

1967

FORD

and

MERCURY



SHOP MANUAL



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1967 Ford and Mercury Shop Manual

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1967

FORD- MERCURY

SHOP MANUAL

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**SPECIFICATIONS AND SPECIAL SERVICE TOOLS
AT END OF EACH GROUP**

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FOREWORD

This shop manual provides the Service Technician with information for the proper servicing of the 1967 Ford and Mercury Cars.

The maintenance schedule and procedures for maintenance operations are published in the 1967 Passenger Car Maintenance and Lubrication Manual.

The information in this manual is grouped according to the type of work being performed, such as diagnosis and testing, frequently performed adjustments and repairs, in-vehicle adjustments, overhaul, etc. Specifications and recommended special tools are included.

Refer to the opposite page for important vehicle identification data.

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



SERVICE PUBLICATIONS

Vehicle Identification

GROUP

1

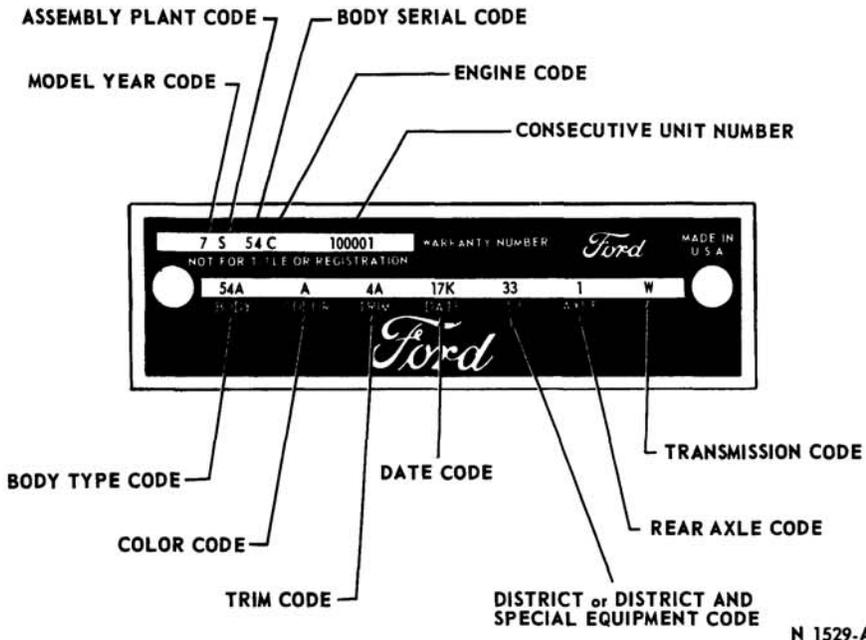


FIG. 1—Warranty Plate

N 1529-A

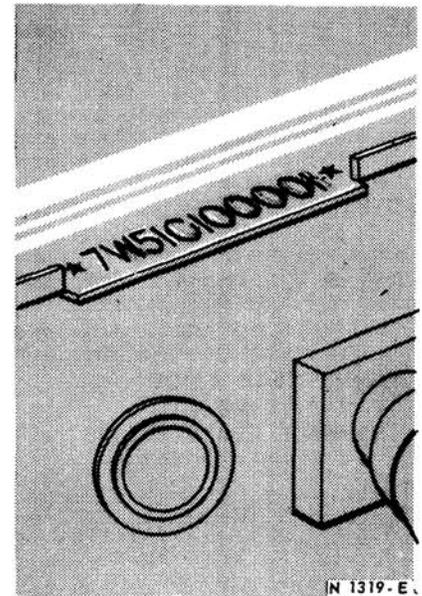


FIG. 3—Ford Identification Number Location

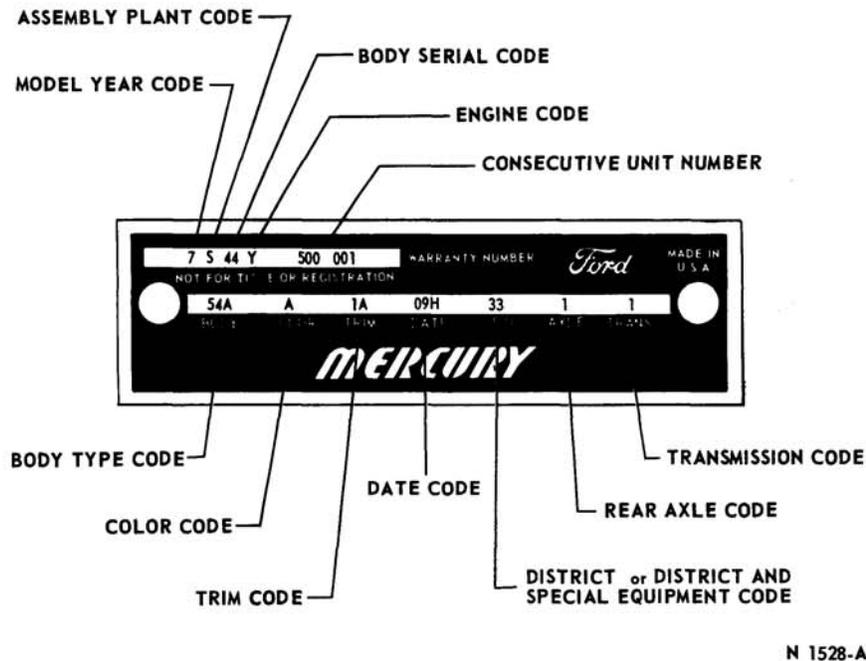


FIG. 2—Warranty Plate

N 1528-A

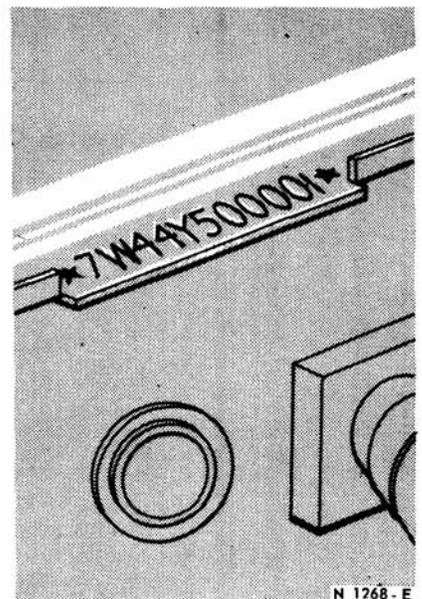


FIG. 4—Mercury (Full-Size) Identification Number Location

N 1268 - E

VEHICLE WARRANTY NUMBER

The vehicle warranty number is the first line of numbers and letters appearing on the Warranty Plate (Figs. 1 and 2). 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 Numbers for title and registration purposes are stamped in the following locations:

FORD—On a tab attached to the top right side (weld flange) of the dash panel in the engine compartment (Fig. 3).

MERCURY—On a tab attached to the top right side (weld flange) of the dash panel in the engine compartment (Fig. 4).

MODEL YEAR CODE

The number 7 designates 1967

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 Plant
F Dearborn	T Metuchen
G Chicago	U Louisville
H Lorain	W Wayne
J Los Angeles	Y Wixom
K Kansas City	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 Date, 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.

FORD

Body Serial Code	Body Style Code	Body Type	Model
51	54E	4-Door Sedan ①	Custom
50	62E	2-Door Sedan ①	
53	54B	4-Door Sedan ①	Custom 500
52	62B	2-Door Sedan ①	
54	54A	4-Door Sedan ①	Galaxie 500
56	57B	4-Door Hardtop ①	
55	63B	2-Door Hardtop ①	
57	76A	2-Door Convertible ①	
58	63C	2-Door Hardtop ②	Galaxie 500XL
59	76B	2-Door Convertible ②	
66	57F	4-Door Hardtop ①②	LTD
62	63J	2-Door Hardtop ①③	
64	54C	4-Door Sedan	
70	71D	4-Door 6 Passenger	Ranch Wagon
71	71B	4-Door 6 Passenger	Country Sedan
72	71C	4-Door 6+4 Passenger	
73	71E	4-Door 6 Passenger	Country Squire
74	71A	4-Door 6+4 Passenger	

① Bench Seat
② Bucket Seat
③ Formal Roof

MERCURY

Body Serial Code	Body Style Code	Body Type	Model
44	54A	4-Door Sedan ①	Monterey
44	54B	4-Door Sedan ①③	
48	57A	4-Door Hardtop ①	
47	63A	2-Door Hardtop ①	
45	76A	2-Door Convertible ①	
47	63G	2-Door Hardtop ②	
45	76G	2-Door Convertible ②	
54	54C	4-Door Sedan ①	Montclair
54	54D	4-Door Sedan ①③	
58	57B	4-Door Hardtop ①	
57	63B	2-Door Hardtop ①	
64	54E	4-Door Sedan ①	Parklane
68	57F	4-Door Hardtop ①	
67	63F	2-Door Hardtop ①	
65	76F	2-Door Convertible ①	
61	54J	4-Door Sedan ①	Brougham
62	57C	4-Door Hardtop ①	
69	63D	2-Door Hardtop ④	Marquis
72	71B	4-Door 6 Passenger	Commuter
72	71C	4-Door 9 Passenger	
76	71E	4-Door 6 Passenger	Colony Park
76	71A	4-Door 9 Passenger	

CONSECUTIVE UNIT NUMBER

Each model year, each assembly plant begins production with number 100001 (Ford) or 500001 (Mercury) and continues on for each unit built.

ENGINE CODES

Code	Type
V	6 Cyl. 240 Cu. In. (1V)
E	6 Cyl. 240 Cu. In. (1V) Taxi
B	6 Cyl. 240 Cu. In. (1V) Police
C	8 Cyl. 289 Cu. In. (2V)
3	8 Cyl. ① 289 Cu. In. (2V)
A	8 Cyl. 289 Cu. In. (4V) Prem. Fuel
K	8 Cyl. 289 Cu. In. (4V) Hi-Perf.
Y	8 Cyl. 390 Cu. In. (2V)
H	8 Cyl. 390 Cu. In. (2V)
Z	8 Cyl. 390 Cu. In. (4V)
S	8 Cyl. 390 Cu. In. (4V)
M	8 Cyl. 410 Cu. In. (4V)
Q	8 Cyl. 428 Cu. In. (4V)
8	8 Cyl. ① 428 Cu. In. (4V)
P	8 Cyl. 428 Cu. In. (4V) Police
W	8 Cyl. 427 Cu. In. (4V) Hi-Perf.
R	8 Cyl. 427 Cu. In. (8V) Hi-Perf.
L	8 Cyl. 427 Cu. In. (4V) Hi-Perf. SOHC
D	8 Cyl. 427 Cu. In. (8V) Hi-Perf. SOHC

① Low Compression

TRANSMISSION CODES

Code	Type
1	3-Speed Manual
2	Overdrive
3	3-Speed Manual
5	4-Speed Manual
W	Automatic (C4)
U	Automatic (C6)
Y	Automatic (MX)
X	Automatic (FX)
Z	Automatic (XPL Special)

REAR AXLE RATIO CODES

A number designates a conventional axle, while a letter designates a locking differential.

Code	Ratio	Code	Ratio
1	3.00:1	A	3.00:1
4	3.25:1	D	3.25:1
5	3.50:1	F	2.80:1
6	2.80:1	—	—
8	2.75:1	—	—
9	4.11:1	—	—
0	3.10:1	—	—

EXTERIOR PAINT COLOR CODES

Code	M-30-J	M-32-J	
A	1724-A		Black
B	1734-A		Lt. Aqua
E	2045-A		Med. Beige Met.
F	1226-A		Lt. Blue
K	1903-A		Dk. Blue Met.
M	1619-A		White
Q	1624-A		Med. Blue Met.
T	2008-A		Red
V	2066-A		Bronze Met.
W	1908-A		Med. Aqua Met.
X	1632-A		Maroon Met.
Y	2039-A		Dk. Green Met.
Z	1915-A		Med. Gold. Met.
4	1901-A		Med. Gray Met.
6	1631-A		Lt. Beige
8	1955-A		Yellow
0	2040-A		Lt. Green

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.

MERCURY

Code	District	Code	District
11	Boston	34	Detroit
16	Philadelphia	41	Chicago
15	New York	42	St. Louis
17	Washington	46	Twin Cities
21	Atlanta	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	Export

FORD

Code	District	Code	District
11	Boston	33	Detroit
13	New York	34	Indianapolis
15	Newark	35	Lansing
16	Philadelphia	37	Buffalo
17	Washington	38	Pittsburgh
21	Atlanta	41	Chicago
22	Charlotte	42	Fargo
24	Jacksonville	43	Milwaukee
25	Richmond	44	Twin Cities
27	Cincinnati	45	Davenport
28	Louisville	51	Denver
32	Cleveland	52	Des Moines

FORD (Cont'd)

Code	District	Code	District
53	Kansas City	74	Seattle
54	Omaha	75	Phoenix
55	St. Louis	81	Ford of Canada
61	Dallas	83	Government
62	Houston	84	Home Office Reserve
63	Memphis	85	American Red Cross
64	New Orleans	89	Transportation Services
65	Oklahoma City	90-99	Export
71	Los Angeles		
72	San Jose		
73	Salt Lake City		

