mounted in a holding fixture, loosen the internal rear servo adjusting screw lock nut (Fig. 15).

2. Set the internal adjusting screw to the dimension shown in Figure 15. Tighten the lock nut.

3. With the internal adjusting screw properly adjusted, loosen the external adjusting screw lock nut.

4. Using a torque wrench with an Allen head socket, tighten the adjusting screw to 10 ft-lbs torque.

5. Back off the adjusting screw 1-1/2 turns.

6. Hold the adjusting screw from turning and torque the lock nut to specification.

GOVERNOR REPLACEMENT

1. Raise the vehicle so that the transmission extension housing is accessible.

2. Drain the fluid from the transmission.

3. Disconnect the drive shaft from the rear axle and slide the front yoke out of the extension housing.

4. Disconnect the speedometer cable from the extension housing.

5. Remove the two bolts that secure the extension housing to the engine rear support.

6. Remove the nut and bolt that secures the engine rear support to the crossmember.

7. Raise the transmission high enough to provide clearance for the rear mount.

8. Lift the engine rear support from the crossmember.

9. Lower the jack until the extension housing just clears the crossmem-

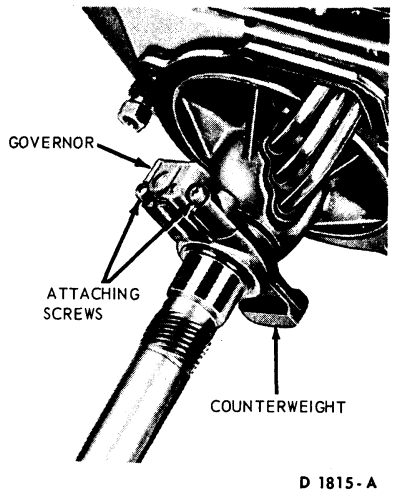


FIG. 16—Governor Installed

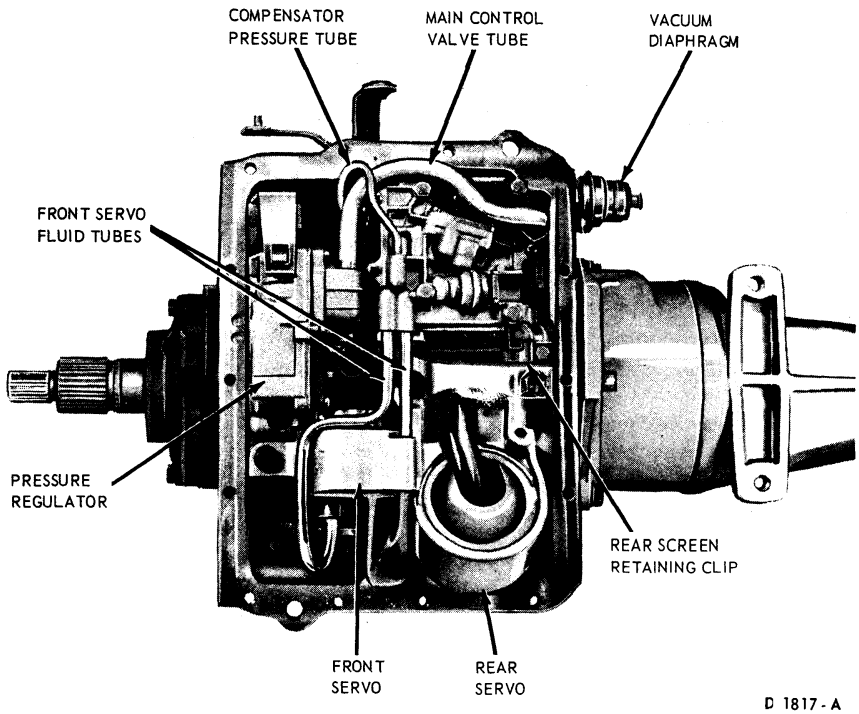


FIG. 17—Typical Hydraulic Control System

ber to remove all weight from the housing.

10. Loosen the parking brake cable adjustment nut enough to disconnect the cables from the equalizer.

11. Remove the extension housing attaching bolts. Slide the housing off the output shaft and remove the gasket. **When removing the extension housing and/or governor, hold the output shaft and rear support from moving rearward to prevent the needle bearing and race from dropping out of location.**

12. Remove the governor to counterweight attaching screws. Lift the governor from the counterweight (Fig. 16).

13. Lubricate the governor valve parts with clean transmission fluid. **Make certain that the valve moves freely in the valve body bore.**

14. Position the governor valve body on the counterweight with the cover facing toward the front of the vehicle. Install and tighten the two attaching screws to the specified torque.

15. Position a new extension housing gasket on the rear of the transmission case.

16. Slide the extension housing into place and secure it to the transmission case with the attaching bolts. Torque the bolts to specification. **With the extension housing installed, rotate the output shaft. The shaft must rotate freely by hand. If the shaft is tight or bound up, it is likely that the needle bearing and race have dropped out of location, in which case, the transmission must be partially disassembled and the bearing and race repositioned.**

17. Connect the speedometer cable to the extension housing.

18. Raise the transmission high enough with a jack to position the engine rear support on the crossmember. Secure the support to the crossmember with attaching bolt.

19. Lower the transmission and remove the jack. Secure the extension housing to the rear support with the two attaching bolts.

20. Connect the parking brake cables to the equalizer and adjust the cables as required.

21. Install the driveshaft.

22. Fill the transmission to the correct level with the specified fluid.

OIL PAN AND CONTROL VALVE BODY REPLACEMENT

1. Raise the vehicle so that the transmission fluid pan is accessible.

2. Drain the fluid from the transmission by loosening the pan attaching bolts starting at the rear of the pan and working toward the front. When most of the fluid has drained from the pan, remove the remainder of the attaching bolts. Remove the pan and gasket. Discard the gasket. **If the same fluid is to be used again in the transmission, filter the fluid through a 100-mesh screen before installing it in the transmission. Re-use the fluid only if it is in good condition.**

3. Disconnect the hose from the vacuum diaphragm unit. Remove the diaphragm unit using tool FCO-24. **Do not use any tools on the diaphragm housing, such as pliers, pipe wrenches, etc. Do not allow solvents to enter the diaphragm unit.** Remove the push rod. Remove the fluid screen retaining clip and the screen.

4. Remove the fluid filter retaining clip and the filter.

5. Remove the two tubes which connect to the pressure regulator and the control valve body (Fig. 17).

6. Loosen the front servo attaching bolts three turns.

7. Remove the three control valve body attaching bolts, and lower the valve body while pulling it off the front servo tubes. **Be careful not to damage the valve body or the tubes.**

8. Before installing the control valve body, check for a bent manual valve by rolling it on a flat surface.

9. Install the control valve body by aligning the front servo tubes with the holes in the valve body. Shift the manual lever to the 1 detent, and place the inner downshift lever between the downshift lever stop and the downshift valve. **The manual valve must engage the actuating pin in the manual detent lever.**

10. Install but do not tighten, the control valve body attaching bolts.

11. Move the control valve body toward the center of the case until the clearance is less than 0.050 inch, between the manual valve and the actuating pin on the manual detent lever.

12. Torque the attaching bolts to specification. Be sure that the rear fluid filter retaining clip is installed under the valve body bolt as shown in Figure 17.

13. Install the tubes to the pressure regulator and the control valve body.

14. Turn the manual valve one full turn in each manual lever detent position. If the manual valve binds against the actuating pin in any detent position, loosen the valve body attaching bolts and move the body away from the center of the case. Move the valve body only enough to relieve the binding. Torque the attaching bolts and recheck the manual valve for binding.

15. Position the push rod in the bore of the vacuum diaphragm unit. Using the diaphragm unit as a guide, insert the push rod into the threaded opening of the case. Torque the diaphragm unit to specification. Connect the vacuum hose.

16. Torque the front servo attaching bolts to specification.

17. Adjust the front band. If the unit is a model PHB-C, D, E, F, G or H, adjust the rear band at this time.

18. Install the fluid filter and the filter retaining clip.

19. Position a new fluid pan gasket on the bottom of the transmission case, and install the pan. Torque the pan screws to specification.

20. Adjust the rear band on PHB-A and PHD models.

21. Fill the transmission with fluid. **If the fluid that was drained from the transmission is to be used again, filter the fluid through a 100-mesh screen as it is poured back into the transmission. Re-use the fluid only if it is in good condition.**

22. If the control valve body was replaced, adjust the transmission control linkage.

PRESSURE REGULATOR REPLACEMENT

1. Drain the fluid from the transmission, and remove the pan and fluid filter.

2. Remove the small compensator pressure tube and the large control pressure tube from the control valve body and the pressure regulator.

3. Remove the pressure regulator spring retainer, springs, and spacer. **Maintain pressure on the retainer to prevent the springs from flying out.**

4. Remove the pressure regulator attaching bolts and washers, and remove the regulator.

5. Position the replacement regulator body on the transmission case and install the two attaching bolts. Torque the bolts to specification.

6. Check the converter pressure and control pressure valves to be sure the valves operate freely in the bores.

7. Install the valve springs, spacer, and retainer.

8. Install the large control pressure tube, and the small compensator pressure tube.

9. Install the fluid filter and the pan, and fill the transmission to the correct level with the specified fluid.

FRONT SERVO REPLACEMENT

1. Drain the fluid from the transmission, and remove the pan and fluid filter.

2. Remove the vacuum diaphragm unit.

3. Loosen the three control valve body attaching bolts.

4. Remove the attaching bolts from the front servo (Fig. 17), hold the strut with the fingers, and remove the servo.

5. To install the front servo, position the front band forward in the case with the end of the band facing downward. Make sure the front servo anchor pin is in position in the case web. Align the large end of the servo strut with the servo actuating lever, and align the small end with the band end.

6. Rotate the band, strut, and servo to align the anchor end of the band with the anchor in the case.

Push the servo body onto the control valve body tubes.

7. Install the attaching bolts and torque to specification.

8. Torque the control valve body attaching bolts to specification.

Check the clearance between the manual valve and manual lever actuating pin as given in Oil Pan and Control Valve Body Replacement.

9. Adjust the front band.

10. Install the vacuum diaphragm unit and rod.

11. Install the fluid filter and pan, and fill the transmission with fluid.

12. Adjust the downshift and manual linkage.

REAR SERVO REPLACEMENT

1. Drain the fluid from the transmission, and remove the pan and fluid filter.

2. Remove the vacuum diaphragm unit.

3. Remove the control valve body and the two front servo tubes.

4. Remove the attaching bolts from the rear servo, hold the actuating and anchor struts with the fingers, and remove the servo. Remove the servo dowel on PHB models.

5. To install the rear servo, position the servo anchor strut on the servo band, and rotate the band to engage the strut.

6. Hold the servo anchor strut in position with the fingers, position the actuating lever strut, and install the servo. Insert the servo dowel on PHB models.

7. Install the servo attaching bolts, and torque them to specification. **The longer bolt must be installed in the inner bolt hole.**

8. Install the two front servo tubes and the control valve body.

Check the clearance between the manual valve and the manual lever actuating pin as given above in Oil Pan and Control Valve Body Replacement.

9. Adjust the rear band.

10. Install the fluid filter and pan, and fill the transmission with fluid.

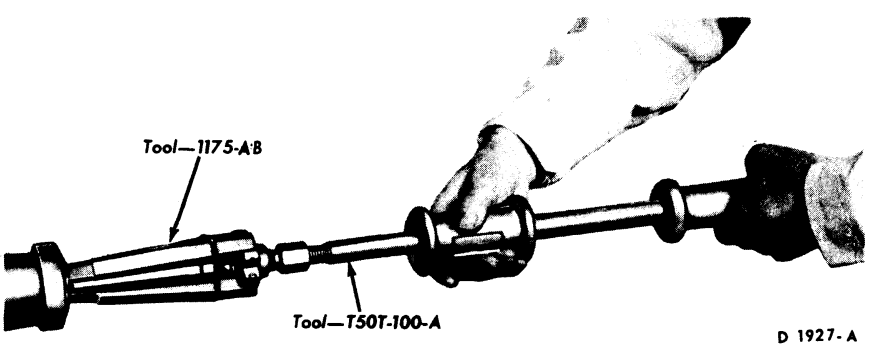


FIG. 18—Removing Extension Housing Seal

EXTENSION HOUSING BUSHING AND REAR SEAL REPLACEMENT

1. Disconnect the drive shaft from the transmission.
2. Carefully remove the seal with the tools shown in Fig. 18.
3. Remove the bushing as shown in Fig. 19. Use **the bushing remover carefully so that the spline seal is not damaged.**
4. When installing a new bushing use the special tool shown in Fig. 20.
5. Before installing a new seal, inspect the sealing surface of the universal joint yoke for scores. If scores are found, replace the yoke.
6. Inspect the counterbore of the housing for burrs. Polish off all burrs with crocus cloth.
7. Install the seal into the housing with tool shown in Fig. 21. The seal should be firmly seated in the bore.

PARKING PAWL REPLACEMENT

1. On Ford and Meteor vehicles, loosen the right front scuff plate and lift the carpet back until the rear band adjusting stud access hole is accessible.

Remove the access hole plug and, with Tool 7195-C or Tool T58L-7195-A, loosen the adjusting stud lock nut. Turn the adjusting stud in until the tool handle overruns. **This will tighten the rear band around the planet carrier and will hold the planet carrier and clutch assemblies in position during the parking pawl repair operation.**

2. Raise the vehicle and drain the fluid from the transmission.
3. Place the adjustable support stand under the rear of the engine.
4. Remove the driveshaft.
5. Disconnect the parking brake cables from the crossmember and equalizer bracket.
6. Remove the engine rear support-to-extension housing bolts.
7. Remove the bolt that secures the engine rear support to the crossmember. Raise the engine with the adjustable support stand just high enough to provide clearance for removing the support.
8. Lower the jack until the extension housing just clears the crossmember to remove all weight from the housing.
9. Disconnect the speedometer cable from the transmission.
10. Remove the transmission pan and fluid filter.
11. On a Fairlane, Montego, Mustang or Cougar, loosen the rear band adjusting screw lock nut and tighten the adjusting screw to 24 in-lbs torque. **This will tighten the rear band around the planet carrier and will hold the planet carrier and clutch assemblies in position during the parking pawl repair operation.**

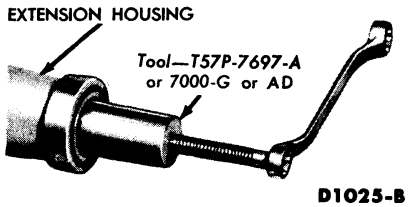


FIG. 19—Removing Extension Housing Bushing

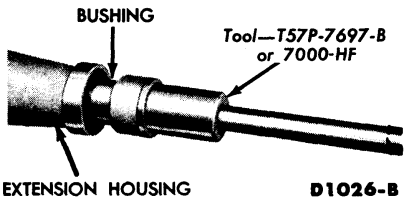


FIG. 20—Installing Extension Housing Bushing

12. Remove the vacuum control diaphragm unit and control rod.
13. Remove the main control valve rear support assembly from the case.
14. Remove the extension housing attaching bolts and housing.
15. Remove the output shaft and assembly retaining bolts and valve assembly.
16. Remove the parking pawl pin from the case with a magnet.
17. Working from inside of the case, drive on the shoulder of the toggle lever (Fig. 52) pin with a small punch to move the retaining plug part way out of the case. Remove the plug with a pair of pliers.
18. To remove the toggle lever pin, slide the toggle lever toward the front of the case. Cock the lever to one side to apply pressure on the pin, then move the toggle to the rear of the case to move the pin outward. Repeat this procedure until the pin can be removed from the case. Lift the pawl and toggle from the case as an assembly.
19. Remove the pawl and toggle lever as an assembly.
20. Position the new parking pawl and link assembly, then install the toggle lever pin and the plug.
21. Secure the pawl to the case with the pawl pin.
22. Position a new gasket on the front of the support and at the rear. Hold them in place with transmission fluid or vaseline.
23. Make sure that the thrust washer is in place, then position the support and output shaft in place making sure that the pressure tubes are entered in the case.
24. Secure the extension housing to the case with the attaching bolts.
25. Install the main control valve assembly.
26. Adjust the front band.
27. Adjust the rear band on a Fairlane, Montego, Mustang or Cougar.
28. Position the vacuum control rod in the case. Install the vacuum diaphragm unit.
29. Install the filter, transmission pan and a new gasket.
30. Connect the speedometer cable to the extension housing.
31. Raise the transmission high enough to position the engine rear support on the crossmember. Secure the support with the attaching bolt.
32. Lower the transmission and remove the jack. Install the two extension housing-to-engine rear support attaching bolts.
33. Connect the parking brake cables to the equalizer.
34. Install the driveshaft, then lower the vehicle.
35. On Ford and Meteor vehicles, adjust the rear band.
36. Fill the transmission to the correct level with the specified fluid.

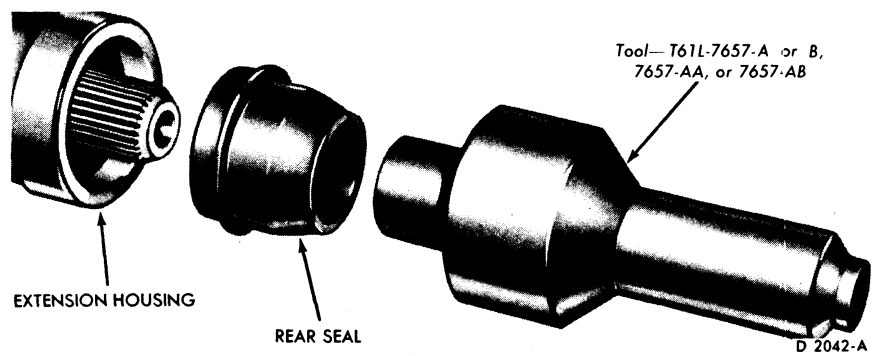


FIG. 21—Installing Extension Housing Seal

3 REMOVAL AND INSTALLATION

An oil impregnated plastic grommet is incorporated in the end of the manual shift linkage lever arm on all column shift vehicles. A special tool T67P-7341-A is required to install the grommet in the manual lever, and to install the manual linkage rod into the grommet. Refer to Part 7-1, Section 2, for the grommet replacement procedures.

TRANSMISSION AND CONVERTER REPLACEMENT—FORD-METEOR

REMOVAL

1. Drive the vehicle on a hoist, **but do not raise at this time.**
2. Remove the two upper bolts and lock washers which attach the converter housing to the engine.
3. Raise the vehicle and remove the cover from the lower front side of the converter housing. Drain the fluid from the transmission.
4. Remove one of the converter drain plugs. Then rotate the converter 180 degrees and remove the other plug. **Do not attempt to turn the converter with a wrench on the converter stud nuts.** If desired, the converter may be drained after the unit has been removed from the vehicle.
5. Disconnect the fluid filler tube from the transmission case. Disconnect the vacuum hose from the vacuum diaphragm unit and the tube from the extension housing clip.
6. When the fluid has stopped draining from the transmission and converter, remove the flywheel to converter nuts and flat washers. Install the drain plugs in the converter and torque to specifications. Install the converter housing front plate to hold the converter in place when the transmission is removed.
7. Disconnect the starter cables from the starter and remove the starter.
8. Disconnect the oil cooler lines from the transmission. Remove the transmission vent tube.
9. Disconnect the downshift linkage from the transmission.
10. Disconnect the selector rod from the transmission manual lever with T67P-7341-A.
11. Disconnect the speedometer cable from the extension housing, and remove the driveshaft.
12. Support the transmission on a stand. Remove the engine rear support to transmission bolts, and raise the transmission slightly to take the weight off the cross member. Remove the cross member. Support the rear part of the engine.
13. Remove the remaining converter housing to engine attaching bolts. Move the assembly to the rear and down to remove it.

INSTALLATION

1. If the converter has been removed from the converter housing, carefully position the converter in the housing, and then install the housing lower front cover plate to prevent the converter from slipping out of the housing.
2. Install the transmission vent tube. Rotate the converter until the studs adjacent to the drain plugs are in a vertical position.
3. Rotate the flywheel as required to align the drain plug holes with the drain plugs in the converter. With the transmission mounted on a support stand, move the converter and transmission assembly forward into position, using care not to damage the flywheel and the converter pilot.
4. Install the converter lower housing-to-engine bolts, then torque the bolts to specification.
5. Install the cross member.
6. Lower the transmission until the extension housing rests on the cross member, and then install the extension housing-to-cross member bolts.
7. **The converter must rest squarely against the flywheel. This indicates that the converter pilot is not binding in the engine crankshaft.**
8. Install the converter attaching nuts and flat washers. Install the access plates.
9. Connect the oil cooler inlet and outlet lines to the transmission case.
10. Coat the front universal joint yoke seal and spline with B8A-19589-A lubricant, and install the drive shaft.
11. Connect the speedometer cable at the transmission.
12. Using tool T67P-7341-A install a new grommet in the manual lever. Then secure the manual selector rod to the lever.
13. Connect the downshift linkage and bushing at the transmission throttle lever.
14. Install the starter motor.
15. Connect the fluid filter tube to the transmission case. Connect the vacuum hose to the vacuum diaphragm unit and the tube to its clip.
16. Lower the transmission support stand. Then install the upper two converter housing-to-engine bolts and tighten them to specification.
17. Lower the vehicle and fill the transmission with transmission fluid, following the recommended procedure.
18. Check the transmission, converter assembly, and fluid cooler lines for fluid leaks, and then adjust the manual and downshift linkages.

TRANSMISSION REPLACEMENT WITHOUT CONVERTER—FORD-METEOR

The frame construction of the convertible will not permit the transmission to be moved rearward enough to clear the turbine shaft from the converter. For this reason, the converter and transmission must be removed as a unit from this model.

REMOVAL

1. Raise the vehicle on a hoist.
2. Drain the fluid from the transmission.
3. Disconnect the hose from the vacuum diaphragm unit and the tube from its clip. Disconnect the fluid filler tube from the case.
4. Remove the cover from the lower front side of the converter housing.
5. Remove one of the converter drain plugs. Then rotate the converter 180 degrees and remove the other plug. **Do not attempt to turn the converter with a wrench on the converter stud nuts.**
6. Disconnect the drive shaft from the rear axle, and remove the drive shaft.
7. Disconnect the fluid cooler lines from the transmission. Remove the vent tube.
8. Disconnect the downshift linkage at the transmission.
9. Disconnect the selector rod from the transmission manual lever with tool T67P-7341-A.
10. Disconnect the speedometer cable at the extension housing.
11. Remove the two engine rear support to transmission bolts.
12. Position a transmission jack under the transmission and raise it slightly to take the weight off the cross member.

13. Remove the crossmember bolts and cross member. With the transmission jack in position, remove the four transmission to converter housing bolts.

14. Support the engine. Tilt the rear of the transmission assembly slightly upward, and with the jack, move the assembly toward the rear until it is clear of the turbine shaft. Lower the assembly and remove it from the vehicle.

INSTALLATION

1. Install guide pins in the two top transmission to converter housing attaching bolt holes.

2. Mount the transmission on the jack. **Be sure to align the turbine shaft splines with the turbine splines and the converter impeller flats with the flats in the front pump drive gear.**

3. Raise the transmission, move it toward the front of the vehicle, and position it on the converter housing.

4. Install the transmission to converter housing lower attaching bolts. Remove the two guide pins and install the two upper attaching bolts. Torque the bolts to specification.

5. Install the frame cross member and bolts.

6. Lower the transmission onto the crossmember, and install the engine rear support to transmission bolts.

7. Connect the oil cooler to transmission oil inlet and outlet lines to the transmission. Tighten the fittings securely. Install the vent tube.

8. **Lubricate the front universal slip yoke seal and spline with B8A-19589-A lubricant.** Slide the universal joint yoke onto the output shaft, and then connect the drive shaft at the rear axle.

9. Connect the speedometer cable to the extension housing.

10. Connect the downshift linkage at the transmission.

11. Using tool T67P-7341-A, install a new grommet in the manual lever. Then, secure the manual selector rod to the lever.

12. Adjust the linkage.

13. Connect the fluid filler tube to the case. Tighten the fittings securely. Connect the hose to the vacuum diaphragm unit and the tube to the clip.

14. Lower the vehicle to the floor and fill the transmission with the specified transmission fluid. Check the fluid level with the transmission at normal operating temperature.

TRANSMISSION AND CONVERTER REPLACEMENT— FAIRLANE, MONTEGO, MUSTANG AND COUGAR

REMOVAL

1. Raise the vehicle and remove the cover from the front of the converter housing. Drain the fluid from the transmission.

2. Remove one of the converter drain plugs. Then, rotate the converter 180 degrees and remove the other plug. **Do not attempt to turn the converter with a wrench on the converter stud nuts.**

3. When the fluid has stopped draining from the transmission and converter, remove the four flywheel-to-converter nuts. Install the drain plugs in the converter and torque to specification. Install the converter housing front plate to hold the converter in place when the transmission is removed.

4. Disconnect the starter cables from the starter and remove the starter.

5. Remove the nuts that attach each muffler inlet pipe to the exhaust manifolds. Separate the pipes from the manifolds and allow them to hang.

6. Disconnect the oil cooler lines from the transmission.

7. Disconnect the vacuum hose from the vacuum diaphragm unit.

8. Disconnect the speedometer cable from the extension housing, and remove the drive shaft.

9. Disconnect the manual and downshift linkage from the transmission.

On vehicles equipped with a column shift, use tool T67P-7341-A to remove the selector rod from the manual lever.

10. Remove the two rear support-to-crossmember nuts.

11. Position a transmission jack under the transmission and secure the transmission to the jack with a safety chain.

12. Raise the transmission just enough to remove the weight from the crossmember. Remove the two crossmember-to-frame side support bolts and nuts and remove the crossmember.

13. Lower the transmission and remove the bolt that secures the transmission fluid filler tube to the cylinder head. Lift the filler tube and the dipstick from the transmission case.

14. Remove the six converter housing-to-cylinder block attaching bolts.

15. Move the jack rearward until the transmission clears the engine, then tip it forward to provide clearance. Lower the transmission and remove it from under the vehicle.

INSTALLATION

1. If the converter has been removed from the converter housing, carefully position the converter in the housing and install the housing lower front cover to prevent the converter from slipping out of the housing.

2. Rotate the converter until the studs adjacent to the drain plugs are in a vertical position. Rotate the flywheel as required to align the drain plug holes with the drain plugs in the converter.

3. Roll the transmission into position under the vehicle and raise it to align with the engine. Remove the housing lower front cover that was previously installed. Move the transmission forward until the converter housing contacts the cylinder block. Install and torque the converter to cylinder block attaching bolts.

4. Remove the jack safety chain from the transmission.

5. Install a new O-ring on the lower end of the filler tube. Dip the O-ring in clean automatic transmission fluid and insert the filler tube in the transmission case.

6. Connect the two oil cooler lines to the transmission case.

7. Position the crossmember to the frame side supports and install and tighten the attaching bolts and nuts to specification.

8. Remove the transmission jack from under the vehicle. Install and torque the rear support-to-crossmember nuts.

9. Install the converter-to-flywheel attaching nuts and torque them to specification.

10. Secure the converter drain plug access cover to the lower end of the converter housing with the attaching bolts.

11. Install the starter and torque the attaching bolts to specification. Connect the starter cables.

12. Install and tighten the filler tube to cylinder head bolt.

13. Install the drive shaft.

14. Connect the speedometer cable to the extension housing.

15. Install the linkage rods on the transmission downshift and manual control levers.

On vehicles equipped with a column shift, use tool T67P-7341-A to install a new grommet in the manual lever,

and to install the manual linkage rod into the grommet.

16. Connect the vacuum hose to the vacuum diaphragm unit.

17. Connect the exhaust inlet pipes to the manifolds.

18. Lower the vehicle. Fill the transmission to the proper level with the specified fluid. Adjust the manual and downshift linkage.

4 MAJOR REPAIR OPERATIONS

DISASSEMBLY OF TRANSMISSION

1. Before removing any of the transmission sub-assemblies, thoroughly clean the outside of the transmission case to prevent dirt from getting inside the mechanism.

2. After the transmission has been removed from the vehicle, place the assembly in the transmission holder shown in Fig. 22.

3. Remove the transmission pan, gasket, and filter retainer clip.

4. Lift the filter from the case.

5. Remove the spring seat from the pressure regulator. **Maintain constant pressure on the seal to prevent distortion of the spring seat and the sudden release of the springs.** Remove the pressure regulator springs and pilots, but do not remove the valves.

6. Remove the small compensator pressure tube. Then remove the large control pressure tube from the pressure regulator and the control valve body. If necessary, tap the tubes with a soft-faced hammer but do not distort them.

7. Loosen the front and rear servo band adjusting screws five turns. Loosen the front servo attaching bolts three turns.

8. Remove the vacuum diaphragm unit and push rod.

9. Remove the control valve body attaching bolts. Align the levers to permit removal of the valve body. Then lift the valve body clear of the transmission case. Pull the body off the servo tubes and remove it from the case.

10. Remove the regulator from the case. **Keep the control pressure valve and the converter pressure regulator valve in the pressure regulator to avoid damage to the valves.**

11. Remove the front servo apply and release tubes by twisting and pulling at the same time. Remove the front servo attaching bolts. Hold the front servo strut with the fingers, and lift the servo from the case.

12. Remove the rear servo attaching bolts. Hold the actuating and anchor struts with the fingers, and lift the servo from the case.

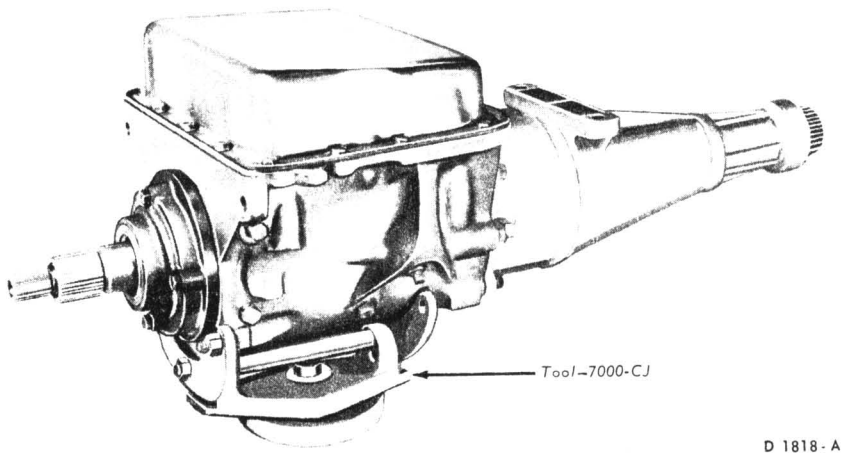


FIG. 22—Transmission Mounted in Holding Fixture

TRANSMISSION END PLAY CHECK

1. Remove one of the front pump attaching bolts. Mount the dial indicator support tool 77067 in the front pump bolt hole. Mount a dial indicator on the support so that the contact rests on the end of the turbine shaft.

2. Install the extension housing seal replacer on the output shaft to provide support for the shaft.

3. Pry the front clutch cylinder to the rear of the transmission with a large screwdriver. Set the dial indicator at zero while maintaining a slight pressure on the screwdriver.

4. Remove the screwdriver and pry the units toward the front of the transmission by inserting the screwdriver between the large internal gear and the transmission case.

5. Record the indicator reading for use during transmission assembly. End play should be 0.010-0.029 inch (minimum end play is preferred). If end play is not within specifications a new selective thrust washer must be used when the transmission is assembled.

6. Remove the indicator support, and then remove the seal replacer from the output shaft.

REMOVAL OF CASE AND EXTENSION HOUSING PARTS

1. Remove the remaining front pump attaching bolts. Then remove the front pump and gasket. **If necessary, tap the screw bosses with a soft-faced hammer to loosen the pump from the case.**

2. Remove the lubrication tube from the case. Remove the five transmission to extension housing bolts. These bolts also attach the rear support to the case. Remove the extension housing.

3. Remove the output shaft assembly (Fig. 23). To facilitate output shaft removal, insert a screwdriver between the output shaft ring gear and pinion carrier and pry the output shaft rearward. Be careful not to bend the pressure tubes between the rear support or distributor sleeve and case as the tubes are removed from the case.

4. Remove the four seal rings from the output shaft with the fingers to prevent breaking the rings.

5. Remove the governor snap ring from the output shaft. Using a soft faced hammer, tap the governor assembly off the output shaft. Remove the governor drive ball (Fig. 24).

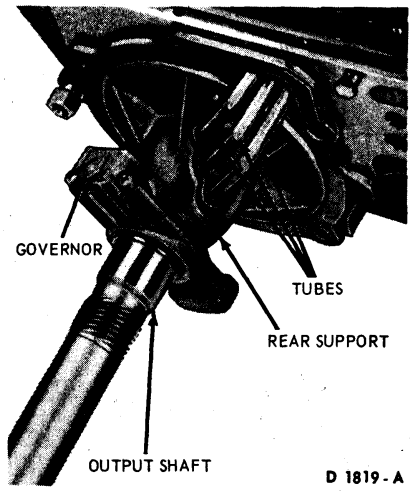


FIG. 23—Rear Support and Output Shaft Installed

6. Remove the rear support and gasket from the output shaft. Remove the needle bearings and race from the rear support (Fig. 24).

7. Remove the selective thrust washer from the rear of the pinion carrier.

8. Remove the pinion carrier.

9. Remove the primary sun gear rear thrust bearing and races from the pinion carrier.

10. Note the rear band position for reference in assembly. The end of the band next to the adjusting screw has a depression (dimple) in the center of the boss. Squeeze the ends of the rear band together, tilt the band to the rear, and remove the rear band from the case.

11. Remove the two center support outer bolts (one each side) from the transmission case.

12. Exert enough pressure on the end of the input shaft to hold the clutch units together. Then remove the center support and the front and rear clutch assemblies as a unit (Fig. 25).

13. Install the clutch assemblies in the bench fixture (Fig. 26).

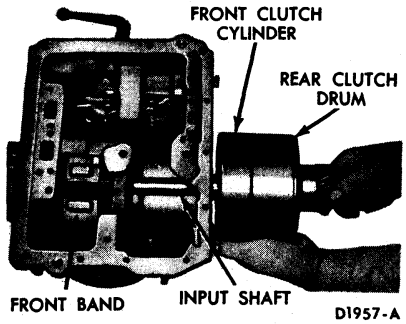


FIG. 25—Removing or Installing Input Shaft and Clutch

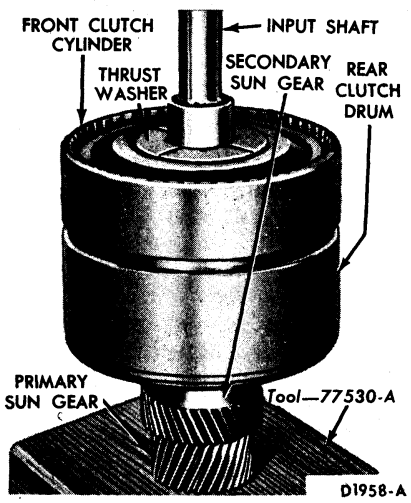


FIG. 26—Input Shaft and Clutch in Holding Fixture

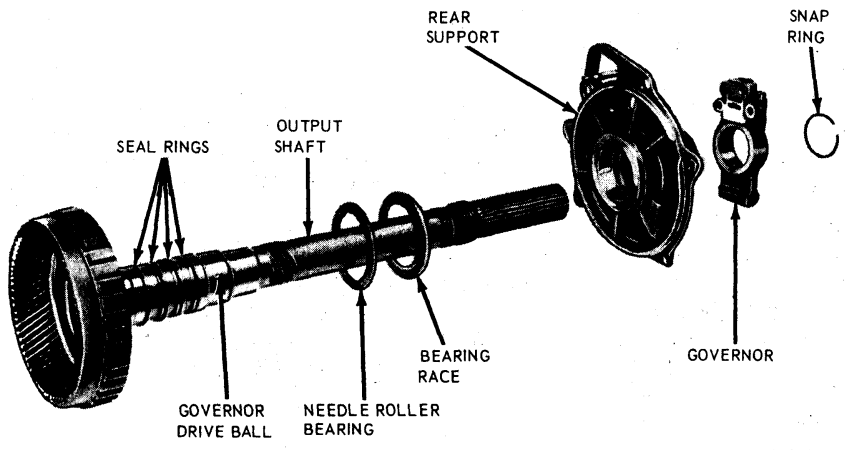


FIG. 24—Output Shaft Disassembled

14. Remove the thrust washer from the front of the input shaft.

15. To remove the front band, position the band ends between the case webbing and tilt the bottom of the band rearward. Then, squeeze the ends of the band together and remove from the rear of the case.

16. Lift the front clutch assembly from the primary sun gear shaft.

17. Remove the bronze and the steel thrust washers from the rear clutch assembly. Wire the thrust washers together to assure correct installation.

18. Remove the front clutch seal rings from the primary sun gear shaft.

19. Lift the rear clutch assembly from the primary sun gear shaft.

20. Remove the rear clutch seal rings from the primary sun gear shaft. **Do not break the seal rings.**

21. Remove the primary sun gear front thrust washer.

PARTS REPAIR AND REPLACEMENT

During the repair of the subassemblies, certain general instructions which apply to all units of the transmission must be followed. These instructions are given here to avoid unnecessary repetition.

Handle all transmission parts carefully to avoid nicking or burring the bearing or mating surfaces.

Lubricate all internal parts of the transmission with transmission fluid before assembly. **Do not use any other lubricants except on gaskets and thrust washers which may be coated with vaseline to facilitate assembly. Always install new gaskets when assembling parts of the transmission.**

Tighten all bolts and screws to the recommended torque. For detail cleaning and inspection operations refer to Part 7-1.

