1964 COMET and FALCON SHOP MANUAL

1964 Ford Car Shop Manual
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1964

COMET-FALCON

SHOP MANUAL

SERVICE DEPARTMENT
FORD DIVISION
Ford MOTOR COMPANY

FIRST PRINTING—SEPTEMBER, 1963

GROUP INDEX

SPECIFICATIONS AT END OF EACH GROUP

FOREWORD

This shop manual provides the Service Technician with complete information for the proper servicing of the 1964 Comet and Falcon cars.

The information 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 DEPARTMENT

FORD MOTOR COMPANY

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September 1997

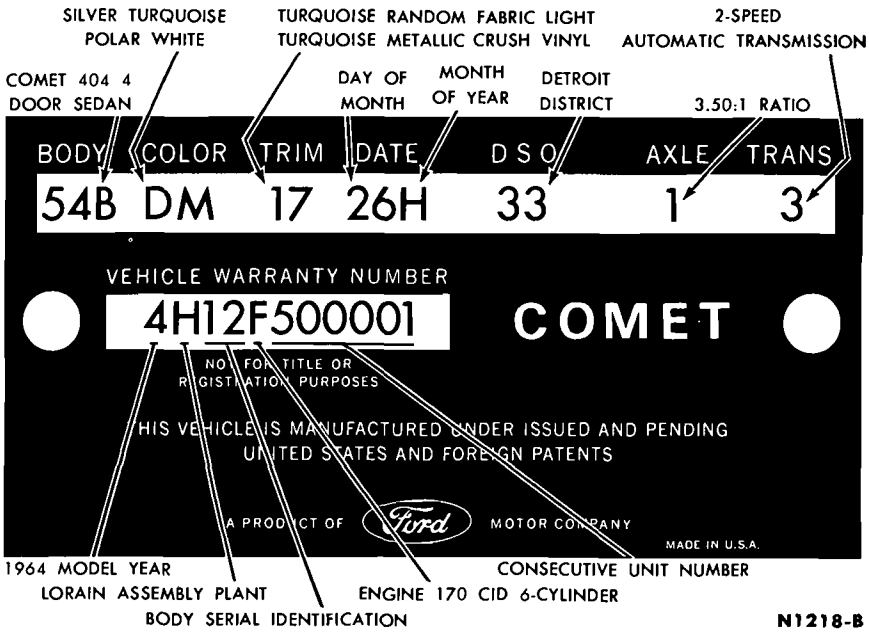


FIG. 1—1964 Comet Warranty Plate

Figure 1 illustrates the 1964 Comet warranty plate. The plate is located on the rear face of the left front door panel.

The official Vehicle Identification Number for title and registration purposes is stamped on the left fender apron (Fig. 2). Do not use the "Vehicle Warranty Number" which appears on the warranty plate for title or registration purposes.

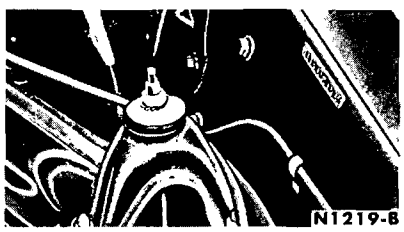


FIG. 2—1964 Comet Vehicle Identification Number Location

VEHICLE DATA

Example (Fig. 1)

(54B DM 17 26H 33 1 3)

54B	4-Door Sedan
DM	Silver Turquoise and Polar White
17	Turquoise Random Fabric Light Turquoise Metallic Crush Vinyl
26H	26th Day August
33	Detroit District
1	3.00:1 Ratio
3	2-Speed Automatic

ASSEMBLY PLANT CODES

Code	Assembly Plant
H	Lorain
J	Los Angeles
T	Metuchen
S	Pilot Plant

MODEL AND BODY STYLE CODES

Serial Code	Body Code	Body Type	Model
02	54A	4-Door Sedan (Bench)	Comet 202
01	62A	2-Door Sedan (Bench)	
12	54B	4-Door Sedan (Bench)	Comet 404
11	62B	2-Door Sedan (Bench)	
11	62C	2-Door Sedan (Bucket)	
32	71A	4-Door Wagon (Bench)	Comet 202 Station Wagon
34	71B	4-Door Wagon (Bench)	Comet 404 Station Wagon
36	71C	4-Door Woodrail Wagon (Bench)	
22	54C	4-Door Sedan (Bucket)	
22	54D	4-Door Sedan (Bench)	
23	63C	2-Door Hardtop (Bucket)	Comet Caliente
23	63D	2-Door Hardtop (Bench)	
23	63E	2-Door Hardtop (Bucket)	
25	76B	2-Door Convertible (Bucket)	
25	76D	2-Door Convertible (Bench)	

COLOR CODES

A single-letter code designates a solid body color and two letters denote a two-tone—the first letter, the lower color and the second letter, the upper color.