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

INTERIOR TRIM CODES

Code	Trim Schemes
1A	Black Cloth and Black Vinyl
1B	Blue Cloth and Blue Vinyl
1D	Red Cloth and Red Vinyl
1G	Ivy Gold Cloth and Ivy Gold Vinyl
1K	Aqua Cloth and Aqua Vinyl
1U	Parchment Cloth and Parchment Vinyl W/Black
2A	Black Vinyl
2B	Blue Vinyl
2D	Red Vinyl
2F	Saddle Vinyl
2G	Ivy Gold Vinyl
2K	Aqua Vinyl
2U	Parchment Vinyl W/Black
3B	Blue Cloth and Blue Vinyl
3G	Ivy Gold Cloth and Ivy Gold Vinyl
3K	Aqua Cloth and Aqua Vinyl
3L	Silver Cloth and Silver Vinyl
3U	Parchment Cloth and Parchment Vinyl W/Black
4A	Black Vinyl
4B	Blue Vinyl
4D	Red Vinyl
4G	Ivy Gold Vinyl
4K	Aqua Vinyl
5A	Black Cloth and Black Vinyl
5B	Dark Blue Cloth and Blue Vinyl
5G	Dk. Ivy Gold Cloth and Ivy Gold Vinyl
5K	Aqua Cloth and Aqua Vinyl
5U	Parchment Cloth and Parchment Vinyl W/Saddle
6A	Black Vinyl
6B	Dark Blue Vinyl
6D	Red Vinyl
6F	Saddle Vinyl
6G	Dk. Ivy Gold Vinyl
6K	Aqua Vinyl
6U	Parchment Vinyl
7B	Blue Vinyl ①
7D	Red Vinyl
7F	Saddle Vinyl
7G	Ivy Gold Vinyl
7K	Lt. Aqua Vinyl
7U	Parchment Cloth and Parchment Vinyl
8A	Black Vinyl
8B	Blue Vinyl
8D	Red Vinyl
8F	Saddle Vinyl
8U	Parchment Vinyl W/Black
9A	Black Cloth and Black Vinyl
9B	Dk. Blue Cloth and Dk. Blue Vinyl
9D	Dk. Red Cloth and Dk. Red Vinyl
9G	Dk. Ivy Gold Cloth and Dk. Ivy Gold Vinyl
9K	Aqua Cloth and Aqua Vinyl
9L	Silver Cloth and Silver Vinyl
9U	Parchment Cloth and Parchment Vinyl W/Black
BA	Parchment Vinyl W/Black
BB	Parchment Vinyl W/Blue
BD	Parchment Vinyl W/Red
BF	Parchment Vinyl W/Saddle
BG	Parchment Vinyl W/Ivy Gold
BK	Parchment Vinyl W/Aqua
CA	Parchment Vinyl W/Black
CB	Parchment Vinyl W/Blue
CD	Parchment Vinyl W/Red
CF	Parchment Vinyl W/Saddle
CG	Parchment Vinyl W/Gold
CK	Parchment Vinyl W/Aqua
CU	Parchment Vinyl
DA	Black Vinyl
DB	Blue Vinyl
DD	Red Vinyl
DU	Parchment Vinyl

INTERIOR CODES—(Continued)

Code	
E1	Black Cloth and Black Vinyl
E2	Dk. Blue Cloth and Dk. Blue Vinyl
E9	Parchment Cloth and Parchment Vinyl
F1	Black Vinyl
G1	Black Cloth and Black Vinyl
G2	Dk. Blue Cloth and Dk. Blue Vinyl
G9	Parchment Cloth and Parchment Vinyl
H1	Black Vinyl
JA	Black Leather
JB	Lt. Blue Vinyl
JD	Dk. Red Leather
JU	Parchment Vinyl
KA	Black Cloth and Black Vinyl
KB	Dk. Blue Cloth and Dk. Blue Vinyl
KD	Dk. Red Cloth and Dk. Red Vinyl
KG	Ivy Gold Cloth and Ivy Gold Vinyl
KU	Parchment Cloth and Parchment Vinyl W/Saddle
LU	Parchment Cloth and Parchment Vinyl W/Black
MA	Parchment Vinyl W/Black
MB	Parchment Vinyl W/Blue
MD	Parchment Vinyl W/Red
MF	Parchment Vinyl W/Saddle
MG	Parchment Vinyl W/Ivy Gold
MK	Parchment Vinyl W/Aqua
NB	Blue Vinyl
ND	Red Vinyl
NU	Parchment Vinyl
OE	Beige Vinyl
PU	Parchment Cloth and Parchment Vinyl
RA	Black Vinyl
RB	Dk. Blue Vinyl
RD	Dk. Red Vinyl
RF	Saddle Vinyl
RU	Parchment Vinyl
SA	Black Vinyl
SU	Parchment Cloth and Parchment Vinyl W/Black
TA	Black Leather
TD	Dk. Red Leather
UA	Black Vinyl
UU	Parchment Vinyl
VU	Parchment Cloth and Parchment Vinyl
WA	Black Vinyl
WU	Parchment Vinyl
ZA	Black Cloth and Black Vinyl
ZB	Dk. Blue Cloth and Dk. Blue Vinyl
ZD	Dk. Red Cloth and Dk. Red Vinyl
ZG	Dk. Ivy Gold Cloth and Dk. Ivy Gold Vinyl
ZK	Aqua Cloth and Aqua Vinyl
ZL	Silver Cloth and Silver Vinyl
ZU	Parchment Cloth and Silver Vinyl

Brakes

GROUP

2

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PART 2-1 General Brake Service

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Brake System Tests	2-1	Disc Brakes	2-6
Road Test	2-3	Drum Brakes	2-6
2 Common Adjustments and Repairs	2-3	Disc Brake Trouble Symptoms and Possible Cause	2-7
Parking Brake Linkage Adjustment	2-3	Drum Brake (and General System) Trouble Symptoms and Possible Causes	2-8
Power Brake Master Cylinder Push Rod Adjustment	2-3	Booster Unit	2-9
Hydraulic System Bleeding and Centralizing of the Differential Valve	2-4		

1 DIAGNOSIS AND TESTING

Refer to Figs. 9 and 10 for the brake trouble symptoms and possible causes.

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 to 1/2 inch of the master cylinder reservoirs, add Rotunda Brake Fluid—Extra Heavy Duty—Part Number C6AZ-19542-A (ESAM6C25-A) or equivalent for all disc brake applications and SAE 70R3 Rotunda Brake Fluid—Heavy Duty—Part Number B7AZ-19542-A, R-103-A or equivalent for power drum or standard drum brake applications to obtain the specified level. The disc brake extra heavy duty brake fluid is colored blue for identification purposes. Do not mix low temperature brake fluids with the specified disc brake fluid.

1. Turn the ignition switch to the ACC or ON position. If the light on the brake warning lamp remains on, the condition may be caused by a defective switch, grounded switch wires or the differential pressure valve is not centered. Centralize the differential pressure valve as outlined under

Bleeding the Brake System in this section of the manual. If the warning light remains on, check the switch connector and wire for a grounded condition and repair or replace the wire assembly. If the condition of the wire is good, replace the brake warning lamp switch.

2. Turn the ignition switch to the start position. If the brake warning lamp does not light, check the light and wiring for defects and replace or repair wiring.

3. If the brake warning lamp does not light when a pressure differential condition exists in the brake system, the warning lamp may be burned out, the warning lamp switch is inoperative or the switch to lamp wiring has an open circuit. Check the bulb and replace it, if required. Check the switch to lamp wires for an open circuit and repair or replace them, if required. If the warning lamp still does not light, replace the switch.

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).

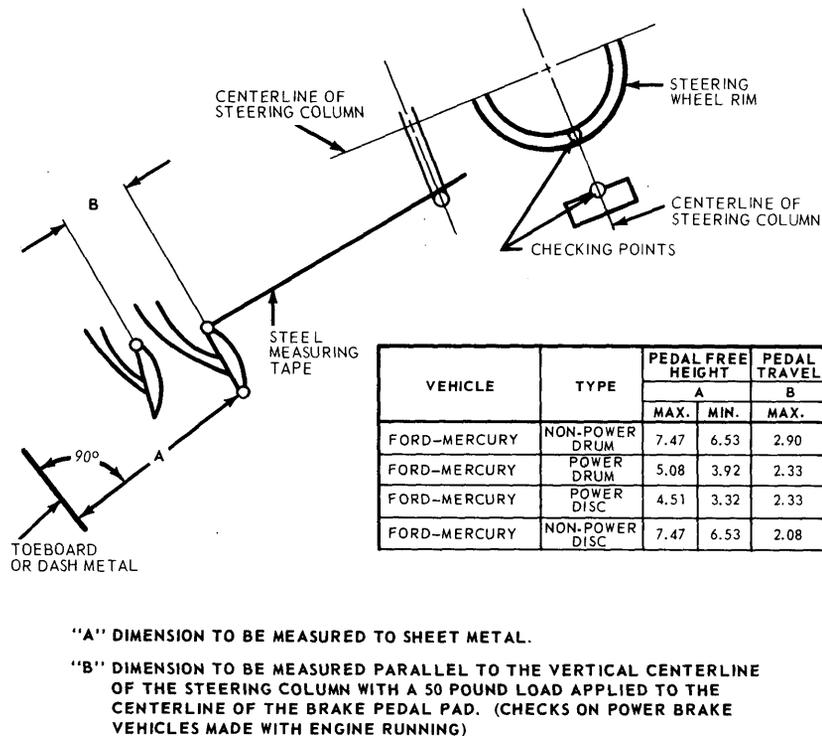
2. If the position of the pedal is not within specification, check the brake pedal linkage for missing bushings or loose attaching bolts and replace them, if required.

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 defective parts as necessary.

Brake Pedal Travel Measurement

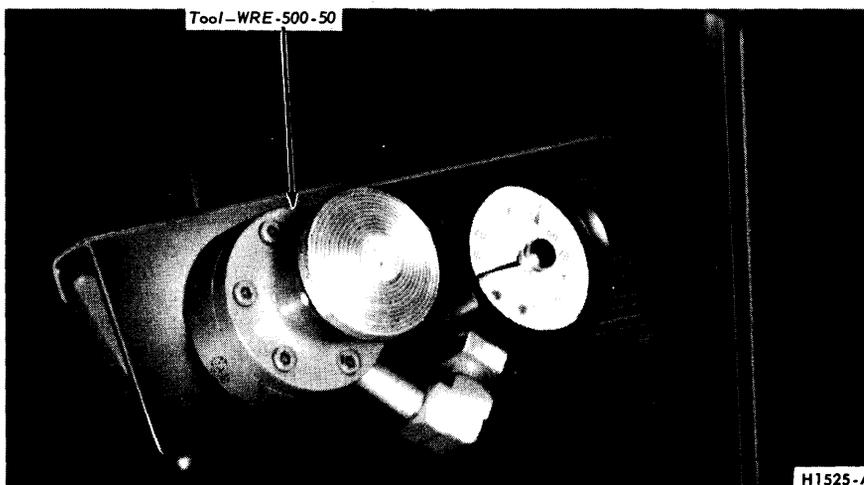
1. Install a Brake Pedal Effort Gauge on the brake pedal pad (Fig. 2).

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 o'clock position on the steering wheel rim.



H 1544-A

FIG. 1—Brake Pedal Height and Travel Measurements



H1525-A

FIG. 2—Brake Pedal Effort Gauge Installed

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 B, 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 (Figs. 13 and 14, 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 bushings or loose attachments. Bleed the brakes and centralize the differential valve.

POWER BRAKE FUNCTIONAL TEST

1. 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.

2. With the engine shut off, exhaust all vacuum in the system. Depress the brake pedal and hold it in the applied position. If the pedal gradually falls away under this pressure, the hydraulic system is leaking. Check all tubing, hoses, calipers (if so equipped), wheel cylinders and connections for leaks.

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. Also, check for leaks or insufficient fluid.

LOCKED WHEEL BRAKE

Should one of the wheel brakes be locked and the car 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.**

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 activated. 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.

Diagnosis of vacuum release systems is basically similar to electrical diagnosis. That is, the vacuum system must be complete from the source to the vacuum components. Any leaks, like a bad connection will make the system inoperative. If a leak develops in one of the vacuum systems, one or all of the vacuum components may become inoperative. This would be dependent on the location of the vacuum leak. If the leak is in the vacuum supply, all systems will become inoperative. If the leak is in the component side of the vacuum control for the specific system, all other systems will operate when the leaking system is off.

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 (ARE 345) 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 bad 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 and apply the parking brake. Move the transmission shift control to drive 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, start the engine. 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.

During a road test, apply the vehicles brakes at a road speed of 20 mph for all problem conditions listed in Figs. 9 and 10 with the exception of those resolved in the brake system tests and brake chatter. To check for brake chatter or surge, apply the brakes lightly at 50 mph. For each of the symptoms encountered, check and eliminate the causes which are listed in Figs. 9 and 10.

If the road test reveals one or more problem conditions listed in Figs. 9 and 10, 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.

2 COMMON ADJUSTMENTS AND REPAIRS

PARKING BRAKE LINKAGE ADJUSTMENT

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, or on a vacuum release pedal by pushing down the manual release lever.

2. Depress the parking brake pedal until it is engaged in the first notch of the control.

3. Raise the vehicle. With the transmission in neutral, turn the

adjusting nut forward against the equalizer (Fig. 3) until a moderate drag is felt when turning the rear wheels (approximately 100 lbs. of force at the outside diameter of the tire is required to turn the rear wheels).

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 satisfactorily hold the vehicle.

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.

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. Failure to maintain this relationship will prevent the master cylinder piston from completely releasing hydraulic pressure and can cause the brakes to drag.

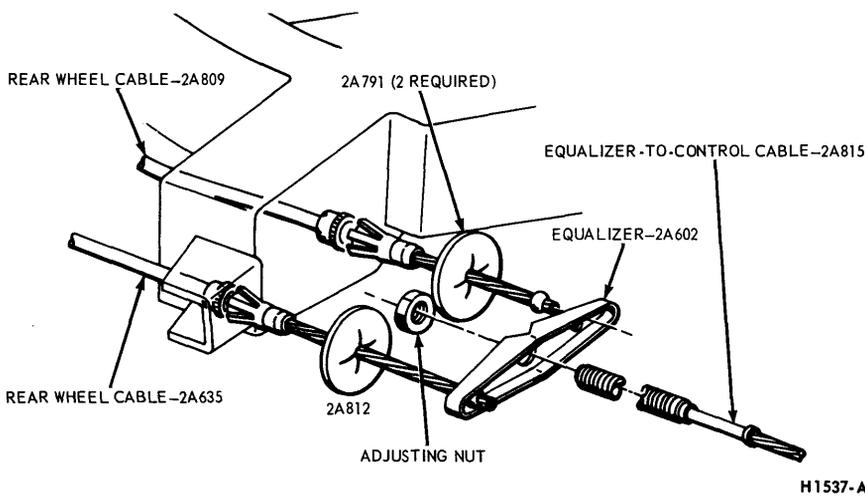


FIG. 3—Parking Brake Adjustment

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.

To check the adjustment of the screw, fabricate a gauge of the dimensions shown in Fig. 4. On the Midland-Ross booster, remove the master cylinder and air filter assembly and push the bellows back into

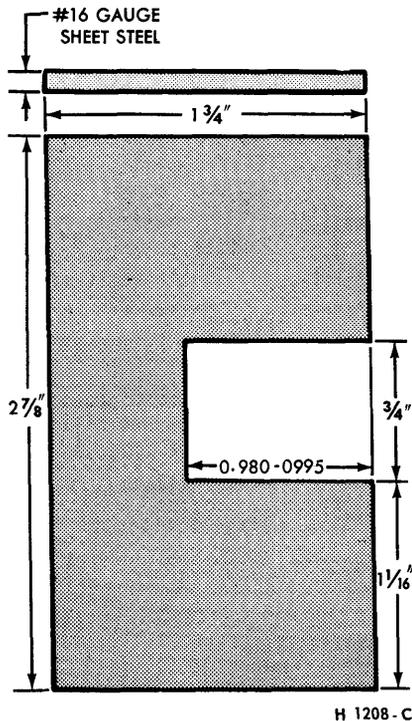


FIG. 4—Push Rod Gauge Dimensions

the booster body. Re-install the air filter directly against the booster body, and then place the gauge against the master cylinder mounting surface of the air filter assembly as shown in Fig. 5 or Fig. 6. The push rod screw should be adjusted so that the end of the screw just touches the inner edge of the slot in the gauge.