REAR BRAKE DRUM SUPPORT BUSHING REPLACEMENT

1. If the rear brake drum support bushing is to be replaced, press the bushing from the support as shown in Fig. 27.

2. Press a new bushing into the brake drum support with the tool shown in Fig. 27.

OUTPUT SHAFT BUSHING REPLACEMENT

1. Remove the output shaft bushing if it is worn or damaged. Use the cape

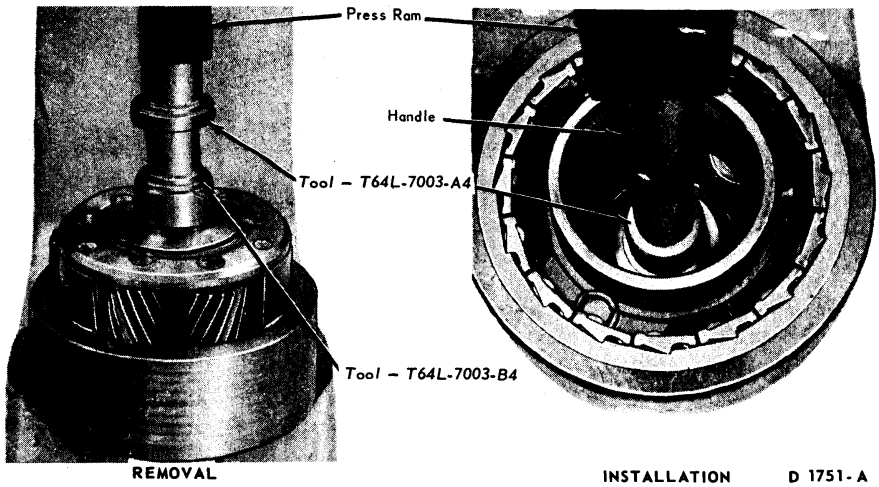


FIG. 27—Replacing Rear Brake Drum Support Bushing

chisel and cut along the bushing seam until the chisel breaks through the bushing wall. Pry the loose ends of the bushing up with an awl and remove the bushing.

2. Insert a new bushing into the installation tool and position the tool and bushing over the output shaft hub. Then, press the bushing on the output shaft hub as shown in Fig. 28.

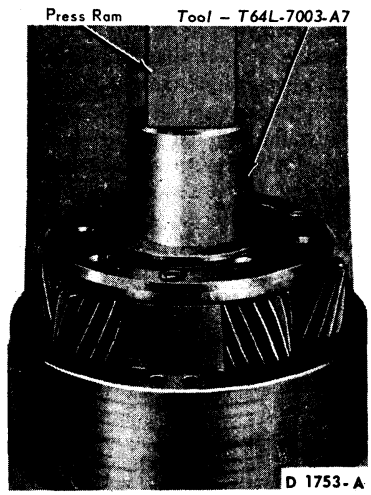


FIG. 28—Installing Output Shaft Bushing

PRIMARY SUN GEAR SHAFT

1. Position the primary sun gear shaft in the clutch bench fixture.

2. Check the fit of the seal rings in their respective bores. If equipped with cast iron seal rings, a clearance of 0.002-0.009 inch should exist between the ends of the rings.

If equipped with teflon seals that are worn or damaged, cut the seals from the shaft with a sharp knife. Be careful not to score the ring grooves.

3. Replace the teflon seals with cast iron seal rings, and check for free movement in the groove.

REAR CLUTCH

1. Remove the clutch pressure plate snap ring, and remove the pressure plate from the drum. Remove the waved cushion spring. Remove the composition and steel plates.

2. Compress the spring with the tools shown in Fig. 29 and remove the snap ring.

3. Guide the spring retainer while releasing the pressure to prevent the retainer from locking in the snap ring grooves.

4. Position the primary sun gear shaft in the rear clutch. Place an air hose nozzle in one of the holes in the shaft, and place one finger over the other hole. Then force the clutch piston out of the clutch drum with air pressure. **Hold one hand over the piston to prevent damage.**

5. Remove the inner and outer seal rings from the clutch piston.

6. Remove the rear clutch sun gear bushing if it is worn or damaged. Use the cape chisel (Fig. 31) and cut along the bushing seam until the chisel breaks through the bushing wall. Pry the loose ends of the bushing up with an awl and remove the bushing.

7. Press a new bushing into the rear clutch sun gear with the tool shown in Fig. 32.

8. Install new inner and outer seal rings on the piston.

9. To install the piston in the clutch drum, lubricate the piston seals and tools (Fig. 30) with clean transmission fluid.

10. Push the small fixture down over the cylinder hub.

11. Insert the piston into the large fixture with the seal toward the thin-walled end.

12. Hold the piston and large fixture and insert as a unit into the cylinder. Push down over the small fixture until the large tool stops

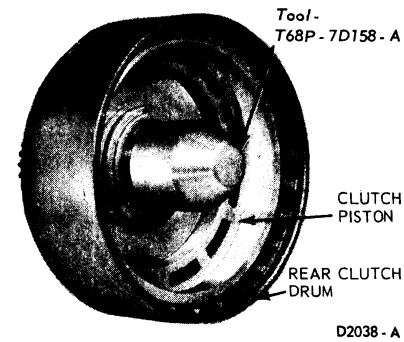


FIG. 30—Installing Rear Clutch Piston

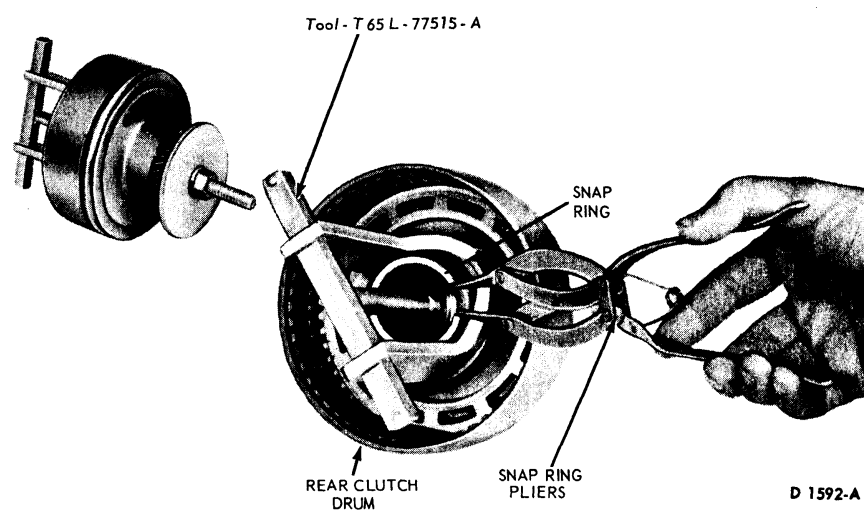


FIG. 29—Removing Rear Clutch Spring Snap Ring

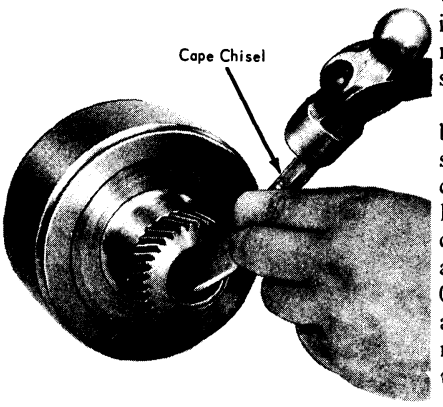


FIG. 31—Removing Rear Clutch Sun Gear Bushing

against the shoulder in the cylinder; then push the piston down, out of the tool, until it bottoms in the cylinder. Remove the tools.

13. Install the clutch release spring, and position the retainer on the spring.

14. Install the tool on the spring retainer as shown in Fig. 29. Compress the clutch spring, and install the snap ring. **While compressing the spring, guide the retainer to avoid interference of the retainer with the snap ring groove. Make sure the snap ring is fully seated in the groove.** When new composition clutch plates are used, soak the plates in automatic transmission fluid for 15 minutes before they are assembled.

15. Install a steel clutch plate and the waved cushion spring. Then, install steel and friction plates alternately starting with a steel plate.

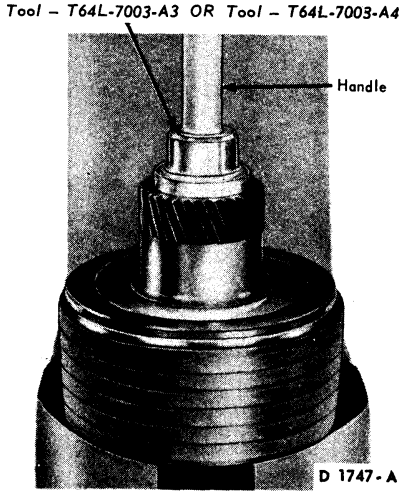


FIG. 32—Installing Rear Clutch Sun Gear Bushing

16. Install the clutch pressure plate with the bearing surface down. Then install the clutch pressure plate snap ring. Make sure the snap ring is fully seated in the groove.

17. Check the free pack clearance between the pressure plate and the snap ring with a feeler gauge. The clearance should be 0.030-0.055 inch. If the clearance is not within specifications, selective snap rings are available in the following thicknesses: 0.060-0.064, 0.074-0.078, 0.088-0.092 and 0.102-0.106 inch. Insert the correct size snap ring and recheck the clearance.

18. Install the thrust washer on the primary sun gear shaft. Lubricate all parts with automatic transmission fluid or petroleum jelly. Install the two center seal rings.

19. Install the rear clutch on the primary sun gear shaft. **Be sure all of the needles are in the hub if the unit is equipped with loose needle bearings.** Assemble two seal rings in the front grooves.

20. Install the steel and the bronze thrust washers on the front of the secondary sun gear assembly. If the steel washer is chamfered, place the chamfered side down.

FRONT CLUTCH

1. Remove the clutch cover snap ring with a screwdriver, and remove the input shaft from the clutch drum.

2. Remove the thrust washer from the thrust surface of the clutch hub. Insert one finger in the clutch hub, and lift the hub straight up to remove the hub from the clutch drum.

3. Remove the composition and the steel clutch plates, and then remove the pressure plate from the clutch drum.

4. Place the front clutch spring compressor on the release spring, position the clutch drum on the bed of an arbor press, and compress the release spring with the arbor press until the release spring snap ring can be removed (Fig. 33).

5. Remove the clutch release spring from the clutch drum.

6. Install the special nozzle shown in Fig. 34 on an air hose. Place the nozzle against the clutch apply hole in the front clutch housing, and force the piston out of the housing.

7. Remove the piston inner seal from the clutch housing. Remove the piston outer seal from the groove in the piston.

8. Remove the input shaft bushing if it is worn or damaged. Use the cape

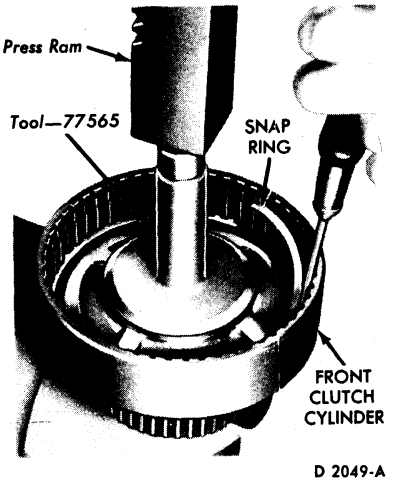


FIG. 33—Removing or Installing Front Clutch Snap Ring

chisel and cut along the bushing seam until the chisel breaks through the bushing wall. Pry the loose ends of the bushing up with an awl and remove the bushing.

9. Slip a new bushing over the end of the installation tool and position the tool and bushing to the bushing hole. Then, press the bushing into the input shaft as shown in Fig. 35.

10. Lubricate all parts with transmission fluid. Install a new piston inner seal ring in the clutch cylinder. Install a new piston outer seal in the groove in the piston.

11. Install the piston in the clutch housing. **Make sure the steel bearing ring is in place on the piston.**

12. Position the release spring in the clutch cylinder with the concave side up. Place the release spring compressor on the spring, and compress the spring with an arbor press. Then

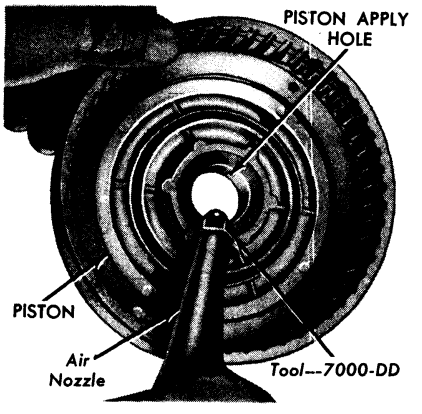


FIG. 34—Removing Front Clutch Piston

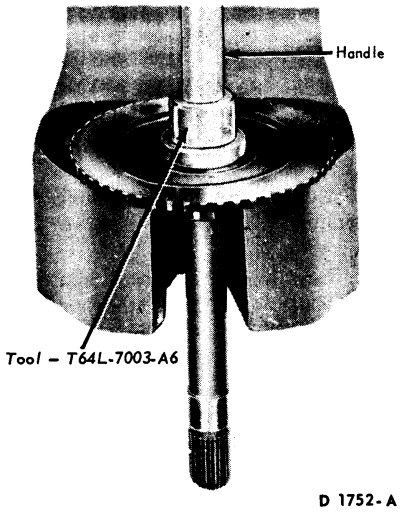


FIG. 35—Installing Input Shaft Bushing

install the snap ring as shown in Fig. 33. **Make sure the snap ring is fully seated in the groove.**

13. Install the front clutch housing on the primary sun gear shaft by rotating the clutch units to mesh the rear clutch plates with the serrations on the clutch hub. **Do not break the seal rings.**

14. Install the clutch hub in the clutch cylinder with the deep counterbor down (Fig. 36). Install the thrust washer on the clutch hub.

15. Install the pressure plate in the clutch cylinder with the bearing surface up (Fig. 37). Install the composition and the steel clutch plates alternately, starting with a composition plate (Fig. 38). Lubricate the plates as they are installed.

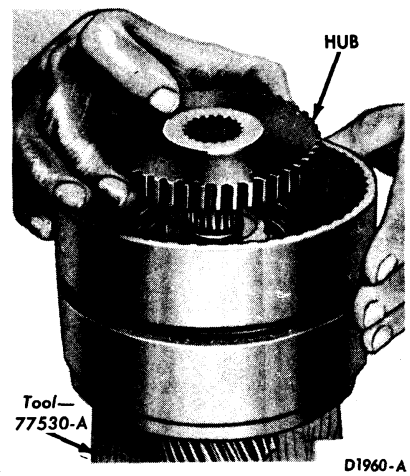


FIG. 36—Installing Clutch Hub

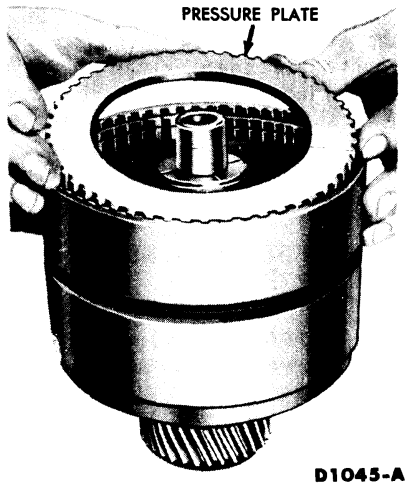


FIG. 37—Installing Pressure Plate

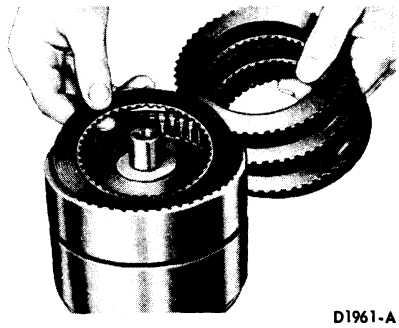


FIG. 38—Installing Clutch Plates

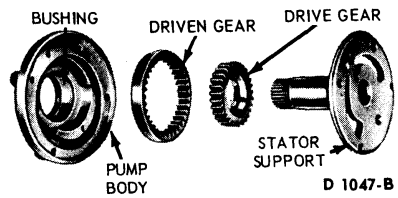


FIG. 39—Front Pump Disassembled

The final friction plate to be installed is selective. Install the thickest plate that will be a minimum of 0.010 inch below input shaft shoulder in cylinder. For all other plates, use the thinnest available. Refer to the Specifications Section for available plate thickness.

16. Install the turbine shaft in the clutch cylinder, and then install the snap ring. **Make sure the snap ring is fully seated in the groove.**

17. Install the thrust washer on the turbine shaft.

FRONT PUMP

1. Remove the stator support attaching screws and remove the stator support. Mark the top surface of the pump driven gear with Prussian blue to assure correct assembly. **Do not scratch the pump gears.**

2. Remove the drive and driven gears from the pump body.

3. Refer to Fig. 39 for a disassembled view of the front pump. Inspect the pump body housing, gear pockets and crescent for scores.

4. If the pump housing bushing is to be replaced, press the bushing from the front housing with the tools shown in Fig. 40.

5. Press a new bushing into the pump housing with the handle and tool shown in Fig. 40.

6. If any parts other than the stator support or bushings are found defective, replace the pump as a unit. Minor burrs and scores may be removed with crocus cloth. The stator support is serviced separately.

7. Bolt the front pump to the transmission case with capscrews.

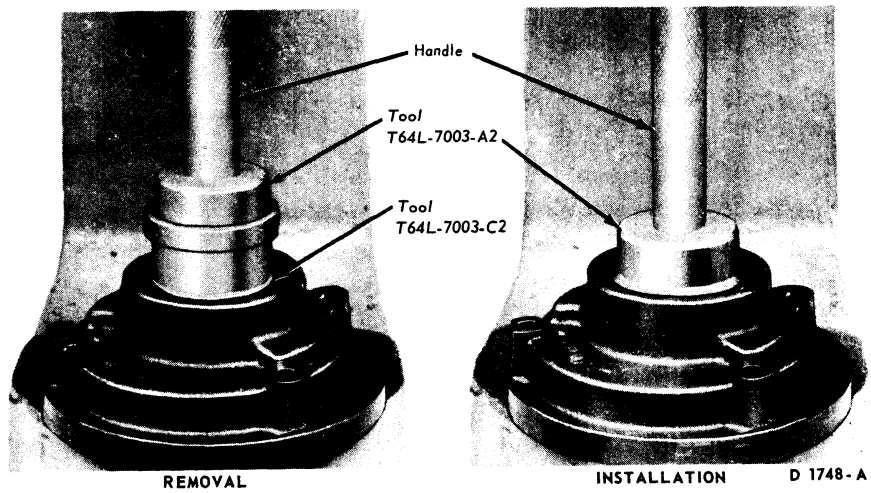


FIG. 40—Replacing Front Pump Housing Bushing

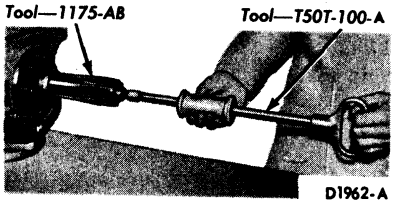


FIG. 41—Removing Front Pump Seal

8. Install the oil seal remover shown in Fig. 41. Then pull the front seal from the pump body.

9. Clean the pump body counterbore. Then inspect the bore for rough spots. Smooth up the counterbore with crocus cloth.

10. Remove the pump body from the transmission case.

11. Coat the outer diameter of a new seal with FoMoCo Sealing Compound, or its equivalent. Then position the seal in the pump body. Drive the seal into the pump body with the tool shown in Fig. 42 until the seal is firmly seated in the body. Tool 77837 may be reworked (Fig. 43) to install the latest type seal.

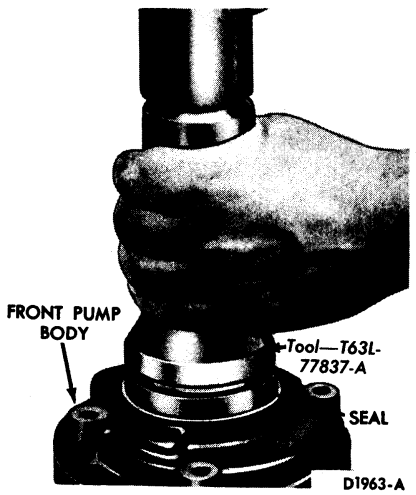


FIG. 42—Installing Front Pump Seal

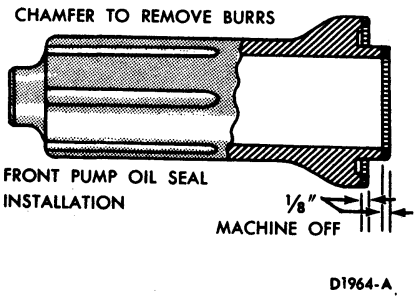


FIG. 43—Front Pump Seal Installing Tool Modification

12. Place the pump driven gear in the pump body with the mark on the gear facing down. Install the drive gear in the pump body with the chamfered side of the flats facing down.

13. Install the stator support and attaching screws. Check the pump gears for free rotation.

REAR SUPPORT BUSHING REPLACEMENT

1. Remove the three pressure tubes from the support housing.

2. Remove the rear support bushing if it is worn or damaged. Use a cape chisel and cut along the bushing seam until the chisel breaks through the bushing wall. Pry the loose ends of the bushing up with an awl and remove the bushing.

3. Press a new bushing into the support housing with the tool shown in Fig. 44.

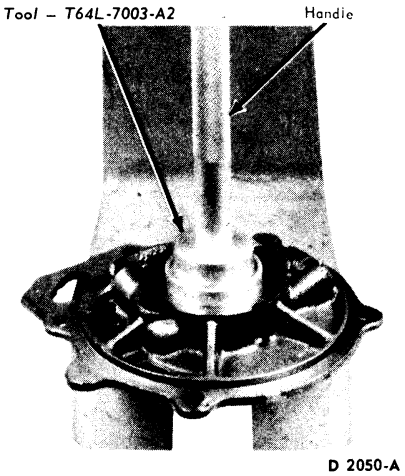


FIG. 44—Installing Rear Support Housing Bushing

4. Install the pressure tubes.

PRESSURE REGULATOR

1. Remove the valves from the regulator body.

2. Remove the regulator body cover attaching screws, and remove the cover (Fig. 45).

3. Remove the separator plate.

4. Wash all parts thoroughly in clean solvent and blow dry with moisture-free compressed air.

5. Inspect the regulator body and cover mating surfaces for burrs.

6. Check all fluid passages for obstructions.

7. Inspect the control pressure and converter pressure valves and bores for burrs and scores. Remove all burrs carefully with crocus cloth.

8. Check the free movement of the valve in their bores. Each valve should fall freely into its bore when both the valve and bore are dry.

9. Inspect the valve springs for distortion.

10. Position the separator plate on the regulator cover.

11. Position the regulator cover and separator plate on the regulator body, and install the attaching screws. Torque the screws to specification.

12. Insert the valves in the pressure regulator body (Fig. 45).

CONTROL VALVE BODY

During the disassembly of the control valve assembly, avoid damage to valve parts and keep the valve parts clean. Place the valve assembly on a clean shop towel while performing the disassembly operation. **Do not sepa-**

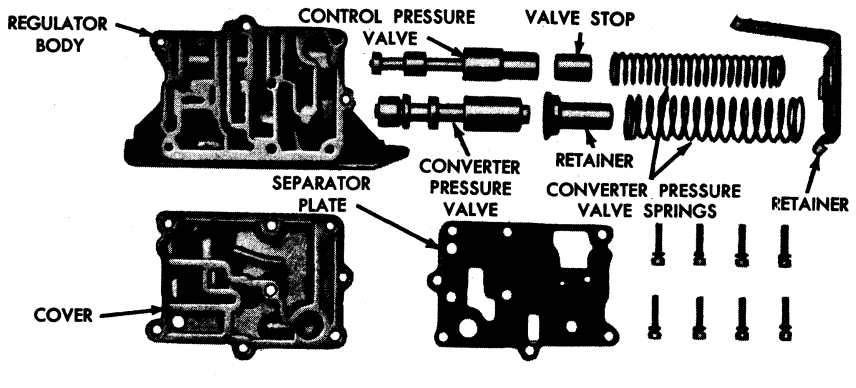


FIG. 45—Pressure Regulator Disassembled

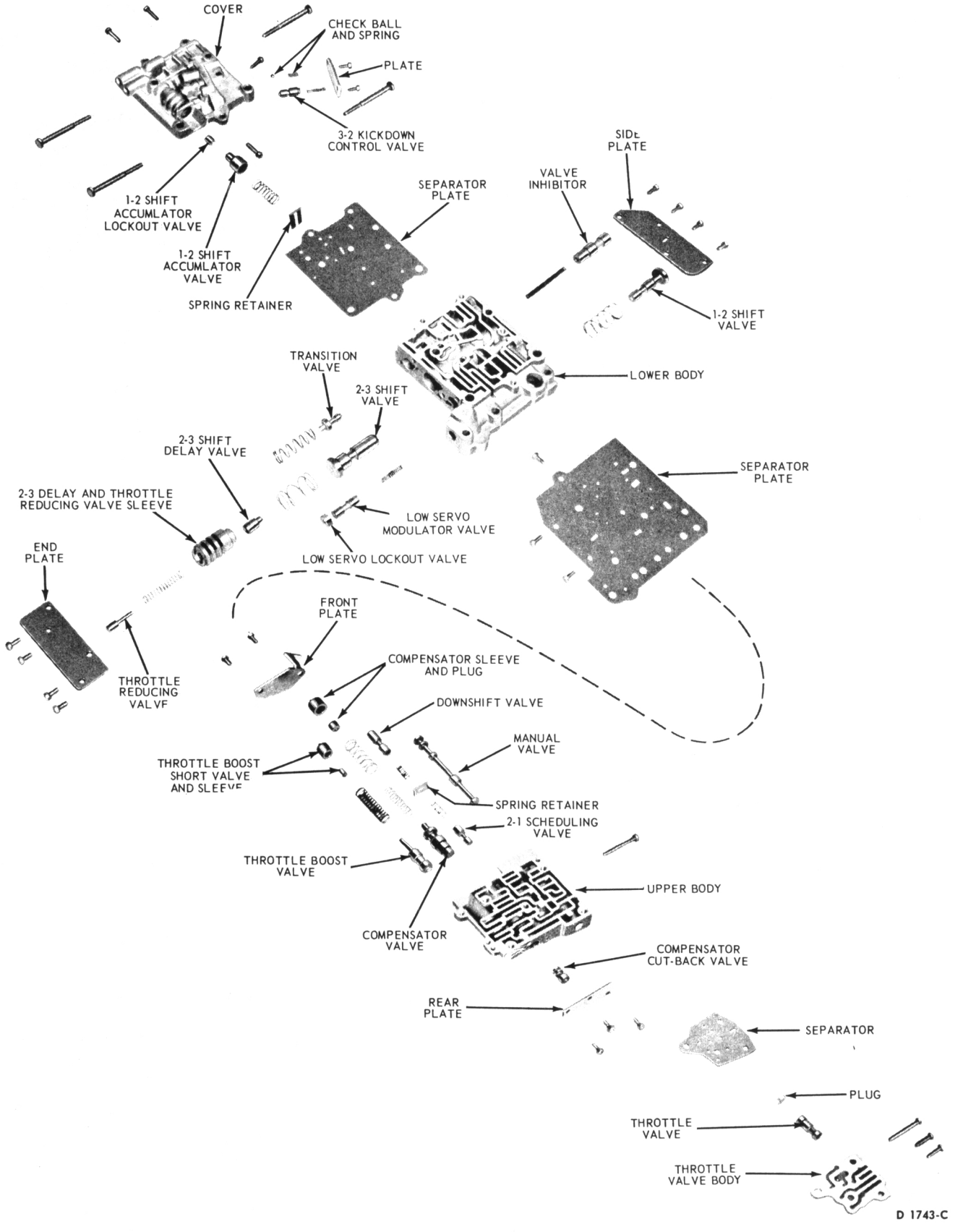


FIG. 46—Control Valve Disassembled

rate the upper and lower valve bodies and cover until after the valves have been removed.

Disassembly

1. Remove the manual valve (Fig. 46).

2. Remove the throttle valve body and the separator plate. Be careful not to lose the check valve when removing the separator plate from the valve body. Remove the throttle valve and plug.

3. Remove one screw attaching the separator plate to the lower valve body. Remove the upper body front plate. **The plate is spring-loaded. Apply pressure to the plate while removing the attaching screws.**

4. Remove the compensator sleeve and plug, and remove the compensator valve springs. Remove the compensator valve.

5. Remove the throttle boost short valve and sleeve. Remove the throttle boost valve spring and valve.

6. Remove the downshift valve and spring. Remove the 2-1 scheduling valve retainer from the valve body and remove the spring and valve.

7. Remove the upper valve body rear plate.

8. Remove the compensator cut back valve.

9. Remove the lower body side plate (Fig. 46). **The plate is spring-loaded. Apply pressure to the plate while removing the attaching screws.**

10. Remove the 1-2 shift valve and spring. Remove the inhibitor valve and spring.

11. Remove the two screws attaching the separator plate to the cover. Remove the lower body end plate. **The end plate is spring-loaded. Apply pressure to the plate while removing the attaching screws.**

12. Remove the low servo lockout valve, low servo modulator valve and spring.

13. Remove the 2-3 delay and throttle reducing valve sleeve, the throttle reducing valve, spring, and the 2-3 shift delay valve. Remove the 2-3 shift valve spring and valve.

14. Remove the transition valve spring and valve.

15. Remove the plate (Fig. 46) from the valve body cover.

16. Remove the check ball spring and check ball. Remove the 3-2 kickdown control valve spring and valve.

17. Remove the 1-2 shift accumulator valve spring retainer from the cover. Remove the spring, 1-2 shift accumulator valve and 1-2 shift accumulator lockout valve.

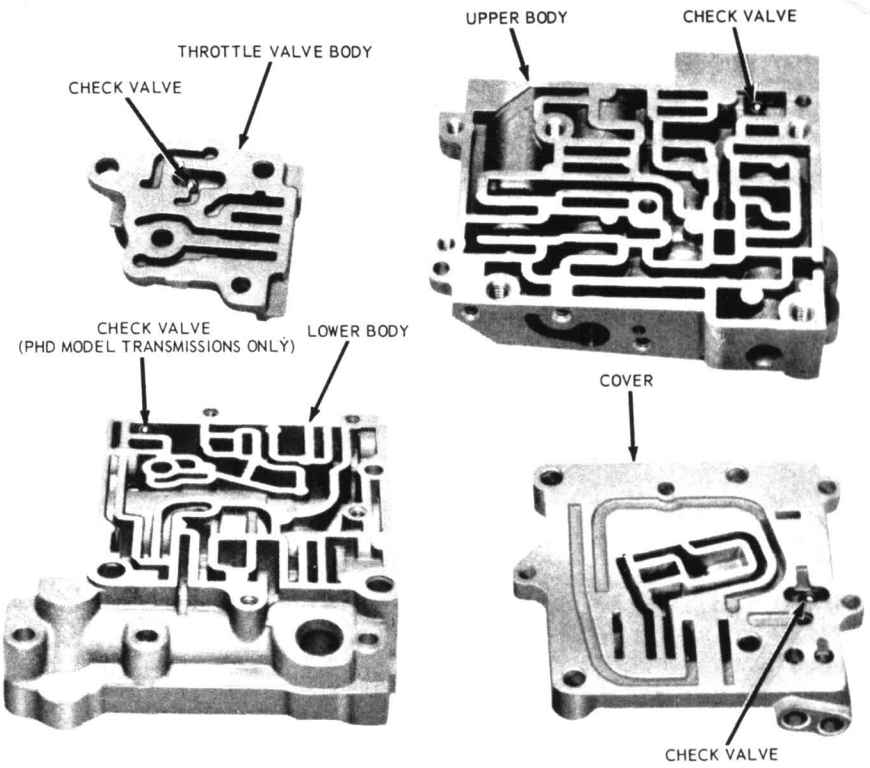


FIG. 47 — Check Valve Locations

18. Remove the through bolts and screws. Then, separate the bodies. Remove the separator plates from the valve bodies and cover. Be careful not to lose the check valves.

Assembly

1. Arrange all parts in their correct positions (Fig. 46). Rotate the valves and plugs when inserting them in their bores to avoid shearing of soft body castings.

2. Place the check valve in the upper body as shown in Fig. 47. Then, position the separator plate on the body.

3. Position the lower body on the upper body, and start **but do not tighten the attaching screws.**

4. Place the check valve in the cover (Fig. 47) and position the cover and separator plate on the lower body. Start the four through bolts.

5. Align the separator with the upper and lower valve body attaching bolt holes. Install and torque the four valve body bolts to specification. **Excessive tightening of these bolts may distort the valve bodies, causing valves or plugs to stick.**

6. Install the 3-2 kickdown control valve and spring and the check ball and spring in the cover. Install the plate.

7. Insert the 1-2 shift accumulator lockout valve, 1-2 shift accumulator valve, and spring in the cover. Install the valve spring retainer.

8. Install the transition valve and spring in the lower body.

9. Install the 2-3 shift valve and spring. Install the 2-3 shift delay valve and the spring and throttle reducing valve in the sleeve. Slide the sleeve and valve into position in the lower body.

10. Install the low servo lockout valve spring. Install the low servo modulator and low servo lockout valves. Install the lower body end plate.

11. Install the inhibitor valve spring and valve in the lower body.

12. Install the 1-2 shift valve spring and valve. Install the lower body side plate.

13. Install the compensator cutback valve in the upper body. Install the upper body rear plate.

14. Install the 2-1 scheduling valve, spring, and spring retainer in the body. Install the downshift valve spring and valve.

15. Install the throttle boost valve and spring. Install the throttle boost short valve and sleeve.

16. Install the compensator valve,

inner and outer compensator springs, and the compensator sleeve and plug.

17. Position the front plate. Apply pressure to the plate while installing the two attaching screws.

18. Install the throttle valve, plug and check valve in the throttle valve body. Position the separator on the upper body and install the throttle valve body. Install the three attaching screws.

19. Install four screws attaching the cover to the lower body, two screws attaching the separator plate to the upper body, and one screw attaching the separator plate to lower body. Torque the cover and body screws to specification.

20. Install the manual valve.

GOVERNOR

1. Remove the governor valve body cover.

2. Remove the valve body from the counterweight.

3. Remove the plug, sleeve, and the valve and spring from the body (Fig. 48).

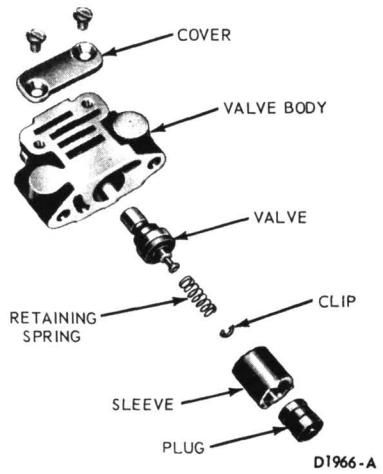


FIG. 48—Governor Disassembled

4. Install the governor valve and spring assembly in the bore of the valve body. Install the sleeve, and plug.

5. Install the body on the counterweight. **Make sure the fluid passages in the body and the counterweight are aligned.**

6. Position the valve body cover on the body, and install the screws.

FRONT SERVO

1. Remove the servo piston retainer snap ring (Fig. 49). The servo piston is spring-loaded. **Apply pressure to the piston when removing the snap ring.**

2. Remove the servo piston retainer, servo piston, and the return piston from the servo body. It may be necessary to tap the piston stem lightly with a soft-faced hammer to separate the piston retainer from the servo body.

3. On PHB-A and PHD models, remove the screw and washer from the end of the piston stem, and separate the piston retainer, return piston, and servo piston.

4. Remove all the seal rings, and remove the spring from the servo body.

5. Inspect the servo body for cracks and the piston bore and the servo piston stem for scores (Fig. 49).

Check fluid passages for obstructions.

6. Check the actuating lever for free movement, and inspect it for wear. If it is necessary to replace the actuating lever shaft, remove the retaining pin and push the shaft out of the bracket. If the shaft is not retained by a pin, it is retained in the body by serrations on one end of the shaft. These serrations cause a press fit at that end. To remove the shaft, press on the end opposite the serrations.

Inspect the adjusting screw threads and the threads in the lever.

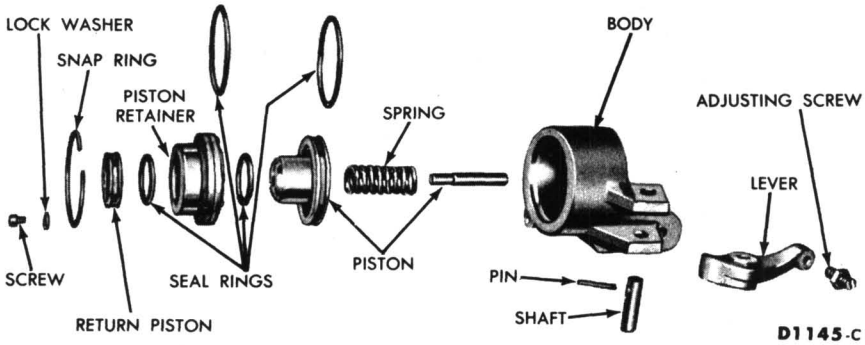


FIG. 49—Front Servo—Disassembled

7. Check the servo spring and servo band strut for distortion.

8. Inspect the servo band lining for excessive wear and bonding to the metal. **The band should be replaced if worn to a point where the grooves are not clearly evident.**

9. Inspect the band ends for cracks and check the band for distortion.

10. Lubricate all parts of the front servo with transmission fluid to facilitate assembly.

11. Install the inner and outer O-rings on the piston retainer. Install a new O-ring on the return piston and on the servo piston. Figure 50 identifies the servo components used in each transmission model.