Code	M-30-J/ M-32-J/*	Color	Sales Name
A	1724	Black	Onyx
B	1638	Peacock	Peacock
D	1625	Medium Turquoise Metallic	Silver Turquoise
F	1622	Medium Blue Metallic	Pacific Blue
G	1636	Buff	Palomino
J	1515	Red	Carnival Red
K	1621	Silver Blue Metallic	Anniversary Silver
M	1619	White	Polar White
R	1633	Yellow	Yellow Mist
T	1631	Light Beige	Fawn
X	1632	Maroon Metallic	Burgundy
Y	1623	Light Blue	Glacier Blue
Z	1630	Medium Beige Metallic	Platinum Beige

*"M-32-J" Acrylic Paint Alternate with "M-30-J".

TRIM CODES

A two-digit number indicates the type of trim and trim color.

If, due to unavailability or other difficulties in production, a particular trim set is not intended for service (minor deviation from intended trim), the warranty plate code will be followed with a numerical designation—For example: 52-1, 52-2.

If the trim set is serviced directly, the warranty plate code will bear an alphabetical suffix—For example: 52-A, 52-B.

Code	Trim Schemes
	Random Fabric and Crush Vinyl
12	Blue — Light Blue Metallic
14	Beige — Light Beige Metallic
16	Black — Black
17	Turquoise — Light Turquoise Metallic
	Bright Check Fabric and Crush Vinyl
21	Silver Blue — Light Silver Blue Metallic
22	Blue — Light Blue Metallic
24	Beige — Light Beige Metallic
26	Black — Black
27	Turquoise — Light Turquoise Metallic
	Crush Vinyl (•) Crinkle
32	Light Blue Metallic
35	Red
36	Black
37	Light Turquoise Metallic
39	Medium Palomino (•)
	Block Stripe Fabric and Crush Vinyl
42	Blue — Light Blue Metallic
44	Beige — Light Beige Metallic
46	Black — Black
	Crush Vinyl (•) Crinkle
62	Light Blue Metallic
65	Red
66	Black
67	Light Turquoise Metallic
69	Medium Palomino (•)
	Crush Vinyl (•) Crinkle
72	Medium and Light Blue Metallic
75	Red
76	Black
79	Medium Palomino (•)
	Crinkle Vinyl
89	Medium Palomino

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

DSO AND DISTRICT CODES

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.

Code	District	Code	District
11	Boston	34	Detroit
12	Philadelphia	41	Chicago
13	New York	44	St. Louis
14	Washington	45	Twin Cities
21	Atlanta	51	Denver
22	Dallas	52	Los Angeles
24	Jacksonville	53	Oakland
25	Memphis	54	Seattle
31	Buffalo	81	Ford of Canada
32	Cincinnati	84	Home Office Reserve
33	Cleveland	90-99	Export

REAR AXLE RATIO CODES

A number designates a conventional axle, while a letter designates an Equa-Lock differential.

Code	Ratio
1	3.00:1
3	3.20:1
4	3.25:1
5	3.50:1
6	2.80:1

TRANSMISSION CODES

Code	Type
1	3-Speed Manual
3	2-Speed Automatic
4	Dual Range 3-Speed Automatic
5	4-Speed Manual

VEHICLE WARRANTY NUMBER

Example (Fig. 1): 4H 12F 500001

4	1964 Model Year
H	Lorain Pilot Plant Assembly
12	4-Door Sedan
F	8-Cylinder, 260 Cubic Inch Disp.
500001	First Unit Built (Consecutive Unit No.)

MODEL YEAR CODE

The numeral "4" designates 1964.

ENGINE IDENTIFICATION CODES

Code	Engine
U	6-Cylinder 170 Cubic Inch
T	6-Cylinder 200 Cubic Inch
F	8-Cylinder 260 Cubic Inch
K	8-Cylinder 289 Cubic Inch
*4	6-Cylinder 170 Cubic Inch
*6	8-Cylinder 260 Cubic Inch

*Low Compression.