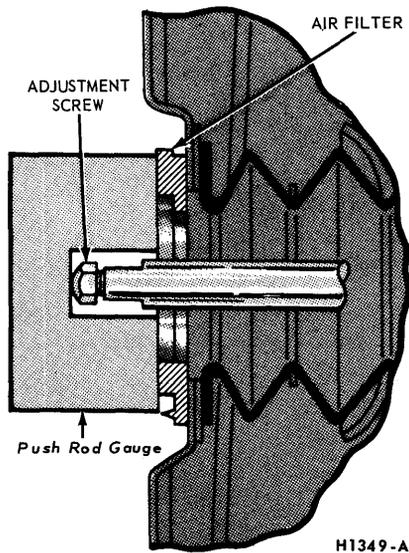


FIG. 5—Push Rod Adjustment—Midland-Ross

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

To check the Bendix-type booster, remove the master cylinder and fit the gauge against the master cylinder mounting surface as shown in Fig. 6.

This is an approximate adjustment only. To verify the adjustment, look through the make-up (rear) port of

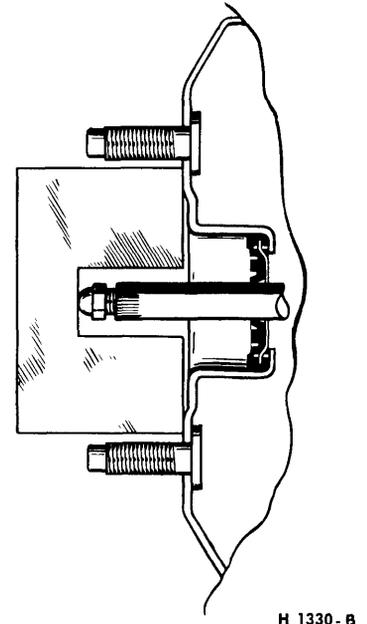


FIG. 6—Push Rod Adjustment—Bendix

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 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 Rotunda Fluid—Extra Heavy Duty—Part Number C6AZ-19542-A (ESA-M6C-25-A). The disc brake 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 system.

1. Loosen the bleed screw located

on the side of the master cylinder. **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. 7) 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.**

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 fully-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 to 1/2 inch from the top of the reservoirs.**

7. If the primary (front brake) system is to be bled, remove the front wheel covers, and the front wheel and tire assemblies to gain access to the bleeder fittings on the disc brake calipers. Repeat steps 2 through 6 at the right front disc brake caliper and ending at the left front disc brake caliper.

8. 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 height exists. Install the front wheel and tire assemblies on the front wheels, and torque the mounting bolts to specification. Install the wheel covers.

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

PRESSURE BLEEDING

Bleed the longest lines first. The

bleeder tank should contain enough new Rotunda Brake Fluid to complete the bleeding operation. Use Rotunda Brake Fluid—Extra Heavy Duty—Part Number C6AZ-19542-A (ESA-M6C25-A) or equivalent for all disc brake applications and Rotunda Brake Fluid—Heavy Duty—Part Number B7AZ-19542-A, R103-A or equivalent for power drum or standard drum applications. **The disc brake fluid is colored blue for identification purposes. Do not mix low temperature brake fluid with the specified disc 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 fitting 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.**

Loosen the primary and secondary tube nuts at the master cylinder of those master cylinders without bleed screws and bleed the master cylinder until the fluid flow is free of air bubbles, then tighten the tube nuts to the specified torque. **Do not over-tighten.**

4. If the rear wheel cylinders and the secondary brake system is to be bled, position a 3/8 inch box wrench (Fig. 7) 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

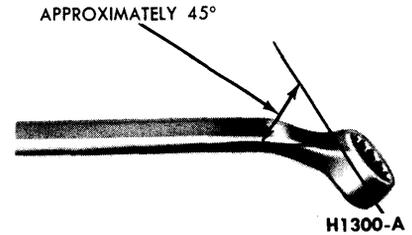


FIG. 7—Wrench for Bleeding Brake Hydraulic System

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 wheel cylinder of the secondary system being bled.

9. **If the vehicle contains disc brakes and the primary (front brake) system is to be bled, remove the front wheel covers, and the front wheel and tire assemblies to gain access to the bleeder fittings on the disc brake calipers.** Repeat steps 4 through 7, starting at the right front disc caliper and ending at the left front disc caliper.

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 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 height exists. Install the front wheel and tire assemblies on the front wheels, and torque the mounting bolts to specification. Install the wheel covers.

13. Remove the Pressure Bleeder Adapter Tool. Fill the master cylinder reservoirs to within 1/4 to 1/2 inch from 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:

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. **Front wheel balancing operations on disc brake equipped vehicles can also cause a pressure differential in the primary (front) brake system, illuminating the brake warning light.**

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 pres-

sure 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 to 1/2 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, caliper splash shield, and the shoe and lining assemblies as outlined in Part 2-2, Section 2.

2. 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 0.195-inch (shoe and lining together) or 0.030-inch (lining material only) at any one of the three measuring locations or if lining shows evidence of brake fluid contamination, replace all (4) shoe and lining assemblies on both front wheels.

3. Check the caliper to spindle attaching bolt and caliper bridge bolt 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 contacts the rotor at a point approximately 1 inch from the outer edge. Rotate the rotor and take an indicator reading. If the reading exceeds 0.002 inch total lateral runout on the indicator, replace or resurface the disc brake rotor. **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 0.002 inch total indicator reading, and the surface finish of the

braking surfaces are to be 85/15 micro inches. **The minimum limiting dimensions (Fig. 8) 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.**

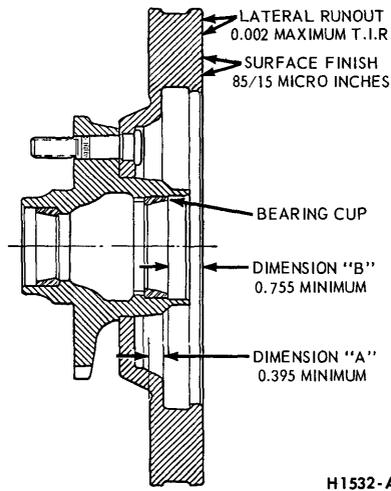


FIG. 8—Disc Brake Rotor Service Limits

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 excess leakage is evident, it should be replaced. Slight leakage around the pistons or seized pistons indicate removal and disassembly.

8. If upon disassembly the caliper

is found to be distorted or damaged, or if the cylinder bores are scored or excessively worn, replace the assembly.

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

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

DRUM BRAKES

1. Remove the wheel from the drum, and remove the drum as outlined in Part 2-2, Section 2. Wash all the parts except the brake shoes in a cleaning fluid and dry with compressed air.

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 has 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 car has 30,000 or more miles of operation on the brake linings or signs of overheating are pres-

POSSIBLE CAUSES OF TROUBLE	TROUBLE SYMPTOMS												
	Excessive Pedal Travel	Brake Roughness or Chatter (Pedal Pumping)	Excessive Pedal Effort	Pull	Rattle	Brakes Heat Up During Driving and Fail to Release	Leaky Wheel Cylinder	Grabbing or Uneven Braking Action	No Braking Effect When Pedal Is Depressed	Brakes for the Respective System Do Not Apply	Pedal Gradually Moves Toward Floor or Dash Panel	Warning Lamp Stays Lit.	Warning Lamp Does Not Light
Shoe and Lining Knock-back after Violent Cornering or Rough Road Travel	X												
Shoe and Lining Assembly not Properly Seated or Positioned	X					X			X				
Leak or Insufficient Fluid in System or Caliper	X		X						X		X		
Loose Wheel Bearing Adjustment	X			X									
Damaged or Worn Caliper Piston Seal	X						X		X				
Improper Master Cylinder Push Rod Adjustment	X												
Excessive Rotor Runout or Out of Parallel		X											
Incorrect Tire Pressure				X					X				
Frozen or Seized Pistons			X	X		X			X				
Brake Fluid, Oil or Grease on Linings		X	X	X					X				
Shoe and Lining Worn Below Specifications			X										
Proportioning Valve Malfunction			X						X				
Booster Inoperative			X										
Caliper Out of Alignment with Rotor				X					X				
Loose Caliper Attachment	X	X		X	X				X				
Metering Valve Seal Leaks									X				
Excessive Clearance Between Shoe and Caliper or Between Shoe and Splash Shield					X								
Shoe Hold Down Clips Missing or Improperly Positioned					X								
Operator Riding Brake Pedal						X							
Scores in the Cylinder Bore							X						
Corrosion Build-Up in the Cylinder Bore or on the Piston Surface			X	X			X						
Bleeder Screw Still Open								X		X			
Caliper Out of Parallel with Rotor				X									
One Section Dual Brake System Is Inoperative									X		X		
Differential Pressure Valve Is not Centered												X	
Wiring to Warning Lamp Switch Is Grounded												X	
Warning Lamp Switch Is Grounded												X	
Warning Lamp Is Burned Out													X
Warning Lamp Switch Has an Open Circuit													X
Warning Lamp Switch Is Inoperative													X
Wiring to Warning Lamp Has Open Circuit													X

FIG. 9—Disc Brake Trouble Symptoms and Possible Causes

POSSIBLE CAUSES OF TROUBLE	TROUBLE SYMPTOMS																
	One Brake Drags	All Brakes Drag	Hard Pedal	Spongy Pedal	Car Pulls to One Side	One Wheel Locks	Brakes Chatter	Excessive Pedal Travel	Pedal Gradually Goes to Floor	Brakes Uneven	Shoe Click After Release	Noisy or Grabbing Brakes	Brakes Do Not Apply	Brakes for the Respective System Do Not Apply	Warning Lamp Stays Lit.	Pedal Gradually Moves Toward Floor or Dash Panel	Warning Lamp Does Not Light
Mechanical Resistance at Pedal or Shoes		X	X														
Brake Line Restricted	X	X	X		X												
Leaks or Insufficient Fluid				X			X	X				X				X	
Improper Tire Pressure					X				X								
Distorted or Improperly Adjusted Brake Shoe	X	X	X		X	X	X				X						
Faulty Retracting Spring	X				X												
Drum Out of Round	X				X	X											
Lining Glazed or Worn			X		X	X	X				X	X					
Oil or Grease on Lining					X	X	X		X		X	X					
Loose Carrier Plate	X					X	X										
Loose Lining							X										
Dirt on Drum-Lining Surface											X						
Faulty Brake Cylinder	X				X	X					X						
Dirty Brake Fluid	X	X							X			X					
Faulty Master Cylinder		X						X	X			X				X	
Air in Hydraulic System	X			X				X				X					
Self Adjusters Not Operating					X			X									
Insufficient Shoe-to-Carrier Plate Lubrication	X									X	X						
Tire Tread Worn						X											
Poor Lining to Drum Contact							X										
Loose Front Suspension							X										
Threads Left by Drum Turning Tool Pulls Shoes Sideways										X							
Cracked Drum								X									
One Section Dual Brake System Is Inoperative													X	X			
Differential Pressure Valve Not Centered															X		
Wiring to Warning Lamp Switch Is Grounded															X		
Warning Lamp Switch Is Grounded															X		
Warning Lamp Is Burned Out																	X
Warning Lamp Switch Has an Open Circuit																	X
Wiring to Warning Lamp Has Open Circuit																	X

FIG. 10—Drum Brake (and General System) Trouble Symptoms and Possible Causes

ent 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 dam-

aged.

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

BOOSTER UNIT

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

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1 DESCRIPTION AND OPERATION

Disc brakes are available as optional equipment for the front wheels. The dual-master cylinder equipped hydraulic brake system employs single anchor, internal expanding and self-adjusting drum brake assemblies on the rear wheels of cars with disc brakes, and on the front and rear wheels of all others.

A vacuum booster is available as optional equipment.

The power disc and power drum brake options for the various vehicle models are listed in Fig. 1.

DUAL MASTER CYLINDER BRAKE SYSTEM

The dual-master cylinder brake system has been incorporated in all

car models to provide increased vehicle safety. The system consists of a dual-master cylinder, pressure differential valve assembly and a switch. The switch on the differential valve activates a dual-brake warning light, located on the instrument panel.

The dual-master cylinder brake system is similar to a conventional (single) system, two master cylinders are combined in a single cast iron casting (Fig. 2). One portion actuates the primary (front) brake system and the other actuates the secondary (rear) brake system (Figs. 21 and 23). Hydraulic fluid leakage or failure of one of the systems does not impair the operation of the other portion of the dual-brake system. A dual-brake warning light signals a failure of

either the front (primary) or rear (secondary) brake system.

On power disc equipped vehicles, the dual-master cylinder has the master cylinder outlet port for the rear (secondary) brake system located on the bottom of the master cylinder body. A master cylinder hydraulic system bleed screw is located in the outboard side of the master cylinder casting. The front (primary) brake system outlet port is located on the outboard side of the master cylinder.

On power drum and standard drum equipped vehicles, the rear (secondary) and front (primary) brake system outlet ports are located on the outboard side of the master cylinder casting. A bleed screw is not used on the master cylinder for power drum and standard drum equipped vehicles.

A code letter is stamped on the end of the master cylinder body casting for easy service identification. Code letter A or P identifies the power disc brake master cylinder, letter S identifies a power drum brake master cylinder and code letter T identifies the standard drum brake master cylinder.

A brake pressure differential valve assembly (Fig. 3) incorporating a hydraulically operated mechanical switch is utilized to operate a dual-brake warning light, located on the

Car Model	Power Drum	Power Disc
Mercury	RPO	① RPO
Ford	② RPO	③ ② RPO

① Standard with 427 V-8. Standard on Parklane, Marquis and Brougham models.
 ② Standard with Ford 7-Litre.
 ③ Power brakes are a mandatory option, on 10-passenger station wagons.