12. On PHB-A and PHD models, tap the piston stem into the servo piston (Fig. 49). Insert the servo piston in the piston retainer. Tap the return piston onto the piston stem and into the piston retainer. Make certain that the dished side of the return piston is toward the servo piston. Secure the return piston to the stem with a screw and plain washer.

13. Position the servo piston release spring in the servo body. Install the servo piston, retainer, and return piston in the servo body as an assembly. Compress the assembly into the body, and secure it with the snap ring. **Make sure the snap ring is fully seated in the groove.**

14. Install the adjusting screw and locknut in the actuating lever if they were previously removed.

REAR SERVO

1. Remove the servo actuating lever shaft retaining pin with a 1/8-inch punch. Remove the shaft and actuating lever needle bearings and thrust washers.

2. Press down on the servo spring retainer, and remove the snap ring. **Release the pressure on the retainer slowly to prevent the spring from flying out.**

3. Remove the retainer and servo spring (Fig. 51).

4. Force the piston out of the servo body with air pressure. Hold one hand over the piston to prevent damage.

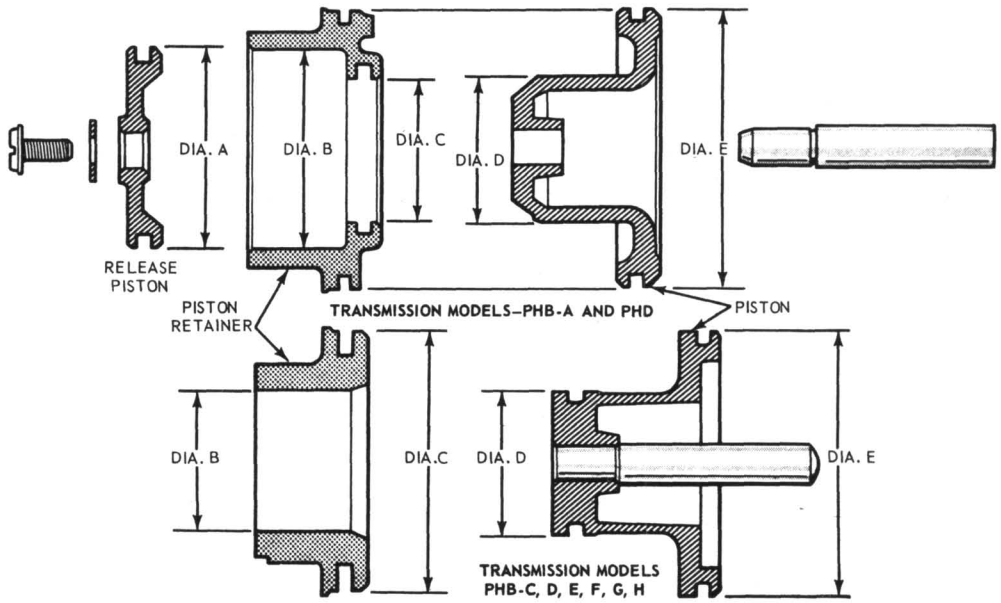
5. Remove the accumulator piston from the servo piston.

6. Remove the piston seal ring.

7. Install a new seal ring on the servo piston.

8. Install the accumulator piston in the servo piston.

9. Install the piston in the servo body. **Lubricate the parts to facilitate assembly.** Install the servo spring with



Models	Release Piston	Retainer	Piston	Diameter—Inches				
				A	B	C	D	E
PHB-A	C8AP-7366-A	C8AP-7A269-C	PAN-77359-A	1.8010	1.438	2.3705	1.281	2.4915
PHB-C,D,E,F,G,H	NONE	C9AP-7A269-A	C9ZP-7A260-A	—	1.313	2.3705	1.2975	2.3585
PHD	PAN-7366-B	PAN-77364-A	PAN-77359-A	1.4090	1.4185	1.291	1.2885	2.4915

FIG. 50—Front Servo Component Identification D2030-A

the small coiled end against the servo piston.

10. Install the spring retainer. Compress the spring with a C-clamp. Then install the snap ring. **The snap ring must be fully seated in the groove.**

11. Install the needle bearings in the actuating lever. Install the actuating lever and thrust washers with the socket in the lever bearing on the piston stem. Install the actuating lever shaft, aligning the retaining pin holes, and install the pin.

12. Check the actuating lever for free movement.

TRANSMISSION CASE LINKAGE REPAIR

Disassembly

1. Remove the inner downshift lever shaft nut (Fig. 52). Then remove the inner downshift lever.

2. Remove the outer downshift lever and shaft. Remove the downshift shaft seal from the counterbore in the manual lever shaft.

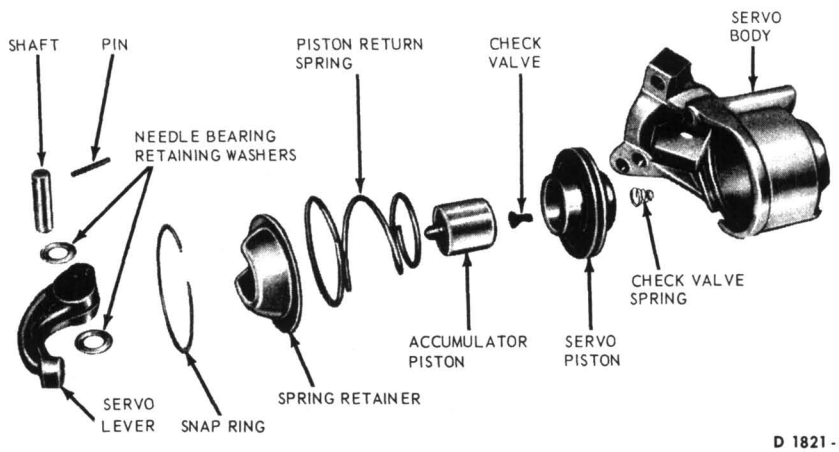


FIG. 51—Rear Servo—Disassembled

3. Remove the cotter pin from the parking pawl toggle operating rod and remove the clip from the parking pawl operating lever. Remove the parking pawl operating rod.

4. Rotate the manual shaft until the detent lever clears the detent plunger. Then remove the detent plunger and spring. **Do not allow the detent plunger to fly out of the case.**

5. Remove the manual lever shaft nut, and remove the detent lever. Remove the outer manual lever and shaft from the transmission case.

6. Tap the toggle lever sharply toward the rear of the case to remove the plug and pin.

7. Remove the pawl pin by working the pawl back and forth. Remove the pawl and toggle lever assembly, and then disassemble.

8. Remove the manual shaft seal and case vent tube. Remove the oil cooler return check valve from the back of the case.

Assembly

1. Coat the outer diameter of a new manual shaft seal with sealer, then install the seal in the case with a driver.

2. Install the vent tube in the transmission case.

3. Assembly the link to the pawl with the pawl link pin, washer, and

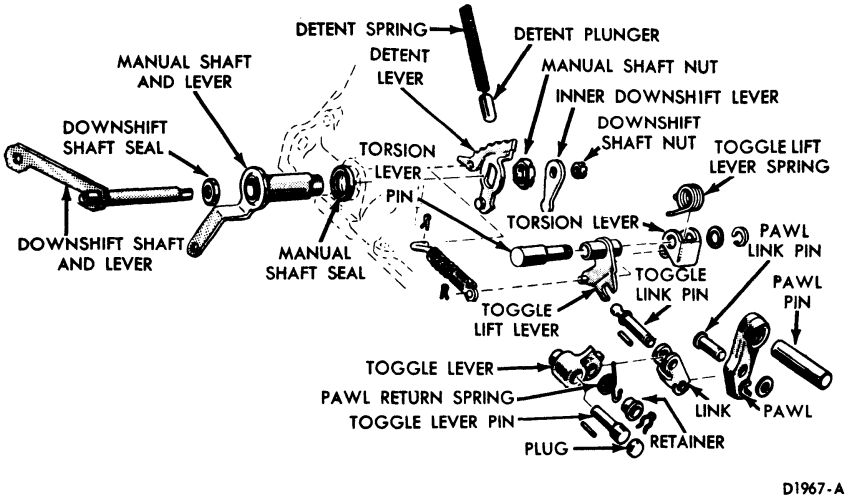


FIG. 52—Transmission Case Control Linkage

pawl return spring. Assemble the toggle lever to the link with the toggle link pin. Position the pawl return spring over the toggle link pin, and secure it in place with the washer and the small retainer clip (Fig. 52). Install the assembly in the transmission case by installing the pawl pin and the toggle lever pin. Install the torsion lever assembly. Position the spring on the torsion lever with a screwdriver. Make certain that the short side of toggle does not extend beyond the largest diameter of the ball or the toggle lever pin (Fig. 52). Tap the toggle lever in or out as necessary to center the toggle lever on the ball.

4. Install the manual lever and shaft in the transmission case. Position the detent lever on the shaft, and secure it with a nut. Tighten the nut to 20-30 ft-lbs torque. Rotate the manual lever to the rear of the case. Position the detent spring in the case. Hold the detent plug on the spring with a 3/16-inch socket wrench, then depress the spring until the plug is flush with the case. Carefully rotate the manual lever to the front of the case to secure the plug. **A piece of thin walled tubing may be used to depress the plug if a small socket wrench is not available.**

5. Position the ends of the parking pawl operating rod in the detent lever and toggle lift lever, and secure with the two small retaining pins.

6. Install a new seal on the downshift lever shaft, then install the lever and shaft in the case. Position the inner downshift lever on the inner end of the shaft with the mark O facing toward the center of the case. Install the lock washer and nut, then tighten the nut to 17-20 ft-lbs torque.

7. Check the operation of the linkage. The linkage should operate freely without binding.

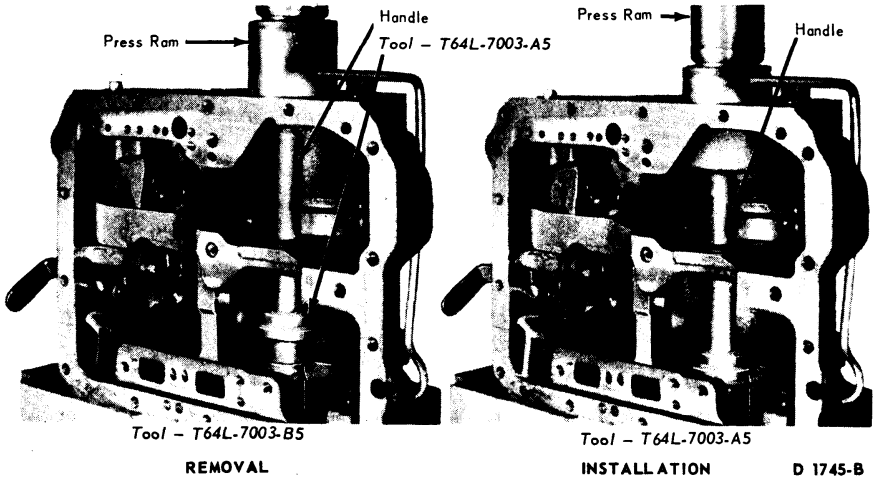


FIG. 53—Replacing Transmission Case Bushing

TRANSMISSION CASE BUSHING REPLACEMENT

1. If the transmission case bushing is to be replaced, press the bushing out of the case with the tools shown in Fig. 53.

2. Install a new transmission case bushing with the tool shown in Fig. 53.

ASSEMBLY OF TRANSMISSION

Do not use force to assemble mating parts. If the parts do not assemble freely, examine them for the cause of the difficulty. **Always use new gaskets and seals during the assembly operations.**

CLUTCH ASSEMBLIES

1. Install the front band in the transmission case so that the anchor end is aligned with the anchor in the case.

2. Make sure the thrust washer is in place on the input shaft. Lift the clutch assemblies out of the holding block. **Do not allow the clutches to separate.**

3. Install the clutch sub-assemblies in the transmission case while positioning the servo band on the drum. Hold the units together while installing them (Fig. 25).

CENTER SUPPORT, ONE-WAY CLUTCH, PINION CARRIER, AND OUTPUT SHAFT

The production center supports are chamfered at the edge of the race (Fig. 54). The service center supports are not chamfered. The following assembly procedures cover both types of center supports.

Installation—Center Support With Chamfered Edge

1. Install the center support and the rear band in the case.

2. Install the primary sun gear rear thrust bearing race, needle bearing, and front thrust bearing race if used in the planet carrier using petroleum jelly to retain them in place.

3. Lubricate the bearing surface on the center support, the rollers of the planetary clutch, and the cam race in the carrier with petroleum jelly (Fig. 54).

4. Install the planetary clutch in the carrier (Fig. 55).

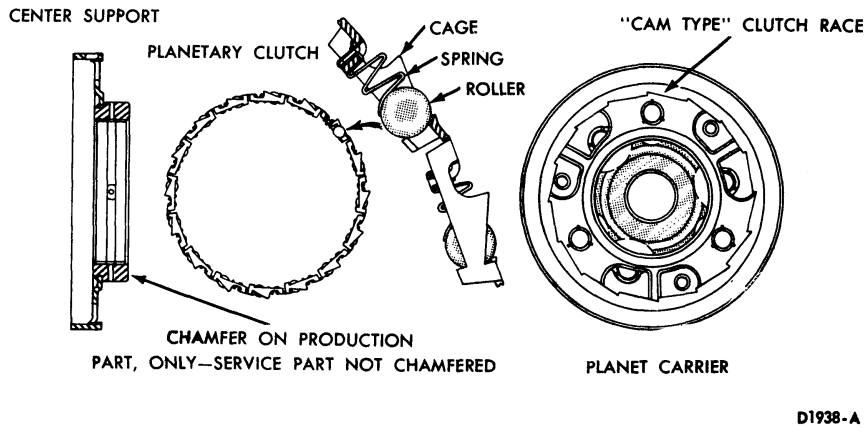


FIG. 54—Planetary Clutch, Planet Carrier and Center Support

5. Carefully position the planet carrier on the center support. Move the carrier forward until the clutch rollers are felt to contact the bearing surface of the center support.

6. While applying forward pressure on the planet carrier, rotate it counterclockwise, as viewed from the rear (Fig. 55). This will cause the clutch rollers to roll toward the large opening end of the cams in the race, compressing the spring slightly, so that the rollers will ride up the chamfer on the planetary support and onto the inner race.

7. Push the planet carrier all the way forward.

8. Check the operation of the planetary clutch by rotating the carrier counterclockwise. It should rotate counterclockwise (viewed from the rear) with a slight drag, and it should lock up when attempting to rotate it in a clockwise direction.

9. Install the selective thrust washer on the pinion carrier rear pilot. **If the end play was not within specifications when checked prior to disassembly, replace the washer with one of proper thickness.** Refer to the Specification Section of Group 7 for selective thrust washer thickness.

10. Install the output shaft, carefully meshing the internal gear with the pinions.

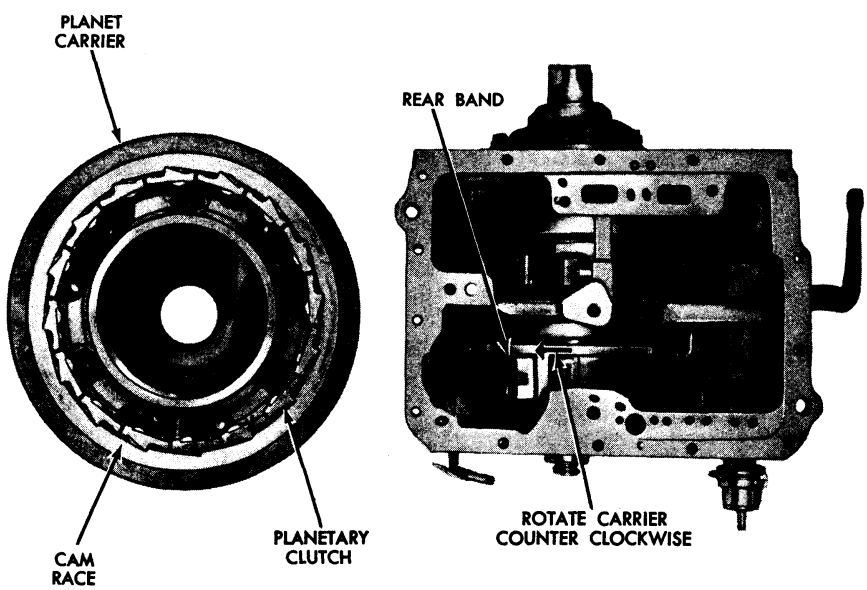


FIG. 55—Planetery Clutch Installation in Carrier—Chamfered Center Support

Installation—Center Support not Chamfered

1. Install the center support and the rear band in the case.

2. Install the primary sun gear, rear thrust bearing race, needle bearing and front thrust bearing race if used in the planet carrier using petroleum jelly to retain them in place.

3. Lubricate the bearing surface of the center support, the rollers of the planetary clutch, and the cam race in the carrier with vaseline.

4. Install the planetary clutch on the center support with the saw teeth of the clutch cage pointing in the clockwise direction as viewed from the rear (Fig. 56). Make sure that all rollers are in the cage.

5. Position the planet carrier on the support so that the cams in the carrier engage the saw teeth on the clutch cage.

6. Push the planet carrier forward until the rollers are felt to contact the surface of the cam race.

7. While applying forward pressure on the carrier, rotate it counterclockwise as viewed from the rear. This will cause the rollers to roll toward the large opening end of the cams in the race, compressing the springs slightly, so that the rollers will enter the cams.

8. Some rollers may become cocked preventing their entry into the outer race. These rollers must be positioned individually with a small screwdriver by pushing the rear of the rollers toward the transmission and into the cam race (Fig. 56). Keep pressure applied to the carrier at all times.

9. After all of the rollers have been started into the cam race, rotate the carrier counterclockwise while pushing it forward. Again, straighten any rollers which still may be in a cocked position and prevent the carrier from sliding onto the support.

10. Make sure that all springs are entered in the cam race before attempting to push the carrier on the support. Push the carrier all the way forward and check the operation of the clutch by rotating it in a counterclockwise direction. The carrier should rotate counterclockwise with a slight drag and should lock up when attempting to rotate it in a clockwise direction.

11. Install the selective thrust washer on the pinion carrier rear pilot. **If the end play was not within specifications when checked prior to disassembly, replace the washer with one of proper thickness.** Refer to the Specification Section of Group 7 for selective thrust washer thickness.

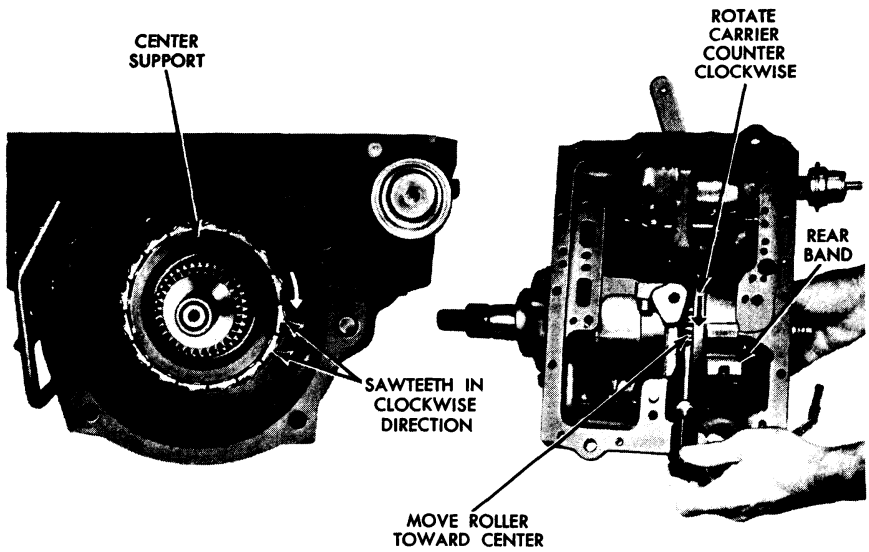


FIG. 56—Planetary Clutch Installation in Carrier—Center Support Not Chamfered

12. Install the output shaft, carefully meshing the internal gear with the pinions.

REAR SUPPORT

1. Position the needle bearing and retainer on the rear support (Fig. 24).

2. Position a new rear support to case gasket on the rear support. Retain the gasket with transmission fluid.

3. Install the rear support. As the support is installed, insert the tubes into the case.

GOVERNOR

1. Position the governor drive ball in the pocket in the output shaft. Retain the ball with transmission fluid.

2. Install the governor assembly, aligning the groove with the ball in the output shaft.

3. Install the governor with the governor body plate toward the front of the vehicle (Fig. 23). Install the governor snap ring.

EXTENSION HOUSING

1. Insert the extension housing oil seal replacer and pilot in the housing. Position a new gasket to the extension housing and install the extension housing on the transmission case. Coat the bolt threads with B5A-19554-A sealer and install the extension housing attaching bolts, breather tube clip, vacuum tube clip, and external tooth lock washer. **The lock washers must be installed with the rolled edge toward the transmission case to insure a tight seal.**

2. Torque the extension housing attaching bolts to specification.

3. Install the lubrication tube.

FRONT PUMP

1. Position a new front pump gasket in the counterbore of the transmission case.

2. Install the front pump, aligning the pump bolt holes with the holes in the case. Install three of the front pump attaching bolts and torque them to specification.

TRANSMISSION END PLAY CHECK

1. Mount the dial indicator support in a front pump bolt hole. Mount a dial indicator on the support so that the contact rests on the end of the turbine shaft.

2. Use a large screwdriver to pry the front of the clutch drum toward the rear of the transmission. Set the dial indicator at zero.

3. Remove the screwdriver and pry the units toward the front of the transmission by inserting a screwdriver between the large internal gear and the transmission case. Note the indicator reading. End play should be 0.010-0.029 inch (minimum end play is preferred).

4. Remove the indicator and the tool from the extension housing.

5. Install the one remaining front pump attaching bolt and torque it to specification.

FRONT SERVO

1. Position the front band forward in the case with the band ends up.

2. Position the servo strut with the slotted end aligned with the servo actuating lever, and with the small end aligned with the band end. Rotate the band, strut, and servo into position engaging the anchor end of the band with the anchor pin in the case.

3. Locate the servo on the case, and install the attaching bolts. **Tighten the attaching bolts only two or three threads.**

4. Install the servo release tube.

REAR SERVO

1. Position the servo anchor strut, and rotate the rear band to engage the strut.

2. Position the servo actuating lever strut with a finger, and then install the servo and attaching bolts. Torque the bolts to specification.

3. Install the front servo apply tube.

PRESSURE REGULATOR BODY

1. Install the pressure regulator body and attaching bolts, and torque the bolts to specifications.

2. Install the control and converter valve guides and springs. Install the spring retainer.

CONTROL VALVE BODY

1. Install the control valve assembly, carefully aligning the servo tubes with the control valve. Align the inner downshift lever between the stop and the downshift valve. Shift the manual lever to the 1 position. **Align the manual valve with the actuating pin in the manual detent lever. Do not tighten the attaching bolts.**

2. Move the control valve body toward the center of the case until the clearance is less than 0.050 inch between the manual valve and the actuating pin on the manual detent lever.

3. Torque the attaching bolts to

specification. Be sure that the rear fluid screen retaining clip is installed under the valve body bolt as shown in Fig. 17.

4. Install the large control pressure tube in the valve body and regulator.

5. Install the small control pressure compensator tube in the valve body and regulator.

6. Turn the manual valve one full turn in each manual lever detent position. If the manual valve binds against the actuating pin in any detent position, loosen the valve body attaching bolts and move the body away from the center of the case. Move the body only enough to relieve the binding. Torque the attaching bolts and check the manual valve for binding.

7. Torque the front servo attaching bolts to specification.

FRONT AND REAR BAND ADJUSTMENTS

Adjust the front and rear bands as detailed in Section 2.

VACUUM DIAPHRAGM UNIT

1. Position the control rod in the bore of the vacuum diaphragm unit and install the diaphragm unit. Make sure the control rod enters the throttle valve as the vacuum unit is installed.

2. Torque the diaphragm unit to specification.

FLUID FILTER AND OIL PAN

1. Position the fluid filter on the rear clip so that the tang enters the hole in the filter flange. Then, rotate the filter (clockwise) until the grommet is over the pump inlet port of the valve body regulator and press the filter down firmly. Install the filter retaining clip.

2. Place a new gasket on the transmission case and install the pan. Install the attaching bolts and lock washers and torque the bolts to specification.

If the converter and converter housing were removed from the transmission, install these components. Position the transmission assembly on the transmission jack, and refer to Transmission Installation Procedures for installing the transmission.

PART 7-4 C-6 Automatic Transmission

Transmission Model	Engine Model	Selector Lever Location	MODEL APPLICATION											
			All Models	Ford	Mercury	Meteor	Cougar	Fairlane	Falcon	Montego	Mustang	Lincoln-Continental	Thunderbird	Continental-Mark III
PGA-A3	390-2V	Column		X	X	X								
PGA-J3	390-2V	Console		X	X	X								
PGA-AC	390-4V I.P.	Column						X		X				
PGA-AD	390-2V I.P.	Console						X		X				
PGA-AE	390-2V I.P.	Console					X				X			
PGA-Z	429-2V	Column		X	X	X								
PGA-AA	429-2V	Console		X	X	X								
PGB-F2	428-4V①②	Column		X	X									
PGB-G2	390-2V, 4V③	Column		X	X	X								
PGB-H2	428-4V③	Column		X	X	X								
PGB-J1	429-4V	Column											X	
PGB-AD	429-4V	Column		X	X	X								
PGB-AE	429-4V	Console		X	X	X								
PGB-AF-1	428-4V C.J.	Console					X				X			
PGB-AG	428-4V C.J.	Column						X		X				
PGB-AH	428-4V C.J.	Console						X		X				
PGC-B	460-4V	Column										X		
PGC-C1	460-4V	Column												X

①Police Interceptor
②All Except 3.25: 1 Axle
③Police, Fleet and Heavy Duty Units

COMPONENT INDEX	All Models
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1 DESCRIPTION

DESCRIPTION

Figure 1 shows the location of the converter, front pump, clutches, gear train and most of the internal parts used in the C6 transmission. The identification tag (Fig. 2), attached to the intermediate servo lower front cover bolt, includes the model prefix and

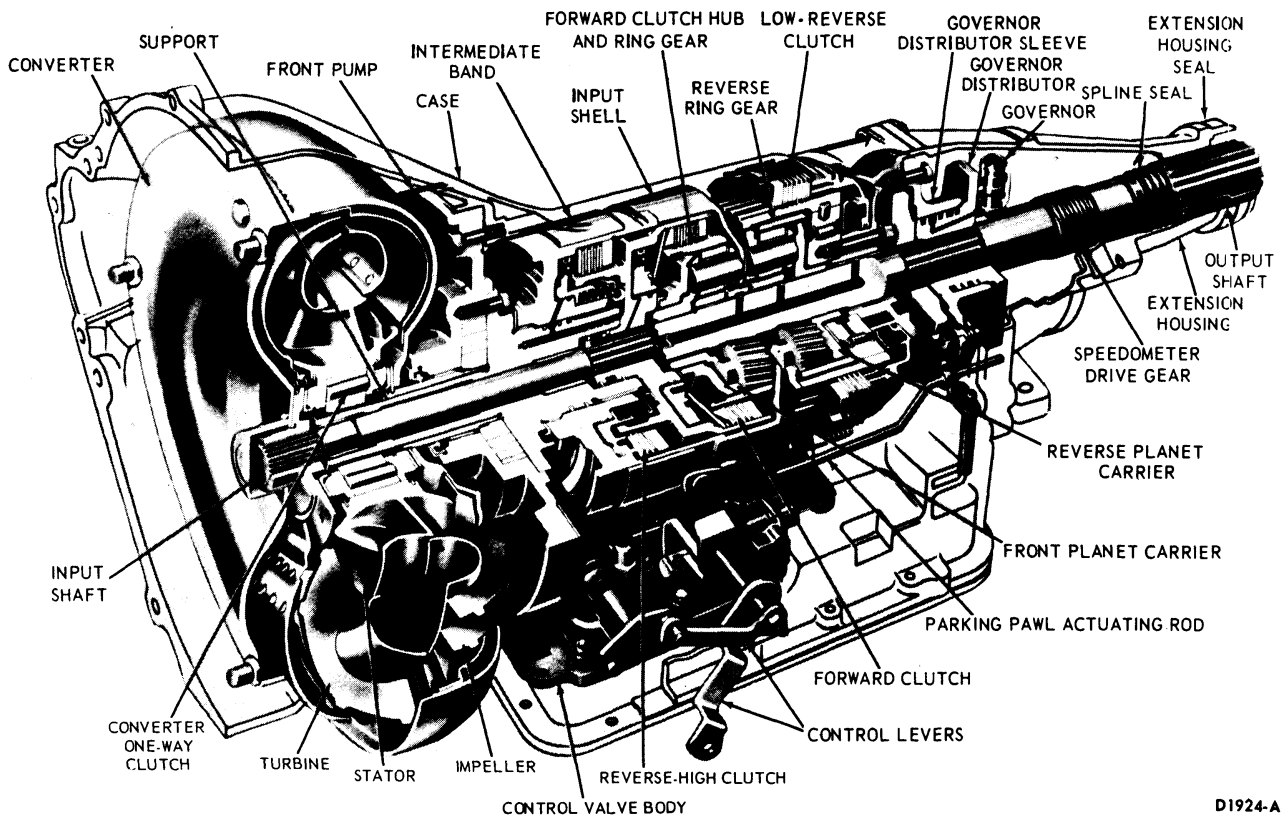


FIG. 1—C6 Automatic Transmission—Sectional

suffix, a service identification number, and serial number. The service identification number indicates changes to service details which affect interchangeability **when the transmission model is not changed.** For interpretation of this number, see the Master Parts Catalog.

The C6 transmission is a three speed unit capable of providing automatic upshifts and downshifts through the three forward gear ratios, and also capable of providing manual selection of first and second gears. The hydraulic control system schematic is shown in Figure 3. The converter housing and the fixed splines which engage the splined OD of the low-reverse clutch steel plates, are both cast integrally into the case.

Only one (intermediate) band is used in the C6 transmission. This along with the forward clutch is used to obtain intermediate gear.

The only adjustment on the transmission proper is the intermediate band.

The fluid is drained from the transmission by loosening the pan bolts and allowing it to drain. Finally, to allow the pan to drain more thoroughly, remove all bolts except the two from the front.

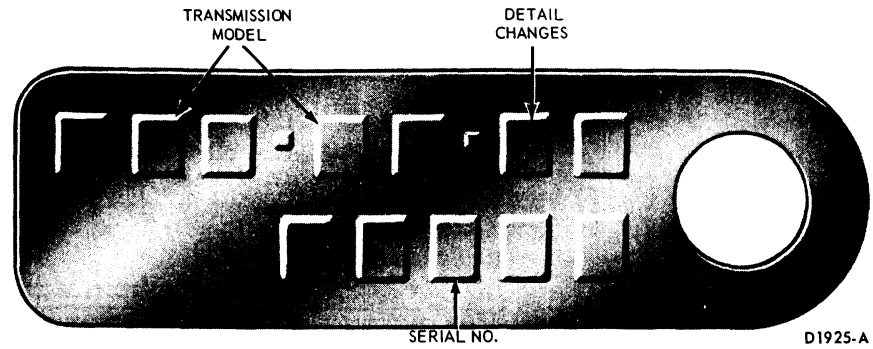


FIG. 2—Identification Tag

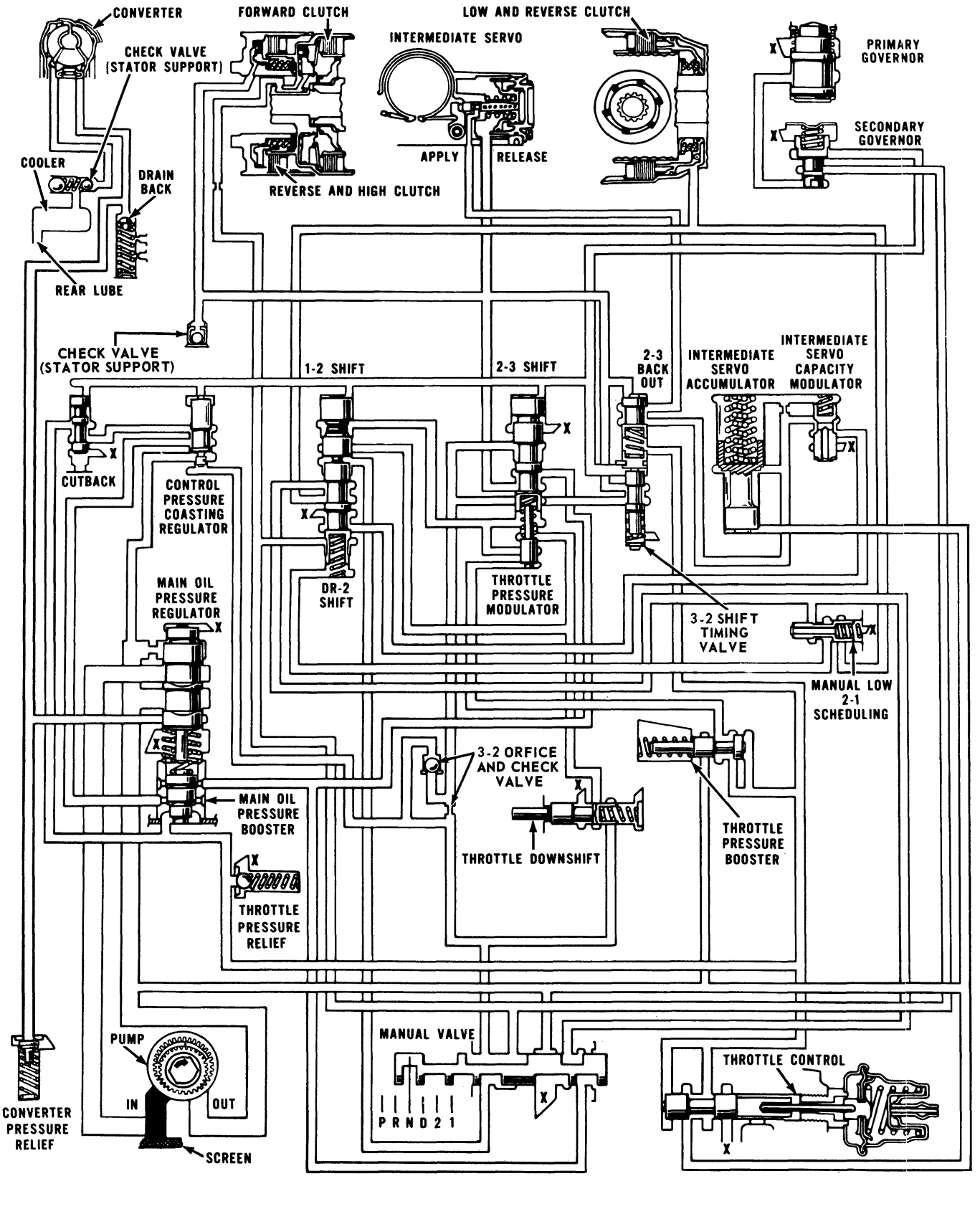


FIG. 3—Hydraulic Control System

2 IN-VEHICLE ADJUSTMENTS AND REPAIRS

CONTROL LINKAGE ADJUSTMENTS

The transmission control linkage adjustments should be performed in the order in which they appear in this section of the manual.

THROTTLE AND DOWNSHIFT LINKAGE ADJUSTMENTS

Adjusting the throttle linkage is important to be certain the throttle and kickdown systems are properly adjusted. The kickdown system should come in when the accelerator is pressed through detent, and not before detent. Refer to Group 10 for detailed throttle and downshift linkage adjustment procedures.

MANUAL LINKAGE ADJUSTMENT

Column Shift

1. Place the selector lever in the D position tight against the stop.
2. Loosen the shift rod adjusting nut at point A (Fig. 4, 5, 6 or 7).
3. Shift the manual lever at the transmission into the D detent position, third from the rear.
4. Make sure that the selector lever has not moved from the D stop; then, tighten the nut at point A to 10-20 ft-lbs.
5. Check the transmission operation for all selector lever detent positions.

Console Shift

1. Position the transmission selector lever in the D position.
2. Raise the vehicle and loosen the manual lever shift rod retaining nut (Fig. 8, 9 or 10). Move the transmission manual lever to the D position, fourth detent position from the back of the transmission.
3. With the transmission selector lever and manual lever in the D positions, torque the retaining nut 10 to 20 ft-lbs.
4. Check the operation of the transmission in each selector lever position.