CONSECUTIVE UNIT NUMBER

Each model year, each assembly plant begins production with the number 500001 and continues on for each car built.

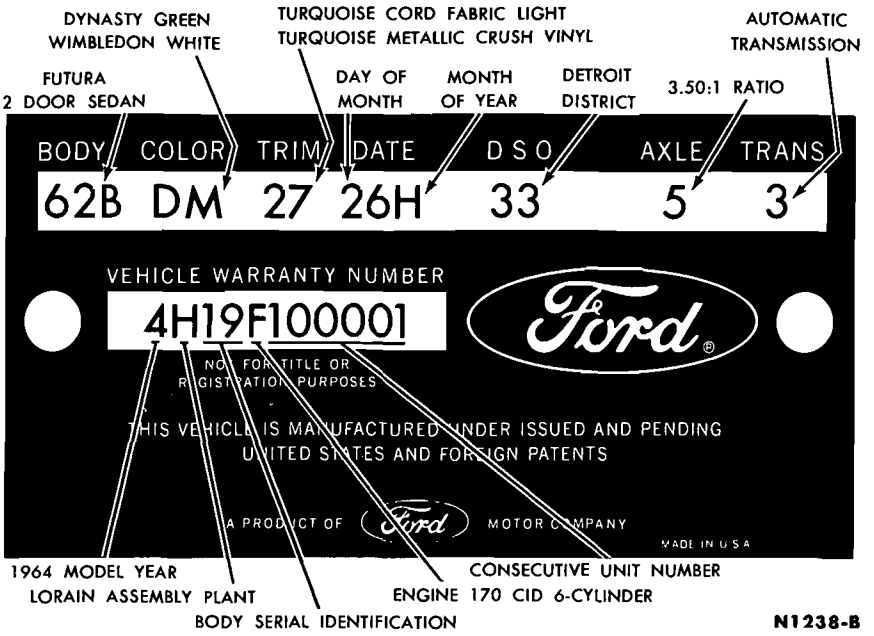


FIG. 3—1964 Falcon Warranty Plate

Figure 1 illustrates the 1964 Falcon Warranty Plate. The plate is located on the rear face of the left front door panel.

The official Vehicle Identification Number for title and registration purposes is stamped on the left cowl-to-front-spring pocket strut (Fig. 4). Do not use the "Vehicle Warranty Number" which appears on the Warranty plate for title or registration purposes.

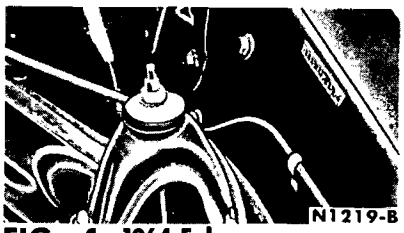


FIG. 4—1964 Falcon Vehicle Identification Number Location

VEHICLE DATA

Example (Fig. 3):

(62B DM 27 26H 33 5 3)

62B.....Futura 2-Door Sedan
DM.....Dynasty Green and Wimbledon White
27.....Turquoise Cord Fabric
Light Turquoise Met. Crush Vinyl
26H.....26th Day August
33.....Detroit District
5.....3.50:1 Ratio
3.....2-Speed Automatic

ASSEMBLY PLANT CODES

Code	Assembly Plant
A	Atlanta
H	Lorain
K	Kansas City
R	San Jose
S	Pilot Plant
T	Metuchen

MODEL AND BODY STYLE CODES

Serial Code	Body Code	Body Type	Model
02	54A	4-Door Sedan	
02	54D	4-Door Sedan (RPO)	Standard Sedan
01	62A	2-Door Sedan	
01	62D	2-Door Sedan (RPO)	
16	54B	4-Door Sedan ((Bench)	
19	62B	2-Door Sedan (Bench)	
17	63B	2-Door Hardtop (Bench)	
11	63C	2-Door Hardtop (RPO Bucket)	Futura
13	63D	2-Door Hardtop Sprint (RPO Bucket)	
15	76A	Convertible (Bench)	
12	76B	Convertible (RPO Bucket)	
14	76D	Convertible Sprint (RPO Bucket)	
21	59A	2-Door Wagon	
22	71A	4-Door Wagon	Station Wagons
24	71B	4-Door Wagon Deluxe	
26	71C	4-Door Squire	
27	66A	2-Door Standard Ranchero	Ranchero
27	66B	2-Door Deluxe Ranchero	
29	78A	Standard Sedan Delivery	Sedan Delivery
29	78B	Deluxe Sedan Delivery	

COLOR CODES

A single letter code designates a solid body color and two letters denote a two-tone—the first letter, the lower color and the second letter, the upper color.