FIG. 1—Power Disc and Power Drum Brake Options

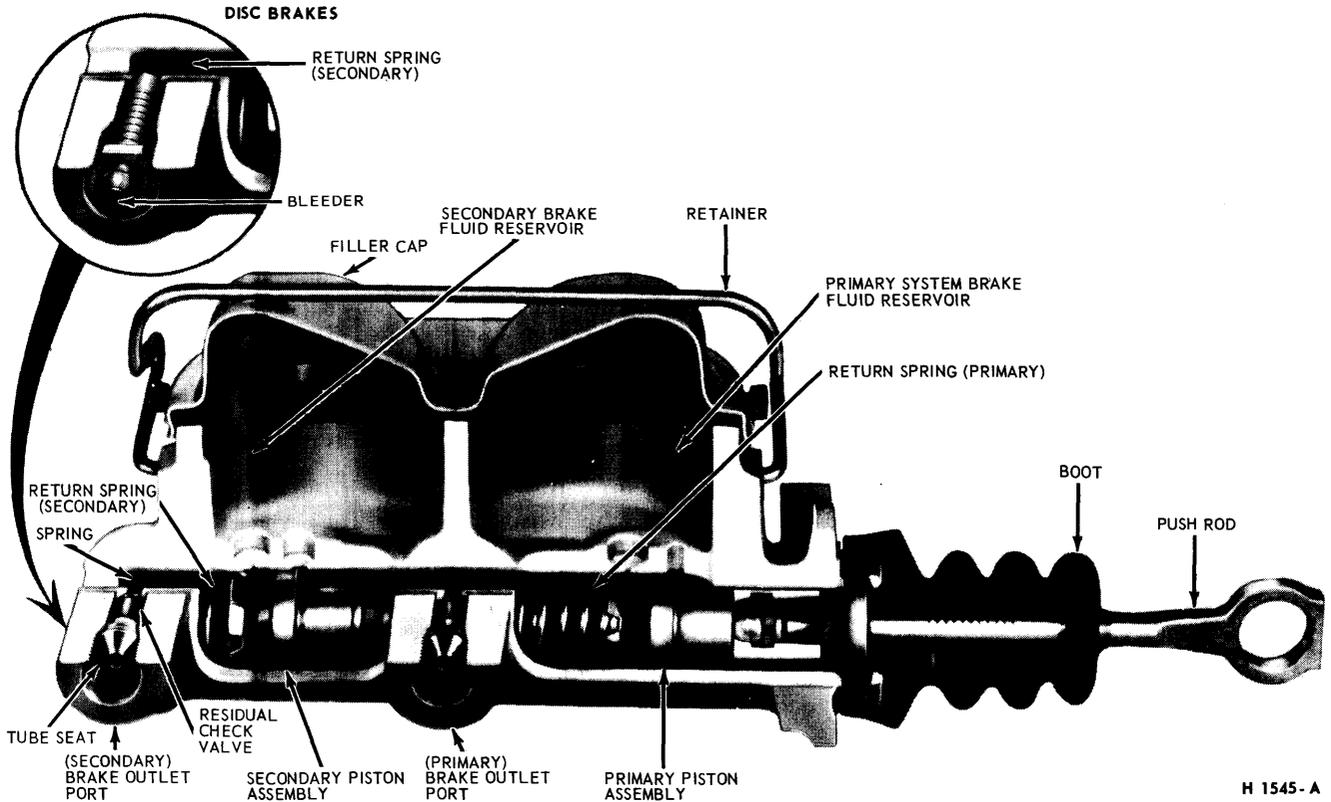


FIG. 2—Dual-Master Cylinder—Typical

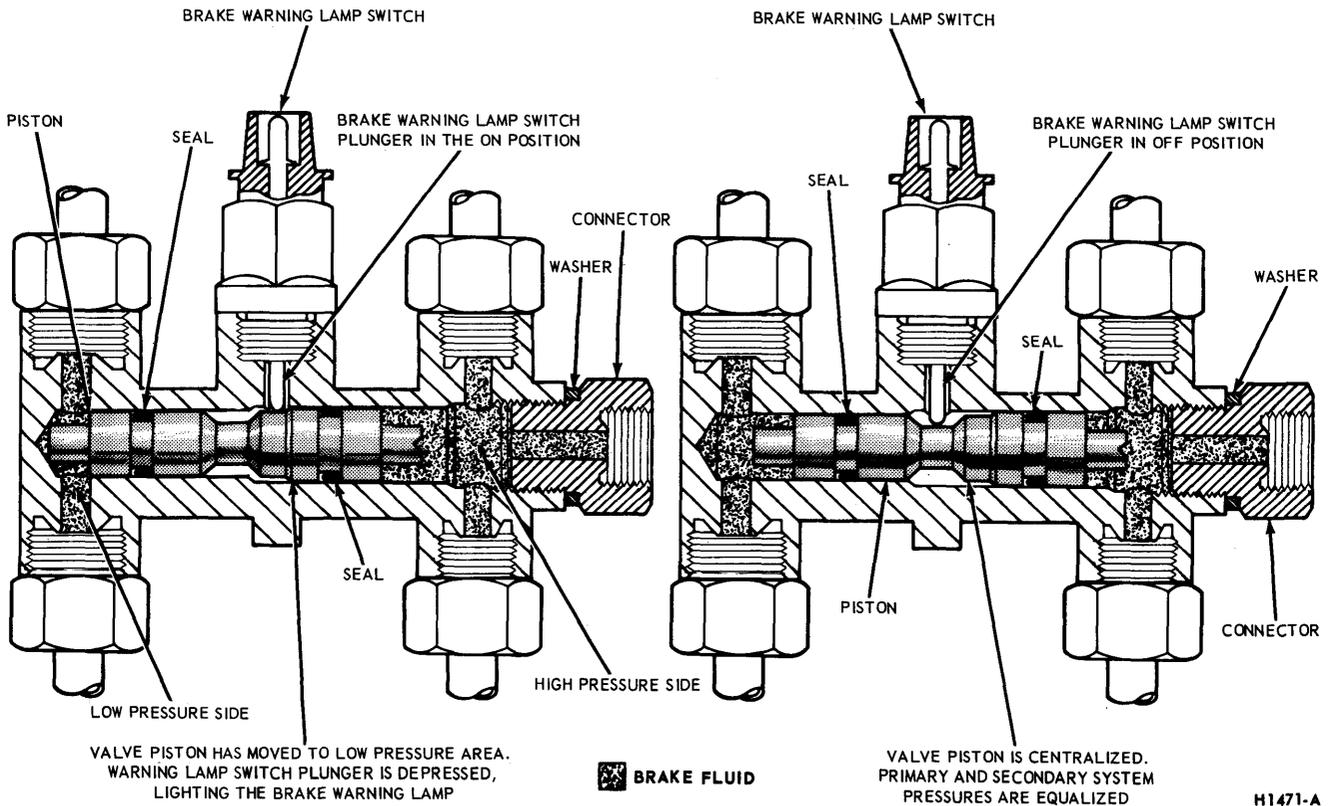


FIG. 3—Pressure Differential Valve and Brake Warning Lamp Switch Operation

instrument panel.

Brake tubes are connected from the dual-master cylinder front (primary) and rear (secondary) brake systems to the pressure differential valve (Fig. 3).

The pressure differential valve is mounted vertically on the frame side rail within the engine compartment. The primary (front) brake system outlet tubes are connected to the ports located in the upper side of the differential valve assembly and the secondary (rear) brake system outlet tubes are connected to the ports located in the lower side of the differential valve assembly.

Hydraulic pressure for both rear wheel brakes is provided from the single secondary (rear) brake outlet line, located opposite the secondary system inlet port of the differential valve. On disc brake equipped vehicles, a proportioning valve is located in the secondary (rear) brake system line that leads to the brake hose bracket on the rear axle housing. The brake hose bracket serves as a junction point for the individual brake lines that lead to the wheel cylinders of right and left rear brake components.

When the brake pedal is depressed, both the primary (front brake) and secondary (rear brake) master cylinder pistons are moved simultaneously to exert hydraulic fluid pressure on their independent hydraulic system. The fluid displacement of the dual-master cylinders is proportioned to fulfill the requirements of each of the two independent hydraulic brake systems (Fig. 2).

If a failure of the rear (secondary) brake system should occur, initial brake pedal movement causes the unrestricted secondary piston to bottom in the master cylinder bore. Primary piston movement displaces hydraulic fluid in the primary section of the dual-master cylinder to actuate the front brake system.

Should the front (primary) brake system fail, initial brake pedal movement causes the unrestricted primary piston to bottom out against the secondary piston. Continued downward movement of the brake pedal moves the secondary piston to displace hydraulic fluid in the rear brake system, actuating the rear brakes.

The increased pedal travel and the increased pedal effort required to compensate for the loss of the failed portion of the brake system provides a warning that a partial brake system failure has occurred. When the igni-

tion switch is turned to the **start** position, a dual-brake warning light provides a visual indication the warning lamp is functional. When the ignition switch is turned to the **ON** or **ACC** position, a dual-brake warning light on the instrument panel also provides a visual indication if one portion of the dual-brake system has become inoperative.

Should a failure of either the front or rear brake hydraulic system occur, the hydraulic fluid pressure differential resulting from the pressure loss of the failed brake system forces the valve toward the low pressure area to illuminate the brake warning light (Fig. 3).

A mechanically operated electrical switch is located on the side of the pressure differential valve assembly between the front and rear brake system inlet ports. The inner-end of the spring loaded switch plunger contacts the bottom of a tapered shoulder groove in the center of the valve (Fig. 3). O-ring seals are retained in seal ring lands near each end of the valve.

Should a failure of the rear brake system occur, hydraulic fluid pressure in the rear brake system would drop. During brake pedal operation the fluid pressure build-up of the front brake system forces the valve to move toward the low pressure area, or toward the rear brake system outlet port (Fig. 3). Movement of the differential valve forces the switch plunger upward over the tapered shoulder of the valve to close the switch electrical contacts and light the dual brake warning lamp, signalling a brake system failure.

In the event a front brake system failure should occur, greater pressure from the rear brake system during brake pedal operation forces the valve forward, moving the switch plunger upward onto the valve ramp to light the brake system warning lamp. However, **failure of either the front or rear system does not impair operation of the other brake system.**

DISC BRAKES

Disc brakes are available as optional equipment for the front wheels. The 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 available as optional equipment.

The master cylinder converts physical force from the brake pedal (and booster if so equipped) into hydraulic pressure against the pistons in the calipers (disc brakes) or in the wheel cylinders (drum brakes). The pistons in turn convert hydraulic pressure back into physical force at the brake shoes.

RELATION AND FUNCTION OF COMPONENT PARTS

The disc brake is a fixed caliper, opposed piston, non-energized, ventilated disc type, actuated by a hydraulic system (Fig. 4). There is no lateral movement of either the disc (rotor) or the caliper. The caliper assembly consists of two caliper housings bolted together with each half containing two cylinder bores of 1 15/16 inch diameter. Each cylinder bore contains a piston with attached molded rubber dust boot to seal the cylinder bore from contamination (Fig. 5). Square-section rubber piston seals are positioned in grooves in the cylinder bores.

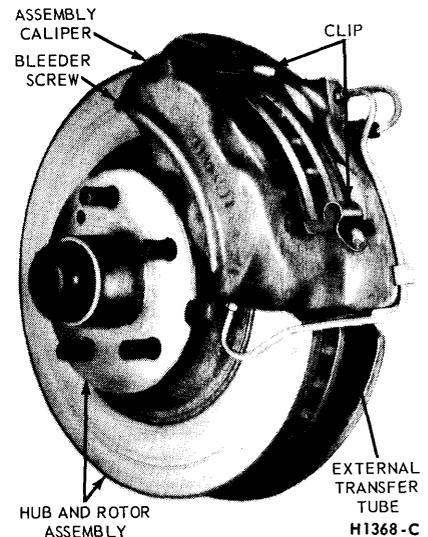


FIG. 4—Disc Brake Assembly

The piston seals perform three important tasks:

1. They provide hydraulic sealing between the cylinders and pistons.
2. They return the pistons to released position, when hydraulic pressure is released.
3. They maintain the shoes in correct adjustment at all times (comparable to the automatic adjusters in drum-type brakes).

The cylinders are connected hydraulically by means of internal passages in the caliper housing and an external transfer tube between the

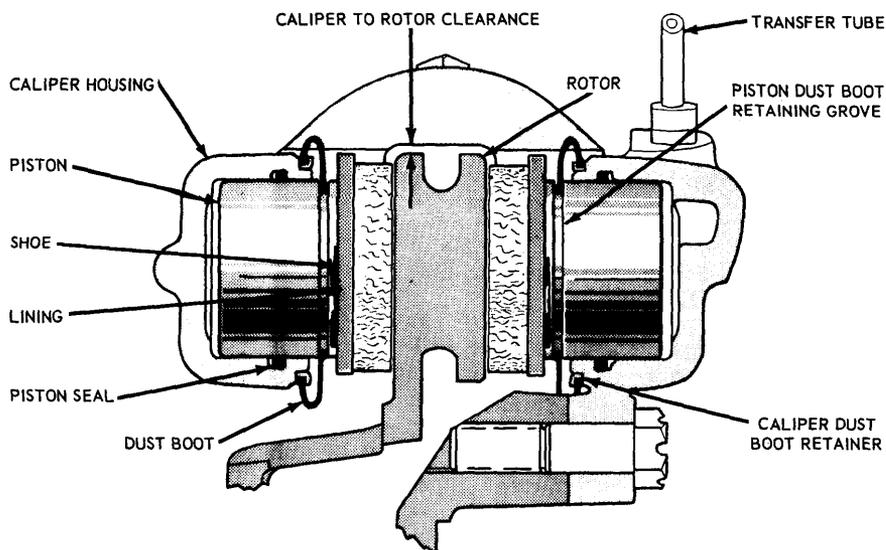


FIG. 5—Caliper Assembly—Sectional View

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. 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. 5). A shoe and lining assembly consists of friction material bonded to a metal plate called the shoe. It is replaced as a unit. Brake torque is absorbed by the mating of the shoe end against the caliper abutments. Two spring clips are attached to the top of the caliper to retain the shoe and lining assemblies. The caliper assembly is mounted directly to the front wheel spindle to the rear of the wheel vertical centerline.