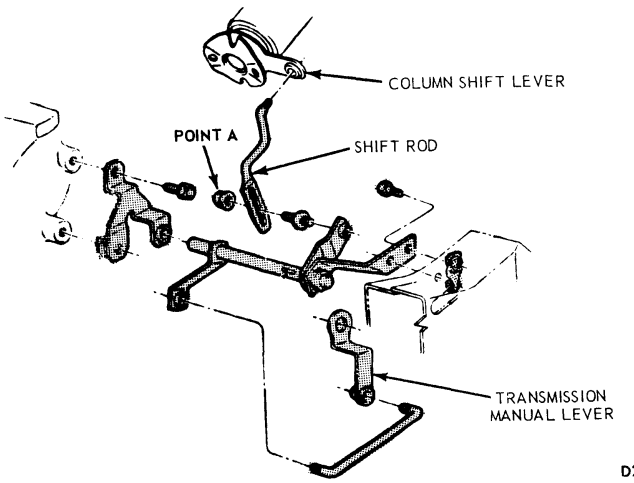


FIG. 4—Manual Linkage—Column Shift—Ford-Mercury-Meteor

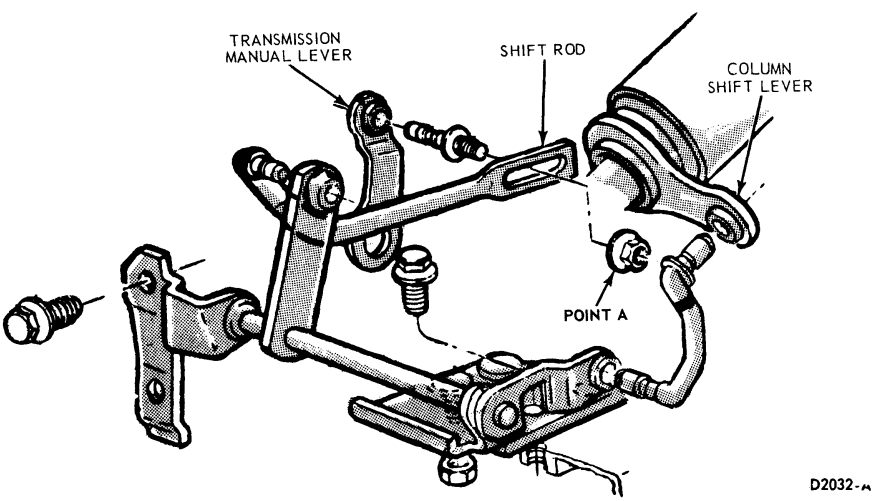


FIG. 5—Manual Linkage—Column Shift—Fairlane-Montego

NEUTRAL START SWITCH ADJUSTMENT—CONSOLE SHIFT

On vehicles equipped with a column-mounted neutral start switch, refer to Part 7-1, Section 2, for the adjustment procedures.

FORD, MERCURY AND METEOR

1. With the manual linkage properly adjusted, check the starter engagement circuit in all positions. The circuit must be open in all drive positions and closed only in park and neutral.
2. Remove the four screws and plates securing the selector lever handle to the lever. Remove the handle and detent control.
3. Remove the two screws from the rear of the console top panel. Pull the panel back to unhook it from the front of the console and remove the panel.
4. Loosen the two combination starter neutral and back-up light switch attaching screws (Fig. 11).
5. Move the selector lever back and forth until the gauge pin (No. 43 drill) can be fully inserted into the gauge pin holes (Fig. 11).
6. Place the transmission selector lever firmly against the stop of the neutral detent position.
7. Slide the combination starter neutral and back-up light switch forward or rearward as required, until

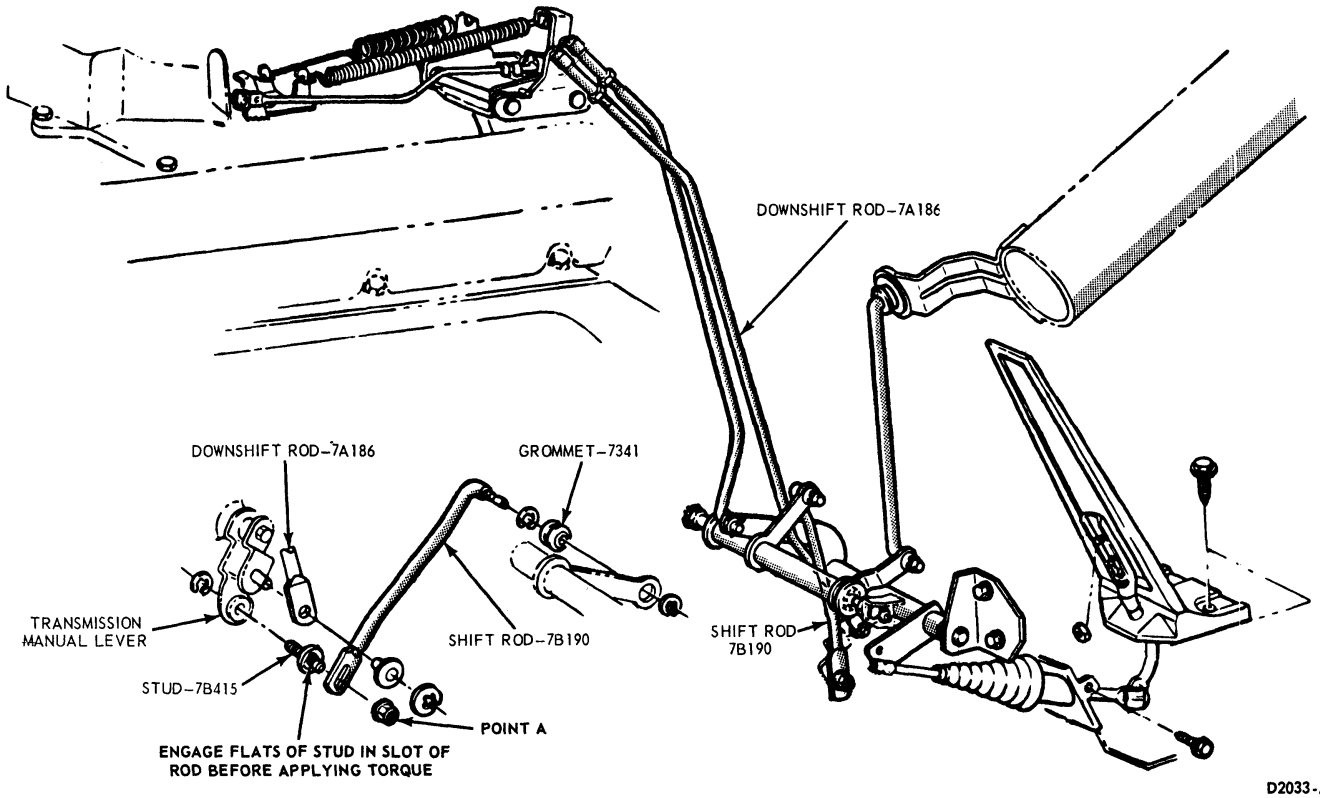


FIG. 6—Manual Linkage—Column Shift—Lincoln Continental

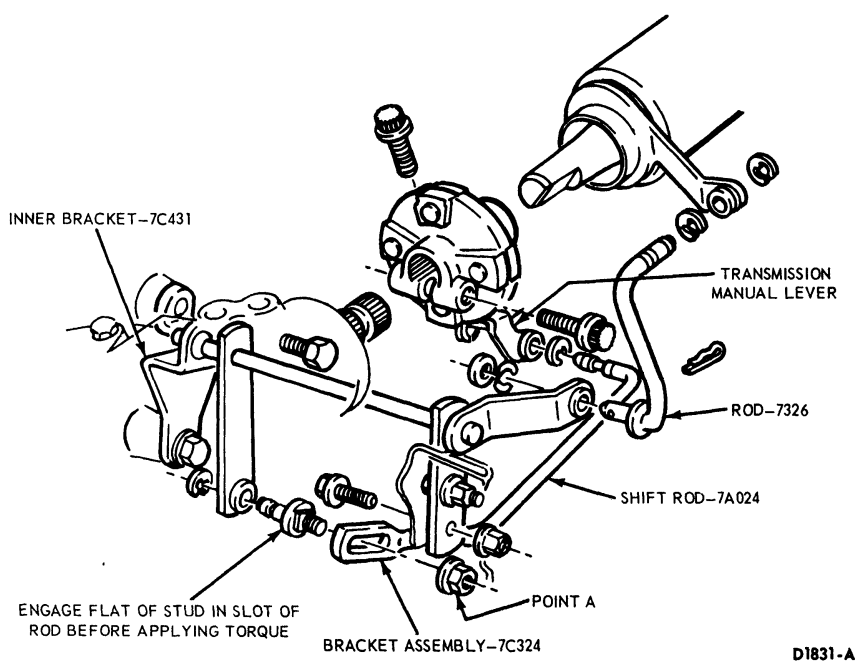


FIG. 7—Manual Linkage—Column Shift—Thunderbird-Continental Mark III

the switch lever contacts the selector lever actuator. If an adjustment can not be made by rotating the switch, loosen the actuator lever attaching bolt and adjust the lever (Fig. 11).

8. Tighten the neutral start switch attaching screws. If the actuator lever was adjusted, tighten the actuator lever bolt.

9. Turn the ignition key to the ACC position and place the selector lever in the reverse position and check the operation of the back-up lights. Turn the key off.

10. Place the console top panel on the console and install the retaining screws.

11. Position the selector lever detent control and handle on the selector lever and secure with the four plates and attaching screws.

FAIRLANE-MONTEGO

1. With the manual linkage properly adjusted, check the starter engagement circuit in all positions. The circuit must be open in all drive positions and closed only in park and neutral.

2. Remove the selector lever handle from the lever.

3. Remove the trim panel from the top of the console.

4. Remove the cover and dial indicator as an assembly.

5. Remove the six screws that secure the selector lever retainer to the selector lever housing. Lift the retainer from the housing.

6. Loosen the two combination starter neutral and back-up light switch attaching screws (Fig. 12).

7. Move the selector lever back and forth until the gauge pin (No. 43 drill) can be fully inserted into the gauge pin holes (Fig. 12).

8. Place the transmission selector lever firmly against the stop of the neutral detent position.

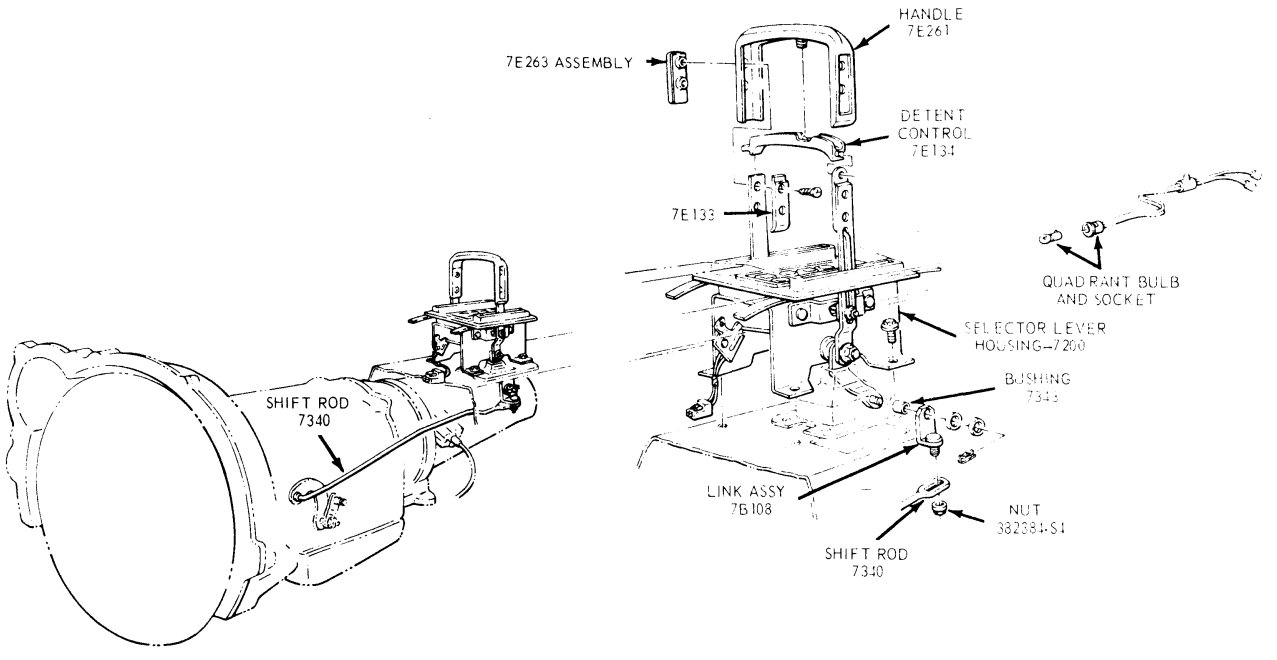


FIG. 8—Manual Linkage—Console Shift—Ford-Mercury-Meteor

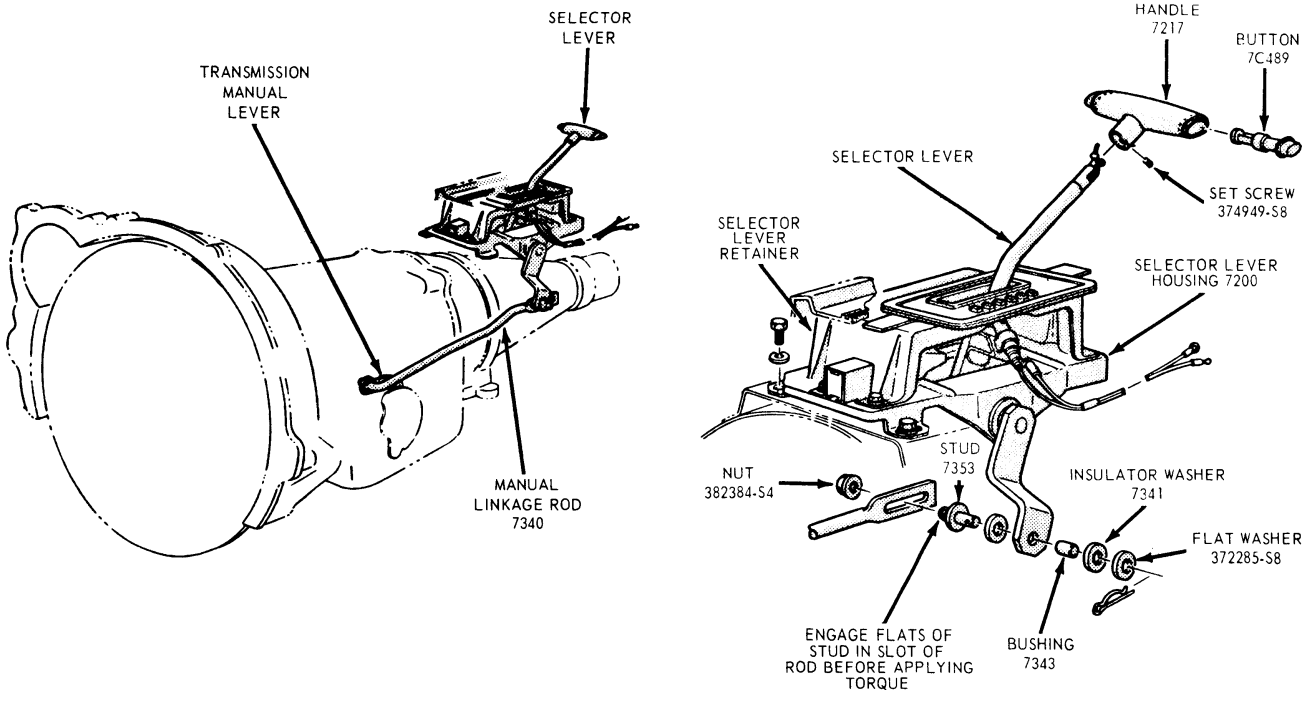


FIG. 9—Manual Linkage—Console Shift—Fairlane-Montego

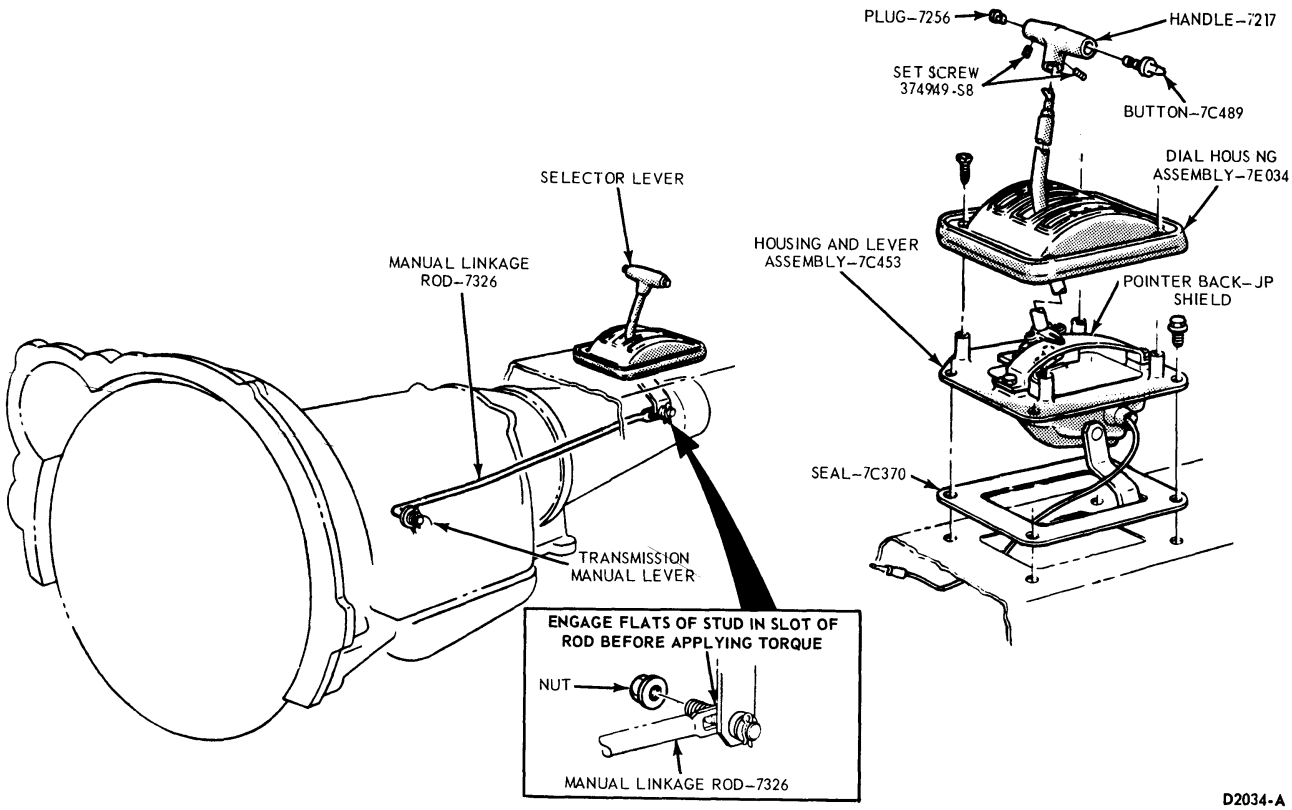


FIG. 10—Manual Linkage—Console Shift—Mustang-Cougar

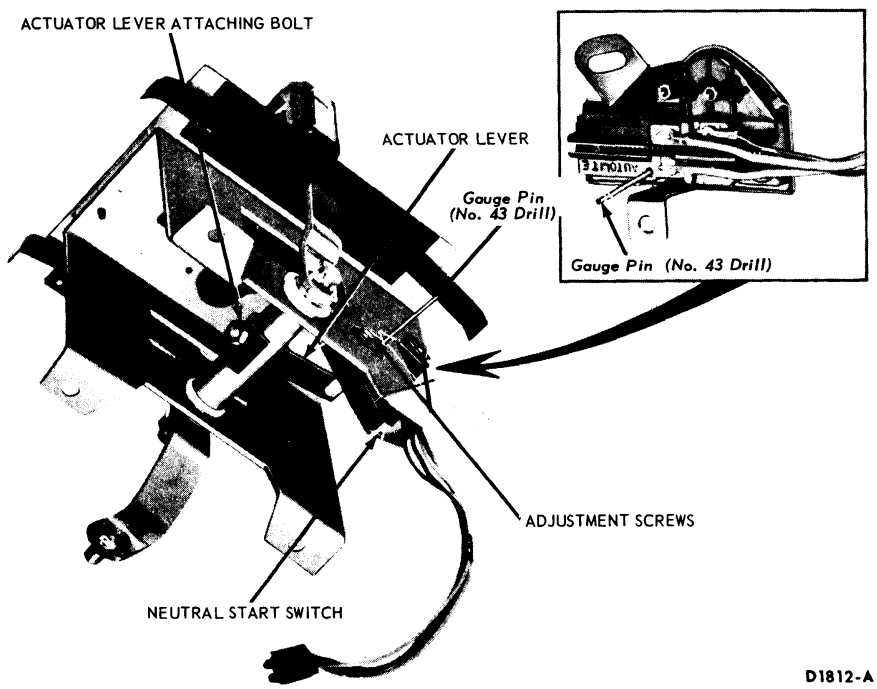


FIG. 11—Neutral Start Switch Adjustments—Console Shift

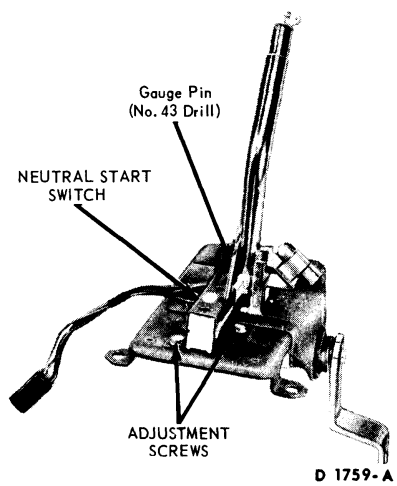


FIG. 12—Neutral Start Switch Adjustment—Console Shift—Fairlane-Montego

9. Slide the combination starter neutral and back-up light switch forward or rearward as required, until the switch actuating lever contacts the selector lever.

10. Tighten the switch attaching screws and remove the gauge pin. Check for starting in the park position.

11. Turn the ignition key to the ACC position and place the selector lever in the reverse position and check the operation of the back-up lights. Turn the key off.

12. Position the selector lever retainer to the selector lever housing. Install the six attaching screws.

13. Install the cover and dial indicator.

14. Install the trim panel on the top of the console. Install the selector lever handle.

MUSTANG AND COUGAR

1. With the manual lever properly adjusted, loosen the two switch attaching bolts (Fig. 13).

2. With the transmission manual lever in neutral, rotate the switch and insert the gauge pin (No. 43 drill shank end) into the gauge pin holes of the switch. **The gauge pin has to be inserted to a full 31/64 inch into the three holes of the switch (Fig. 13).**

3. Torque the two switch attaching bolts to specification. Remove the gauge pin from the switch.

4. Check the operation of the switch. The engine should start only with the transmission selector lever in Neutral and Park.

NEUTRAL START SWITCH REPLACEMENT—CONSOLE SHIFT

On vehicles equipped with a column-mounted neutral start switch, refer to Part 7-1, Section 2, for the replacement procedures.

FORD, MERCURY AND METEOR

1. Remove the four screws and plates securing the selector lever handle to the lever. Remove the handle and detent control.

2. Remove the two screws from the rear of the console top panel. Pull the panel back to unhook it from the front of the console and remove the panel.

3. Remove the two screws securing the dial indicator assembly to the selector lever housing and remove the indicator assembly.

4. Disconnect the neutral start switch wires at the plug connector. Remove the wires from under the retaining clip.

5. Remove the two screws securing the neutral start switch to the selector lever housing and remove the switch (Fig. 11).

6. Position the neutral start switch to the selector lever housing and install the two attaching screws.

7. Adjust the neutral start switch as outlined under the Neutral Start Switch Adjustment procedures in this section.

8. Connect the neutral start switch wires to the plug connector. Position the wires in the retaining clip and close the clip.

9. Place the console top panel on the console and install the retaining screws.

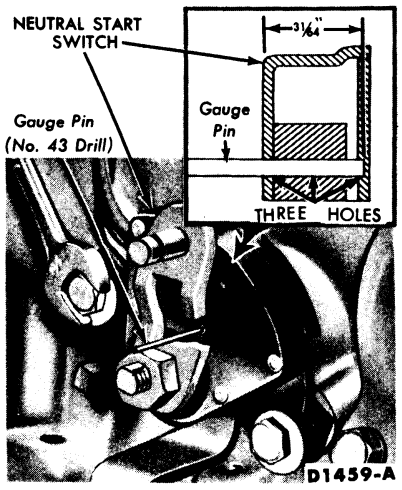


FIG. 13—Neutral Start Switch Adjustment—Console Shift—Mustang and Cougar

10. Position the selector lever detent control and handle on the selector lever and secure with the four plates and attaching screws.

FAIRLANE AND MONTEGO

1. Remove the selector lever handle from the lever.

2. Remove the trim panel from the top of the console.

3. Remove the cover and dial indicator as an assembly.

4. Remove the four screws that secure the selector lever retainer to the selector lever housing. Lift the retainer from the housing.

5. Remove the two screws securing the neutral start switch to the selector lever housing. Disconnect the neutral start switch wires at the plug connector and remove the switch.

6. Position the neutral start switch to the selector lever housing and install the two attaching screws.

7. With the selector lever in neutral, move the selector lever back and forth until the gauge pin (No. 43 drill) can be fully inserted into the gauge pin holes (Fig. 12).

8. Place the transmission selector lever firmly against the stop of the neutral detent position.

9. Slide the combination starter neutral and back-up light switch forward or rearward as required, until the switch actuating lever contacts the selector lever.

10. Tighten the switch attaching screws and remove the gauge pin.

11. Connect the neutral start switch wires to the plug connector and check for starting in the park position.

12. Position the selector lever retainer to the selector lever housing. Install the attaching screws.

13. Install the cover and dial indicator.

14. Install the trim panel on the top of the console. Install the selector lever handle.

MUSTANG AND COUGAR

1. Remove the downshift linkage rod from the transmission downshift lever.

2. Apply penetrating oil to the downshift lever shaft and nut. Remove the transmission downshift outer lever retaining nut and lever (Fig. 13).

3. Remove the two neutral start switch attaching bolts.

4. Disconnect the multiple wire connector. Remove the neutral switch from the transmission.

5. Install the neutral start switch on the transmission. Install the two attaching bolts.

6. With the transmission manual lever in neutral, rotate the switch and install gauge pin (No. 43 drill) into the gauge pin hole (Fig. 13).

7. Tighten the switch attaching bolts to specification and remove the gauge pin.

8. Install the outer downshift lever and attaching nut, and torque the nut to specification. Install the downshift linkage rod to the downshift lever.

9. Install the switch wires. Connect the wire multiple connector. Check the operation of the switch in each detent position. The engine should start only with the transmission selector lever in N (neutral) and P (park).

SELECTOR LEVER REPLACEMENT—CONSOLE SHIFT

FORD, MERCURY AND METEOR

1. Raise the vehicle and disconnect the link assembly from the selector lever arm (Fig. 8).

2. Lower the vehicle. Remove the four screws and plates securing the selector lever handle to the lever. Remove the handle and detent control.

3. Remove the two screws from the rear of the console top panel. Pull the panel back to unhook it from the front of the console and remove the panel.

4. Disconnect the neutral start switch wires at the plug connector. Disconnect the bulb socket from the quadrant.

5. Remove the four bolts that attach the selector lever housing to the floor pan and remove the selector lever and housing.

6. Position the new selector lever and housing assembly on the floor pan and install the attaching bolts.

7. Connect the bulb socket to the quadrant and the neutral start switch wires to the plug connector.

8. Raise the vehicle and secure the link assembly to the selector lever arm with the bushing, insulator, flat washer and cotter pin (Fig. 8). Lower the vehicle.

9. Place the console top panel on the console and install the retaining screws.

10. Position the selector lever detent control and handle on the selector lever and secure with the four plates and attaching screws.

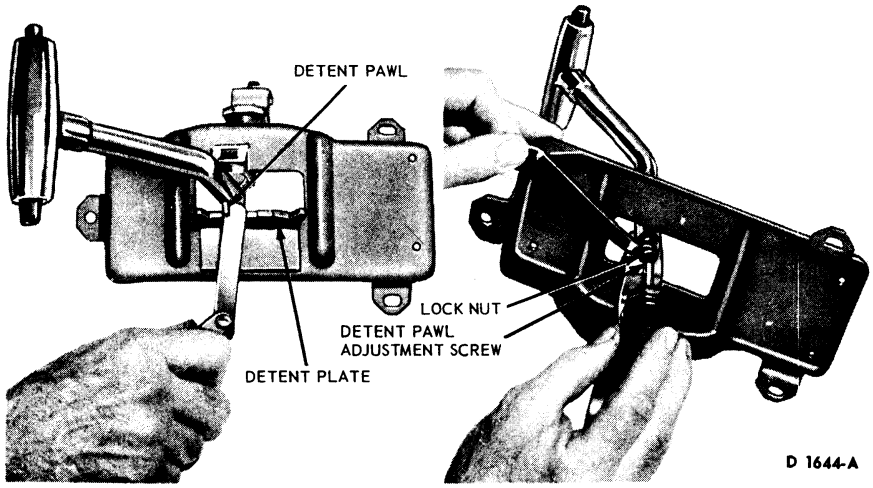


FIG. 14—Typical Selector Lever Detent Pawl Adjustment

FAIRLANE AND MONTEGO

1. Raise the vehicle on a hoist or jack stands.

2. Remove the retainer that secures the manual linkage rod to the lower end of the manual lever (Fig. 9).

3. Remove the flat washer and two insulator washers and disconnect the rod from the arm.

4. Working from inside of the vehicle, remove the selector lever handle attaching screw. Lift the handle off the selector lever.

5. Remove the console trim panel from the top of the console. Remove the console retaining screws and remove the console.

6. Remove the cover and dial indicator as an assembly.

7. Remove the four screws that secure the selector lever retainer to the selector lever housing. Lift the retainer from the housing.

8. Disconnect the neutral start switch wires at the plug connector. Disconnect the bulb socket from the selector lever housing.

9. Remove the three bolts that secure the selector lever control housing to the console. Lift the selector lever housing from the console.

10. Remove the selector lever to housing attaching nut. Remove the lever from the housing.

11. Install the selector lever in the housing and install the attaching nut. Torque the nut to 20 to 25 ft-lbs.

12. Install the selector lever handle.

13. Position the selector lever as shown in Figure 14. With a feeler gauge, check the clearance between the detent pawl and plate. The clearance should be 0.005 to 0.010 inch. If necessary adjust the height of the detent pawl as shown in Figure 14.

14. Remove the handle from the selector lever.

15. Position the selector lever housing in the console and install the three attaching bolts. Do not tighten the attaching bolts at this time.

16. Connect the bulb socket to the selector lever housing and the neutral start switch wires to the plug connector.

17. Position the selector lever retainer to the selector lever housing. Install the four attaching screws.

18. Install the cover and dial indicator.

19. Place the console in position and install the retaining bolts. Tighten the selector lever housing attaching bolts.

20. Position the console trim panel and secure it with the attaching screws.

21. Install the handle and the button on the selector lever. Secure the handle with the set screw.

22. Secure the manual linkage rod to the arm with two insulating washers, a flat washer and a retainer (Fig. 9).

23. Adjust the linkage as required. Lower the vehicle.

MUSTANG AND COUGAR

1. Raise the vehicle and remove the manual lever control rod attaching nut (Fig. 10).

2. Lower the vehicle, remove the selector lever handle attaching screw.

3. Remove the dial housing attaching screws and the housing.

4. Remove the pointer back-up shield attaching screws and remove the shield.

5. Disconnect the dial indicator light.

6. Remove the selector housing and lever assembly attaching bolts. Remove the selector lever and housing.

7. Remove the selector lever to housing attaching nut. Remove the lever from the housing.

8. Install the selector lever in the housing and install the attaching nut. Torque the nut to 20 to 25 ft-lbs.

9. Install the selector lever handle.

10. Position the selector lever as shown in Figure 14. With a feeler gauge check the clearance between the detent pawl and plate. The clearance should be 0.005 to 0.010 inch. If necessary adjust the height of the detent pawl as shown in Figure 14.

11. Remove the handle from the selector lever.

12. Install the selector housing and lever assembly as shown in Figure 10. Torque the attaching bolts 4-6 ft-lbs.

13. Connect the dial indicator light.

14. Install the pointer back-up shield on the housing and lever assembly.

15. Install the dial housing and tighten the attaching screws.

16. Install the selector lever handle and tighten the attaching screw.

17. Position the selector lever in the D position.

18. Raise the vehicle. Install the transmission manual lever rod to the selector lever. Adjust the manual linkage.

19. Lower the vehicle and check the transmission operation in each selector lever detent position.

BAND ADJUSTMENT

INTERMEDIATE BAND

1. Raise the vehicle on a hoist or jack stands.
2. Clean all the dirt from the band adjusting screw area. Remove and discard the lock nut.
3. Install a new lock nut and tighten the adjusting screw to 10 ft-lbs torque (Fig. 15).
4. **Back off the adjusting screw exactly 1 full turn.**
5. Hold the adjusting screw from turning and torque the lock nut to specification.
6. Lower the vehicle.

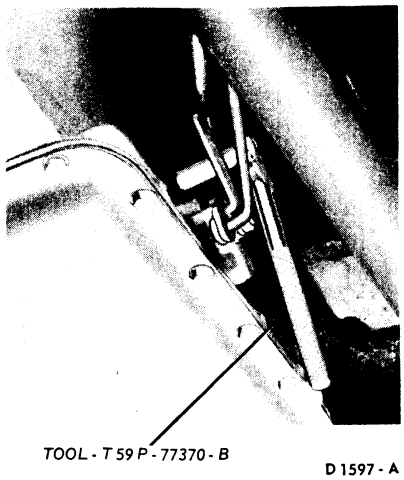


FIG. 15—Adjusting Band

EXTENSION HOUSING OR GOVERNOR REPLACEMENT

REMOVAL

1. Raise the vehicle on a hoist or stands.
2. Disconnect the parking brake cable from the equalizer. On a Lincoln Continental, remove the equalizer.
3. Disconnect the driveshaft from the rear axle flange and remove it from the transmission.
4. Disconnect the speedometer cable from the extension housing.
5. Remove the engine rear support-to-extension housing attaching bolts.

On a Lincoln Continental, remove the reinforcement plate from under the transmission oil pan.

6. Place a jack under the transmission and raise it just enough to remove the weight from the engine rear support.
7. Remove the bolt that secures the engine rear support to the crossmember and remove the support.
8. Place a drain pan under the rear of the transmission case.
9. Lower the transmission and remove the extension housing attaching bolts. Slide the extension housing off the output shaft and allow the fluid to drain.
10. Remove the governor attaching bolts (Fig. 16) and remove the governor from the flange.

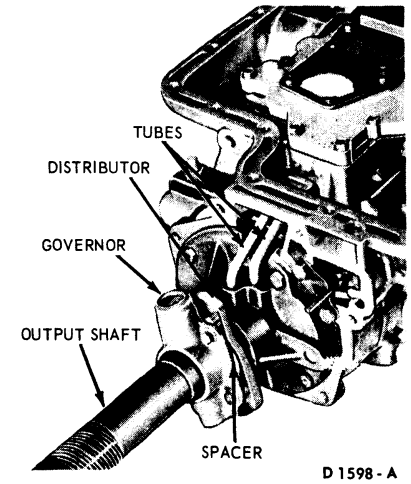


FIG. 16—Governor Installed

INSTALLATION

1. Secure the governor (Fig. 16) to the distributor flange with the attaching bolts. Torque the bolts to specification.
2. Clean the mounting surface on the transmission and on the extension housing. Position a new gasket on the transmission.
3. Hold the extension housing in place and secure it with the attaching bolts.
4. Raise the transmission high enough to position the engine rear support on the crossmember.
5. Secure the support to the cross member with the attaching bolt and nut. Torque the bolt to specification.
6. Lower the transmission and remove the jack. Install and torque the engine rear support-to-extension housing attaching bolts to specification.

On a Lincoln Continental, install the reinforcement plate and secure it with the attaching bolts.

7. Secure the speedometer cable to the extension housing with the attaching bolt.
8. Connect the parking brake cable to the equalizer. On a Lincoln Continental, connect the parking brake equalizer. Adjust the parking brake as required.
9. Install the drive shaft.
10. Fill the transmission to the correct level with the specified fluid.

SERVO REPLACEMENT

ALL VEHICLES EXCEPT LINCOLN CONTINENTAL

Removal

1. Raise the vehicle on a hoist or stands.
2. Remove the engine rear support-to-extension housing attaching bolts.
3. Raise the transmission high enough to remove the weight from the engine rear support.
4. Remove the bolt that secures the engine rear support to the crossmember. Remove the support.
5. Lower the transmission and remove the jack.
6. Place a drain pan beneath the servo. Remove the bolts that attach the servo cover to the transmission case.
7. Remove the cover, piston, spring and gasket from the case, screwing the band adjusting screw inwards as the piston is removed. This insures that there will be enough tension on the band to keep the struts properly engaged in the band end notches while the piston is removed.

SEAL REPLACEMENT

1. Apply air pressure to the port in the servo cover to remove the piston and rod.
2. Remove the seals from the piston (Fig. 17).

On a Continental Mark III, replace the complete piston and rod assembly if the piston or piston sealing lips are unserviceable or damaged.

3. Remove the seal from the cover.
4. Dip the new seals in transmission fluid.
5. Install the new seals on the piston and cover.
6. Coat two new gaskets with petroleum jelly and install the gaskets on the cover.
7. Dip the piston in transmission fluid and install it in the cover.