Code	M-30-J/ M-32-J#	Color	Sales Name
A	1724	Black	Raven Black
D	1625	Medium Turquoise Metallic	Dynasty Green
F	1622	Medium Blue Metallic	Guardsman Blue
G	1636	Buff	Prairie Tan
J	1515	Red	Rangoon Red
K	1621	Silver Mink Metallic	Silvermore Gray
M	1619	White	Wimbledon White
X	1632	Maroon Metallic	Vintage Burgundy
Y	1623	Light Blue	Skylight Blue
Z	1630	Medium Beige Metallic	Chantilly Beige

#"M-32-J" Acrylic Paint Alternate with "M-30-J".

TRIM CODES

Code	Trim Schemes
	Band Fabric and Crush Vinyl
12	Blue — Light Blue Metallic
14	Beige — Light Beige Metallic
15	Red — Red
	Cord Fabric and Crush Vinyl
22	Blue — Light Blue Metallic
24	Beige — Light Beige Metallic
25	Red — Red
27	Turquoise — Light Turquoise Metallic
	Steerhead Vinyl
44	Medium Beige — Light Beige Metallic
	Crush Vinyl (Bench) (•) Crinkle
62	Medium & Light Blue Metallic
64	Beige & Light Beige Metallic
65	Red
66	Black
67	Medium & Light Turquoise Metallic
69	Medium Palomino (•)
	Crush Vinyl (Bucket) (•) Crinkle
82	Medium & Light Blue Metallic
85	Red
86	Black
87	Medium & Light Turquoise Metallic
89	Medium Palomino (•)

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

DSO AND DISTRICT CODES

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.

Code	District	Code	District
11	Boston	26	Washington
12	Buffalo	31	Cincinnati
13	New York	32	Cleveland
14	Pittsburgh	33	Detroit
15	Newark	34	Indianapolis
21	Atlanta	35	Lansing
22	Charlotte	36	Louisville
23	Philadelphia	41	Chicago
24	Jacksonville	42	Fargo
25	Richmond	43	Rockford

DSO AND DISTRICT CODES (Continued)

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

REAR AXLE RATIO CODES

A number designates a conventional axle, while a letter designates an Equa-Lock differential.

Code	Ratio	Code	Ratio
2	3.10:1	B	3.10:1
3	3.20:1	C	3.20:1
4	3.25:1	D	3.25:1
5	3.50:1	E	3.50:1
9	4.00:1	I	4.00:1

TRANSMISSION CODES

Code	Type
1	3-Speed Manual
3	2-Speed Automatic
4	Dual Range
5	4-Speed Manual

VEHICLE WARRANTY NUMBER

Example (Fig. 3): 4H19F 100001

4	1964 Model Year
H	Lorain Pilot Plant Assembly
19	2-Door Sedan (Bench)
F	8-Cylinder, 260 Cubic Inch Disp.
100001	First Unit Built (Consecutive Unit Number)

MODEL YEAR CODES

The numeral "4" designates 1964

ENGINE IDENTIFICATION CODES

Code	Engine
S	6-Cylinder 144 Cubic Inch
U	6-Cylinder 170 Cubic Inch
*F	8-Cylinder 260 Cubic Inch
*4	6-Cylinder 170 Cubic Inch
*6	8-Cylinder 260 Cubic Inch

*Low Compression.

CONSECUTIVE UNIT NUMBER

Each assembly plant begins production with the number 100001 and continues on for each car built.

BRAKES

GROUP 2

PART 2-1 GENERAL BRAKE SERVICE

1 DIAGNOSIS AND TESTING

PRELIMINARY TESTS

1. Check the fluid in the master cylinder, and add FoMoCo **heavy-duty** brake fluid as required.

2. Push the brake pedal down as far as it will go while the car is standing. If the car is equipped with power brakes, the engine should be running while making this test. If the brake pedal travels more than halfway between the released position and the floor, check the automatic adjusters for being inoperative. To check adjuster operation, inspect the brake shoes and the adjuster mechanisms for binding or improper installation and follow the procedure described under "Brake Shoe Adjustments" in Part 2-2, Section 2.