The cast iron disc is of the ventilated rotor type incorporating forty fins and is attached to, and rotates with the wheel hub. The outside diameter of the rotor is 11 7/8 inches and the inside diameter is 7 7/8 inches. This type of design increases cooling area and permits circulation of air through the rotor resulting in more rapid cooling of the brake. A splash shield bolted to the spindle is used primarily to prevent road contaminants from contacting the inboard rotor and lining surfaces (Fig. 20). The wheel provides protection for the outboard surface of the rotor.

As the brake pedal is depressed, hydraulic pressure from the master cylinder forces the pistons out of the caliper bores against their respective shoe and lining assemblies. The force of the pistons against the shoes moves the linings against both sides of the revolving rotor to effect braking action.

During brake application, the rubber seal on each piston stretches as the piston moves against the shoe (Fig. 6). When the hydraulic pressure against the piston is released, the seal relaxes or rolls back. This roll-back action pulls the piston away from the shoe just enough to relieve the force of the lining against the rotor and, thereby, provide the required running clearance. Also, inherent rotor runout contributes to the maintenance of running clearance. Automatic adjustment is accom-

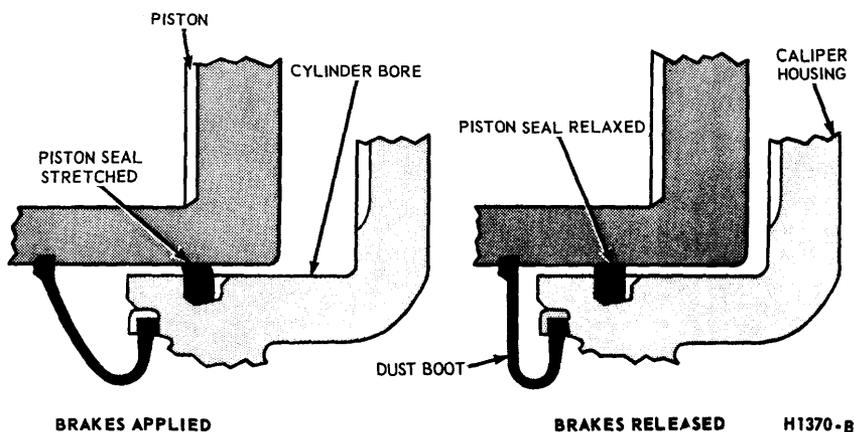


FIG. 6—Function of Piston Seal

plished by the pistons sliding in the seals outward from the cylinder bores. The piston gradually changes its position relative to the seal as the lining wears and, thus, maintains the correct adjustment location at all times.

When the brakes are in the unapplied position, there is no hydraulic pressure to the calipers because the fluid source at the master cylinder bypasses the residual check valve.

A warning sound feature (Fig. 7) is incorporated in the design of the

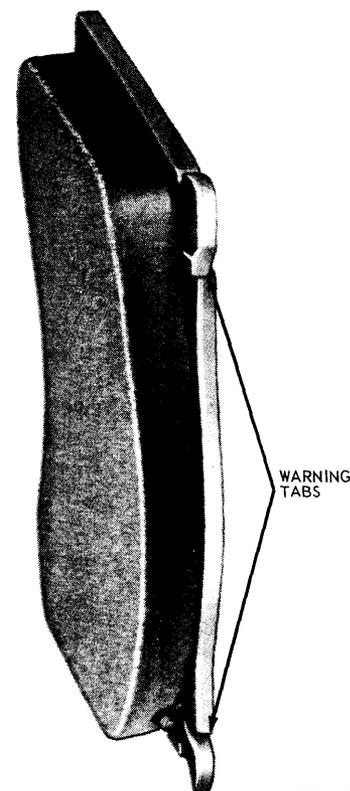


FIG. 7—Worn Lining Warning

brake shoes. Metal tabs on the ends of the shoes create an audible metallic, scraping noise, when the linings become worn enough to allow the tabs to contact the rotor. This metal-to-metal contact warns the driver that the shoes need replacing and is not detrimental to the function of the disc brake.

A proportioning valve located between the pressure differential valve and the rear brake wheel cylinders provides balanced braking action between the front and the rear brakes under a wide range of braking condi-

tions. (Fig. 8). By regulating the hydraulic pressure applied to the rear wheel cylinders, the valve limits rear braking action when high pressures are required at the front brakes. In this manner, premature rear wheel skid is prevented. **The proportioning valve is serviced as an assembly and is never adjusted or overhauled.**

HYDRAULIC SELF-ADJUSTING BRAKE SYSTEM

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

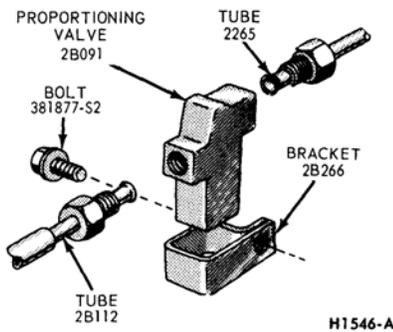
The master cylinder converts physical force from the brake pedal and booster into hydraulic pressure against the pistons in the wheel cylinders. The wheel cylinder pistons, in turn, convert hydraulic pressure back into physical force at the brake shoes.

The self-adjusting brake mechanism consists of a cable, cable guide, adjusting lever, and adjuster spring (Fig. 9). The cable is hooked over the anchor pin at the top and is connected to the lever at the bottom. The cable is connected to 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.

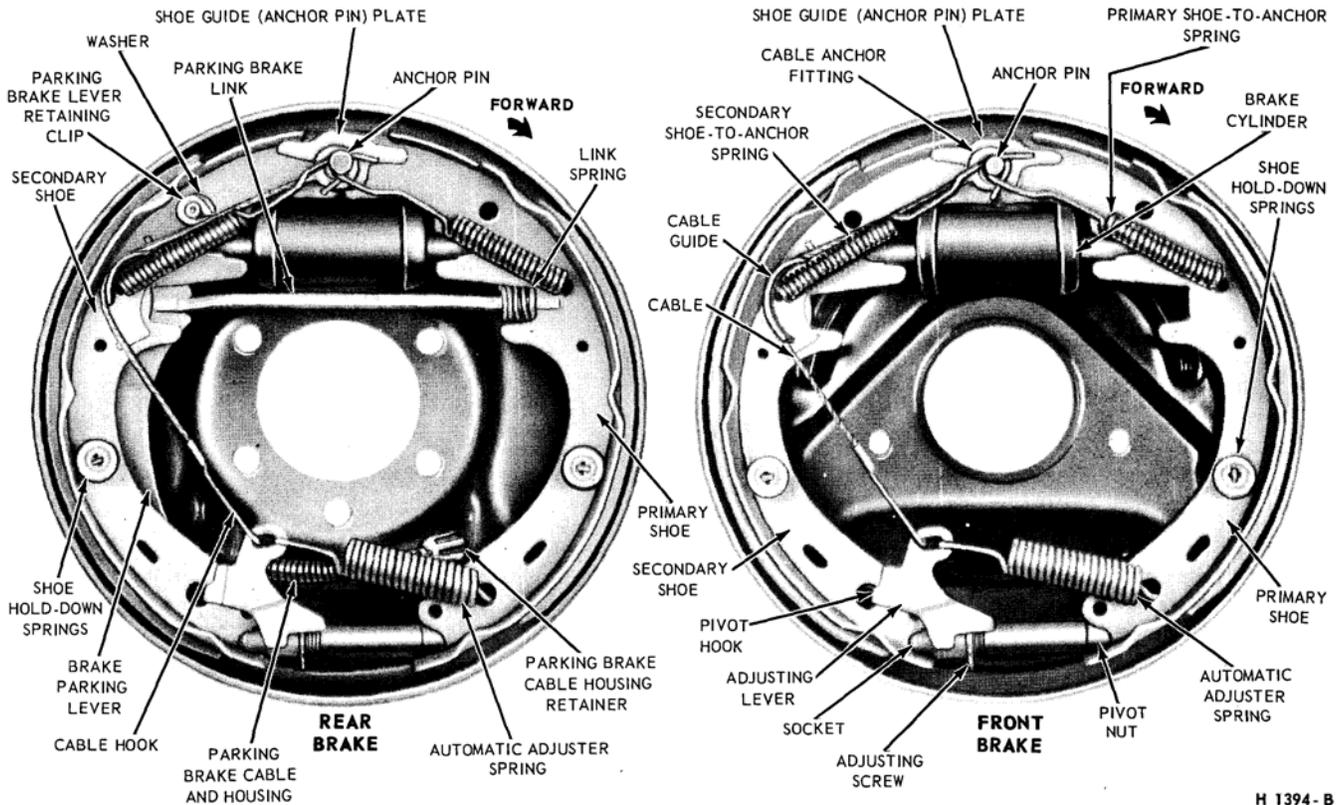
With the vehicle moving rearward and the brakes applied, the wrap-around action of the shoes following the drum forces the upper end of the primary shoe against the anchor pin. The action of the wheel cylinder moves the upper end of the secondary shoe away from the anchor pin. The movement of the secondary shoe causes the cable to pull the adjusting lever upward and against the end of a tooth on the adjusting screw star-wheel. The upward travel of the lever increases as lining wear increases. When the lever can move upward far enough, it passes over the end of the tooth and engages the tooth. When the brakes are released, the adjusting spring pulls the lever downward causing the star-wheel to turn and expand the shoes. The star-wheel is turned one tooth at a time as the linings progressively wear.

With the vehicle moving forward



H1546-A

FIG. 8—Proportioning Valve



H 1394-B

FIG. 9—Self-Adjusting Brake Assemblies

and the brakes applied, the secondary shoe is against the anchor pin and the primary shoe is moved toward the drum. Therefore, the adjuster does not operate.

The rear brake assembly is basically the same as the front brake. The conventional parking brake lever, link, and spring are used in the rear brake.

The anchor pins on all brakes are fixed and non-adjustable.

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 is the only service permitted on the brake booster. The booster unit is to be exchanged when it is inspected, checked and found to be defective.

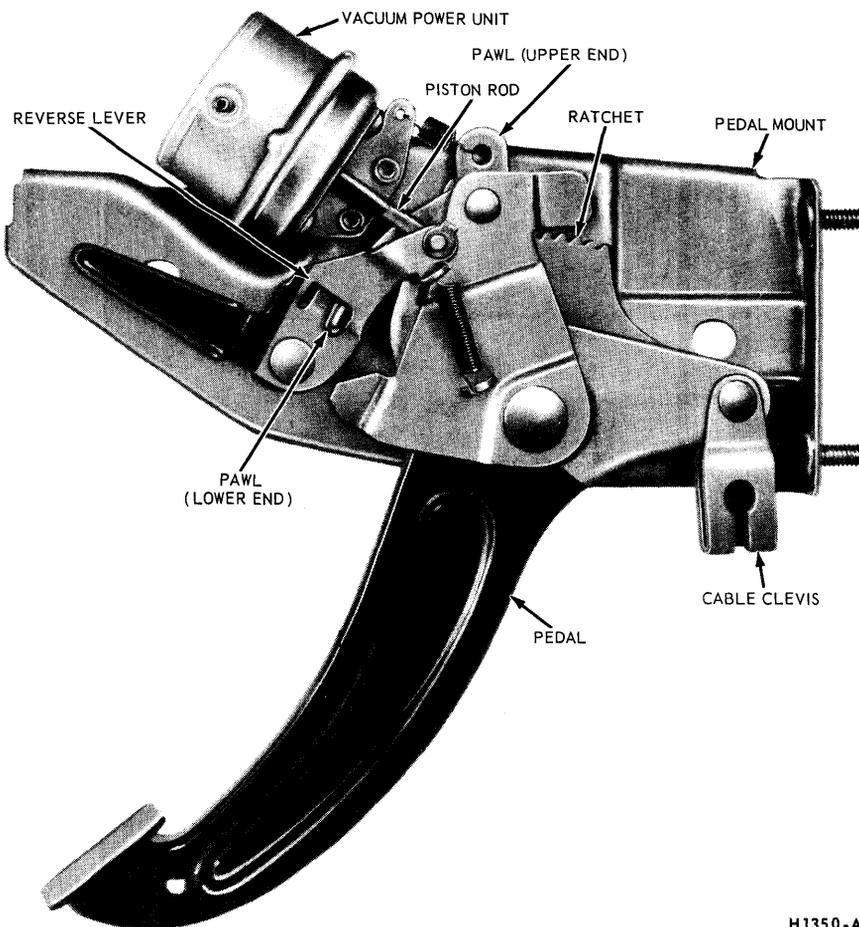
PARKING BRAKE

An independent foot-operated parking brake control actuates the rear wheel brake shoes through a cable linkage. The operating cable is routed from the parking brake control assembly to the equalizer. The rear brake cables connect the equalizer assembly to the parking brake lever at each rear secondary shoe (Fig. 9).

Two types of brake pedal control are used. The automatic (vacuum) release type (Fig. 10) is used on the Mercury Parklane. All other models use the manual release type (Fig. 11).

When the pedal is depressed (either manual or automatic release type) the secondary brake shoes are forced against the rear brake drums. The pedal is held in the applied position by the engagement of a spring-loaded pawl with a ratchet in the control assembly (Figs. 10 and 11).

Either type of parking brake control assembly is mounted to the dash panel and the instrument panel. The pedal, pivots on a stationary pedal mount. A spring-loaded pawl and a release lever are assembled to the pedal. A ratchet is assembled to the upper end of the pedal. The pawl contacts the ratchet at such an angle that the ratchet teeth will slide over the pawl as the pedal is depressed; however, when the applying motion stops



H1350-A

FIG. 10—Parking Brake Control Assembly with Automatic Release

and the pedal starts to release, the pawl engages the ratchet and thus locks the brakes in the applied position.

When the lever is pulled back on the manual release type (Fig. 11), the cam action of the lever on the pawl cam pin will disengage the pawl from the ratchet to release the brakes.

On the automatic type, the vacuum power unit will release the parking brakes automatically when the transmission selector lever is moved into any drive position with the engine running. The brakes will not release automatically, however, when the selector lever is in the neutral or park position with the engine running, or in any position with the engine off.

The power unit piston rod is attached to the release lever. Since the release lever pivots against the pawl, a slight movement of the release lever will disengage the pawl from the ratchet allowing the brakes to release. The release lever pivots on a rivet pin

in the pedal mount (Fig. 10).

The vacuum 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 to move the pawl out of engagement with the ratchet (Fig. 10). 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 (Fig. 10 and 11). Moving the transmission selector lever into any drive position with the engine running will open the release valve to connect engine manifold vacuum to one side of the actuating piston on the power unit. The pressure differential thus created will cause the piston and link to pull the release lever.