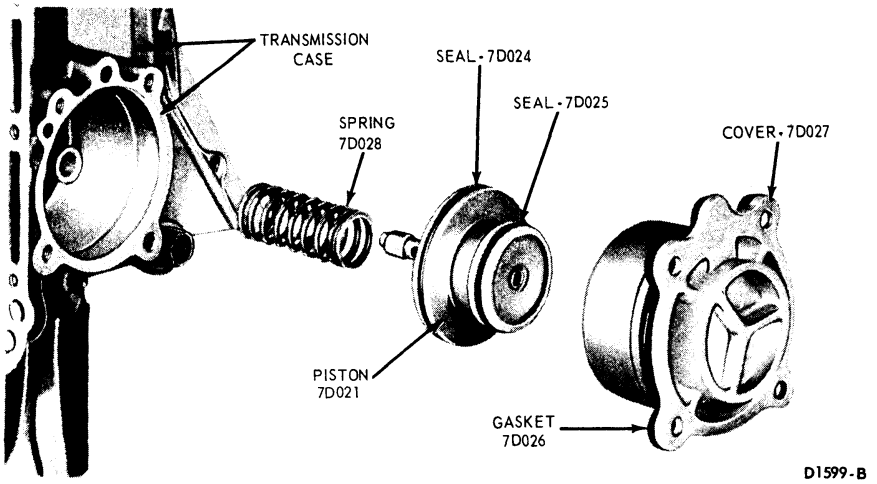


FIG. 17—Servo Disassembled—Typical

INSTALLATION

1. Position a new gasket on the servo cover.
2. Position the servo spring on the piston rod.
3. Insert the servo piston rod in the case. Secure the cover with the attaching bolts, taking care to back off the band adjusting screw as the cover bolts are tightened. Make sure that the vent tube retaining clip and service identification tag are in place.
4. Raise the transmission high enough to install the engine rear support. Secure the support to the extension housing with the attaching bolts. Lower the transmission as required to install the support to crossmember attaching bolt. Torque the attaching bolts to specification.
5. Remove the jack.
6. Adjust the band as detailed in Section 2.
7. Lower the vehicle and replenish the fluid as required.

LINCOLN

Removal

1. Raise the vehicle on a hoist.
2. Place a drain pan under the servo. Remove the bolts that attach the servo cover to the transmission case.
3. Remove the three bolts that attach the manual and downshift control rod splash shield to the frame side rail and remove the shield. Remove the reinforcement plate from under the transmission oil pan.
4. Loosen the band adjusting screw lock nut.
5. Remove the two nuts that attach the engine rear mounts to the crossmember.
6. Place a transmission jack under the transmission and raise it just high enough to remove the weight from the crossmember.
7. Remove the engine rear support-to-extension housing attaching bolts and remove the supports.
8. Remove the servo cover, piston, spring and gasket from the case, turning the band adjusting screw inward as the piston is removed. This insures that there will be enough tension on the band to keep the struts properly engaged in the band end notches while the piston is removed.

Seal Replacement

1. Apply air pressure to the port in the servo cover to remove the piston and rod assembly. If the piston or piston sealing lips are unserviceable or damaged, the complete piston and rod assembly must be replaced.
2. Remove the seal from the cover (Fig. 17).
3. Dip the new seals in transmission fluid.
4. Install a new seal on the cover.
5. Dip the piston and rod assembly in transmission fluid and install it in the cover.

Installation

1. Coat two new gaskets with petroleum jelly and position them on the servo cover.
2. Position the servo spring on the piston rod.
3. Insert the servo piston rod in the case. Secure the cover with the attaching bolts taking care to back off the band adjusting screw as the cover bolts are tightened. Make sure that the transmission identification tag is installed under the lower front cover bolt.
4. Adjust the band as detailed in Section 2.
5. Raise the transmission high enough to install the engine rear supports. Secure the supports to the extension housing with the attaching bolts. Lower the transmission as required to install and torque the support-to-crossmember nuts.
6. Position the manual and downshift control rod splash shield to the frame side rail and secure it with the attaching bolts.
7. Remove the jack.
8. Install the reinforcement plate and secure it with the attaching bolts.
9. Lower the vehicle and replenish the fluid as required.

CONTROL VALVE BODY REPLACEMENT

REMOVAL

1. Raise the vehicle on a hoist or jack stands.
2. On a Lincoln Continental, remove the reinforcement plate from under the oil pan.
3. Place a drain pan under the transmission and loosen the bolts to drain the fluid from the transmission.
4. Remove the transmission pan at taching bolts from both sides and the rear to allow the fluid to drain further. Finally, remove the remainder of the attaching bolts.
5. Remove the valve body attaching bolts and remove the valve body from the case.

INSTALLATION

1. Position the valve body to the case making sure that the selector and downshift levers are engaged, then install and torque the attaching bolts to specification.
2. Clean the fluid pan and gasket surfaces thoroughly.
3. Using a new pan gasket, secure the pan to the transmission case and torque the attaching bolts to specification.

On a Lincoln Continental, install the reinforcement plate and secure it with the attaching bolts.

4. Lower the vehicle and fill the transmission to the correct level with the specified fluid.

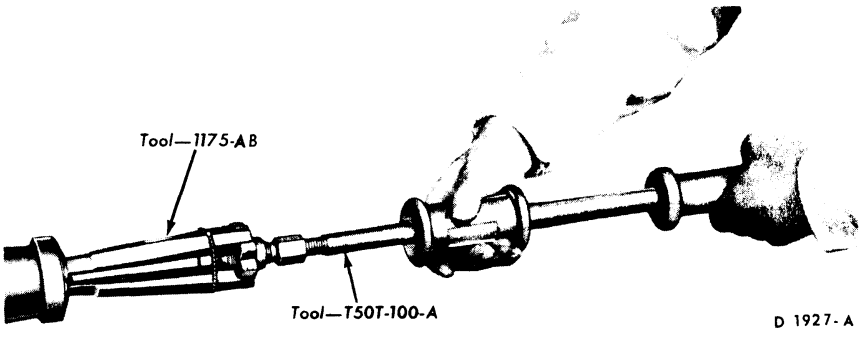


FIG. 18—Removing Extension Housing Seal

EXTENSION HOUSING BUSHING AND REAR SEAL REPLACEMENT

1. Disconnect the drive shaft from the transmission.

2. On a Lincoln Continental, remove the parking brake equalizer. Position the equalizer and cables out of the way to obtain free access to the transmission extension housing.

3. When only the rear seal needs replacing, carefully remove it with a tapered chisel or the tools shown in Fig. 18. Remove the bushing as shown in Fig. 19. **Use the bushing remover carefully so that the spline seal is not damaged.**

4. When installing a new bushing use the special tool shown in Fig. 20.

5. Before installing a new seal, inspect the sealing surface of the universal joint yoke for scores. If scores are found, replace the yoke.

6. Inspect the counterbore of the housing for burrs and if present, remove with crocus cloth.

7. Install the seal into the housing with the tool shown in Fig. 21. The seal should be firmly seated in the bore. Coat the inside diameter of the fiber portion of the seal with B8A-19589-A lubricant.

8. Coat the front universal joint spline with B8A-19589-A lubricant and install the drive shaft.

9. On a Lincoln Continental, connect the parking brake equalizer.

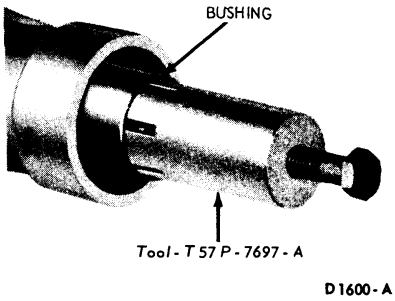


FIG. 19—Removing Extension Housing Bushing

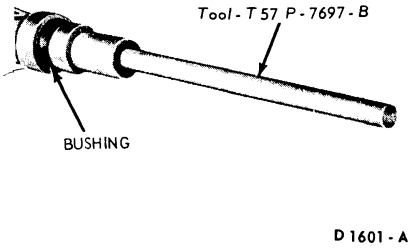


FIG. 20—Installing Extension Housing Bushing

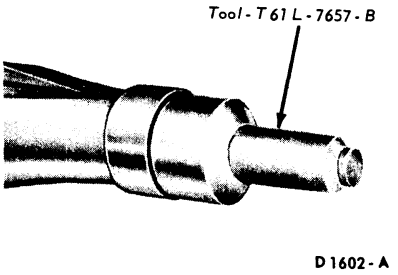


FIG. 21—Installing Extension Housing Seal

3 REMOVAL AND INSTALLATION

An oil impregnated plastic grommet is incorporated in the end of the manual shift linkage lever arm on all column shift vehicles. A special tool T67P-7341-A is required to install the grommet in the manual lever, and to install the manual linkage rod into the grommet. Refer to Part 7-1, Section 2, for the grommet replacement procedures.

REMOVAL—FORD MERCURY AND METEOR

1. Raise the vehicle on a hoist or stands. Drain the fluid from the transmission and from the converter.

2. Disconnect the drive shaft from the rear axle and slide the shaft rearward from the transmission. Install a seal installation tool in the extension housing to prevent fluid leakage.

3. Disconnect the cable from the terminal on the starter motor. Remove the three attaching bolts and remove the starter motor.

4. Remove the four converter-to-flywheel attaching nuts. Place a wrench on the crankshaft pulley at-

taching bolt to turn the converter to gain access to the nuts.

5. Remove the rear mount to crossmember attaching bolt.

6. Remove the two crossmember-to-frame attaching bolts.

7. Remove the two engine rear support-to-extension housing attaching bolts.

8. Disconnect the downshift rod from the transmission downshift lever.

9. Disconnect the manual linkage rod from the lever at the transmission. On a column shift, use tool T67P-7341-A to remove the rod.

10. Remove the two bolts securing the bellcrank bracket to the converter housing.

11. Raise the transmission with a transmission jack to provide clearance to remove the crossmember.

12. Remove the rear mount from the crossmember and remove the crossmember from the side supports.

13. Lower the transmission to gain access to the oil cooler lines.

14. Disconnect each oil line from the fittings on the transmission.

15. Disconnect the vacuum line from the diaphragm located at the right rear of the transmission. Remove the metal line from the retaining clip on the transmission.

16. Disconnect the speedometer cable from the extension housing.

17. Remove the bolt that secures the transmission fluid filler tube to the cylinder block. Lift the filler tube and the dipstick from the transmission.

18. Secure the transmission to the jack with the chain.

19. Remove the converter housing-to-cylinder block attaching bolts.

20. Carefully move the transmission away from the engine and, at the same time, lower it to clear the underside of the vehicle.

21. Remove the converter and mount the transmission in a holding fixture.

INSTALLATION—FORD MERCURY AND METEOR

1. Torque the two converter drain plugs to specification.

2. Install the converter on the stator support.

3. Secure the transmission to the jack with the chain.

4. Rotate the flywheel to place two converter mounting stud holes that are adjacent to the drain plug holes in a vertical position.

5. Rotate the converter so that the studs and drain plugs are in alignment with those in the flywheel.

6. Move the transmission toward the cylinder block until they are in contact. Install and torque the attaching bolts to specification making sure that the vacuum tube retaining clips are properly positioned.

7. Remove the transmission jack chain from around the transmission.

8. Install a new O-ring on the lower end of the transmission filler tube. Insert the tube in the transmission case and secure the tube to the engine with the attaching bolt.

9. Connect the speedometer cable to the extension housing.

10. Connect the oil cooler lines to the right side of transmission case.

11. Connect the vacuum line to the vacuum diaphragm making sure that the metal tube is secured in the retaining clip.

12. Position the cross member on the side supports. Position the rear mount on the crossmember and install the attaching bolt and nut.

13. Secure the engine rear support to the extension housing and torque the bolts to specification.

14. Lower the transmission and remove the jack.

15. Secure the crossmember to the side supports with the attaching bolts and torque them to specification.

16. Position the bellcrank bracket to the converter housing and install the two attaching bolts.

17. Connect the downshift rod to the transmission downshift lever.

18. Connect the selector rod to the manual lever at the transmission. On a column shift, use tool T67P-7341-A and install a new grommet in the manual lever. Then, secure the manual selector rod to the lever.

19. Secure the converter-to-flywheel attaching nuts and torque them to specification. Use a wrench on the crankshaft pulley attaching nut to rotate the flywheel. Do not use a wrench on the converter attaching nuts to rotate it.

20. Install the converter housing dust shield and secure it with the attaching bolts.

21. Secure the starter motor in place with the attaching bolts. Connect the cable to the terminal on the starter.

22. Install the driveshaft.

23. Adjust the shift linkage as detailed in Section 2.

24. Lower the vehicle.

25. Fill the transmission to the correct level with the specified lubricant. Start the engine and shift the transmission to all ranges, then recheck the fluid level.

REMOVAL—FAIRLANE, MONTEGO, MUSTANG AND COUGAR

1. On Mustang and Cougar, disconnect the neutral switch wires from the harness connector and the retaining clip on the dash.

2. Remove the bolt that secures the filler tube to the rear of the right cylinder head.

3. Raise the vehicle on a hoist or jack stands.

4. Remove the converter drain plug access cover from the lower end of the converter housing.

5. Place a drain pan under the converter housing and remove the two converter drain plugs. Install the plugs after the fluid has drained.

6. Place the drain pan under the transmission fluid pan. Starting at the rear of the pan and working toward the front, loosen the attaching bolts and allow the fluid to drain. Finally remove all of the pan attaching bolts except two at the front, to allow the fluid to further drain. After the fluid has drained, install two bolts on the rear side of the pan to temporarily hold it in place.

7. Disconnect the drive shaft from the rear axle flange and remove it from the transmission. Install tool T61L-7657-A in the rear of the extension housing to prevent the fluid from leaking.

8. Disconnect the downshift rod from the transmission downshift lever.

9. Disconnect the shift rod from the manual lever. On a column shift, use tool T67P-7341-A to remove the rod.

10. Disconnect the speedometer cable from the extension housing.

11. Disconnect the rubber hose from the vacuum diaphragm at the rear of the transmission. Remove the vacuum tube from the retaining clip at the transmission.

12. Disconnect the starter cable from the terminal on the starter. Remove the starter attaching bolts and remove it from the housing.

13. Lift the fluid filler tube from the transmission case.

14. Remove the four converter-to-flywheel attaching nuts.

15. On a Mustang or Cougar, disconnect the complete exhaust system and allow it to hang on the rear axle.

16. Remove the two nuts that attach the engine rear support to the crossmember.

17. Raise the transmission with a jack just enough to remove the weight from the crossmember.

18. Remove the cotter pins from the crossmember-to-frame side sup-

port attaching nuts and remove the nuts. Lift the crossmember from the frame side supports.

19. Remove the bolts that attach the engine rear support to the extension housing and remove the support.

20. Lower the transmission, then disconnect the fluid cooler lines from the transmission case.

21. Secure the transmission to the jack with a chain.

22. Remove the six bolts that attach the converter housing to the cylinder block.

23. Move the jack rearward until the transmission clears the engine, then tip it forward to provide clearance. Lower the transmission and remove it from under the vehicle.

24. Remove the converter from the transmission. Mount the transmission in a holding fixture if repairs are necessary.

INSTALLATION—FAIRLANE, MONTEGO, MUSTANG AND COUGAR

1. Mount the transmission in a transmission jack and secure it with a safety chain.

2. Install the converter on the front pump.

3. Rotate the flywheel so that the drain plug holes are in a vertical position. Rotate the converter so that the drain plugs are in the same relative position as the drain plug holes in the flywheel.

4. Roll the transmission into position under the vehicle and raise it to alignment with the engine. Move it forward until the converter housing contacts the cylinder block. Install and torque the converter-to-cylinder block attaching bolts.

5. Remove the jack safety chain from the transmission.

6. Connect the two fluid cooler lines to the fittings in the transmission case.

7. Secure the engine rear support to the extension housing with the attaching bolts. Torque the bolts to specification.

8. Position the crossmember on the frame side supports and install and tighten the attaching nuts to specification. Install cotter pins to retain the nuts.

9. Remove the transmission jack from under the vehicle. Install and torque the engine rear support-to-crossmember attaching nuts.

10. Install the exhaust system on Mustang and Cougar.

11. Install the converter-to-flywheel attaching nuts and torque them to specifications. Tighten the drain plugs to specification.

12. Secure the converter drain plug access cover to the lower end of the converter housing with the attaching bolts.

13. Install a new O-ring on the lower end of the fluid filler tube. Dip the O-ring in clean automatic transmission fluid and insert the filler tube in the transmission case.

14. Secure the starter to the converter housing. Connect the cable to the terminal on the starter.

15. Connect the speedometer cable to the extension housing.

16. Connect the shift rod to the manual lever at the transmission. On a column shift, use tool T67P-7341-A and install a new grommet in the manual lever. Then, secure the manual selector rod to the lever.

17. Connect the downshift rod to the lever on the transmission. Adjust the rod.

18. Remove the tool from the extension housing and install the drive shaft.

19. Lower the vehicle.

20. Working from the engine compartment, secure the fluid filler tube to the rear of the right cylinder head with the attaching bolt.

21. On Mustang and Cougar, connect the neutral switch wires to the harness. Secure the wires to the dash with the retaining clip.

22. Fill the transmission with the specified lubricant as detailed in Part 7-1.

REMOVAL—THUNDERBIRD

1. Working from the engine compartment, remove the fluid filler tube bracket attaching screw that secures it to the rear of the right cylinder head. Lift the tube and dipstick from the transmission.

2. Remove the starting motor upper attaching bolt using a long extension.

3. Remove the two converter housing upper attaching bolts.

4. Raise the vehicle on a hoist or stands.

5. Remove the dust shield from the front lower end of the converter housing.

6. Crank the engine until one of the converter drain plugs is accessible. Then, remove the plug.

7. Crank the engine until the other plug is at the bottom. Place a drain pan to catch the fluid, then remove the pan and allow the fluid to drain.

8. Remove the drive shaft.

9. Remove the frame side rail support brace attaching bolts and remove the brace.

10. After the fluid has been drained from the converter, install the plug.

11. Place the drain pan under the transmission pan and loosen the attaching bolts and allow the fluid to drain. Finally remove all of the pan attaching bolts except two, to allow the oil to further drain. After the fluid has drained, install two bolts on the opposite side of the pan to temporarily hold it in place.

12. Remove the converter-to-flywheel attaching nuts.

13. Disconnect the downshift linkage from the transmission downshift lever.

14. Using tool T67P-7341-A, remove the selector rod from the manual lever.

15. Remove the two screws that attach the shift rod bellcrank bracket to the converter housing and remove the bracket.

16. Disconnect the vacuum diaphragm hose from the upper end of the vacuum tube.

17. Disconnect the speedometer cable from the extension housing and place it to one side.

18. Remove the starting motor two lower attaching bolts and place the motor to one side.

19. Disconnect the two oil cooler lines from the right side of the transmission.

20. Disconnect the muffler inlet pipes at the exhaust manifolds and allow the pipes to hang.

21. Remove the vibration absorber from the extension housing.

22. Remove the two engine rear support-to-extension housing attaching bolts.

23. Place a transmission jack under the transmission and raise it just enough to remove the weight from the support.

24. Remove the two support attaching bolts and remove the support.

25. Lower the jack just enough to remove the weight.

26. Remove the four remaining converter housing-to-cylinder block attaching bolts and the accelerator linkage stop from the left side of the housing.

27. Carefully lower the transmission and remove it from under the vehicle.

28. Remove the converter and mount the transmission in a holding fixture.

INSTALLATION— THUNDERBIRD

1. Torque the two converter drain plugs to specification.
2. Install the converter on the stator support.
3. Secure the transmission on a transmission jack.
4. Rotate the converter so that the studs and drain plugs are in alignment with their holes in the flywheel.
5. Move the transmission toward the cylinder block until they contact each other. Install and torque the attaching bolts to specification. Before tightening the center bolt on the left side, make sure that the accelerator linkage stop bracket is properly positioned so that the left upper bolt may be installed later.
6. Connect the fluid cooler lines to their fittings on the right side of the transmission.
7. Raise the transmission and install the engine rear support and torque the bolts to specification. Make sure that the hand brake equalizer is positioned properly.
8. Lower the transmission and remove the jack.
9. Install the engine rear support-to-extension housing attaching bolts.
10. Install the drive shaft.
11. Connect the speedometer cable to the extension housing.
12. Position the starting motor on the converter housing and secure it with the two lower bolts.
13. Install the torque converter-to-flywheel attaching nuts and torque them to specification.
14. Install the converter housing dust shield.
15. Secure the frame side rail support brace with the attaching bolts and lock washers. Torque the bolts to specification.
16. Connect the downshift rod to the transmission downshift lever.
17. Connect the vacuum diaphragm hose to the upper end of the vacuum tube.
18. Using Tool T67P-7341-A, install a new grommet in the manual lever. Then, secure the manual selector rod to the lever.
19. Position the vibration absorber to the transmission extension housing and secure it with the three attaching bolts.
20. Connect the muffler inlet pipes to the exhaust manifolds.
21. Lower the vehicle and install the two converter housing upper bolts and torque them to specification.
22. Install the starting motor upper bolt.
23. Place a new O-ring on the end of the fluid filler tube and insert it in the transmission case. Secure the tube to the rear of the right cylinder head with the attaching screw and lock washer.
24. Fill the transmission to the proper level with the specified fluids.
25. Adjust the manual and throttle linkage as required.

REMOVAL— CONTINENTAL MARK III

1. Working from the engine compartment, lift the fluid filler tube dipstick from the transmission.
2. Raise the vehicle on a hoist or stands.
3. Remove the dust shield from the front lower end of the converter housing.
4. Crank the engine until one of the converter drain plugs is accessible. Then, remove the plug.
5. Crank the engine until the other plug is at the bottom. Place a drain pan to catch the fluid, then remove the pan and allow the fluid to drain.
6. Remove the driveshaft.
7. Remove the frame side rail support brace attaching bolts and remove the brace.
8. After the fluid has been drained from the converter, install the plug.
9. Place the drain pan under the transmission pan and loosen the attaching bolts and allow the fluid to drain. Finally remove all of the pan attaching bolts except two, to allow the oil to further drain. After the fluid has drained, install two bolts on the opposite side of the pan to temporarily hold it in place.
10. Remove the converter-to-flywheel attaching nuts.
11. Disconnect the downshift linkage from the transmission downshift lever.
12. Using tool T67P-7341-A, remove the selector rod from the manual lever.
13. Remove the two screws that attach the shift rod bellcrank bracket to the converter housing and remove the bracket.
14. Disconnect the vacuum diaphragm hose at the transmission.
15. Disconnect the speedometer cable from the extension housing and place it to one side.
16. Remove the two idler arm bracket retaining bolts at the frame side rail and allow the linkage to hang.
17. Disconnect the starter cable from the terminal on the starter. Remove the starter attaching bolts and remove it from the housing.
18. Remove the clip securing the oil cooler lines to the support bracket.
19. Disconnect the two oil cooler lines from the right side of the transmission.
20. Disconnect the muffler inlet pipes at the exhaust manifolds and allow the pipes to hang.
21. Remove the vibration absorber from the extension housing.
22. Remove the engine rear support to extension housing attaching bolts.
23. Place a transmission jack under the transmission and raise it just enough to remove the weight from the support.
24. Remove the two support attaching bolts and remove the support.
25. Lower the jack and secure the transmission to the jack with a safety chain.
26. Remove the bolt that secures the filler tube to the rear of the right cylinder head and lift the tube from the transmission case.
27. Remove the six converter housing-to-cylinder block attaching bolts.
28. Carefully lower the transmission and remove it from under the vehicle.
29. Remove the converter and mount the transmission in a holding fixture.

INSTALLATION— CONTINENTAL MARK III

1. Torque the two converter drain plugs to specification.
2. Install the converter on the stator support.
3. Secure the transmission on a transmission jack.
4. Rotate the converter so that the studs and drain plugs are in alignment with their holes in the flywheel.
5. Move the transmission toward the cylinder block until they contact each other. Install and torque the attaching bolts to specification.
6. Remove the jack safety chain from the transmission.
7. Connect the fluid cooler lines to their fittings on the right side of the transmission.
8. Install a new O-ring on the lower end of the fluid filler tube. Dip the O-ring in clean automatic transmission fluid and insert the tube in the transmission case. Install the attaching bolt.

9. Raise the transmission and install the engine rear support and torque the bolts to specification.
10. Lower the transmission and remove the jack.
11. Install the engine rear support-to-extension housing attaching bolts.
12. Install the drive shaft.
13. Connect the speedometer cable to the extension housing.
14. Connect the muffler inlet pipes to the exhaust manifolds.
15. Position the starting motor on the converter housing and secure it with the attaching bolts. Connect the cable to the terminal on the starter.
16. Position the idler arm bracket to the frame side rail and install the attaching bolts.
17. Install the torque converter-to-flywheel attaching nuts and torque them to specification.
18. Install the converter housing dust shield.
19. Secure the frame side rail support brace with the attaching bolts and lock washers. Torque the bolts to specification.
20. Connect the downshift rod to the transmission downshift lever.
21. Using Tool T67P-7341-A, install a new grommet in the manual lever. Then, secure the manual selector rod to the lever.
22. Connect the vacuum hose to the vacuum diaphragm.
23. Install the oil cooler line retaining clip at the transmission support.
24. Position the vibration absorber to the transmission extension housing and secure it with the three attaching bolts.
25. Lower the vehicle.
26. Fill the transmission to the proper level with the specified fluids.
27. Adjust the manual and throttle linkage as required.

REMOVAL— LINCOLN CONTINENTAL

1. Raise the hood and remove the transmission dipstick.
2. Raise the vehicle on a hoist. Remove the bolt that secures the transmission filler tube to the cylinder head.
3. Remove the bolts that attach the reinforcement plate at the rear of the transmission oil pan and remove the plate.
4. Remove the three bolts that attach the manual and downshift control rod splash shield to the side rail and remove the shield.
5. Place a drain pan under the transmission. Loosen all transmission pan attaching bolts and allow the fluid to drain. Remove the bolts from the rear and both sides of the pan to allow further drainage; then, finally remove the pan. After all fluid has been drained, install the pan using four attaching bolts.
6. Remove the two bolts that attach the cover to the lower end of the converter housing.
7. Remove the two front support bracket bolts at the converter housing.
8. Remove the two drain plugs from the converter and allow it to drain.
9. Remove the four nuts that attach the converter to the flywheel.
10. Lift the fluid filler tube from the transmission case.
11. Remove the two idler arm bracket bolts from the frame side rail and allow the idler arm to hang free.
12. Disconnect the starter cable from the starter. Remove the starter attaching bolts and remove the starter.
13. Disconnect the oil cooler lines from the transmission.
14. Disconnect the vacuum hose from the diaphragm.
15. Loosen the parking brake adjusting nut at the equalizer and remove the retracting spring. Disconnect the rear brake cables and remove the equalizer from the bracket.
16. Disconnect the speedometer cable from the extension housing.
17. Disconnect the drive shaft from the transmission flange and position the shaft out of the way.
18. Disconnect the downshift rod from the transmission downshift lever.
19. Using tool T67P-7341-A, remove the manual selector rod from the manual lever.
20. Remove the lower bellcrank attaching bolts and remove the bellcrank.
21. Pry the upper bellcrank out of the converter housing and allow it to hang free.
22. Remove the cooler lines from the clip at the cylinder head.
23. Remove the converter housing-to-cylinder block lower attaching bolts.
24. Remove the two nuts that attach the engine rear mounts to the crossmember.
25. Place a transmission jack under the transmission and raise it just high enough to remove the weight from the crossmember.
26. Remove the engine rear support-to-extension housing attaching bolts and remove the supports.
27. Remove the crossmember-to-frame attaching nuts and remove the crossmember.
28. Secure the transmission to the jack with the safety chain. Lower the transmission and remove the upper converter housing-to-cylinder block attaching bolts.
29. Move the transmission away from the cylinder block.
30. Carefully lower the transmission and remove it from under the vehicle.
31. Remove the converter and mount the transmission in a holding fixture.

INSTALLATION— LINCOLN CONTINENTAL

1. Torque the two converter drain plugs to specification.
2. Install the converter on the stator support.
3. Secure the transmission on a transmission jack.
4. Rotate the converter so that the studs and drain plugs are in alignment with those in the flywheel.
5. Move the transmission toward the cylinder block until they contact each other. Install and torque the attaching bolts to specification.
6. Secure the converter to the flywheel with the four attaching nuts. Torque the nuts to specification.
7. Secure the converter access cover to the converter housing with the attaching bolts.
8. Secure the two front support brackets to the converter housing with the attaching bolts.
9. Raise the transmission high enough to position the crossmember. Install the bolts, but do not tighten at this time.
10. Secure the engine rear support to the extension housing and torque the bolts to specification. At this time, install and torque the crossmember-to-frame attaching nuts to specification.
11. Lower the transmission and install the engine rear support-to-crossmember attaching nuts and plates. Torque the nuts to specification. Remove the transmission jack.
12. Install the upper bellcrank in the left side of the converter housing.
13. Position the lower bellcrank to the transmission and floor pan and secure it with the two attaching bolts.
14. Connect the downshift rod to transmission downshift lever.
15. Using tool T67P-7341-A, install a new grommet in the manual lever. Then, secure the manual selector rod to the lever.

16. Position the manual and downshift control rod splash shield to the frame side rail and secure it with the attaching bolts.

17. Connect the speedometer cable to the extension housing.

18. Connect the vacuum hose to the vacuum diaphragm and secure with a clamp.

19. Connect the two oil cooler lines to the fittings on the right side of the case.

20. Install the cooler lines under the clip at the cylinder head.

21. Position the reinforcement plate and torque the attaching bolts.

22. Install the equalizer and parking brake cables. Install the equalizer lever retracting spring.

23. Install the drive shaft.

24. Install a new seal on the filler tube and install it in the transmission case. Secure the filler tube to the cylinder head.

25. Install the starting motor and connect the cable.

26. Install the idler arm bracket-to-frame side rail.

27. Lower the vehicle.

28. Fill the transmission to the correct level with the specified fluid.

29. Adjust the manual and throttle linkage as required.

4 MAJOR REPAIR OPERATIONS

DISASSEMBLY OF TRANSMISSION

1. Mount the transmission in holding fixture T64L-6001-A (Fig. 22).

2. Remove the 17 fluid pan attaching bolts. Remove pan and gasket.

3. Remove the 8 valve body attaching bolts (Fig. 23). Lift the valve body from the transmission case.

4. Attach a dial indicator to the front pump as shown in Fig. 24. Install tool T61L-7657-B in the extension housing to center the shaft.

5. Pry the gear train to the rear of the case and at the same time, press the input shaft inward until it bottoms (Fig. 24). Set the dial indicator to read zero.

6. Pry the gear train forward (Fig. 24) and note the amount of gear train end play on the dial indicator. Record the end play to facilitate assembling the transmission. Remove the dial indicator from the pump and the tool from the extension housing.

7. Remove the vacuum diaphragm, rod and the primary throttle valve from the case. Slip the input shaft out of the front pump.

8. Remove the front pump attaching bolts. Pry the gear train forward as shown in Fig. 25 to remove the pump.

9. Loosen the band adjustment screw and remove the two struts.

10. Rotate the band 90 degrees counterclockwise to align the ends with the slot in the case (Fig. 26). Slide the band off the reverse-high clutch drum.

11. Remove the forward part of the gear train as an assembly as shown in Fig. 27.

12. Remove the large snap ring that secures the reverse planet carrier in the low-reverse clutch hub. Lift the planet carrier from the drum.

13. Remove the snap ring (Fig. 28) that secures the reverse ring gear and hub on the output shaft. Slide the ring gear and hub off the shaft.

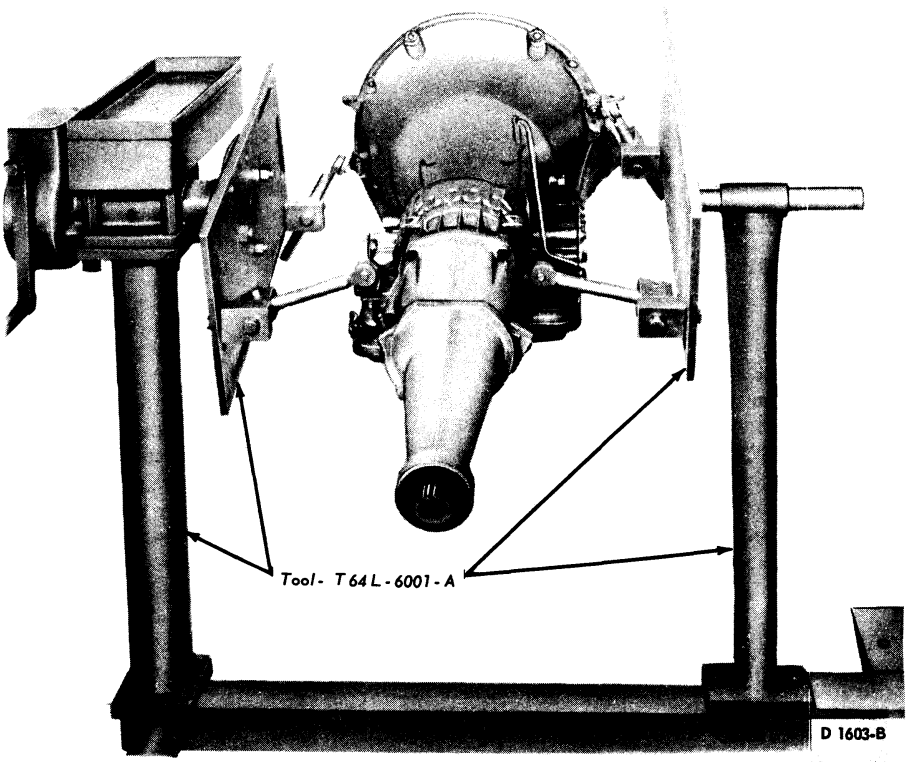


FIG. 22—Transmission Mounted in Holding Fixture

14. Rotate the low-reverse clutch hub in a clockwise direction and at the same time, withdraw it from the case.

15. Remove the reverse clutch snap ring from the case, then remove the clutch discs, plates and pressure plate from the case.

16. Remove the extension housing attaching bolts and vent tube from the case. Remove the extension housing and gasket.

17. Slide the output shaft assembly from the transmission case.

18. Remove the distributor sleeve attaching bolts and remove the sleeve, parking pawl gear and the thrust washer.

If the thrust washer is staked in place, use a sharp chisel and cut off the metal from behind the thrust washer. Be sure to clean the rear of the case with air pressure or a suitable solvent to remove any metal particles.

19. Compress the reverse clutch piston release spring with tool T65P-77515-A (Fig. 29). Remove the snap ring. Remove the tool and the spring retainer.

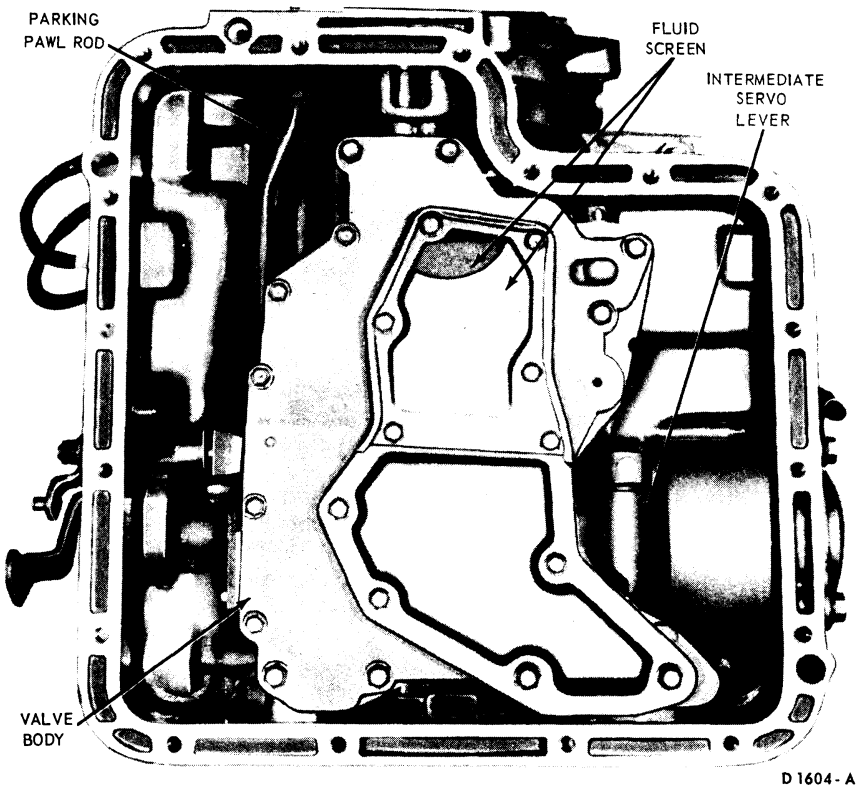


FIG. 23—Transmission with Pan Removed

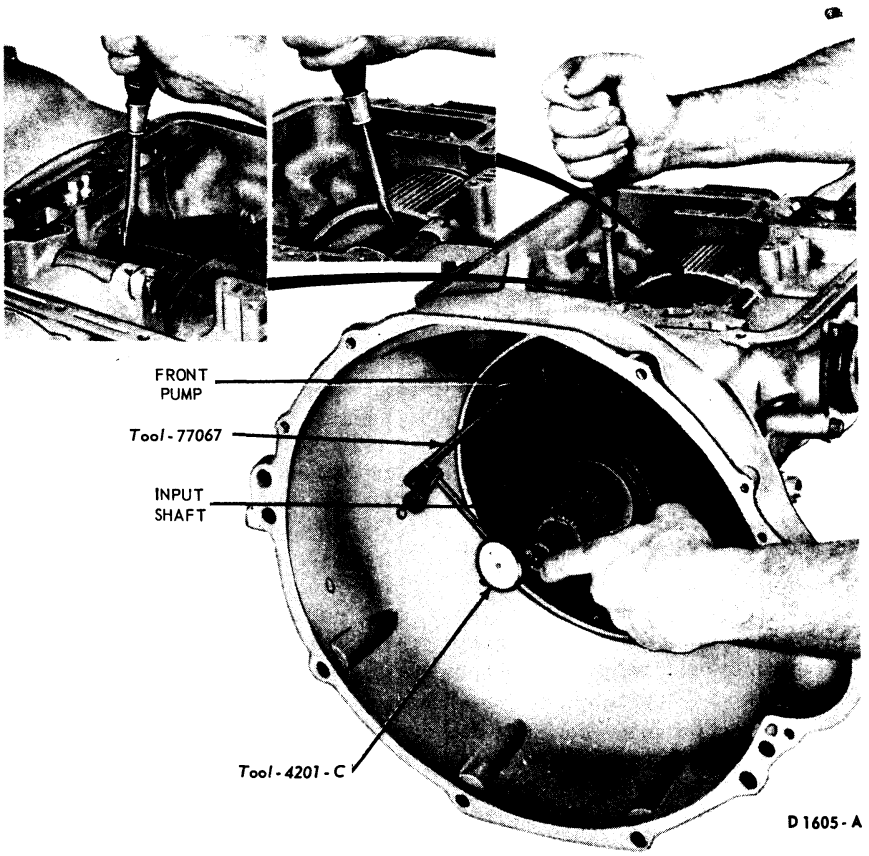


FIG. 24—Checking Gear Train End Play

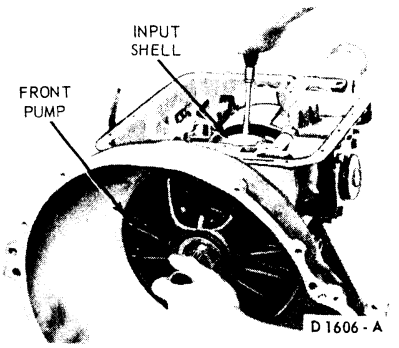


FIG. 25—Removing Front Pump

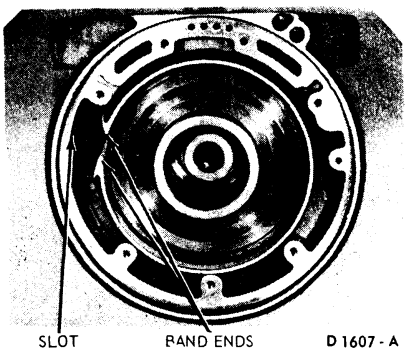


FIG. 26—Removing or Installing Band

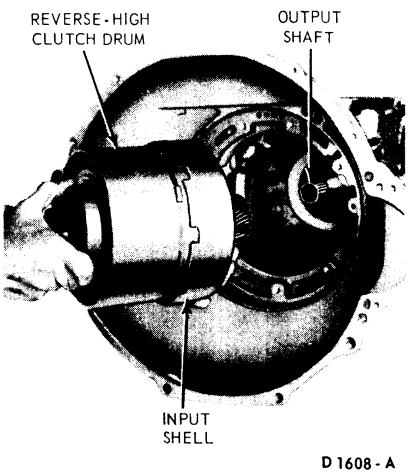


FIG. 27—Removing or Installing Forward Part of Gear Train

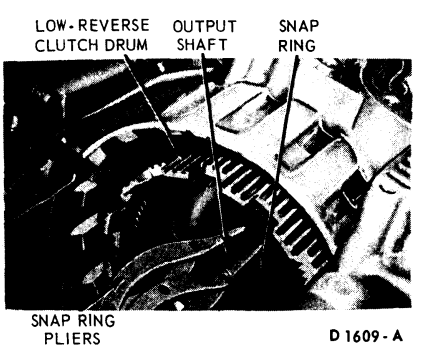


FIG. 28—Removing or Installing Reverse Ring Gear Hub Retaining Ring

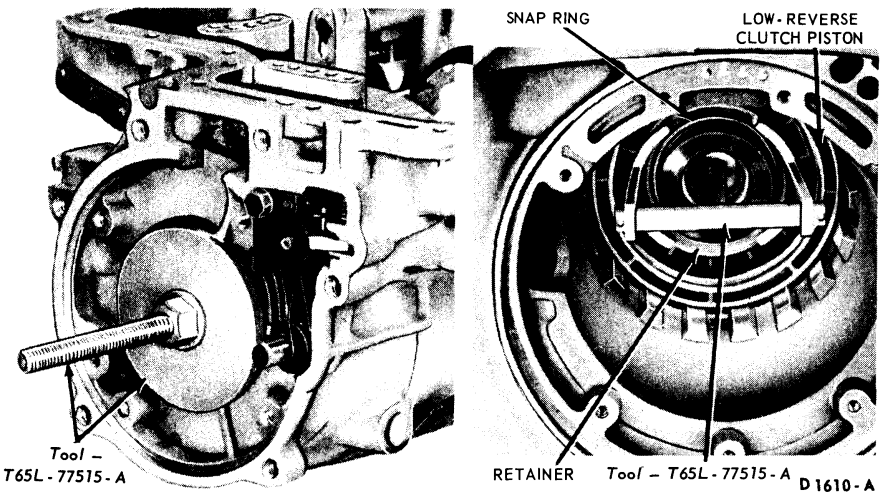


FIG. 29—Compressing Reverse Clutch Spring

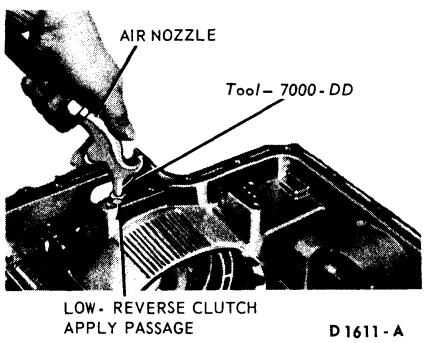


FIG. 30—Removing Low-Reverse Clutch Piston

20. Remove the one-way clutch inner race attaching bolts from the rear of the case. Remove the inner race from inside of the case.

21. Remove the reverse clutch piston from the case as shown in Fig. 30.

PARTS REPAIR OR REPLACEMENT

During the repair of the sub-assemblies, certain general instructions which apply to all units of the transmission must be followed. Following these instructions will avoid unnecessary repetition.

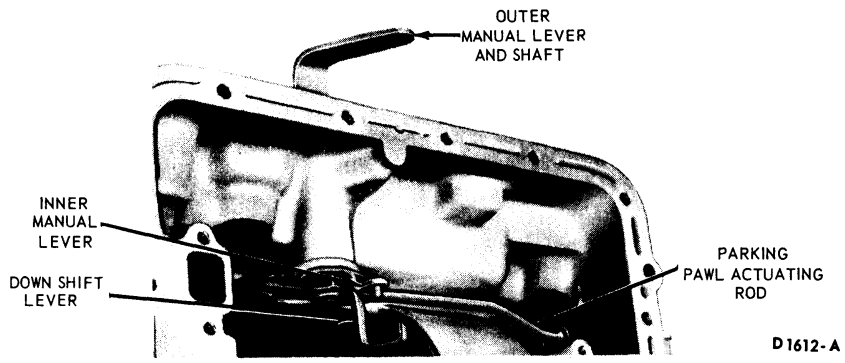


FIG. 31—Downshift and Manual Linkage

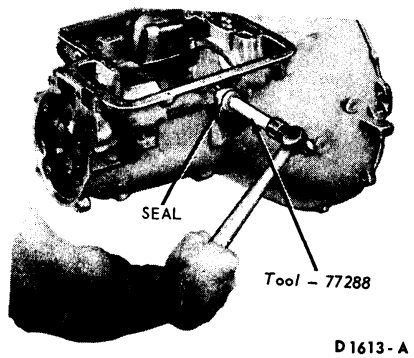


FIG. 32—Installing Manual Lever Seal

All transmission parts must be handled carefully to avoid nicking or burring the bearing or mating surfaces.

Lubricate all internal parts of the transmission with clean automatic transmission fluid before assembling them.

Do not use any other lubricants except on gaskets and thrust washers. These may be coated with vaseline to facilitate assembly. Always use new gaskets and seals when assembling a transmission.

Tighten all bolts and screws to the recommended torque as outlined in the Specification Section.

TRANSMISSION CASE AND LINKAGE

Downshift and Manual Linkage

1. Remove the nut and lock washer that secures the outer downshift lever to the transmission and remove the lever.

2. On a Mustang or Cougar, remove the two bolts that secure the neutral safety switch to the case. Insert a screwdriver between the switch and case as close as possible to the shaft. Gently pry the switch from the case.

3. Slide the downshift lever out from the inside of the case (Fig. 31). Remove the seal from the recess in the manual lever shaft.

4. Remove the C-ring that secures the parking pawl actuating rod to the manual lever. Remove the rod from the case.

5. Remove the nut that secures the inner manual lever to the shaft. Remove the inner lever from the shaft. Slide the outer lever and shaft from the case.

6. Remove the seal from the case with Tools T59L-100-B and T58L-101-A or 7600-E.

7. Dip the new seal in transmission fluid and install it in the case as shown in Fig. 32.

8. Slide the outer manual lever and shaft in the transmission case.

9. Position the inner lever on the shaft and install the attaching nut. Tighten the nut to specification. Install the parking pawl actuating rod and secure it to the inner manual lever with a C-washer.

10. Install a new downshift lever seal in the recess of the outer lever shaft. Slide the downshift lever and shaft into position.

11. On a Mustang or Cougar, position the neutral switch on the manual lever and secure it with the two attaching bolts. Leave the attaching bolts loose to adjust the switch after installing the control valve.

12. Place the outer downshift lever on the shaft and secure it with a lock washer and nut.

Parking Pawl Linkage

1. Remove the bolts that secure the parking pawl guide plate to the case (Fig. 33). Remove the plate.
2. Remove the spring, parking pawl and shaft from the case.
3. Working from the pan mounting surface, drill a 1/8 inch diameter hole through the center of the cupped plug. Pull the plug from the case with a wire hook.
4. Lift the end of the spring off the park plate pin to relieve the tension.
5. Thread a 1/4-20 inch or # 8-32 x 1 1/4 inch screw (Fig. 34) into the park plate shaft. Pull the shaft from the case with the screw.
6. Position the spring and park plate in the case and install the shaft. Hook the end of the spring over the pin on the park plate.
7. Install a new cupped washer (Fig. 33) to retain the shaft.
8. Install the parking pawl shaft in the case. Slip the parking pawl and spring into place on the shaft.
9. Position the guide plate on the case making sure that the actuating rod is seated in the slot of the plate. Secure the plate with two bolts and lock washers.

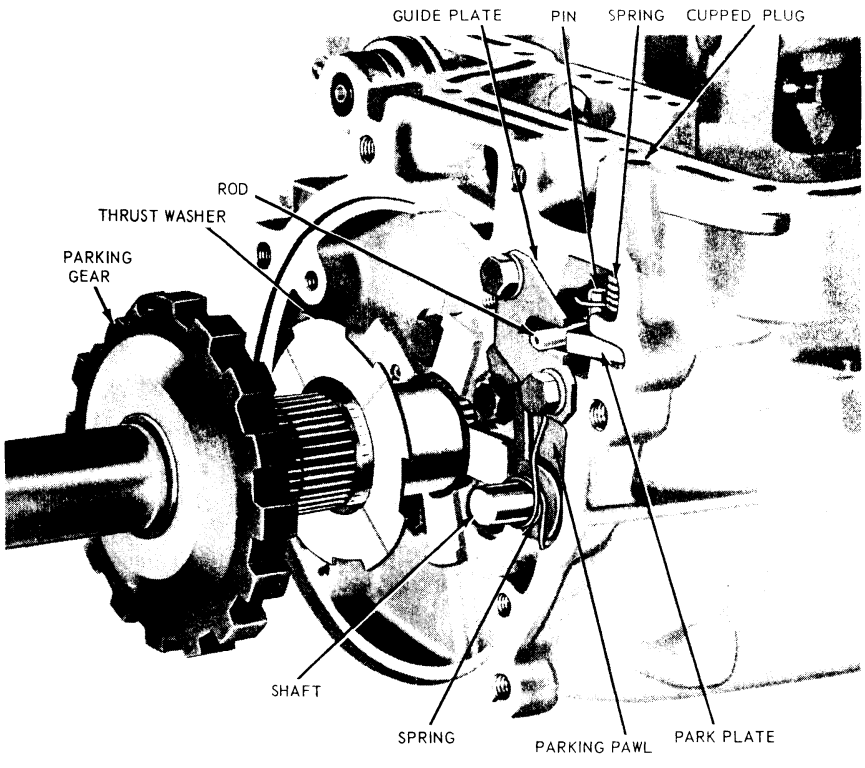


FIG. 33—Parking Pawl Mechanism

Servo Apply Lever

1. Working from inside of the transmission case, carefully drive on the servo apply lever shaft to remove the cup plug. The shaft (Fig. 35) can be withdrawn from the case by hand.
2. Hold the servo apply lever in position and install the new shaft.
3. Using the fabricated tool shown in Fig. 35, drive the cup plug into position in the case. Be sure the plug is flush with the shoulder of the counterbore. The cup plug may be coated with Loctite, Part No. C3AZ-19554-A, before installation.

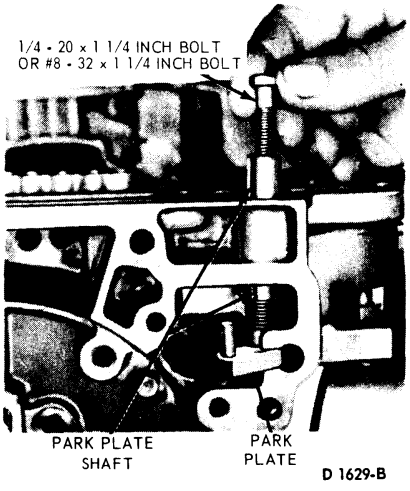


FIG. 34—Removing Park Plate Shaft

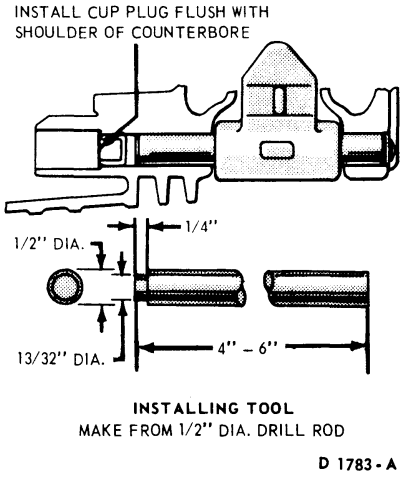


FIG. 35—Servo Apply Lever Installation

Thread Repair-Case

Thread service kits may be purchased from local jobbers or the Heli-Coil Corporation. To repair a damaged thread, the following procedures should be carefully followed:

1. Drill out the damaged threads **using the same size threads as the thread OD.** For example, use a 5/16-inch drill when repairing a 5/16-18 inch thread.
2. Select the proper **special** tap and tap the drilled hole. The tap is marked for the size of the thread being repaired. Thus, the special tap supplied with the repair kit marked 5/16-18 will not cut the same thread as a standard 5/16-inch tap. It will cut a thread large enough to accommodate the insert, and after the insert is installed, the original thread size (5/16-18 inch) is restored.
3. Select the proper coil inserting tool. These tools are marked with the thread size being repaired. Place the insert on the tool and adjust the sleeve to the length of the insert being used. Press the insert against the face of the tapped hole. Turn the tool clockwise and wind the insert into the hole until the insert is one half turn below the face.
4. Working through the insert, bend the insert tang straight up and down until it breaks off at the notch.
5. If the inserts are not properly installed, they can be removed with the extractor tool. Place the extractor tool in the insert so that the blade rests against the top coil 1/4-1/2 turn away

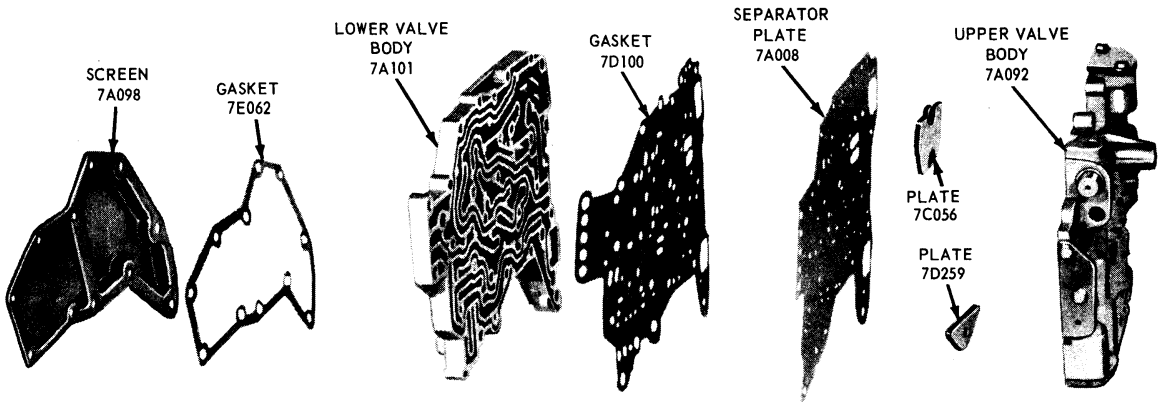


FIG. 36—Upper and Lower Valve Bodies Disassembled

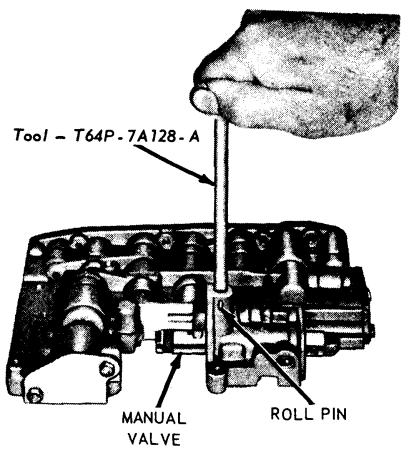


FIG. 37—Removing Manual Valve

from the end of the coil. Tap the tool sharply with a hammer so that the blade cuts into the insert. Exert downward pressure on the tool and turn it counterclockwise until the insert is removed.

CONTROL VALVE BODY

Disassembly

1. Remove the nine screws that attach the screen to the lower valve body and remove the screen and gasket (Fig. 36).
2. Remove the twelve screws and the 2 plates that attach the two valve bodies.
3. Separate the bodies and remove the separator plate and gasket. Be careful not to lose the check valves and springs.
4. Depress the manual valve detent spring with the tool shown in Fig. 37. Remove the retaining pin from the upper valve body. Remove the spring and detent plunger.
5. Slide the manual valve (Fig. 38) out of the valve body.
6. Cover the downshift valve port with a finger, then working from the underside of the body remove the downshift valve retainer. Remove the spring and downshift valve.
7. Apply pressure on the pressure booster valve retaining plate and remove the two attaching screws. Slowly release the pressure and remove the plate, sleeve and the pressure booster valve. Remove the two springs and the main regulator valve from the same bore.
8. Apply pressure on the throttle booster valve retaining plate and remove the two attaching screws. Slowly release the pressure and remove plate, throttle booster valve and spring, and the manual low 2-1 scheduling valve and spring from the body.
9. Apply pressure on the remaining valve retaining plate and remove the eight attaching screws.
10. Hold the valve body so that the plate is facing upward. Slowly release the pressure and remove the plate.
11. When removing the various valves from the control valve body, keep all ports covered with your fingers except the bore the valve is being removed from. Remove the spring and the intermediate servo modulator valve (Fig. 38) from the valve body.
12. Remove the intermediate servo accumulator valve and springs.
13. Remove the 2-3 back-out valve, and spring.
14. Remove the 2-3 shift valve, spring and the throttle modulator valve.
15. Remove the 1-2 shift valve, D2 shift valve and the spring from the valve body.
16. Remove the coasting regulator valve from the body.
17. Remove the cutback control valve.
18. Remove the 3-2 shift timing valve retainer and remove the plug. Remove the 3-2 shift timing valve and spring to complete the disassembly of the control valve. Do not remove the 3-2 shift timing valve plug if it is found to be peened, preventing the removal of the plug and the 3-2 shift timing valve. This condition will not affect transmission operation and is not cause for replacement of the main control. The 3-2 shift timing valve is non-functional and removal of the plug, 3-2 shift timing valve and spring is not required.

Assembly

1. Place the spring 3-2 shift timing valve and plug in the valve body if they were previously removed. Install the plug retainer.
2. Place the downshift valve and spring in the valve body. Compress the spring and install the retainer from the underside of the body.
3. Place the valve body on a clean surface and the passage side facing up. Place the converter relief valve spring in its bore (Fig. 39). Coat the converter relief valve check valve with vaseline and place it on top of the spring. Place the 2-3 shift check valve ball in its cavity. Place the throttle pressure relief valve spring in its bore (Fig. 39). Coat the throttle pressure relief valve check ball with vaseline and place it on top of the spring.

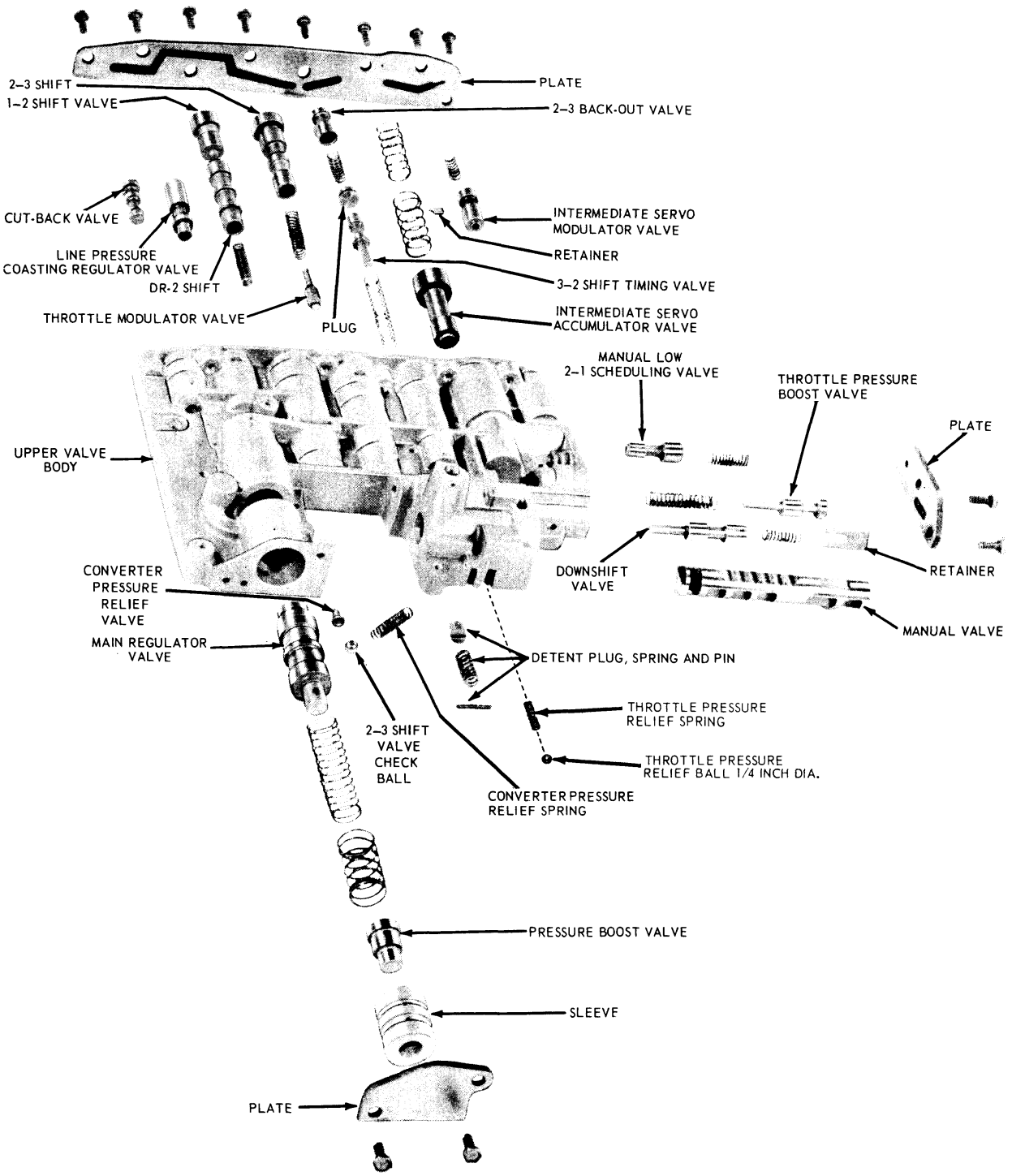


FIG. 38 —Upper Valve Body Disassembled

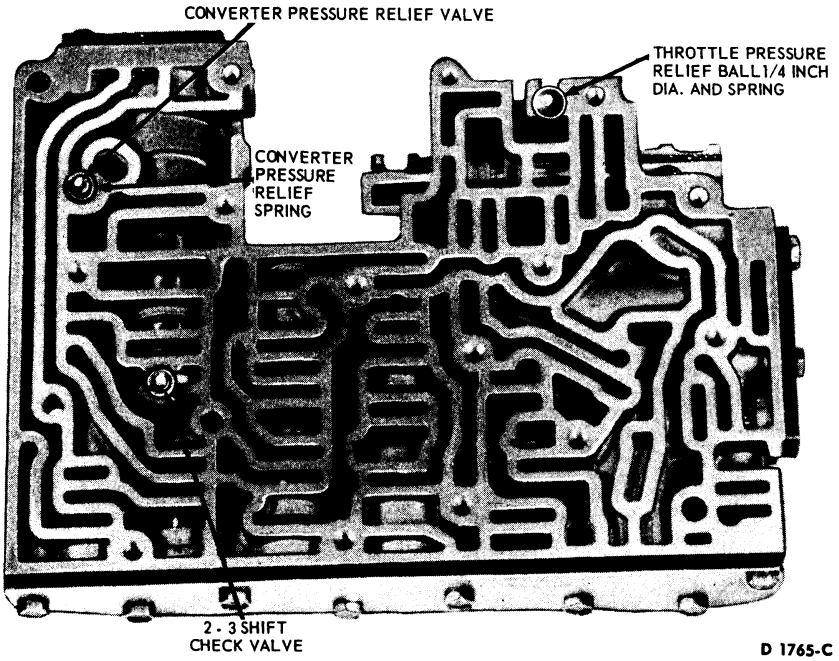


FIG. 39—Converter Pressure Relief Valve, Throttle Pressure Relief Valve, and 2-3 Shift Check Valve Locations

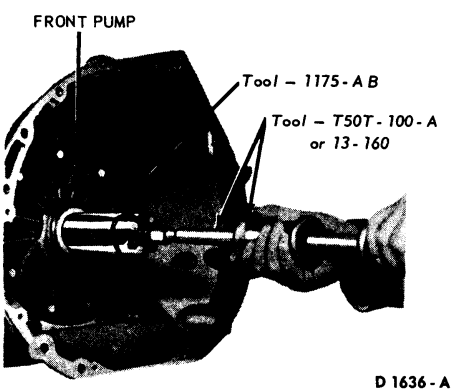


FIG. 40—Removing Front Pump Seal

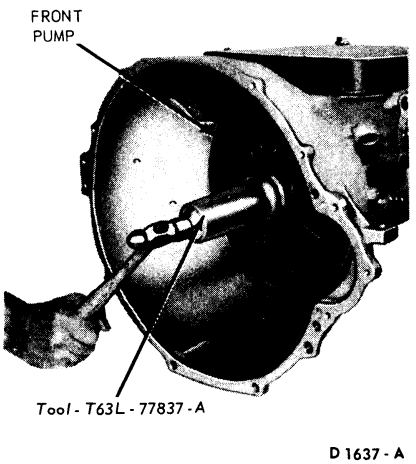


FIG. 41—Installing Front Pump Seal

4. Carefully position the separator plate, new gasket and the lower valve body on the upper valve body and install and torque the attaching bolts to specification.

5. Secure the screen to the lower valve body with the attaching bolts and torque them to specification.

6. Place the cutback control valve (Fig. 38) in the valve body.

7. Place the coasting regulator valve in the body.

8. Place the spring D2 shift valve and the 1-2 shift valve in the body.

9. Place the throttle modulator valve and spring and the 2-3 shift valve in the valve body.

10. Place the spring and the 2-3 backout valve in the valve body.

11. Place the two springs and the intermediate servo accumulator valve in the valve body.

12. Place the intermediate servo modulator valve and spring in the body.

13. Carefully place the valve retaining plate on the body and secure it with the eight attaching screws. Tighten the screws to specification.

14. Place the throttle booster valve and spring in the valve body. Place the manual low 2-1 scheduling valve and spring in the valve body and install the retaining plate. Torque the attaching screws to specification.

15. Place the main regulator, two springs, pressure booster valve and the sleeve in the valve body.

16. Install the pressure booster plate and torque the two attaching screws to specification.

17. Place the manual valve in the valve body and install the detent plug, spring and the retaining pin in the body.

FRONT PUMP

The front seal can be replaced after the pump has been installed on the transmission (Figs. 40 and 41).

Disassembly

1. Remove the two seal rings and the selective thrust washer (Fig. 42).

2. Remove the large square-cut seal from the O.D. of the pump housing.

3. Remove the 5 bolts that secure the pump support to the pump housing. Lift the support from the housing.

4. Remove the drive and the driven gear from the housing.

Assembly

1. Install the drive and driven gears in the pump housing. Each gear has an identification mark on one face. **The identification mark on each gear must be toward the front of the pump housing.**

2. Position the pump support in the pump housing and install and torque the five attaching bolts to specification.

3. Carefully install two new seal rings on the pump support. Make sure that the ends of the rings are engaged to lock them in place. Install a new square-cut seal on the O.D. of the pump housing.

4. Install the selective thrust washer. Make sure that the correct thickness selective washer is being used to obtain the specified end play.

5. Place the pump on converter making sure that the drive gear engages the converter hub. Rotate the pump to make sure that the gears rotate freely.

REVERSE-HIGH CLUTCH

Disassembly

1. Separate the drive train as shown in Fig. 43. Remove the pressure plate retaining snap ring as shown in Fig. 44.

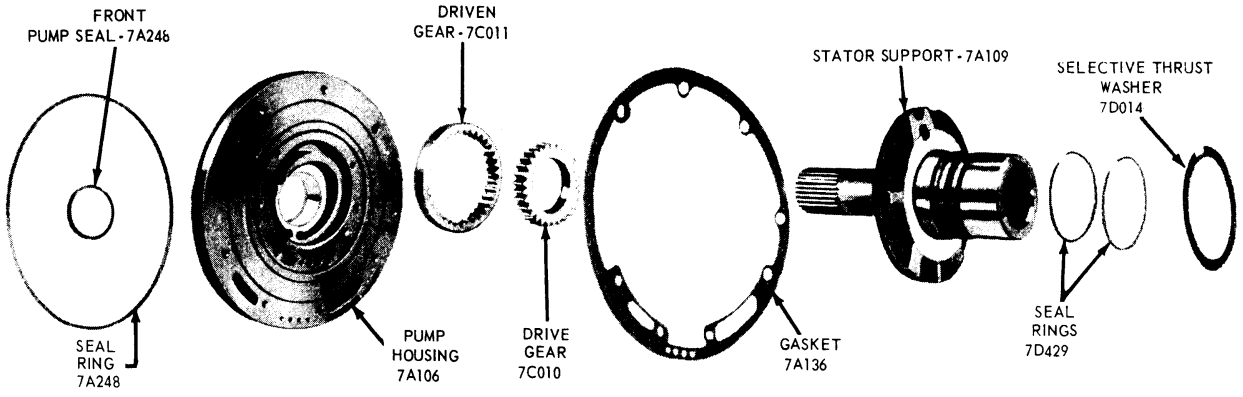


FIG. 42—Front Pump Disassembled

2. Remove the pressure plate and the drive and driven clutch plates (Fig. 45).

3. Install Tool T65L-77515-A (Fig. 46) on the reverse-high clutch drum.

Make sure that the legs clear the snap ring enough to permit expanding it enough for removing it. Remove the snap rings and remove the tool.

4. Remove the spring retainer and the piston return springs.

5. Apply air pressure to the piston apply hole in the clutch hub (Fig. 47) and remove the piston.

6. Remove the piston outer seal from the piston and the inner seal from the clutch drum (Fig. 45).

7. Remove the front and rear bushings from the clutch drum if they are worn or damaged. To remove the front bushing, use a cape chisel and cut along the bushing seam until the chisel breaks through the bushing wall. Pry the loose ends of the bushing up with an awl and remove the bushing.

To remove the rear bushing, use the tool shown in Fig. 48, and press the bushing from the drum.

Assembly

1. If the clutch drum bushings were removed, position the drum in a press and press new bushings into the drum with the tools shown in Figs. 48 or 49.

2. Dip the new seals in transmission fluid and install one on the drum and one on the piston.

3. Install the piston in the clutch drum.

4. Position the piston return springs in the piston sockets. Place the spring retainer on the springs.

5. Install Tool T65L-77515-A (Fig. 46) and compress the springs. Make certain that the spring retainer is centered while compressing the springs. Install the snap ring. Before releasing the pressure on the tool, make certain that the snap ring is positioned inside of the four snap ring guides on the spring retainer.

6. Clutch plate usage varies with each model, refer to the Specifications Section for the number of plates required. Dip the clutch plates in clean transmission fluid. Install the clutch plates alternately starting with a steel drive plate (Fig. 45).

7. After all clutch plates have been installed, position the pressure plate in the clutch drum. Install the pressure plate snap ring.

8. With a feeler gauge, check the clearance between the pressure plate and snap ring (Fig. 50).

9. The pressure plate should be held downward as the clearance is checked. Refer to the Specification Section for the proper clearance. If the clearance is not within specifications, selective thickness snap rings are available in the following thicknesses: 0.065-0.069, 0.074-0.078, and 0.083-0.087 inch. Install the correct size snap ring and recheck the clearance.

FORWARD CLUTCH

Disassembly

1. Remove the clutch pressure plate retaining snap ring (Fig. 51).

2. Remove the rear pressure plate, the drive and driven plates and the forward pressure plate from the clutch hub (Fig. 52).

3. Remove the snap ring (Fig. 53) that secures the disc spring in the clutch cylinder. Remove the disc spring.

4. Apply air pressure to the clutch apply passage in the cylinder (Fig. 54) to remove the piston.

5. Remove the seal from the piston and the seal from the clutch hub (Fig. 52).

Assembly

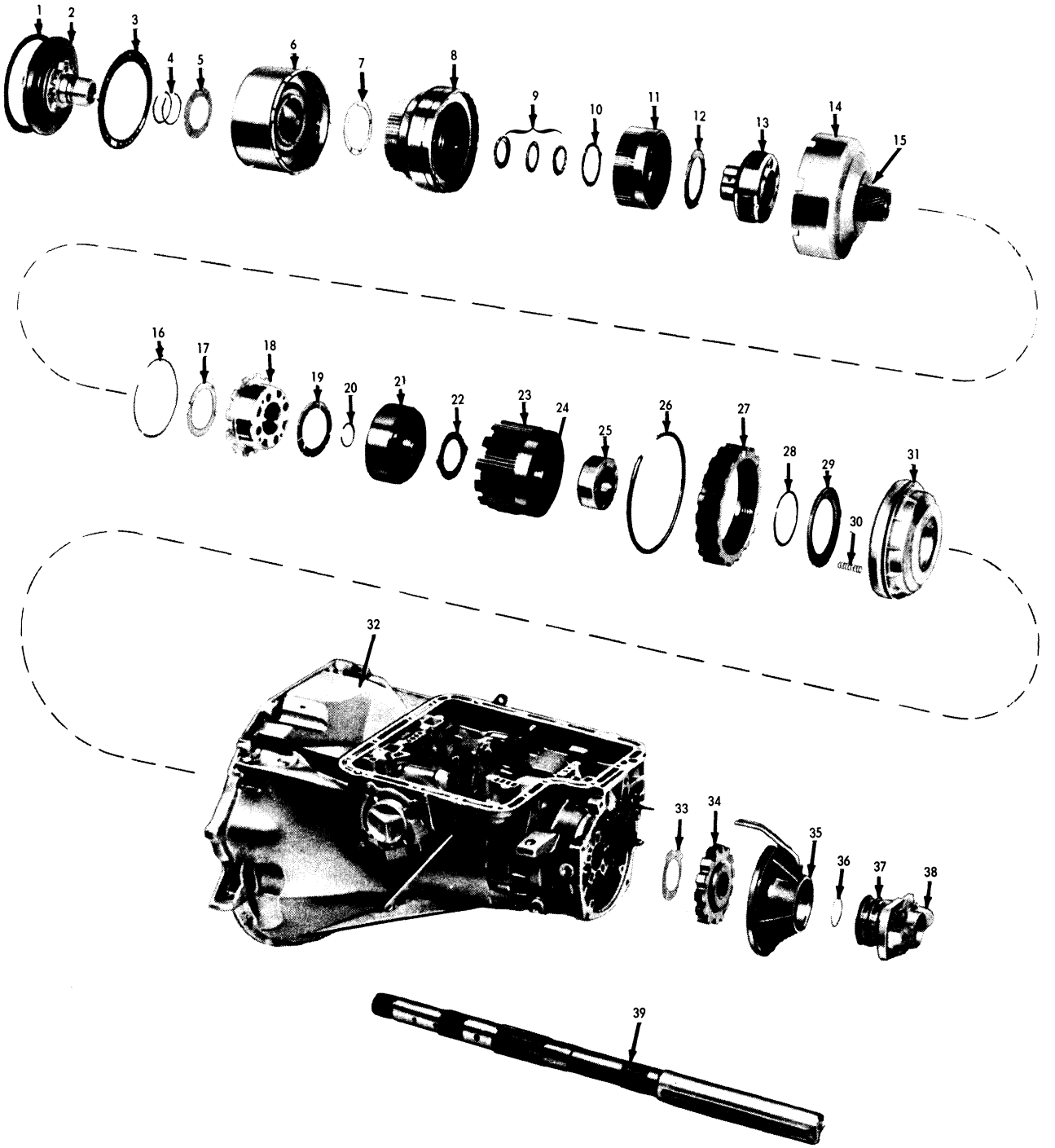
1. Dip two new seals in transmission fluid. Install the smaller seal on the clutch hub and the other seal on the clutch piston.