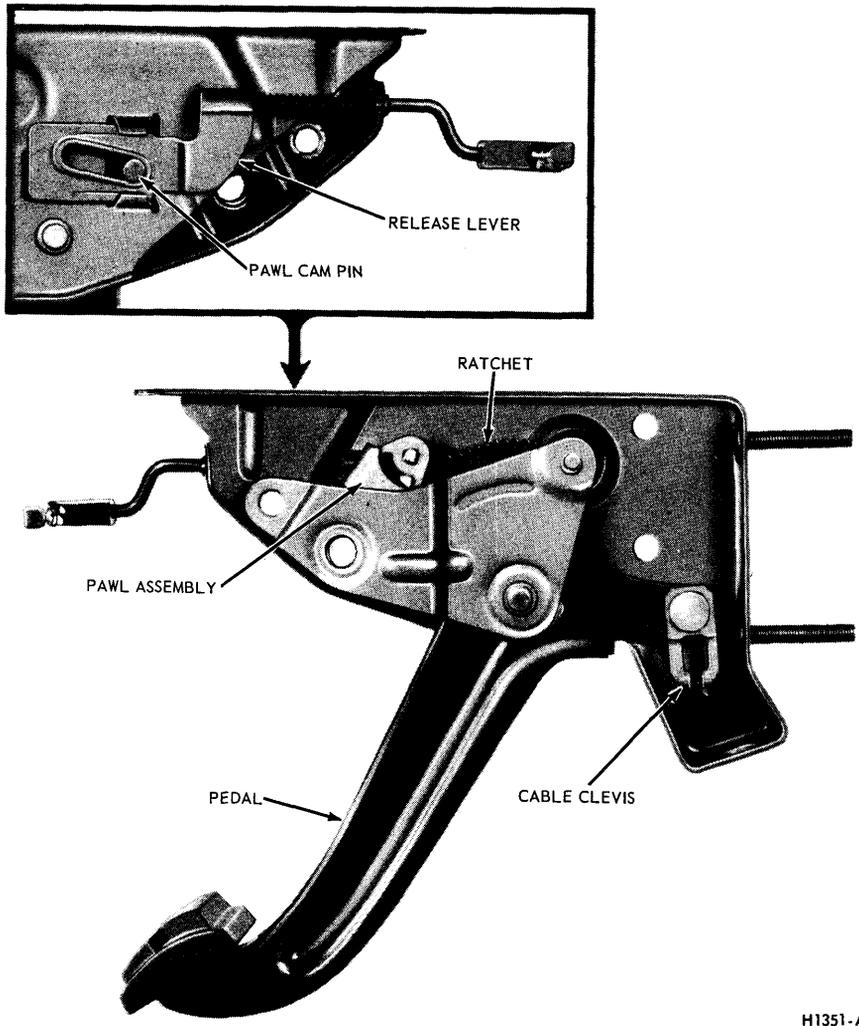


FIG. 11—Parking Brake Control Assembly—Manual Release

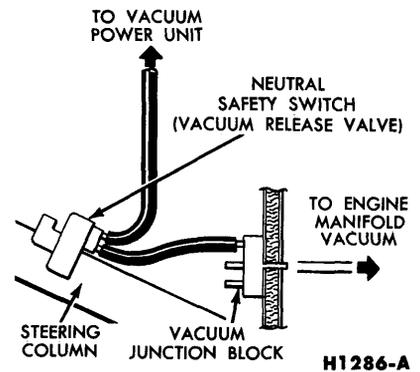


FIG. 12—Connections for Automatic Parking Brake Release

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 applications) should be avoided when driving the vehicle.

BRAKE SHOE ADJUSTMENTS

The hydraulic service 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. 13) to determine the inside diameter of the drum braking surface.

2. Reverse the tool as shown in Fig. 14 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.

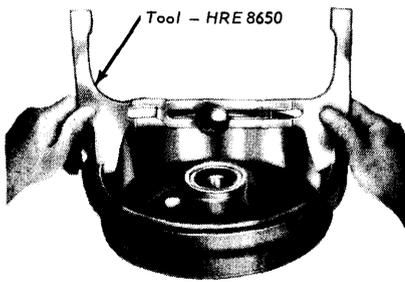
4. Apply a small quantity of high temperature grease to the points where the shoes contact the carrier plate, being careful not to get the lubricant on the linings.

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

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

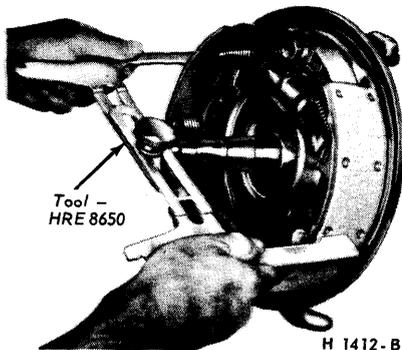
7. Complete the adjustment by applying the brakes several times with a minimum of 50 lbs pressure on the pedal while backing the car. After each stop the vehicle must be moved forward.

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.



H 1411-B

FIG. 13—Measuring Drum



H 1412-B

FIG. 14—Measuring Shoes

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.

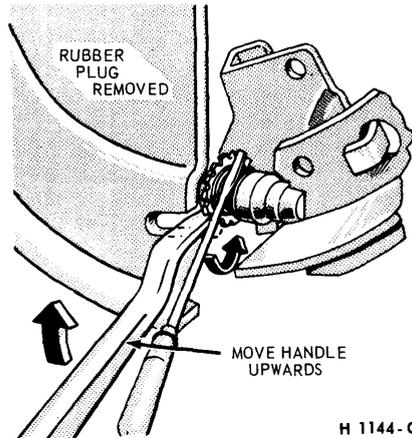
2. Remove the grease cap from the hub. Remove the cotter pin, nut lock, adjusting nut, and flat washer from the spindle. Remove the outer bearing cone and roller assembly.

3. Pull the drum off the wheel spindle.

4. If the drum will not come off, remove the rubber cover from the brake backing plate, using a punch. 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. 15). **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,



H 1144-C

FIG. 15—Backing Off Brake Adjustment

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 retainer. Pack the wheel bearings, install the inner bearing cone and roller assembly in the inner cup, and install the new grease retainer. 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 3-5, Section 2, then install the grease cap. Install the wheel and hub cap.

REAR BRAKE DRUM

REMOVAL

1. Raise the vehicle so that the wheel 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, remove the rubber cover from the backing plate. (Clean away all metal from the brake area before installing the drum). Insert a narrow screwdriver through the hole in the carrier 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. 15). **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.

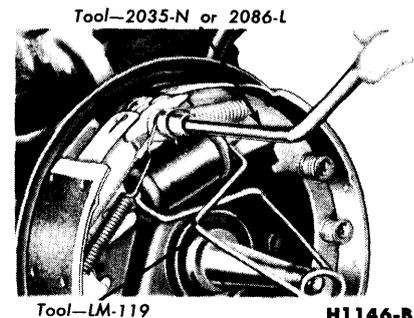
2. Adjust the brakes as outlined under Brake Shoe Adjustments in this section. Place the drum over the brake assembly and into position.

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

REMOVAL

1. With the wheel and drum removed, install a clamp over the ends of the brake cylinder as shown in Fig. 16.



Tool—LM-119

H1146-B

FIG. 16—Retracting Spring Removal

2. Remove the secondary shoe to anchor spring with the tool shown in Fig. 16. With the same tool remove the primary shoe to anchor spring and unhook the cable eye from the anchor pin.

3. Remove the shoe guide (anchor pin) plate.

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. 9).

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. Connect the parking brake cable to the parking brake lever (Fig. 9).

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

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. 17).

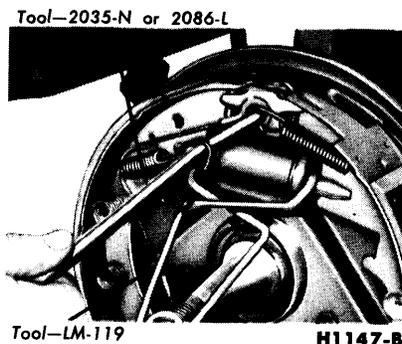


FIG. 17—Retracting Spring Installation

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. 9).

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. 17.

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 ad-

justing 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. 18). 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 a right or left brake assembly (Fig. 18).

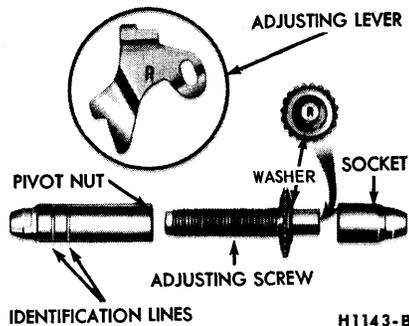


FIG. 18—Adjusting Screw and Lever Identification

12. Position the hooked end of the 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. 9).

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. 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.

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.

DISC BRAKE SHOE AND LINING REPLACEMENT

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 the square sectioned rubber piston seals are worn or damaged, they should be replaced immediately.

3. During removal and installation of a wheel assembly, exercise care not to interfere with and damage the

caliper splash shield, the bleeder screw fitting or the transfer tube.

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 bridge bolts joining the two caliper housings should not be disturbed.

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

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

9. 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.

REMOVAL

1. Remove the wheel and tire from the hub. **Be careful to avoid damage or interference with the bleeder screw fitting or transfer tube.**

2. Remove the two bolts that attach the brake shoe retaining clips, (Fig. 20).

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. 5). 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. 19).

INSTALLATION

When new shoe and lining assemblies are being installed to replace worn linings it will be necessary to push the pistons all the way into the caliper bore. This will displace fluid from the caliper into the master cylinder reservoir. Check the primary (front) brake system reservoir level and remove fluid to approximately half full before replacing brake shoes. This will prevent overflow. **Do not reuse the removed fluid.**

1. Position a new shoe and lining assembly on each side of the rotor so that the lining faces the rotor. Be sure that the tabs on the shoe flanges seat fully against the caliper bridges (Fig. 19).

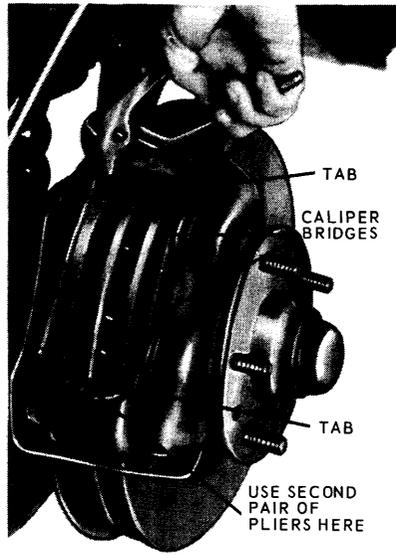


FIG. 19—Removing Disc Brake Shoe and Lining Assembly

2. Position the spring clips on the caliper and install the retaining bolts and washers.

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 on the hub.

5. Check and refill the master cylinder reservoir with specified brake fluid as required. **It should not be necessary to bleed the system after a shoe and lining replacement providing the hydraulic system has not been opened.**

6. Road test the vehicle.

DISC BRAKE CALIPER ASSEMBLY

REMOVAL

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. (Figs. 20 and 21). **Leave the steel tube connected to 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 and 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 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.

2. Install the caliper to spindle retaining bolts and torque them to specification. Install the safety wire on the bolts, (if so equipped). 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. 5).

3. Position the brake hose bracket and caliper assembly to the spindle. Install the retaining bolts and torque them to specification. Install the safety wire (if so equipped) on the bolts.

4. Connect the front wheel steel transfer tube from the caliper to the front brake hose connector. Check the hose for proper installation (Fig. 20).

5. 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.**

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

7. Road test the vehicle.

FRONT WHEEL HUB AND ROTOR ASSEMBLY—DISC BRAKES

REMOVAL

1. Remove the wheel and tire from the hub. (Fig. 20). **Be careful to avoid damage or interference with bleeder screw fitting 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 pistons from coming out of the cylinder bores while the caliper is removed.

Handle the rotor and caliper as-

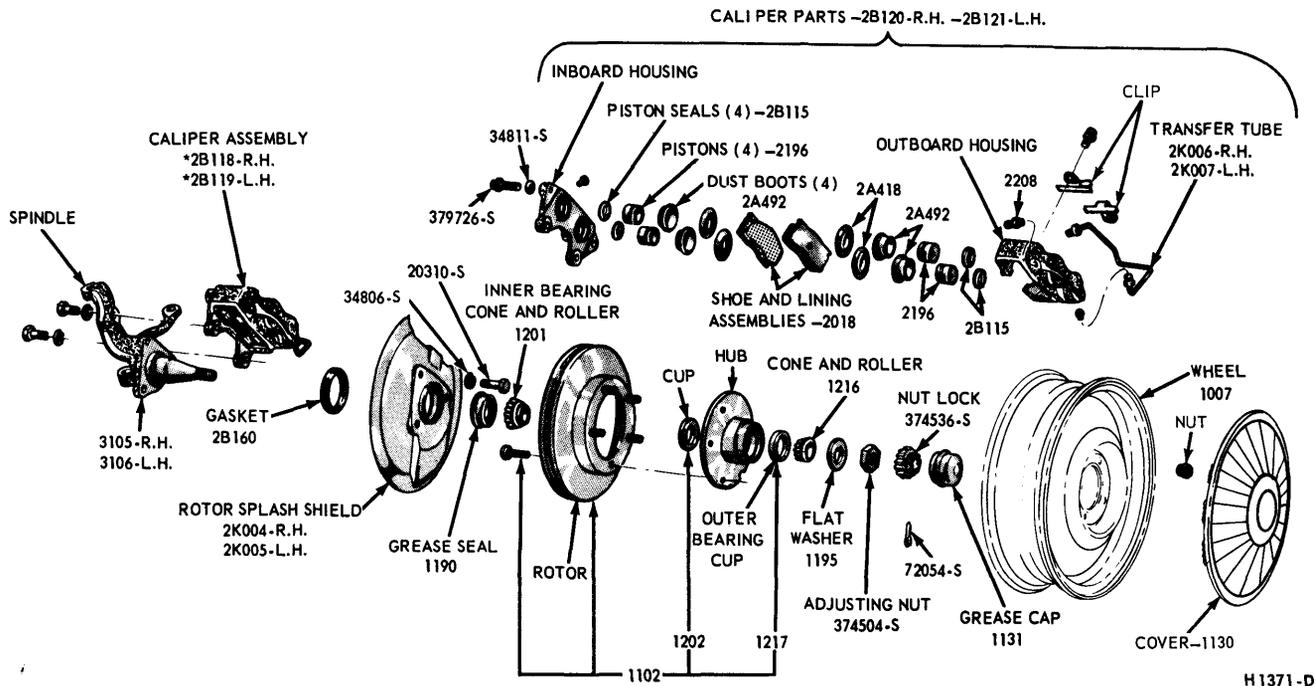


FIG. 20—Disc Brake Disassembled

semblies 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-1C75A), and install the inner bearing cone and roller assembly in the inner cup. Pack grease lightly between the lips of a new grease retainer and install the retainer (Fig. 20).