2. Install the clutch piston in the cylinder.

3. Make sure that the steel pressure ring is in the groove on the piston. Position the disc spring in the cylinder with the dished face downward. Install the spring as shown in Fig. 56. Secure the disc with the retaining snap ring.

4. Install the forward pressure plate with the flat side up and the beveled side downward. Install first a composition driven plate and a steel drive plate (Fig. 52). Install the remaining plates in this sequence. Refer to the Specification Section for the number of plates required. The last plate installed will be the rear pressure plate. Install the snap ring and make certain that it seats fully in the groove.

5. With a feeler gauge, check the clearance between the snap ring and the pressure plate (Fig. 55). Downward pressure on the plate should be maintained when making this check. Refer to the Specifications Section for the proper clearance.



1. FRONT PUMP SEAL RING
2. FRONT PUMP
3. GASKET
4. SEAL
5. NUMBER 1 THRUST WASHER (SELECTIVE)
6. REVERSE–HIGH CLUTCH ASSEMBLY
7. NUMBER 2 THRUST WASHER
8. FORWARD CLUTCH ASSEMBLY
9. NUMBER 3 THRUST WASHER
10. NUMBER 4 THRUST WASHER
11. FORWARD CLUTCH HUB ASSEMBLY
12. NUMBER 5 THRUST WASHER
13. FORWARD PLANET ASSEMBLY
14. INPUT SHELL AND SUN GEAR ASSEMBLY
15. NUMBER 6 THRUST WASHER
16. SNAP RING
17. NUMBER 7 THRUST WASHER
18. REVERSE PLANET ASSEMBLY
19. NUMBER 8 THRUST WASHER
20. REVERSE RING GEAR AND HUB RETAINING RING
21. REVERSE RING GEAR AND HUB
22. NUMBER 9 THRUST WASHER
23. LOW–REVERSE CLUTCH HUB
24. ONE–WAY CLUTCH
25. ONE–WAY CLUTCH INNER RACE
26. SNAP RING
27. LOW–REVERSE CLUTCH
28. SNAP RING
29. LOW–REVERSE PISTON RETURN SPRING RETAINER
30. RETURN SPRING
31. LOW–REVERSE PISTON
32. CASE
33. NUMBER 10 THRUST WASHER
34. PARKING GEAR
35. GOVERNOR DISTRIBUTOR SLEEVE
36. SNAP RING
37. GOVERNOR DISTRIBUTOR
38. GOVERNOR
39. OUTPUT SHAFT

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FIG. 43—Drive Train Disassembled

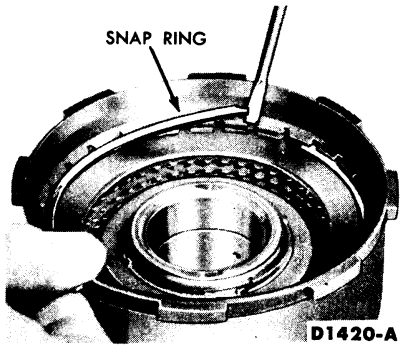


FIG. 44—Removing or Installing Reverse-High Clutch Pressure Plate Snap Ring

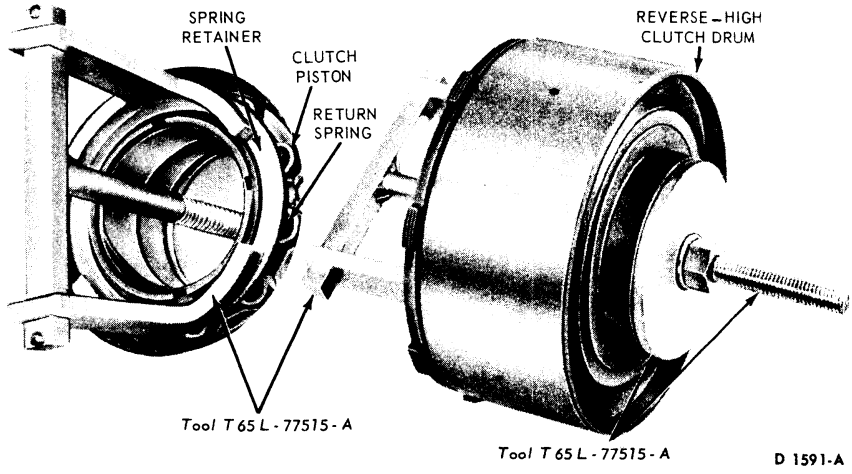


FIG. 46—Removing or Installing Reverse-High Clutch Piston Snap Ring

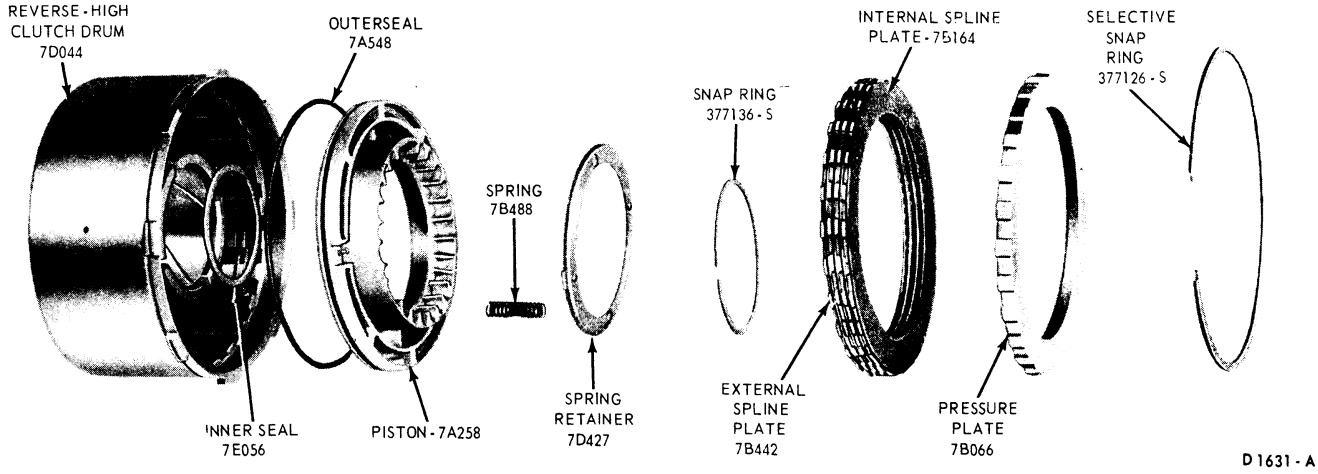


FIG. 45—Reverse-High Clutch Disassembled

6. If the clearance is not within specifications, selective snap rings are available in the following thicknesses: 0.056-0.060, 0.065-0.069, 0.074-0.078, 0.083-0.087 and 0.092-0.096 inch. Insert the correct size snap ring and recheck the clearance.

INPUT SHELL AND SUN GEAR

Disassembly

1. Remove the external snap ring on from the sun gear as shown in Fig. 56.

2. Remove the thrust washer from the input shell and sun gear (Fig. 57).

3. Working from inside the input shell remove the sun gear. Remove the internal snap ring from the gear.

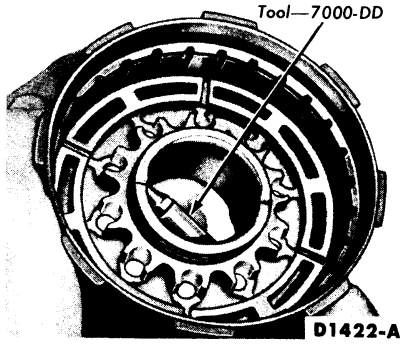


FIG. 47—Removing Reverse-High Clutch Piston

Assembly

1. Install the forward snap ring on the forward end (short end) of the sun gear (Fig. 57). Working from inside the input shell, slide the sun gear and snap ring into place making sure that the longer end is at the rear (Fig. 57).

2. Place the No. 6 thrust washer on the sun gear and install the rear snap ring.

OUTPUT SHAFT HUB AND RING GEAR

Disassembly

1. Remove the hub retaining snap ring (Fig. 58) from the ring gear.

2. Lift the hub from the ring gear.

Assembly

1. Position the hub in the ring gear.

2. Secure the hub with the retaining snap ring. Make certain that the snap ring is fully engaged with the groove.

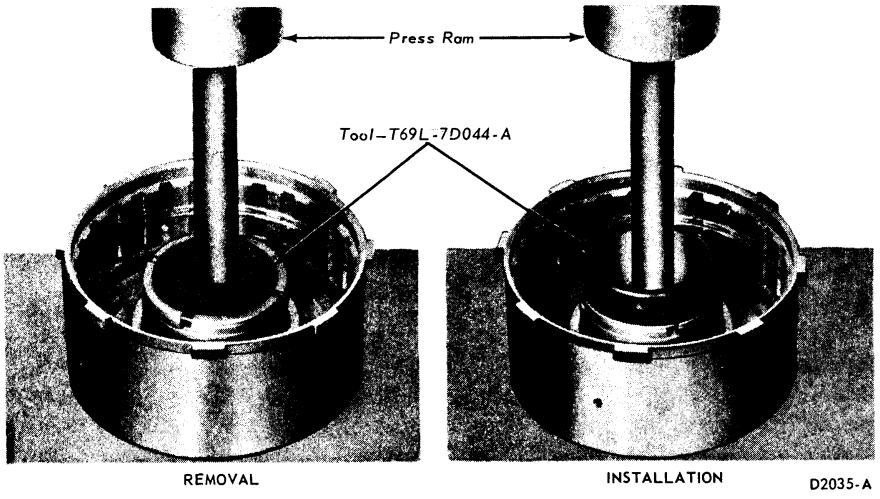


FIG. 48 — Replacing Reverse-High Clutch Rear Bushing

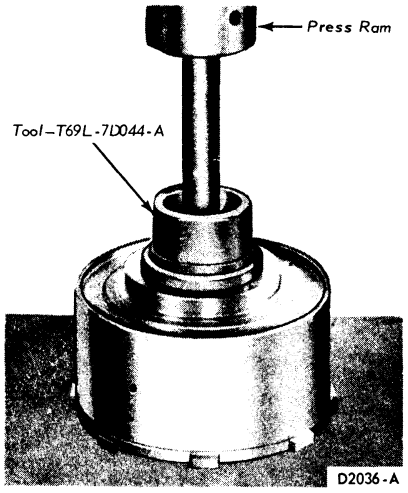


FIG. 49—Installing Reverse-High Clutch Front Bushing

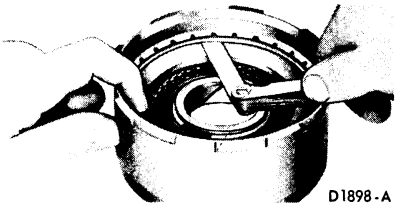


FIG. 50—Checking Reverse-High Clutch Snap Ring Clearance

ONE-WAY CLUTCH

Disassembly

1. Remove the snap ring and rear bushing from the rear of the low-reverse clutch hub (Fig. 59).
2. Remove the springs and rollers from the spring retainer and lift the spring retainer from the hub.
3. Remove the remaining bushing and snap ring from the hub.

Assembly

1. Install a snap ring in the forward snap ring groove of the low-reverse clutch hub.
2. Place the low-reverse clutch hub on the bench with the forward end down (Fig. 60).
3. Place the forward clutch bushing against the snap ring with the flat side up. Install the one-way clutch spring retainer on top of the bushing. Be sure to install the retainer in the hub so that the springs load the rollers in a counterclockwise direction when looking down at the unit (Fig. 60).
4. Install a spring and roller into each of the spring retainer compartments by slightly compressing each spring and positioning the roller between the spring and the spring retainer (Fig. 60).
5. Install the rear bushing on top of the retainer with the flat side down.
6. Install the remaining snap ring at the rear of the low-reverse clutch hub to secure the assembly.

SERVO

Disassembly

1. Apply air pressure to the port in the servo cover to remove the piston and rod.
2. Remove the seals from the piston.

On Lincoln Continental and Continental Mark III models, replace the complete piston and rod assembly if the piston or piston sealing lips are unserviceable or damaged.

3. Remove the seal from the cover.

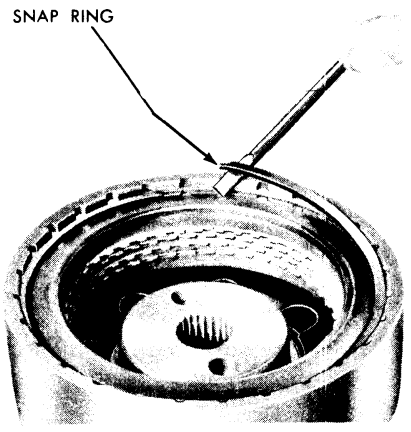


FIG. 51—Removing Forward Clutch Pressure Plate Snap Ring

Assembly

1. Dip the new seals in transmission fluid.
2. Install new seals on the cover and servo piston. Fig. 61 shows the correct servo piston and cover for the transmission.
3. Dip the piston in transmission fluid and install it in the cover.

LOW-REVERSE CLUTCH PISTON

Disassembly

1. Remove the inner and the outer seal from the reverse clutch piston.

Assembly

1. Dip the two new seals in clean transmission fluid.
2. Install the seals on the piston.

OUTPUT SHAFT

Disassembly

1. Remove the governor attaching bolts and remove the governor.
2. Remove the snap ring that secures the governor distributor on the output shaft (Fig. 62) and slide it off the front of the shaft.
3. Remove the seal rings from the distributor.

Assembly

1. Carefully install new seal rings on the distributor.
2. Working from the front end of the output shaft, slide the governor

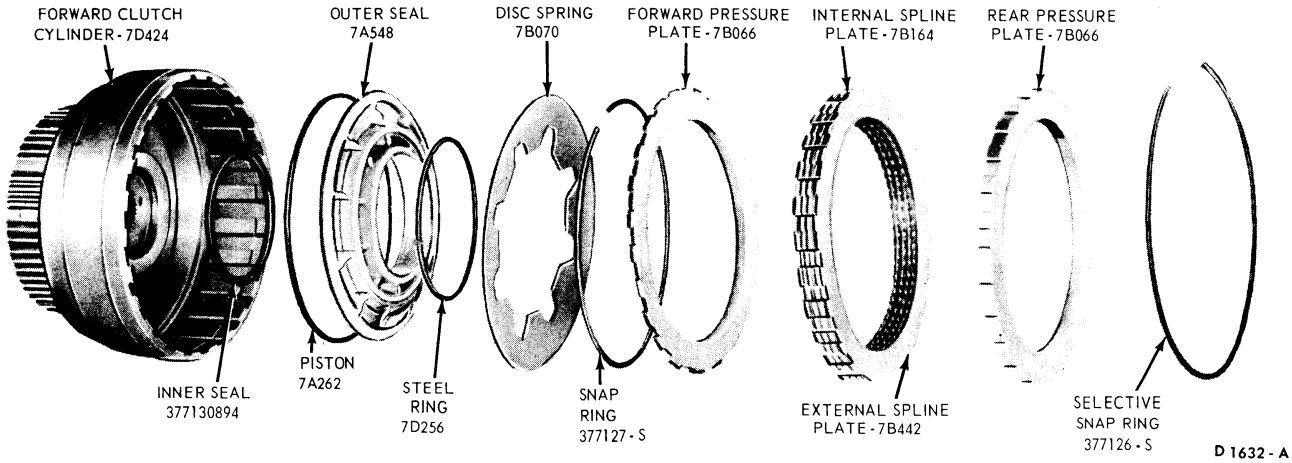


FIG. 52—Forward Clutch Disassembled

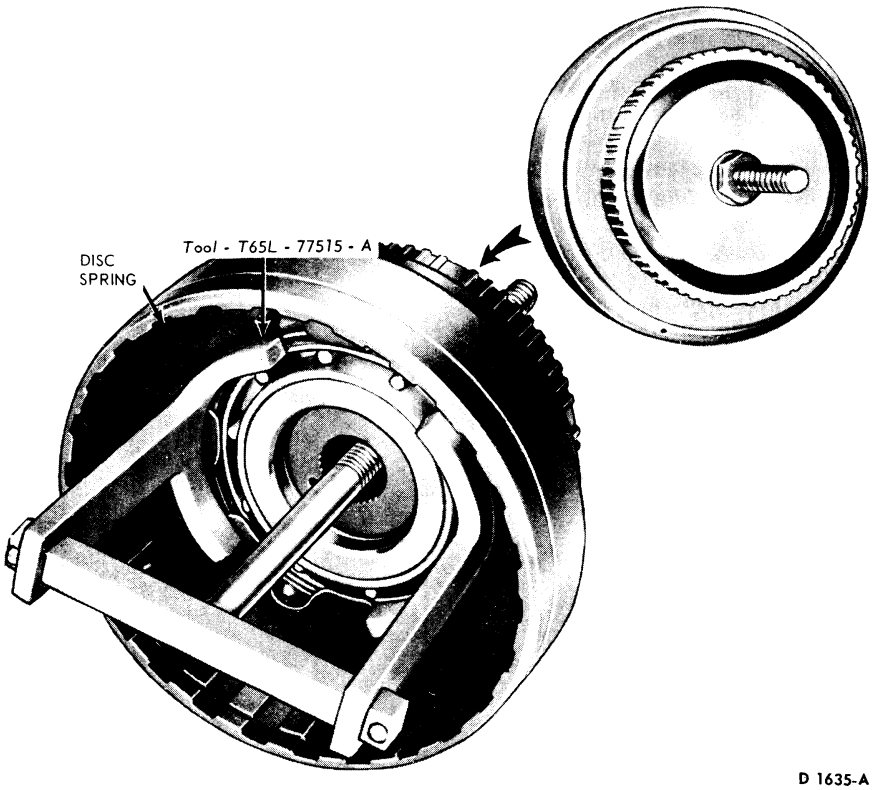


FIG. 53—Removing or Installing Disc Spring

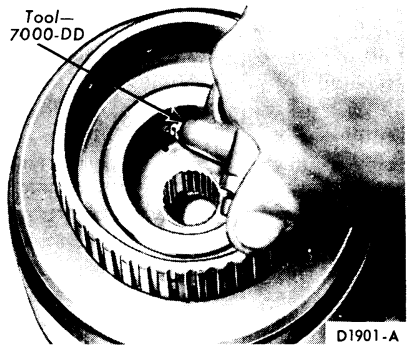


FIG. 54—Removing Forward Clutch Piston

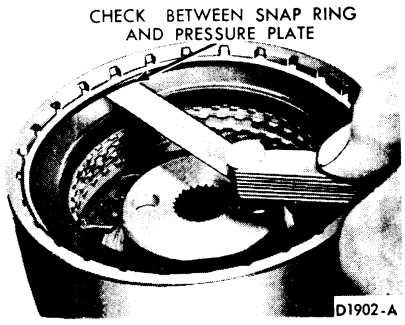


FIG. 55—Checking Forward Clutch Clearance

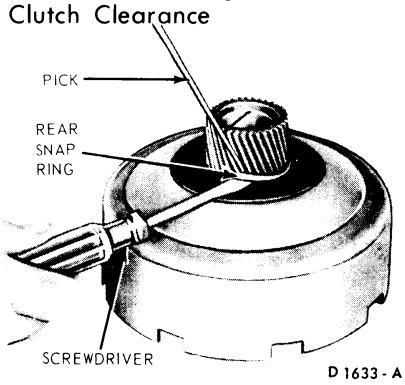


FIG. 56—Removing Sun Gear Snap Ring

distributor into place on the shaft. Install the snap ring to secure it. Make sure that the snap ring is seated in the groove.

3. Position the governor on the distributor (Fig. 62) and secure them with the attaching screws.

ASSEMBLY OF TRANSMISSION

1. Place the transmission case in a holding fixture.

2. Position the low-reverse clutch piston so that check ball is in the 6 o' clock position (toward bottom of case) and tap the piston into place in the case with a clean rubber hammer.

3. Hold the one-way clutch inner race in position and install and torque the attaching bolts to specification.

4. Install a low-reverse clutch return spring in each pocket in the clutch piston. Press the springs firmly into the piston to prevent them from falling out.

5. Position the spring retainer over the springs and position the retainer snap ring in place on the one-way clutch inner race.

6. Install the compressing tool shown in Fig. 29 and compress the springs just enough to install the low-reverse clutch piston retainer snap ring.

7. Install the snap ring, then remove the compressing tool.

8. Place the transmission case on the bench with the front end facing downward.

9. Position the parking gear thrust washer and the gear on the case (Fig. 33). **Do not restake the thrust washer.**

10. Position the oil distributor and tubes in place on the rear of the case. Install and torque the attaching bolts to specification.

11. Install the output shaft, and governor as an assembly.

12. Place a new gasket on the rear of the transmission case. Position the extension housing on the case and install the attaching bolts. Torque the attaching bolts to specification.

13. Place the case in the holding fixture.

14. Align the low-reverse clutch hub and one-way clutch with the inner race at the rear of the case. Rotate the low-reverse clutch hub clockwise while applying pressure to seat it on the inner race.

15. Install the low-reverse clutch plates, starting with a steel plate and following with friction and steel plates alternately. Retain them with vaseline. Refer to the Specifications Section for the number of plates required. If new composition plates are being used, soak them in clean transmission fluid for fifteen minutes before installation. Install the pressure plate and the snap ring. Test the operation of the low-reverse clutch by applying air pressure at the clutch pressure apply hole in the case.

16. Install the reverse planet ring gear thrust washer and the ring gear and hub assembly. Insert the snap ring in the groove in the output shaft.

17. Assemble the front and rear thrust washers onto the reverse planet assembly; retain with vasoline. Insert the assembly into the ring gear and install the snap ring.

18. Set the reverse-high clutch on the bench, with the front end facing down. Install the thrust washer on the rear end of the reverse-high clutch assembly. Retain the thrust washer with vaseline and insert the splined end of forward clutch into the open end of the reverse-high clutch so that the splines engage the direct clutch friction plates (Fig. 43).

19. Install the thrust washer and retain it with vaseline, on the front end of the forward planet ring gear and hub. Insert the ring gear into the forward clutch.

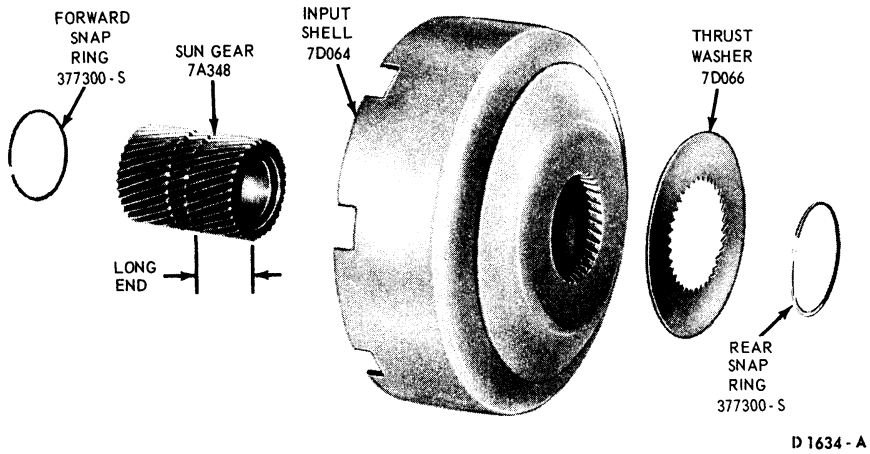


FIG. 57—Input Shell and Sun Gear Disassembled

20. Install the thrust washer on the front end of the forward planet assembly. Retain the washer with vaseline and insert the assembly into the ring gear. Install the input shell and sun gear assembly.

21. Install the reverse-high clutch, forward clutch, forward planet assembly and drive input shell and sun gear as an assembly into the transmission case.

22. Insert the intermediate band into the case around the direct clutch cylinder. Install the struts and then tighten the band adjusting screw sufficiently to retain the band.

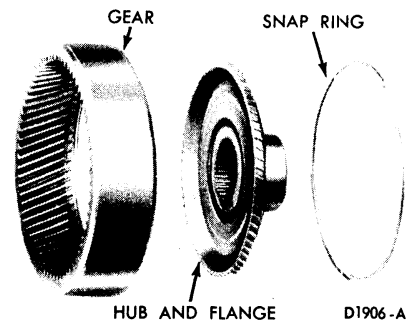


FIG. 58—Output Shaft Hub and Ring Gear

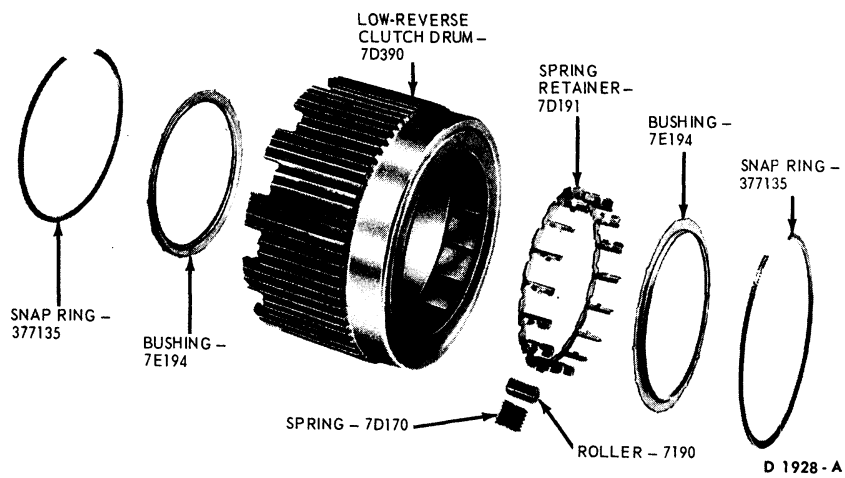


FIG. 59—One-Way Clutch Disassembled

23. Place a selective thickness bronze thrust washer on the rear shoulder of the stator support and retain it with vaseline. If the end play was not within specification when checked prior to disassembly, replace the washer with one of proper thickness. Refer to Specifications Section for selective thrust washer thicknesses. Lay a new gasket on the rear mounting face of the pump and position on the case being careful not to damage the large seal on the O.D. of the pump hous-

ing. Install six of the seven mounting bolts and torque them to specification.

24. Adjust the intermediate band as detailed in Section 2 and install the input shaft with the long splined end inserted into the forward clutch assembly.

25. Install tool 4201-C at the seventh pump mounting bolt (Fig. 24) and check the transmission end play. Remove the tool.

26. Install the control valve in the case, making sure that the levers engage the valves properly. Install the primary throttle valve, rod, and the vacuum diaphragm in the case.

27. Install a new pan gasket and the pan.

28. Install the converter assembly.

29. Install the transmission in the vehicle.

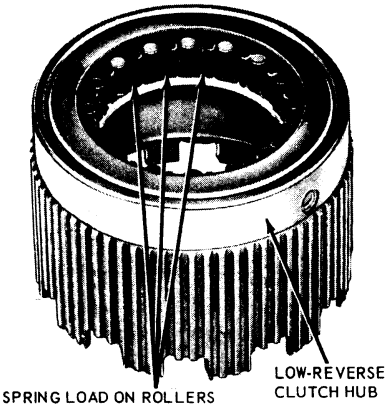
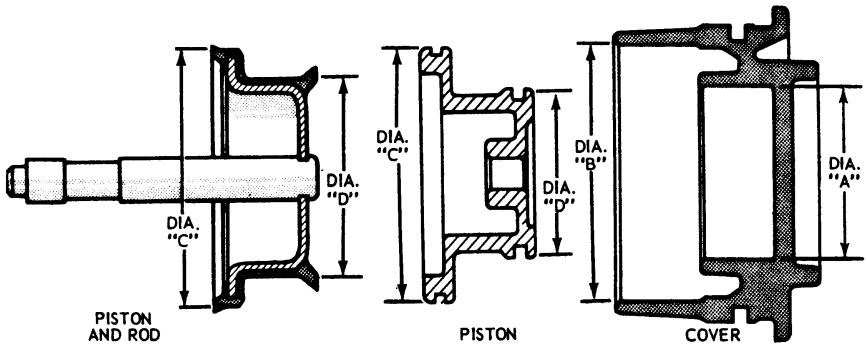


FIG. 60—Installing One-Way Clutch



Models	Piston Assembly	Cover	Diameter – Inches			
			A	B	C	D
PGA–A3, J3, Z, AA PGB–AD, AE, J1	C6AP–7D021-C	C6AP–7D027-A	2.075	2.980	2.971	2.066
PGB–F2, G2, H2	C6AP–7D021-D	C6AP–7D027-D	2.342	3.025	3.016	2.333
PGB–AF1, AG, AH			2.477	NONE	3.492	2.468

Models	Piston and Rod Assembly	Cover	Diameter – Inches			
			A	B	C	D
PGC–B, CI			2.183	2.739	2.705	2.220

D 2037-B

FIG. 61—Intermediate Servo Cover and Piston Dimensions

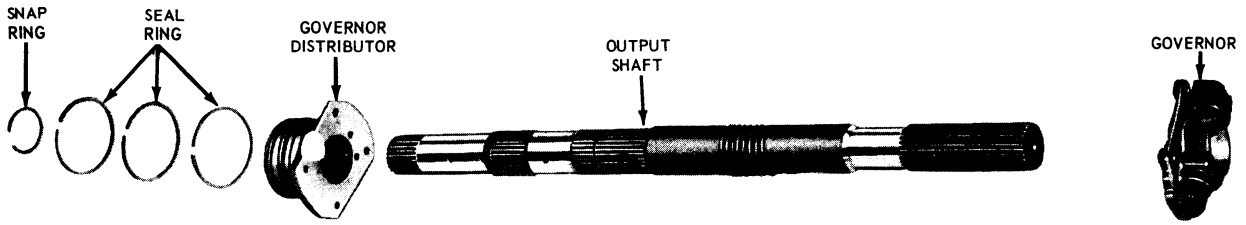


FIG. 62—Output Shaft Disassembled

PART 7-5 Specifications

APPROXIMATE REFILL CAPACITIES

	U. S. Measure	Imperial Measure
FMX Transmission—All Car Lines	11 qt.	9¼ qt.
C4 Transmission—Ford All Engines	10¼ qt.	8¼ qt.
Falcon and Mustang—170 and 200 Engines	8 qt.	6½ qt.
All Other Engines	9 qt.	7¼ qt.
C6 Transmission—Lincoln, Mark III	13 qt.	10¾ qt.
All Other Models	12¾ qt.	10½ qt.

CONVERTER IDENTIFICATION AND STALL SPEEDS
FMX TRANSMISSION

Converter Part Number	Nominal Size	Stall Ratio	Identification No. ①	Transmission Model	Engine CID	Stall Speed
C9OP-7902-A	12	2.05:1	54	PHD-A	240-1V	1300—1500
				PHD-B	302-2V	1450—1650
				PHB-C, D, E,	351-2V	1580—1780
				PHB-F, G, H,	351-4V	1650—1850
C8AP-7902-D	12	2.05:1	48	PHB-A	390-2V	1680—1880

① Converter identification is stamped on the converter cover adjacent to the converter drive stud.

C4 TRANSMISSION

Converter Part Number	Nominal Size	Stall Ratio	Identification No. ①	Transmission Model	Engine CID	Stall Speed
C5DP-7902-D	10¼	2.10:1	AL	PEB-C2	170-1V	1400—1600
				PEB-B2, C2	200-1V	1500—1700
C8AP-7902-E	12	2.05:1	BB	PEA-A2,	240-1V	1300—1500
				PEA-MI, NI	302-2V	1450—1650
C8ZP-7902-A	11¼	2.02:1	BC	PEE-AD, AE, AF	250-1V	1630—1830
				PEE-M, V, AC	302-2V	1800—2000

① Converter identification is stamped on the converter cover adjacent to the converter drive stud.

C6 TRANSMISSION

Converter Part Number	Nominal Size	Stall Ratio	Identification No. ①	Transmission Model	Engine CID	Stall Speed
C8AP-7902-A C8OP-7902-A ④	12	2.05:1	44	PGA-A3 PGA-J3 PGB-G2	390-2V ② ③	1680—1900
C8SP-7902-A C8OP-7902-A ④	12	2.05:1	46	PGB-JI, AD, AE	429-4V	1880—2100
C8VP-7902-B C8OP-7902-A ④	12	2.05:1	52	PGC-B, C1	460-4V	1950—2150
C8OP-7902-B	12	2.05:1	55	PGA-A3, J3, G2	390-2V ③ ⑤	1680—1880
				PGB-G2	390-4V	1740—1940
				PGA-AC,AD,AE	390-4V ⑤	1760—1980
				PGB-F2, ⑥ H2	428-4V	1850—2050
				PGA-Z, AA, AB	429-2V	1820—2020
C8OP-7902-A	12	2.05:1	53	PGB-AF-1, AG, AH	427-4V	1850—2050
					428-4V CJ	1830—2030

① Converter identification is stamped on the converter cover adjacent to the converter drive stud.
② Regular ③ Premium Fuel ④ Service Replacement ⑤ Improved Performance ⑥ Police Interceptor

CONTROL PRESSURE AT ZERO GOVERNOR RPM – FMX TRANSMISSION

Engine Speed	Throttle	Manifold Vac. Ins. Hg.	Range	Control Line Pressure (PSI)	
				PHB-A, C, D, E,	PHB-F, G, H-PHD-A,B
Idle	Closed	Above 18 ①	P, N, D, 2, 1	57-73	57-77
			R	66-101	64-105
As Required	As Required	10	D, 2, 1	83-110	82-111
As Required	As Required	Below 10	D, 2, 1	147-173	146-175
			R	191-213	201-213

① At altitudes above sea level, it may not be possible to obtain 18 inches of engine vacuum at idle. For idle vacuum of less than 18 inches, refer to the following table to determine idle speed pressure specification in D driving range.

Engine Vacuum	Line Pressure
17 inches	57-67
16 inches	57-67
15 inches	57-72
14 inches	57-79
13 inches	57-86
12 inches	57-92
11 inches	57-99

C4 TRANSMISSION

Engine Speed	Throttle	Manifold Vac. Ins. Hg	Range	P.S.I.
Idle	Closed	① Above 18	P, N, D. 2, 1 R	55-61 55-102 55-182
As Required	As Required	10	D, 2, 1	93-101
As Required	As Required	Below 1.0	D, 2, 1 R	142-150 254-268

① At altitudes above sea level, it may not be possible to obtain 18 inches of engine vacuum at idle. For idle vacuums of less than 18 inches, refer to the following table to determine idle speed pressure specification in D driving range.

Engine Vacuum	Line Pressure
17 inches	55-66
16 inches	55-71
15 inches	55-76
14 inches	55-81
13 inches	55-86
12 inches	55-91
11 inches	55-96

C6 TRANSMISSION

Engine Speed			Idle			As Required		As Required		
Throttle			Closed			As Required		As Required		
Manifold Vacuum (Inches Hg)			Above 18 ①			10		Below 1.0		
Range			Control Pressure (psi)		TV Pressure (psi)	Control Pressure (psi)	TV Pressure (psi)	Control Pressure (psi)		TV Pressure (psi)
			P, N, D, 2, 1	R		D, 2, 1		D, 2, 1	R	
	Barometric Pressure in Inches HG	Nominal Altitude (Feet)								
psi @ Barometric Pressure ②	29.5	Sea Level	56–62	71–86	7–10	100–115	40–44	160–190	240–300	77–84
psi @ Barometric Pressure ③	28.5	1000	49–59	65–80	4–7	99–114	37–41	158–176	233–290	74–80
	27.5	2000	49–56	60–75	2–5	96–111	35–39	156–174	228–284	72–78
	26.5	3000	49–56	56–71	0–3	91–106	32–36	151–169	222–277	69–75
	25.5	4000	49–56	56–65	0	88–103	30–34	146–164	215–269	66–72
	24.5	5000	49–56	56–65	0	84–98	27–31	143–161	211–264	64–70
	23.5	6000	49–56	56–65	0	80–95	25–29	138–156	204–256	61–67

C6 TRANSMISSION (Continued)

Manifold Vacuum	Barometric Pressure at 29.5 Inches ②		Barometric Pressure at 24.5 Inches ④	
	T.V.	Cont.	T.V.	Cont.
17	11–14	56–69	0–1	49–56
16	15–18	56–75	2–5	49–56
15	20–22	56–84	7–9	49–61
14	23–26	56–92	10–13	56–67
13	28–31	56–98	15–18	56–75
12	32–35	56–105	19–22	56–84
11	36–40	56–111	23–27	56–92

① It may not be possible to obtain 18 inches of engine vacuum at idle. For idle vacuums of less than 18 inches the following table provides idle speed pressure specifications in D range:

② These specifications (with altitude compensating diaphragm) apply at observed barometric pressure of 29.5 inches (nominal sea level)

③ Specifications for barometric pressures of less than 29.5 inches.

④ At barometric pressures between 29.5 inches and 24.5 inches idle, pressures should fall between the values shown.

CHECKS AND ADJUSTMENTS
FMX TRANSMISSION

Operation	Specification
Transmission End Play Check	0.010-0.029 (Selective Thrust Washers Available)
Turbine and Stator End Play Check	PHB, PHD–New or rebuilt 0.023 max., Used 0.030 max.①
Front Band Adjustment (Use 1/4 inch spacer between adjustment screw and servo piston stem)	Adjust screw to 10 in-lbs torque. Remove spacer, then tighten screw an additional 3/4 turn and lock.
Rear Band Adjustment, Model PHB-A, PHD	Adjust screw to 10 in-lbs torque. Remove spacer, then tighten screw an additional 3/4 turn
Rear Band Adjustment, Model PHB-C, D, E, F, G, H	Adjusting Internally: Loosen internal locknut. Install spacer tool number T69P-7B193-A between internal adjusting screw and servo piston, tighten internal adjusting screw to 24 in-lbs torque. Back off 1 1/2 turns. Hold screw and tighten locknut. Remove spacer. Adjusting Externally: Loosen internal locknut and reset internal adjusting screw to 0.27-0.28 inch. Tighten internal locknut. Loosen external locknut and adjust external adjusting screw to 10 ft-lbs torque. Back off 1 1/2 turns. Hold screw and tighten locknut.
Primary Sun Gear Shaft Ring End Gap Check	0.002-0.009
Rear Clutch Selective Snap Ring Thicknesses	0.060-0.064, 0.074-0.078, 0.080-0.092, 0.102-0.106

① To check end play, exert force on checking tool to compress turbine to cover thrust washer wear plate. Set indicator at zero.

C4 TRANSMISSION

Operation	Specification
Transmission End Play	0.008–0.042 inch (Selective Thrust Washers Available)
Turbine and Stator End Play	Model PEB – New or rebuilt 0.044 max., Used 0.060 max.
	Model PEE, PEA New or rebuilt 0.023 max., Used 0.040 max.
Intermediate Band Adjustment	Remove and discard lock nut. Adjust screw to 10 ft-lbs torque, then back off 1-3/4 turns. Install new lock nut and torque to specification.
Low-Reverse Band Adjustment	Remove and discard lock nut. Adjust screw to 10 ft-lbs torque, then back off 3 turns. Install new locknut and torque to specification.
Selective Snap Ring Thickness	0.102–0.106, 0.088–0.092, 0.074–0.078, 0.060–0.064

C6 TRANSMISSIONS

Operation	Specification	
Transmission End Play	0.008–0.044 (Selective Thrust Washers Available)	
Turbine and Stator End Play	New or rebuilt 0.021 max., Used 0.030 max. ①	
Intermediate Band Adjustment	Remove and discard lock nut. Adjust screw to 10 ft-lbs torque, then back off 1 turn, install new lock nut and tighten lock nut to specification.	
Forward Clutch Pressure Plate-to-Snap Ring Clearance	0.031–0.044	
Selective Snap Ring Thicknesses	0.056–0.060, 0.065–0.069, 0.074–0.078, 0.083–0.087, 0.092–0.096	
Reverse-High Clutch Pressure Plate-to-Snap Ring Clearance	Transmission Models	
	PGA	PGB, PGC
	0.022–0.036	0.027–0.043
Selective Snap Ring Thicknesses	0.065–0.069, 0.074–0.078, 0.083–0.087	

① To check end play, exert force on checking tool to compress turbine to cover thrust washer wear plate. Set indicator at zero.

SELECTIVE THRUST WASHERS

FMX TRANSMISSION

Identification No.	Thrust Washer Thickness – Inch		Identification No.	Thrust Washer Thickness – Inch
By Thickness	0.061–0.063		By Thickness	0.074–0.076
	0.067–0.069			0.081–0.083

C4 TRANSMISSION

THRUST WASHER NO. 1		THRUST WASHER NO. 2	
Nylon Thrust Washer W/Tangs	Color Of Washer	No. Stamped On Washer	Metal Thrust Washer
0.053–0.0575	Red	1	0.041–0.043
0.070–0.074	Green	2	0.056–0.058
0.087–0.091	Natural (White)	3	0.073–0.075
0.104–0.108	Black	4	0.090–0.092
0.121–0.125	Yellow	5	0.107–0.109

C6 TRANSMISSION

Identification No.	Thrust Washer Thickness – Inch		Identification No.	Thrust Washer Thickness – Inch
1	0.056–0.058		4	0.103–0.105
2	0.073–0.075			
3	0.088–0.090		5	0.118–0.120

CLUTCH PLATES

FMX TRANSMISSION

	FORWARD CLUTCH				REAR CLUTCH		
Transmission Model	Steel Plates	Friction Plates	Selective Plate Thicknesses	Selective Plate Identification	Steel Plates	Friction Plates	Free Pack Clearance
PHB, PHD	4	5 ①	0.0605-0.063 0.0785-0.081 0.0965-0.099	No Stripe One Stripe Two Stripes	5 ②	4	0.030-0.055

① Last plate (Friction) in FMX forward clutch is selective. Install thickest plate in pack that will be a minimum of 0.010 inch below input shaft shoulder in cylinder. All other friction plates in pack are thinnest available.

② Plus one waved plate installed between two steel plates at piston end of pack.

C4 TRANSMISSION

Model	Forward Clutch			Reverse Clutch		
	External Spline (Steel-Grit Blasted)	Internal Spline (Comp.)	Free Pack Clear. (Inches)	External Spline (Steel)	Internal Spline (Comp.)	Free Pack Clear. (Inches)
PEB	3 (4) ①	4 (5) ①	0.020–0.036 ②	3 (5) ①	3 (3) ①	0.050–0.066
PEA-PEE	4	5	0.026–0.042	4	4	0.050–0.066

① Use the quantities shown in parenthesis when a service replacement cylinder is installed.

② 0.026–0.042 inches on PEB models with service replacement cylinder.

C6 TRANSMISSION

Transmission Model		Steel Plates	Friction Plates
Forward Clutch Plates—	PGA	3	4
	PGB, PGC	4	5
Reverse—High Clutch Plates—	PGA	3	3
	PGB-F2, G2, H2, J1, AD, AE, PGC	4	4
	PGB-AF-1, AG, AH	5	5

Transmission Model		Steel Plates	Friction Plates
Low-–Reverse Clutch Plates—	PGA	4 (6) ①	4
	PGB-F2, G2, H2, AF-1, AG, AH	6 (6) ①	6
	PGB-J1, AD, AE, PGC	5 (5) ①	5

①Use the quantities shown in parenthesis when a service replacement case is installed.

CONTROL VALVE SPRING IDENTIFICATION
FMX TRANSMISSION

Spring		Total Coils	Free Length (Inches)	Spring Dia. O.D. (Inches)	Wire Dia. (Inches)	Length at Lbs. Load		Spring Color Code
						Load	Length	
1-2 Shift Accumulator Valve	Model PHB	8.5	1.170	0.470	0.035	2.900	0.445	Yel ow
	Model PHD	9	1.260	0.470	0.038	4.250	0.445	None
1st-2nd Shift Control Valve:	Model PHB	7	1.650	0.725	0.047	4.900	0.560	Pink
	Model PHD	7	1.880	0.725	0.044	4.600	0.560	Wh te
Throttle Press. Booster Valve:	Model PHB-A, PHD	15.5	1.980	0.470	0.047	6.650	0.890	Blue
	Model PHB-C,D,E,F,G,H	15.5	1.660	0.470	0.047	5.250	0.890	Green
2-1 Scheduling Valve:	Model PHB	11	0.880	0.265	0.026	2.400	0.415	Orange
	Model PHD	12	0.910	0.265	0.023	1.400	0.415	(2) Pink Stripes
Low Inhibitor Valve:	Model PHB, PHD	42	2.140	0.205	0.028	1.900	1.660	Yellow
Control Oil Press. Comp. Valve-Outer:	Model PHB-A,C,D,E	8	1.640	0.509 I.D.	0.038	3.200	0.500	Wh te
	Model PHB-F,G,H, PHD	9	1.650	0.509 I.D.	0.035	2.400	0.500	None
Control Oil Press. Comp. Valve-Inner:	Model PHB-A,C,D,E	13.5	1.620	0.310 I.D.	0.023	1.000	0.460	Pink
	Model PHB-F,G,H, PHD	13.5	1.230	0.310 I.D.	0.030	2.000	0.460	None
Downshift Valve		13.5	1.107	0.250	0.023	1.400	0.640	None
Control Check Valve		12	0.480	0.214	0.014	0.100	0.280	None
3rd-2nd Downshift Control Valve		14.5	0.820	0.200	0.018	0.605	0.520	Purple
Transition Valve:	Model PHB-A, PHD	8	1.600	0.470 I.D.	0.031	2.000	0.460	None
	Model PHB-C,D,E,F,G,H	7	1.320	0.470 I.D.	0.035	2.750	0.460	None
2nd-3rd Shift Valve–Inner		21	1.340	0.295	0.028	1.500	0.670	Green
2nd-3rd Shift Valve–Outer		4	1.008	0.692 I.D.	0.041	2.950	0.430	White
Low Servo Modulator Valve		29.5	1.800	0.235	0.028	2.975	1.050	None

C4 TRANSMISSION

Spring	Total Coils	Free Length (inches)	Spring Dia. O. D. (inches)	Wire Dia. (inches)	Length at Lbs. Load		Spring Color Code
					Load	Length	
Manual Valve Detent: All except PEC-EI	10	0.764	0.295	0.44	6.5	0.601	White
Model PEC-EI	9	0.74	0.295	0.045	7.5	0.601	None
2-3 Backout Control Valve	10	1.515	0.450	0.026	1.353	0.580	White
Main Oil Press. Reg. Valve	12	2.53	0.615	0.047	7.24	0.716	Pink
Throttle Press. Modulator	15	1.513	0.292	0.028	3.675	0.620	Yellow
Drive 2 Valve	10	0.735	0.230	0.019	0.80	0.450	Gray
Throttle Downshift Valve	9	0.962	0.380	0.034	3.44	0.440	Dk. Green
Throttle Press. Booster Valve	15	1.39	0.249 I. D.	0.036	5.250	0.730	Purple
Control Press. Booster Valve	12.8	1.66	0.350 I. D.	0.028	1.63	0.696	None
Inter. Band Accumulator Valve ①	11	1.38	0.375 I. D.	0.024	1.0	0.400	Purple
Inter. Band Accumulator Valve ②	10	1.293	0.375 I. D.	0.0258	1.25	0.400	None
Line Press Coasting Boost Valve	10	1.03	0.346	0.034	4.42	0.464	White

① Used on Models PEA-A2, MI, NI,
② Used on Models PEB-B2, C2, PEE

C6 TRANSMISSION

Spring	Total Coils	Free Length (inches)	Spring Dia. O. D. (inches)	Wire Dia. (inches)	Length at Lbs. Load		Spring Color Code
					Length	Load	
Manual Valve Detent: Model PGA-AA, A3, J3, Z, PGB-AD, AE, F2, G2, H2, JI	9	0.740	0.295	0.045	0.601	9.50	None
Model PGC	11.5	0.800	0.295	0.041	0.601	5.25	Yellow
Model PGA-AC, AD, AE, PGB-AFI, AG, AH	10	0.764	0.295	0.044	0.601	6.50	White
2-1 Scheduling Valve: All except PGB-JI	12	0.730	0.250	0.023	0.385	1.20	Green
Model PGB-JI	12	0.700	0.250	0.023	0.385	1.050	Green Daub
1-2 Shift Valve: Model PGA, PGB	20	1.160	0.235	0.025	0.650	1.725	White
Model PGC	20	1.120	0.235	0.0244	0.650	1.370	Purple
Throttle Modulator Valve: Model PGA, PGB	17.6	1.257	0.280	0.0286	0.660	2.30	Pink
Model PGC	17.5	1.120	0.280	0.0317	0.660	2.81	Lt. Blue
Throttle Pressure Booster Valve	18	1.570	0.310	0.0379	0.917	5.90	Yellow
3-2 Shift Timing Valve	18.5	1.900	0.340	0.032	0.784	4.25	None
Inter. Oil Pressure Booster Valve	17	2.097	0.480	0.032	0.734	1.50	None
Intermediate Servo Capacity Modulator Valve	9.5	0.580	0.250	0.020	0.330	0.63	Brown
Throttle Downshift Valve	12	0.790	0.240	0.023	0.480	1.15	White Daub
Front Pump Relief Valve	14	1.020	0.250	0.032	0.750	3.30	Brown
Intermediate Servo Accumulator Valve—Inner ①	9.1	1.630	0.500	0.035	1.297	1.0	None
Intermediate Servo Accumulator Valve—Outer ①	7.2	1.500	0.615	0.044	1.297	1.14	None
Main Oil Pressure Regulator	7	1.190	0.690	0.054	0.549	6.45	None
2-3 Backout Shift Valve	11.6	0.812	0.270	0.026	0.485	1.57	Blue
Converter Pressure Relief Valve	18.5	1.120	0.180 I. D.	0.041	0.900	5.0	Blue
① None used on Models PGB-F2, G2, H2							

SHIFT SPEED ACTUAL MPH
FMX TRANSMISSION – FORD, METEOR POLICE AND TAXI WITH 240-1V ENGINE

Throttle	Range	Shift	1	2	3
Closed (Above 17" Vacuum)	D D D 1	1-2 2-3 3-1 2-1	9-10 10-20 7-9 19-26	10-11 10-21 7-10 21-29	10-12 11-23 8-11 22-31
To Detent (Torque Demand)	D D D	1-2 2-3 3-2	21-38 32-54 23-36	22-42 35-58 25-39	24-45 38-63 27-42
Through Detent (W.O.T.)	D D D D	1-2 2-3 3-2 3-1 or 2-1	35-44 55-67 53-63 25-33	38-48 60-75 57-68 27-36	40-51 64-78 61-73 29-38

Axle Ratio	Tire Size	Use Column No.
3.25:1	ALL	1
3.00:1	ALL	2
2.80:1	ALL	3

FMX TRANSMISSION – FORD, METEOR POLICE AND TAXI WITH 302-2V ENGINE

Throttle	Range	Shift	1	2	3
Closed (Above 17" Vacuum)	D D D I	1-2 2-3 3-1 2-1	9-12 10-22 6-10 21-29	10-13 11-23 7-10 22-32	11-14 11-25 7-11 24-34
To Detent (Torque Demand)	D D D	1-2 2-3 3-2	22-40 39-61 25-40	24-43 42-67 27-43	26-46 45-71 29-46
Through Detent (W.O.T.)	D D D D	1-2 2-3 3-2 3-1 or 2-1	38-48 60-74 57-68 27-37	42-52 65-80 62-74 30-40	45-56 69-85 65-79 31-42

AXLE RATIO	TIRE SIZE	USE COLUMN NO.
3.25:1	ALL	1
3.00:1	ALL	2
2.80:1	ALL	3

FMX TRANSMISSION – FAIRLANE, MONTEGO, MUSTANG, COUGAR WITH 351-2V ENGINE

Throttle	Range	Shift	1	2	3	4	5	6
Closed (Above 17" Vacuum)	D D D 1	1-2 2-3 3-1 2-1	9-11 9-19 6-9 27-35	9-12 10-21 6-9 28-36	9-12 10-22 6-10 29-38	10-13 10-22 7-10 31-40	10-13 11-23 7-10 32-41	10-14 11-24 7-11 33-43
To Detent (Torque Demand)	D D D	1-2 2-3 3-2	25-40 41-64 22-36	26-42 42-64 22-37	27-44 44-67 23-39	28-45 46-70 25-40	30-47 48-73 26-42	30-48 50-74 26-44
Through Detent (W.O.T.)	D D D D	1-2 2-3 3-2 3-1 or 2-1	33-41 53-62 50-58 23-31	34-42 54-65 50-61 24-32	35-44 57-68 53-63 25-34	37-46 59-71 55-66 26-35	39-48 62-74 58-69 28-36	40-49 63-76 59-71 28-37

Axle Ratio	Tire Size	Use Column No.
3.25:1	6.95 x 14, C78 x 14 All Except 6.95 x 14, C78 x 14	1 2
3.00:1	6.95 x 14, 7.35 x 14, C78 x 14 7.75 x 14, E70 x 14, E78 x 14, F70 x 14 FR70 x 14	3 4
2.75:1	6.95 x 14, C78 x 14 All Except 6.95 x 14, C78 x 14	5 6

FMX TRANSMISSION – FAIRLANE, MONTEGO, MUSTANG, COUGAR WITH 351-4V ENGINE

Throttle	Range	Shift	1	2	3	4	5	6
Closed	D	1-2	9-11	9-12	9-12	10-13	10-13	10-14
(Above	D	2-3	9-19	10-21	10-22	10-22	11-23	11-24
17"	D	3-1	6-9	6-9	6-10	7-	7-10	7-11
Vacuum)	1	2-1	27-35	28-36	29-38	31-..	32-41	33-43
To Detent	D	1-2	30-43	30-45	32-47	33-49	35-50	36-53
(Torque	D	2-3	47-65	49-68	51-71	53-74	56-76	57-79
Demand)	D	3-2	30-43	30-45	32-47	33-49	35-50	36-53
Through	D	1-2	36-43	38-46	40-48	41-50	43-51	44-53
Detent	D	2-3	57-67	59-70	62-74	65-76	68-79	69-82
(W.O.T.)	D	3-2	52-61	54-65	57-68	59-70	62-72	63-75
	D	3-1 or 2-1	25-33	26-35	27-36	28-37	30-39	30-40

Axle Ratio	Tire Size	Use Column No.
3.25:1	6.95 x 14, C78 x 14	1
	All Except 6.95 x 14, C78 x 14	2
3.00:1	6.95 x 14, 7.35 x 14 C78 x 14	3
	7.75 x 14, E70 x 14 E78 x 14, F70 x 14 FR70 x 14	4
2.75:1	6.95 x 14, C78 x 14	5
	All Except 6.95 x 14, C78 x 14	6

FMX TRANSMISSION – FORD, METEOR WITH 390-2V ENGINE

Throttle	Range	Shift	1	2	3	4
Closed	D	1-2	9-12	10-13	10-13	11-14
(Above	D	2-3	10-22	11-23	11-23	11-25
18"	D	3-1	6-10	7-10	7-10	7-11
Vacuum)	1	2-1	29-38	32-40	32-42	34-45
To Detent	D	1-2	22-40	24-42	24-43	26-46
(Torque	D	2-3	39-61	42-65	42-67	45-71
Demand)	D	3-2	25-40	27-41	27-43	29-46
Through	D	1-2	35-45	38-47	39-49	41-53
Detent	D	2-3	56-69	61-73	62-75	65-80
(W.O.T.)	D	3-2	53-65	57-68	58-70	61-75
	D	2-1 or 3-1	25-34	27-36	27-37	29-40

Axle Ratio	Tire Size	Use Column No.
3.25:1	All	1
3.00:1	7.75 x 15 215R x 15	2
3.00:1	8.25 x 15 8.55 x 15 H70 x 15	3
2.80:1	All	4

C4 TRANSMISSION – FORD, METEOR, FAIRLANE, MONTEGO, FALCON, MUSTANG WITH 6 CYLINDER ENGINE

Throttle	Range	Shift	1	2	3	4	5	6
Closed	D	1-2	8-10	9-10	9-10	9-11	10-11	10-12
(Above	D	2-3	11-20	12-21	12-21	13-22	13-23	14-25
18"	D	3-1	10	10	10	11	11	12
Vacuum)	1	2-1	16-25	17-26	18-27	19-29	19-29	20-32
To Detent	D	1-2	17-29	18-30	18-31	20-33	20-34	21-36
(Torque	D	2-3	31-49	33-51	34-53	36-56	37-57	39-61
Demand)	D	3-2	32	34	35	36	38	41
	D	2-1 or 3-1	18	19	20	20	21	23
Through	D	1-2	26-35	28-37	29-38	30-40	31-41	33-44
Detent	D	2-3	50-65	53-68	55-70	57-74	59-76	66-82
(W.O.T.)	D	3-2	69	72	74	77	81	87
		2-1 or 3-1	27	28	29	30	32	34

Vehicle	Axle Ratio	Tire Size	Use Col. No.
Ford or Meteor	3.25:1	7.75 x 15, 215R x 15	2
		8.25 x 15, 8.55 x 15 H70 x 15	3
	3.10:1	7.75 x 15, 8.25 x 15 215R x 15	4
		8.55 x 15, H70 x 15	5
	3.00:1	All	5
	2.80:1	All	6

Vehicle	Axle Ratio	Tire Size	Use Col. No.
Fairlane, Montego, Falcon or Mustang	3.25:1	7.35 x 14, FR70 x 14	1
		7.75 x 14, F70 x 14 E70 x 14, FR70 x 14	2
	3.08:1	6.95 x 14, 7.35 x 14, C78 x 14	2
		E78 x 14, 7.75 x 14	3
	3.00:1	C78 x 14	2
		7.35 x 14, 6.95 x 14	3
		7.75 x 14, F70 x 14 E70 x 14, FR70 x 14 E78 x 14	4
	2.83:1	C78 x 14	4
		6.95 x 14, 7.35 x 14 E78 x 14	5
	2.79:1	All	5

C4 TRANSMISSION – FORD, METEOR, FAIRLANE, MONTEGO, FALCON, MUSTANG WITH 302 2V ENGINE

Throttle	Range	Shift	1	2	3	4	5	6	7
Closed	D	1-2	9-10	9-10	9-10	10-11	10-11	10-11	10-12
(Above	D	2-3	12-20	13-21	13-22	13-22	13-23	14-24	14-25
18"	D	3-1	10	10	10	11	11	11	12
Vacuum)	1	2-1	18-26	18-27	18-28	19-28	19-29	20-30	21-32
To Detent	D	1-2	20-32	22-33	22-34	23-35	23-36	24-37	25-39
(Torque	D	2-3	38-55	39-57	41-58	41-60	43-61	45-64	46-66
Demand)	D	3-2	33	34	35	36	37	39	41
	D	2-1 or 3-1	19	19	20	20	21	22	23
Through	D	1-2	29-38	31-40	32-41	32-42	34-43	35-45	36-46
Detent	D	2-3	57-71	58-73	60-75	60-77	63-79	66-83	68-86
(W.O.T.)	D	3-2	71	73	74	78	79	84	87
	D	2-1 or 3-1	28	29	29	30	31	33	34

Vehicle	Axle Ratio	Tire Size	Use Col. No.
Ford or Meteor	3.25:1	7.75 x 15	2
		215R x 15	
		8.25 x 15	3
		8.55 x 15, H70 x 15	4
	3.10:1	7.75 x 15, 8.25 x 15 215R x 15	4
		8.55 x 15, H70 x 15	5
	3:00:1	All	5
	2.80:1	7.75 x 15	6
		215R x 15, 8.25 x 15	
		8.55 x 15, H70 x 15	7

Vehicle	Axle Ratio	Tire Size	Use Col. No.
Fairlane, Montego, Falcon, Mustang	3.25:1	7.35 x 14, 7.75 x 14	1
		FR70 x 14, F70 x 14 E70 x 14	2
	3.00:1	C78 x 14	2
		6.95 x 14, 7.35 x 14	3
		7.75 x 14, F70 x, 14, FR70 x 14, E70 x 14, E78 x 14	4
	2.79:1	All Except–7.75 x 14	5
		7.75 x 14	6

C6 TRANSMISSION – FORD, MERCURY, METEOR WITH 390-2V, 429-2V ENGINES

Throttle	Range	Shift	1	2	3	4	5	6	7
Closed	D	1-2	8-10	8-10	7-10	7-9	7-9	7-9	6-8
(Above	D	2-3	8-19	8-19	7-19	7-18	7-17	7-16	6-16
17"	D	3-1	8-10	8-10	7-10	7-9	7-9	7-9	6-8
Vacuum)	1	2-1	23-32	22-32	21-31	21-30	20-29	19-27	18-27
To Detent	D	1-2	29-44	28-43	28-42	27-40	26-39	25-37	24-36
(Torque	D	2-3	51-71	50-69	48-68	47-65	45-63	43-60	41-58
Demand)	D	3-2	26-40	25-39	24-39	23-37	23-36	22-34	21-33
Through	D	1-2	45-54	44-53	43-52	42-50	40-48	38-46	37-45
Detent	D	2-3	78-89	76-87	74-86	72-82	69-80	66-75	63-73
(W.O.T.)	D	3-2	72-82	70-81	69-79	66-75	64-73	61-69	59-68
	D	3-1 or 2-1	35-43	34-43	34-42	33-40	31-39	30-37	29-36

Axle Ratio	Tire Sizes	Use Column No.
2.75:1	8.55 x 15, H70 x 15	1
	8.25 x 15	2
	215R x 15	3
2.80:1	8.55 x 15, H70 x 15	2
	8.25 x 15, 215R x 15	3

Axle Ratio	Tire Sizes	Use Column No.
3.00:1	8.55 x 15	4
	8.25 x 15, 215R x 15	5
3.25:1	8.55 x 15, H70 x 15	6
	7.75 x 15, 8.25 x 15	7
	215R x 15	7

C6 TRANSMISSION – FIARLANE, MONTEGO, MUSTANG, COUGAR WITH 390-4V (IMPROVED PERFORMANCE) ENGINES AND FORD, MERCURY, METEOR WITH 429-4V ENGINE

Throttle	Range	Shift	1	2	3	4	5	6	7	8
Closed	D	1-2	8-10	7-10	7-9	6-9	6-8	6-8	5-7	4-6
(Above	D	2-3	8-19	7-18	7-18	6-16	6-15	6-14	5-13	4-12
17"	D	3-1	8-10	7-10	7-9	6-9	6-8	6-8	5-7	4-6
Vacuum)	1	2-1	22-32	21-31	19-30	18-28	17-26	16-24	14-21	13-20
To Detent	D	1-2	34-48	32-47	29-45	28-41	26-39	25-36	22-32	20-29
Torque	D	2-3	58-75	55-73	51-69	48-64	46-61	43-55	41-50	35-45
Demand)	D	3-2	25-40	24-39	22-37	21-34	20-33	18-30	16-27	15-24
Through	D	1-2	46-55	44-54	41-51	39-47	37-49	34-41	30-37	28-34
Detent	D	2-3	80-91	76-89	70-85	66-78	63-74	59-68	52-61	48-55
(W.O.T.)	D	3-2	71-82	67-80	62-76	59-70	56-67	52-61	46-54	42-50
	D	3-1 or 2-1	35-44	33-42	30-40	29-37	27-35	25-32	23-29	21-26

Axle Ratio	Tire Sizes	Use Column No.
2.75:1	8.55 x 15, H70 x 15	1
	7.75 x 14, F70 x 14	2
	FR70 x 14	2
	8.25 x 15, 215R x 15	2
	7.35 x 14, E78 x 14	3
2.80:1	8.55 x 15, H70 x 15	1
	8.25 x 15, 215R x 15	2
3.00:1	8.25 x 15, 8.55 x 15, 215R x 15	3
	7.75 x 14, F70 x 14	3
	7.35 x 14, FR70 x 14, E78 x 14	4

Axle Ratio	Tire Sizes	Use Column No.
3.25:1	8.25 x 15, 8.55 x 15, H70 x 15	4
	215R x 15	
	7.35 x 14, 7.75 x 14	5
	F70 x 14, FR70 x 14	5
	E78 x 14, 7.75 x 15	5
3.50:1	All	6
3.91:1	All	7
4.30:1	All	8

C6 TRANSMISSION – FORD, MERCURY, METEOR WITH 390-2V, 4V and 428-4V ENGINES (POLICE AND FLEET UNITS)

Throttle	Range	Shift	1	2	3	4	5	6	7
Closed	D	1-2	8-10	8-10	7-10	7-9	7-9	7-9	6-8
(Above	D	2-3	8-22	8-21	7-21	7-20	7-19	7-18	6-18
17"	D	3-1	8-10	8-10	7-10	7-9	7-9	7-9	6-8
Vacuum)	1	2-1	26-35	25-34	24-34	23-32	23-31	22-30	21-29
To Detent	D	1-2	36-51	35-50	34-50	33-47	32-46	31-43	29-42
(Torque	D	2-3	64-83	62-81	61-80	58-76	56-74	54-70	52-68
Demand)	D	3-2	29-43	28-42	27-42	26-40	25-39	24-37	23-36
Through	D	1-2	49-57	48-56	46-55	45-53	43-51	41-49	40-47
Detent	D	2-3	84-95	82-93	80-91	77-87	75-85	71-80	68-78
(W.O.T.)	D	3-2	75-84	73-83	71-82	68-78	66-76	63-72	60-70
	D	3-1 or 2-1	36-43	35-43	34-42	33-40	32-39	31-37	29-36

Axle Ratio	Tire Sizes	Use Column No.
2.75:1	8.55 x 15, H70 x 15	1
	8.25 x 15	2
	215R x 15	3
2.80:1	8.55 x 15, H70 x 15	2
	8.25 x 15, 215R x 15	3

Axle Ratio	Tire Sizes	Use Column No.
3.00:1	8.55 x 15	4
3.00:1	8.25 x 15, 215R x 15	5
3.25:1	8.55 x 15, H70 x 15	6
	7.75 x 15, 8.25 x 15	7
	215R x 15	7

C6 TRANSMISSION – FORD AND MERCURY WITH 428-4V (POLICE INTERCEPTOR) ENGINES

Throttle	Range	Shift	1	2	3	4	5
Closed	D	1-2	8-10	8-10	7-10	7-9	7-9
(Above	D	2-3	8-22	8-22	7-22	7-20	7-20
17"	D	3-1	8-10	8-10	7-10	7-9	7-9
Vacuum)	1	2-1	27-37	26-36	25-36	25-34	24-33
To Detent	D	1-2	38-54	37-53	36-52	35-50	34-48
(Torque	D	2-3	67-87	65-86	63-84	61-80	60-78
Demand)	D	3-2	30-46	29-45	28-44	27-42	26-41
Through	D	1-2	51-60	50-59	49-58	47-56	45-54
Detent	D	2-3	88-100	86-98	84-96	81-92	78-89
(W.O.T.)	D	3-2	78-89	76-88	74-86	72-82	70-80
	D	3-1 or 2-1	38-46	37-45	36-44	35-42	34-41

Axle Ratio	Tire Size	Use Column No.
2.75:1	8:55 x 15, H70 x 15	1
	8.25 x 15	2
	215R x 15	3
2.80:1	8.55 x 15, H70 x 15	2
	8.25 x 15, 215R x 15	3
3.00:1	8.55 x 15	4
	8.25 x 15, 215R x 15	5

C6 TRANSMISSION – FAIRLANE, MONTEGO, MUSTANG AND COUGAR WITH 428-4V C. J. ENGINE

Throttle	Range	Shift	1	2	3	4	5	6	7
Closed (Above 17" Vacuum)	D	1-2	7-9	7-9	6-9	6-8	6-8	5-7	4-6
	D	2-3	7-23	7-22	6-21	6-20	6-18	5-16	4-15
	D	3-1	7-9	7-9	6-9	6-8	6-8	5-7	4-6
	1	2-1	27-38	25-37	24-35	23-33	21-30	19-27	17-25
To Detent (Torque Demand)	D	1-2	40-56	37-55	35-51	33-49	31-44	28-40	25-36
	D	2-3	69-91	63-89	60-83	57-79	53-72	47-64	43-58
	D	3-2	30-47	28-46	26-43	25-41	23-37	21-33	19-30
Through Detent (W.O.T.)	D	1-2	55-65	51-64	48-59	46-56	42-51	38-46	34-42
	D	2-3	94-107	86-105	82-98	78-93	73-85	65-76	59-69
	D	3-2	84-96	77-94	73-87	70-83	65-76	58-68	52-62
	D	3-1 or 2-1	41-51	38-50	36-46	34-44	32-40	28-36	26-33

Axle Ratio	Tire Sizes	Use Column No.
2.75:1	7.75 x 14, F70 x 14,	1
	FR70 x 14,	1
	7.35 x 14, E78 x 14	2
3.00:1	7.75 x 14, F70 x 14	2
	7.35 x 14, FR70 x 14,	3
	E78 x 14	3

Axle Ratio	Tire Sizes	Use Column No.
3.25:1	All	4
3.50:1	All	5
3.90:1	All	6
4.30:1	All	7

C6 TRANSMISSION – THUNDERBIRD WITH 429-4V ENGINES

Throttle	Range	Shift	1	2	3	4
Closed (Above 17" Vacuum)	D	1-2	7-9	7-9	7-10	8-10
	D	2-3	7-17	7-17	7-18	8-19
	D	3-1	7-9	7-9	7-10	8-10
	1	2-1	17-26	18-27	18-28	19-29
To Detent (Torque Demand)	D	1-2	30-43	31-44	33-46	34-47
	D	2-3	53-67	55-69	56-71	58-73
	D	3-2	22-36	23-37	24-38	25-39
Through Detent (W.O.T.)	D	1-2	42-50	43-51	45-53	46-54
	D	2-3	72-82	75-84	77-88	80-90
	D	3-2	64-73	66-75	69-79	71-81
	D	3-1 or 2-1	31-39	32-40	34-42	35-43

Axle Ratio	Tire Sizes	Use Column No.
2.80:1	8.25 x 15, 215R x 15	1
	8.55 x 15	2
3.00:1	8.25 x 15, 215R x 15	3
	8.55 x 15	4

C6 TRANSMISSION – LINCOLN CONTINENTAL AND CONTINENTAL MARK III VEHICLES WITH 460-4V ENGINES

Throttle	Range	Shift	1	2	3	4
Closed	D	1-2	8-10	7-10	8-10	7-9
(Above	D	2-3	8-22	7-21	8-22	7-21
17"	D	3-1	8-10	7-10	8-10	7-9
Vacuum)	1	2-1	21-30	20-28	20-29	19-28
To Detent	D	1-2	29-42	27-39	29-41	27-38
(Torque	D	2-3	59-76	55-71	58-75	54-70
Demand)	D	3-2	27-42	25-39	27-41	25-38
Through	D	1-2	43-50	40-47	42-49	40-46
Detent	D	2-3	83-92	77-86	81-90	76-85
(W.O.T.)	D	3-2	2-81	67-76	70-79	66-74
	D	3-1 or 2-1	26-34	25-32	26-33	24-31

Vehicle	Axle Ratio	Tire Size	Use Column No.
Lincoln Continental	2.80:1	9.15 x 15	1
	3.00:1	9.15 x 15	2
Continental Mark III	2.80:1	8.55 x 15	3
		9.15 x 15	1
	3.00:1	8.55 x 15	4
		9.15 x 15	2

TORQUE LIMITS

Item	Ft-Lbs		
	FMX	C4	C6
Converter to Flywheel	23-28	23-28	20-30
Converter Hsg. to Trans. Case	40-50	28-40	—
Front Pump to Trans. Case	17-22	28-40	12-20
Front Servo to Trans. Case	30-35	—	—
Rear Servo to Trans. Case	40-45	—	—
Upper Valve Body to Lower Valve Body	4-6	—	—
Overrunning Clutch Race to Case	—	13-20	18-25
Oil Pan to Case	10-13	12-16	12-16
Rear Servo Cover to Case	—	12-20	—
Stator Support to Pump	—	12-20	12-16
Converter Cover to Converter Hsg.	12-16	12-16	12-16
Guide Plate to Case	—	—	12-16
Intermediate Servo Cover to Case	—	16-22	10-14
Regulator to Case	17-22	—	—
Planetary Support to Trans. Case	20-25	—	—
Control Valve Body to Trans. Case	8-10	—	—
Dia; 'ragm Assy. to Case	20-30	15-23	15-23
Cooler Return Check Valve	9-12	—	—
Distributor Sleeve to Case	—	12-20	12-16
Governor to Counterweight	50-60	—	—
Governor Valve Body Cover Screws	20-30	—	—
Pressure Regulator Cover Screws	20-30	—	—
Control Valve Body Screws (10-24)	20-30	—	—
Front Servo Release Piston	20-30	—	—
End Plates to Body	20-30	20-35	20-30
Stator Support to Pump	23-35	—	—
Inner Downshift Lever Stop	—	40-55	20-30

① Tighten to 10 ft-lbs and back off ⅝ turn.
② Mustang and Cougar only.

Item	Ft-Lbs		
	FMX	C4	C6
Extension Assy. to Trans. Case	30-40	28-40	25-30
Pressure Gauge Tap	7-15	9-15	9-15
Band Adj. Screw Locknut to Case	—	35-45	35-45
Yoke to Output Shaft	—	60-80	—
Reverse Servo Piston to Rod	—	①	—
Cooler Tube Connector Lock	—	—	25-35
Converter Drain Plug	15-28	20-30	14-28
Rear Band Adjusting Screw to Case	35-40	—	—
Front Band Adjusting Screw Locknut	20-25	—	—
Manual Valve Inner Lever to Shaft	8-12	8-12	8-12
Downshift Lever to Shaft	17-20	12-16	12-16
Filler Tube to Engine	20-25	20-25	20-25
Filler Tube to Pan	—	32-42	—
Transmission to Engine	40-50	40-50	40-50
Transmission to Engine: Falcon Mustang-6-Cyl.	—	23-33	—
Lower to Upper Valve Body	—	40-55	40-50
Reinforcement Plate to Body	—	40-55	20-30
Screen and Lower to Upper Valve Body	—	40-55	40-50
Neutral Switch to Case ②	—	55-75	55-75
Neutral Switch to Column	20	20	20
Accumulator Plate to Body	—	50-90	—
Lower Valve Body Cover and Plate to Valve Body	48-72	—	—
Control Assy. to Case	96-120	80-120	90-125
Gov. Body to Collector Body	—	80-120	80-120
Cooler Line Fittings	—	80-120	—