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 retainer 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 mounting bracket and torque the two attaching bolts to specification. If necessary, push the caliper pistons into the cylinder bores to obtain clearance between the shoe and lining assemblies and the rotor. Be sure that the shoe and lining assemblies are seated on the bridges. Check the flexible hose for correct routing.

6. Install the wheel and tire on the hub.

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 (Fig. 20).

INSTALLATION

1. 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 (Fig. 20).

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

PROPORTIONING VALVE

The proportioning valve is serviced as an assembly and is never adjusted or overhauled.

REMOVAL

1. Disconnect and remove the differential pressure valve to proportioning valve brake tube. (Fig. 21).

2. Disconnect the front to rear brake tube at the proportioning valve.

3. Remove the bolt attaching the proportioning valve to the frame and remove the valve.

INSTALLATION

1. Position the proportioning valve to the frame and install the attaching bolt.

2. Connect the front to rear brake tube to the valve.

3. Position and connect the differential pressure valve to proportioning valve brake tube.

4. Bleed the brake system and centralize the differential valve. (Refer to Part 2-1, Section 2 for the correct procedure.)

STANDARD OR REAR WHEEL CYLINDER REPAIR

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.

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. 22).

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. 22). Place a boot over each end of the cylinder. Bleed the brake system.

WHEEL CYLINDER REPLACEMENT

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. 21 and 23. **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 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 the rear wheel, remove the wheel cylinder attaching bolts and lock washers and remove the cylinder. On the front wheel, 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. To install a front cylinder:

a. 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.

b. Install a new copper gasket over the hose fitting. Thread the hose assembly into the cylinder.

c. 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.

2. To install a rear cylinder:

a. 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.

b. Secure the cylinder to the carrier plate by installing the attaching bolts and lock washers.

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

3. 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.

4. 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.

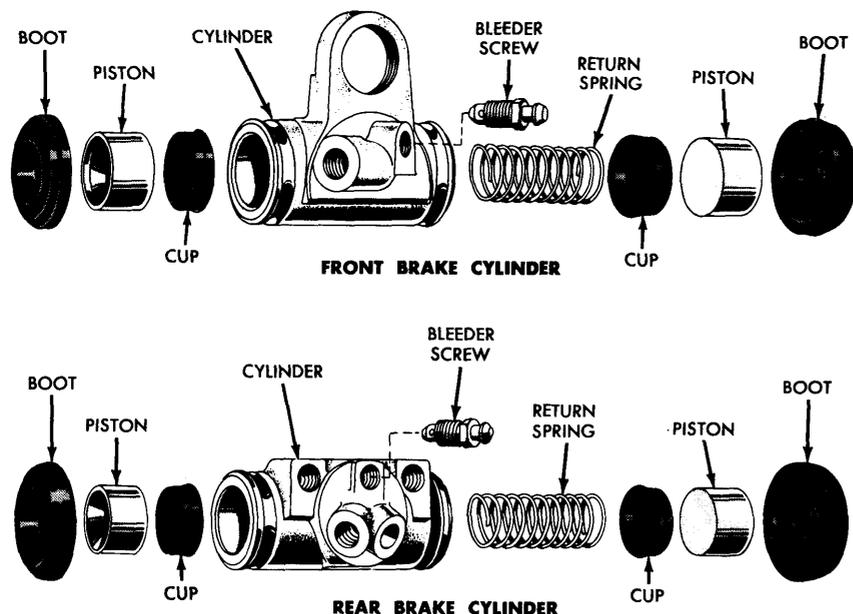
BRAKE BACKING PLATE REPLACEMENT

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. Remove the backing plate and gasket.



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FIG. 22—Front and Rear Wheel Cylinders

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. Install the rear axle shaft for the 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.

HYDRAULIC LINES

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. 21 and 23).

Always bleed the applicable primary or secondary brake system after primary or secondary brake system hose or line replacement. Centralize the brake system after bleeding the brake 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 brake 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. 21 and 23).

A rear brake hose should be installed so that it does not touch the muffler outlet pipe or shock absorber.

Place a new gasket over the rear hose fitting and 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

DUAL MASTER CYLINDER—STANDARD BRAKES

REMOVAL

Refer to Fig. 24.

1. Working from inside the car below the instrument panel, disconnect the master cylinder push rod from the brake pedal assembly.

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 of 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 that secure the master cylinder to the dash panel and lift the cylinder forward and upward from the car.

INSTALLATION

Refer to Fig. 24.

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 mounting studs on the dash panel.

2. Install the lock nuts on the studs 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 hairpin 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 to 1/2 inch of the dual reservoirs. Use Rotunda Brake Fluid—Extra Heavy Duty—Part Number C6AZ-19542-A (ESA-M6C25-A) for disc brake applications, and Rotunda Brake Fluid—Part Number B7AZ-19542-A, R 103-A or equivalent for power drum

and standard brake applications. **The disc 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 the proper procedure.

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

DUAL MASTER CYLINDER—POWER BRAKES

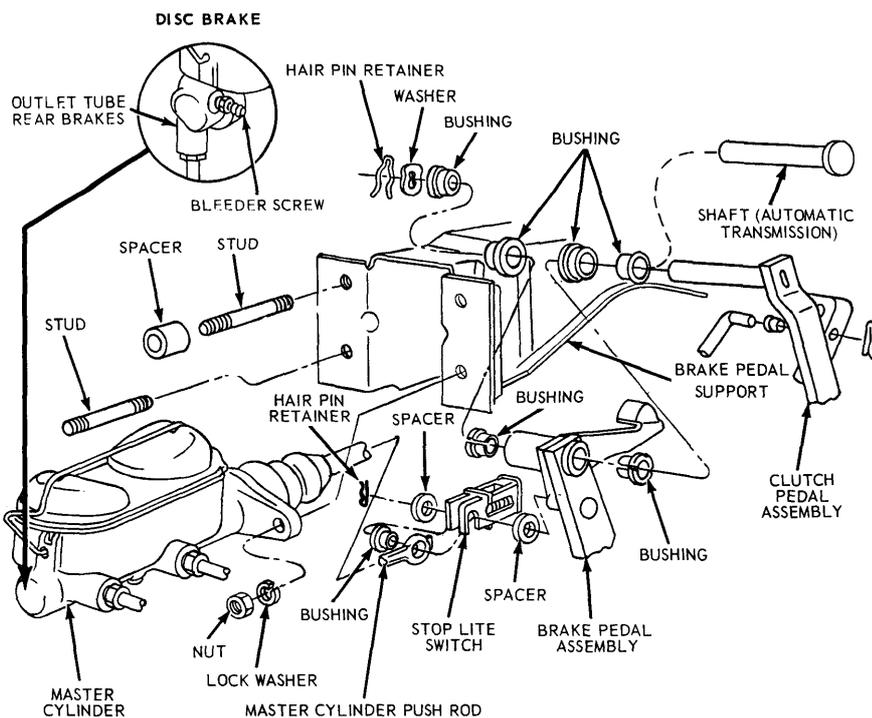
Refer to Fig. 25.

REMOVAL

1. Remove the brake tubes from the primary and secondary outlet ports of the master cylinder.

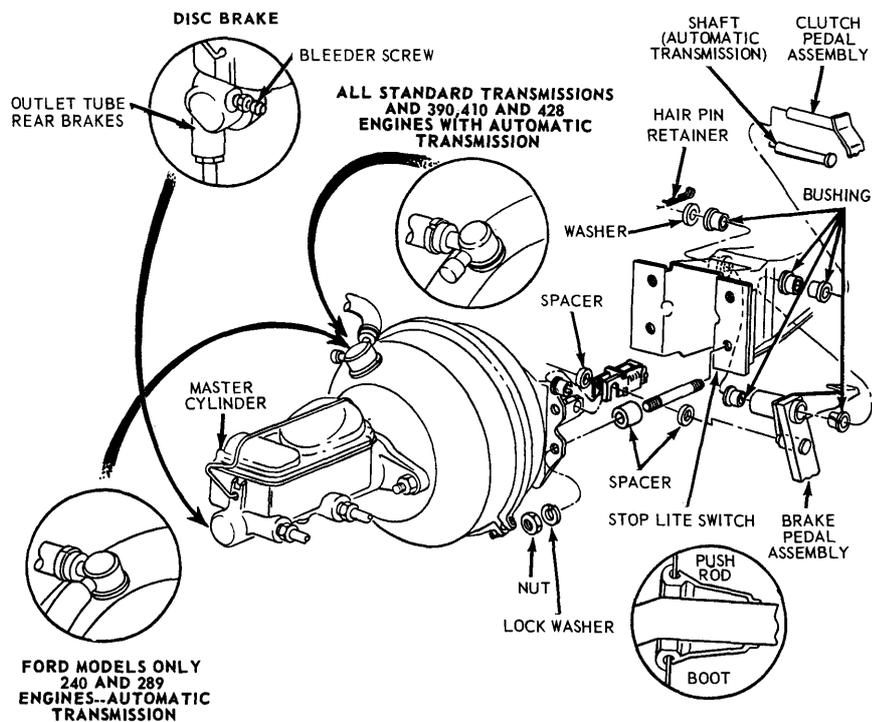
2. Remove the two nuts and two lockwashers attaching the master cylinder to the brake booster assembly.

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



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FIG. 24—Master Cylinder Installation—Standard Brakes



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FIG. 25—Master Cylinder Installation—Power Brakes

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.

3. Install the attaching nuts and lockwashers 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 to 1/2 inch of the top of the dual reservoirs. Use Rotunda Brake Fluid—Extra Heavy Duty—Part Number C6AZ-19542-A (ESA-M6C25-A) for disc brake applications, and Rotunda Brake Fluid—Part Number B7AZ-19542-A, R 103-A or equivalent for power drum and standard brake applications. **The disc brake system fluid is colored blue for identification. Do not mix low temperature brake fluids with the specified fluid for the disc brake system.**

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 ASSEMBLY

Refer to Figs. 21 and 23.

REMOVAL

1. Disconnect the brake warning light wire from the pressure differential valve assembly switch. **To prevent damage to the brake warning switch wire connector, expand the plastic lugs to allow removal of the shell-wire connector from the switch body.**

2. Loosen the tube nut connecting the primary (front brake) system inlet tube at the top of the pressure differential valve assembly and disconnect the tube.

3. Disconnect the primary system left front brake outlet tube from the top side of the pressure differential

valve assembly.

4. Disconnect the primary system right front brake outlet tube from the top side of the differential valve assembly.

5. Disconnect the secondary (rear brake) system inlet tube at the lower side of the pressure differential valve assembly.

6. Disconnect the secondary system rear brake outlet tube from the lower side pressure differential valve assembly.

7. Remove the screw retaining the pressure differential valve assembly to the frame side rail and remove the valve assembly.

8. 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 and the brake warning lamp switch are separate units and each is serviced as a separate assembly only.**

INSTALLATION

1. Mount the pressure differential valve assembly on the frame side rail and tighten the attaching screw.

2. Connect the rear brake system inlet tube to the pressure differential valve assembly and tighten the tube nut to the specified torque (Refer to Part 2-3).

3. Connect the rear brake system outlet tube to the pressure differential valve assembly. Tighten the tube nut to the specified torque.

4. Connect the front brake system inlet tube to the pressure differential valve assembly and tighten the tube nut to the specified torque.

5. Connect the right front brake outlet tube to the pressure differential valve assembly. Tighten the tube nut to the specified torque.

6. Connect the left front brake outlet tube to the pressure differential valve assembly. Tighten the tube nut to the specified torque.

7. 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.**

8. Bleed the brakes and centralize the pressure differential valve.

BOOSTER UNIT

REMOVAL

1. Working from inside the vehicle below the instrument panel, disconnect the booster push rod link 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 lift the switch straight **upward** from the pin. Be careful not to damage the switch during removal. Slide the master cylinder push rod and the nylon washers and bushing off the brake pedal pin (Fig. 25).

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 from the booster unit. If the vehicle is equipped with an automatic transmission disconnect the transmission vacuum unit hose.

4. Remove the four bracket-to-dash panel attaching nuts (Fig. 25). Remove the booster and bracket assembly from the dash panel, sliding the push rod link out from the engine side of the dash panel. Remove the four spacers.

5. Remove the push rod link boot from the dash panel.

INSTALLATION

1. Install the push rod link boot in the hole in the dash panel as shown in Fig. 25. Install the four spacers on the mounting studs.

2. Mount the booster and bracket assembly to the dash panel by sliding the bracket onto the mounting studs and the push rod link in through the hole and boot in the dash panel. Install the bracket-to-dash panel attaching locknuts (Fig. 25).

3. Connect the manifold vacuum hose to the booster. If the vehicle is equipped with an automatic transmission connect the transmission vacuum unit hose.

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 retaining 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 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, and install the nylon washer as shown in Fig. 25. **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—MANUAL SHIFT TRANSMISSION

REMOVAL

1. Disconnect the clutch pedal-to-equalizer rod at the clutch pedal by removing the hairpin type retainer and bushing (Figs. 24 and 25).

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

3. 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 push rod and the nylon washers and bushing off the brake pedal pin (Figs. 24 and 25).

4. Remove the hairpin type retainer and washer from the clutch and brake pedal shaft. Remove the clutch pedal and shaft, the brake pedal, and the bushings from the pedal support bracket (Figs. 24 and 25).

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 through the support bracket and brake pedal. Install the washer and retainer (Figs. 24 and 25).

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, and install the nylon washer as shown in Figs. 24 and 25. **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. Connect the clutch pedal-to-equalizer rod to the clutch pedal assembly with the bushing and hairpin retainer. Apply SAE 10 engine oil to the bushing. Adjust the clutch pedal free play (Group 5) to specification if required. Check the Brake Pedal Free Height and Travel Measurements (Part 2-1, Section 1).

BRAKE PEDAL—AUTOMATIC TRANSMISSION

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 push rod and the nylon washers and bushing off the brake pedal pin (Figs. 24 and 25).

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. 24 and 25).

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 spring washer and retainer.

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, and install the nylon washer as shown in Figs. 24 and 25. **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, Section 1.

PARKING BRAKE CONTROL ASSEMBLY

REMOVAL

1. Remove the two nuts attaching the control assembly to the dash panel (Fig. 26).

2. Remove the bolt attaching the control assembly to the instrument panel.

3. Disconnect the hose to the parking brake vacuum unit, when so equipped.

4. Remove the cable retainer clip from the cable end and disconnect the cable from the control.

5. Remove the control assembly from the car.

INSTALLATION

1. Position the control in the approximate final position.

2. Fit the cable through its mounting hole and install the retaining clip.

3. Connect the vacuum hose to the parking brake unit, when so equipped.

4. Install the attaching bolt to the instrument panel. Do not tighten.

5. Install the two attaching nuts on the control assembly bracket on the engine side of the dash panel.

6. Torque all nuts and bolts to specifications.

7. Adjust parking brake cable tension, and check operation, as outlined in Part 2-1, Section 2.

PARKING BRAKE TO EQUALIZER CABLE

Refer to Fig. 26.

REMOVAL

1. Raise the vehicle on a hoist.

2. Loosen the parking brake cable adjusting nut at the equalizer.

3. Remove the cable from the fold-over tab on the underbody. Remove spring retainer clip.

4. Remove hairpin clip retaining cable to the frame.

5. From inside of passenger compartment, remove hairpin clip retaining 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 vehicle openings and position it 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. Install the spring retainer clip. Position cable in the foldover tab on the underbody.

6. Position the cable thru the equalizer and install the cable adjusting nut.

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

8. Lower vehicle on hoist.

PARKING BRAKE EQUALIZER TO REAR WHEEL CABLE

Refer to Fig. 26.

REMOVAL

1. Raise the vehicle and loosen the parking brake equalizer rod adjusting nut. Disconnect the equalizer from the rear cables.

2. Compress the prongs on the left-hand cable-to-frame side member retainer so the prong can pass through the side-member. Remove the clip that attaches the left-hand cable to the left-hand lower arm. Pull the cable thru the frame left side member.

3. Compress the prongs on the right hand cable-to-frame side member retainer bracket so the prong can pass through the bracket. Remove the clips retaining the right-hand 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 hand cable and position the cable the retaining bracket on the frame side member. Tighten all retaining clip screws.

4. Position the left hand cable,

retaining clip and screw on the left-hand lower suspension arm. Compress the prongs on the left hand 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 that 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).

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 re-finished diameter must not exceed 0.060 inch oversize (11.090 inches).

If the drum diameter is less than 0.030 inch oversize (11.060 inches) after refinishing, standard lining may be installed. If the drum diameter is 11.060-11.090 inches, oversize linings 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 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 0.002 inch total indicator reading, and the surface finish of the braking surfaces are to be 85/15 micro inches. The minimum limiting dimensions (Fig. 8, Part 2-1) from the inboard bearing cup to the outboard rotor face (dimension A) and from the inboard bearing cup to the inboard rotor face (dimension B) must be observed when removing material from the rotor braking surfaces.

BRAKE SHOE RELINING

Brake linings that are worn to within 1/32 inch of the rivet 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 car.**

Inspect brake shoes for distortion, cracks, or looseness. If this condition exists, the shoe must be discarded. **Do not 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 11.030 inches, standard lining may be installed. If the diameter is 11.060-11.090 inches, 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. Install all parts supplied in the kit. **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.

2. Remove the secondary piston stop bolt from the bottom of the cylinder (Figs. 27 and 28).

3. Remove the bleed screw, if required.

4. Remove the snap ring from the retaining groove at the rear of the master cylinder bore (Fig. 28). 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 retainer, primary cup and protector**

on the primary piston. This assembly is factory pre-adjusted and should not be disassembled.

5. Remove the secondary piston, pumping cups and protectors, primary cup, primary cup retainer and the secondary piston return spring. **Do not remove the outlet tube seats, outlet check valves and outlet check valve springs from the master cylinder body.**

INSPECTION AND REPAIR

1. Clean all parts in clean denatured alcohol, and inspect the parts for chipping, excessive wear or damage. Replace them as required. **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. Install the seal and pumping cup on the secondary piston (Figs. 27 and 28). Install the protector and brake master cylinder primary cup on the secondary piston, then install the primary cup retainer and secondary piston return spring on the secondary piston. **Care must be taken to assure the protector is installed.**

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

4. Install the primary piston and return spring assembly in the master cylinder bore.

5. Install the push rod retainer on the push rod, if so equipped. Install the push rod assembly in the cylinder bore. **Make sure the retainer is prop-**

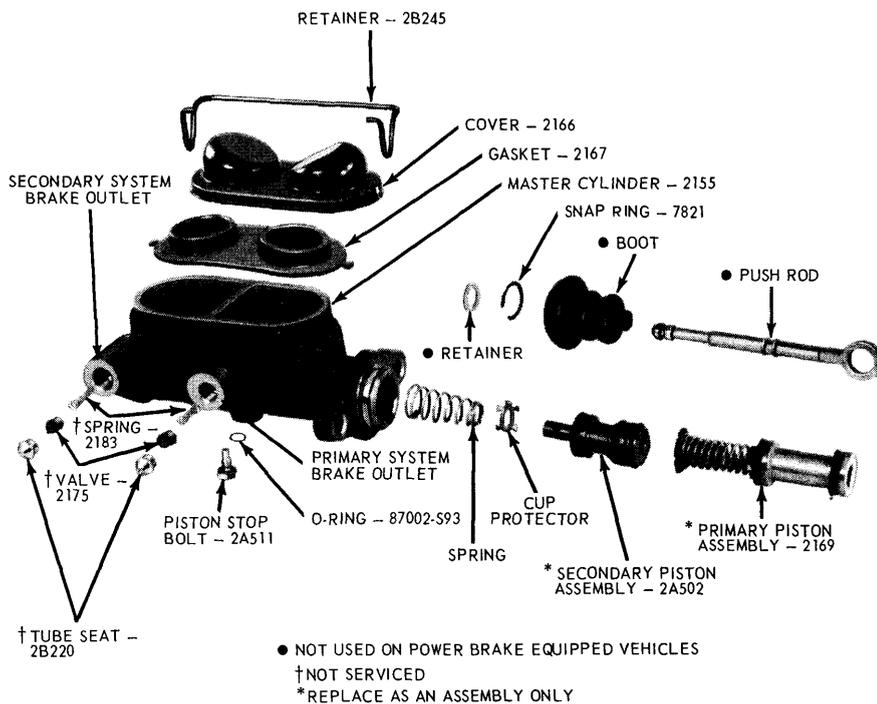


FIG. 27—Dual Master Cylinder Disassembled—Except Disc Brakes

H 1499-B

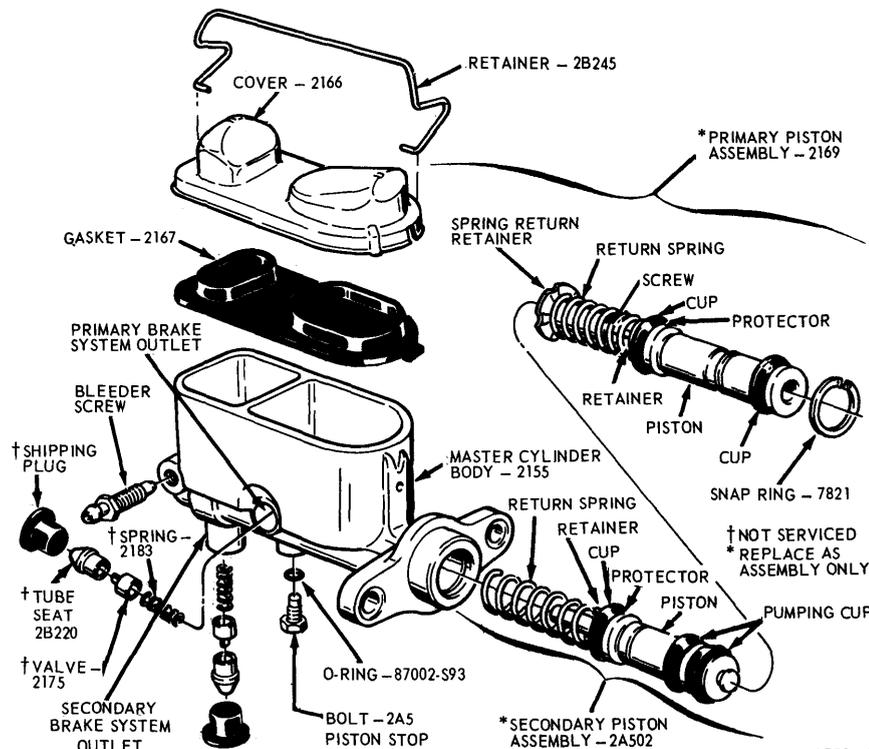
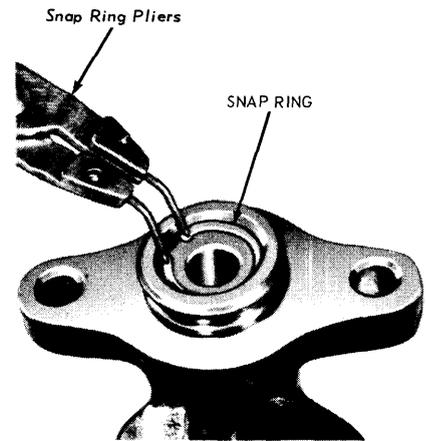


FIG. 28—Dual Master Cylinder Disassembled—Disc Brakes

H 1550-A



H1477-B

FIG. 29—Removing Snap Ring—Typical

erly seated and holding the push rod securely.

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

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

8. Install the secondary piston stop bolt and gasket in the bottom of the master cylinder.

9. Install the bleed screw (if so equipped). Install the gasket (diaphragm) in the master cylinder filler cover. Position the gasket as shown in Figs. 27 and 28. **Make sure the gasket is securely seated.**

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

DISC BRAKE CALIPER

DISASSEMBLY

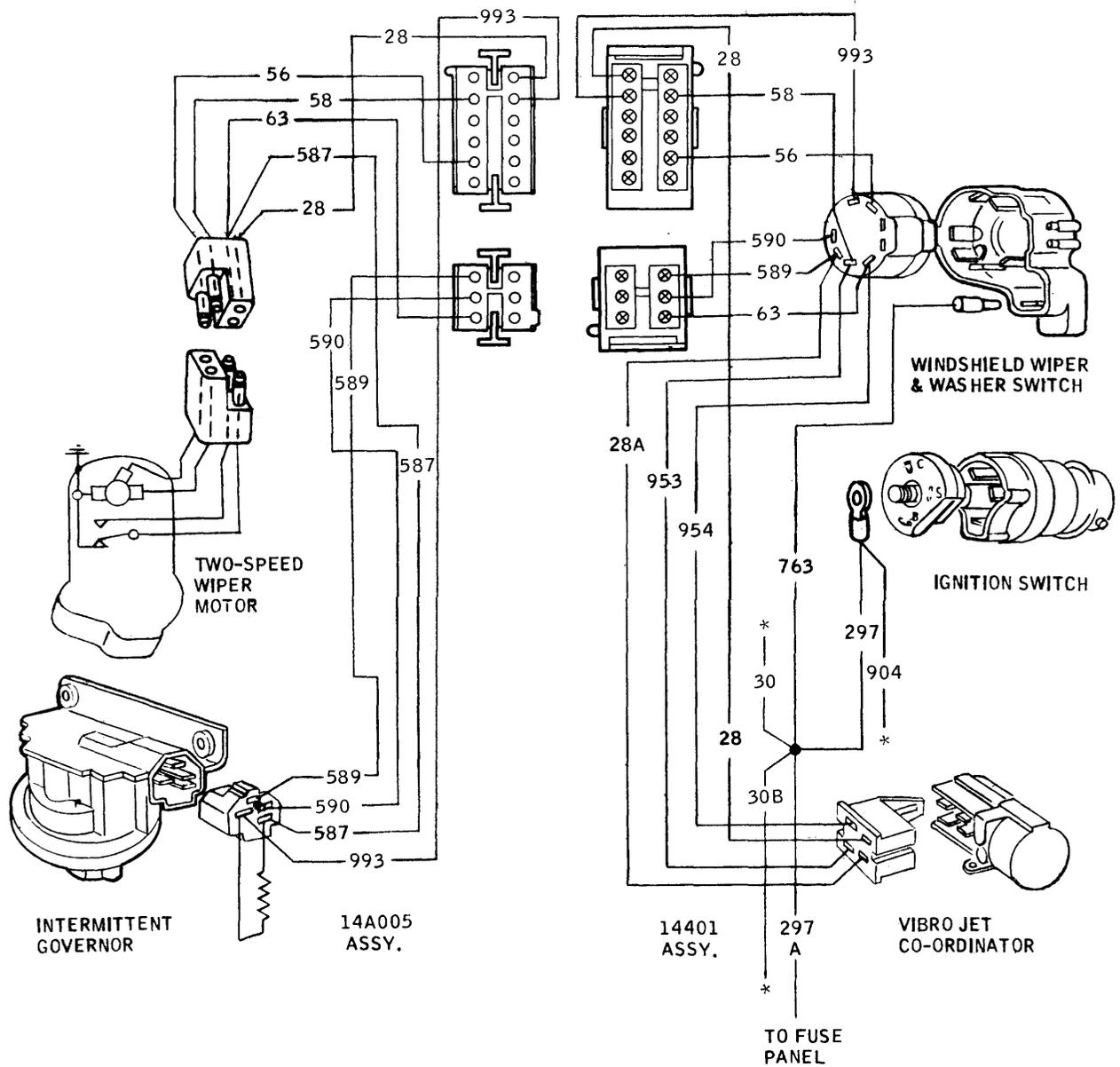
Do not remove the bridge bolts that hold the two halves of the caliper together. The two caliper housings are shown separated in Fig. 22 for illustration purposes only.

1. Remove the caliper assembly from the vehicle as outlined in Section 2.

2. Remove the two attaching bolts and the caliper splash shield (Fig. 30).

3. Remove the two shoe and lining assemblies.

4. Remove the flexible brake hose from the caliper.



WIRING COLOR CODE

28	28-A	BLACK
	56	BLUE
	58	WHITE
	63	RED
30	30B	297A
	954	297
		587
		589
		590
		763
		953
		993
		904

*NOTE:
WIRE FUNCTION NOT APPLICABLE
TO THIS CIRCUIT

FIG. 33—Mercury Intermittent Windshield Wiper and Washer