Make several reverse stops to ensure uniform adjustment at all wheels. This procedure applies to power brakes only.

3. With the transmission in neutral, stop the engine and apply the parking brake. Depress the service brake pedal several times to exhaust all vacuum in the system. Then, 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. Follow the procedures in the "Booster Diagnosis Guide".

4. With the engine shut off, exhaust all vacuum in the system (power brakes only). 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, and connections for leaks.

If the brake pedal movement feels spongy, bleed the hydraulic system to remove air from the lines and cylinder. See "Hydraulic System Bleeding", Section 2. Also, check for leaks or insufficient fluid.

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

ROAD TEST

The car should be road tested only if the brakes will safely stop the car. Apply the brakes at a speed of 25-30 mph to check for the existence of the trouble symptoms listed in Table 1, with the exception of those resolved in the preliminary tests and brake chatter. For each of the symptoms encountered, check and eliminate the causes which are also listed in Table 1. To check for brake chatter or surge, apply the brakes lightly from approximately 50 mph.

BOOSTER DIAGNOSIS GUIDE

For booster removal and installation procedures, refer to Part 2-2, Section 3. For disassembly and assembly procedures, refer to Part 2-2, Section 4. For cleaning and inspection refer to Part 2-1, Section 3.

TROUBLE SYMPTOMS, CAUSES, AND CORRECTIONS

BOOSTER INOPERATIVE—HARD PEDAL	If the preliminary tests show that the booster is inoperative or if a hard pedal condition still exists after eliminating the causes of "Hard Pedal" listed in Table 1, the trouble may be caused by vacuum leakage. Disconnect the vacuum line at the booster, remove the vacuum manifold and check valve assembly, and look for a sticking or faulty check valve. Check all vacuum connections for leakage or obstruction. Check all hoses for a leaking or collapsed condition. Repair or replace parts as necessary. If the foregoing procedure does

CONTINUED ON NEXT PAGE

TROUBLE SYMPTOMS, CAUSES, AND CORRECTIONS (Continued)

BOOSTER INOPERATIVE—HARD PEDAL (Continued)	not eliminate the trouble, remove the booster from the car. Separate the front shell from the rear shell, and check the valve and rod assembly reaction disc, diaphragm plate, and diaphragm assembly for damage that	would cause leaks. When assembling, be sure that the diaphragm assembly is properly positioned. Improper location could cause leakage between the vacuum and atmospheric sides of the diaphragm.
BRAKES DRAG OR GRAB	If the brakes still drag or grab after eliminating the causes listed in Table 1, the condition is probably caused by a sticking valve plunger	assembly. Remove and disassemble the booster. Clean, inspect, and replace parts as necessary.
SELF APPLICATION OF BRAKES WHEN ENGINE STARTS	Remove and disassemble the booster. Check for a leak in the rear shell. Check the diaphragm for being out of locating radii in the housing. Check for a sticking or un-	seated valve poppet. Clean, inspect, and replace parts as necessary. Be sure that the diaphragm is properly located when assembling.

TABLE 1—Brake Trouble Symptoms and Possible Causes

Possible Causes of Trouble Symptoms	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 Release	Noisy or Grabbing Brakes	Brakes Do Not Apply
Mechanical Resistance at Pedal or Shoes Damaged Linkage		X	X										
Brake Line Restricted	X	X	X		X								
Leaks or Insufficient Fluid				X				X	X				X
Improper Tire Pressure					X					X			
Improperly Adjusted or Worn Wheel Bearing	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						
Linings Glazed or Worn			X		X	X	X	X				X	X
Oil or Grease on Lining			X		X	X	X			X		X	X
Loose Carrier Plate	X					X	X						
Loose Lining					X		X						
Scored Drum										X		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
Air in Hydraulic System	X			X				X					X
Self Adjusters Not Operating					X			X			X		
Insufficient Shoe-to-Breaking Plate Lubrication	X										X		
Tire Tread Worn						X							
Poor Lining to Drum Contact							X						
Loose Front Suspension							X						
"Threads" Left by Drum Turning Tool Pull Shoes Sideways											X		
Cracked Drum								X					
Sticking Booster Control Valve		X										X	

2 COMMON ADJUSTMENTS AND REPAIRS

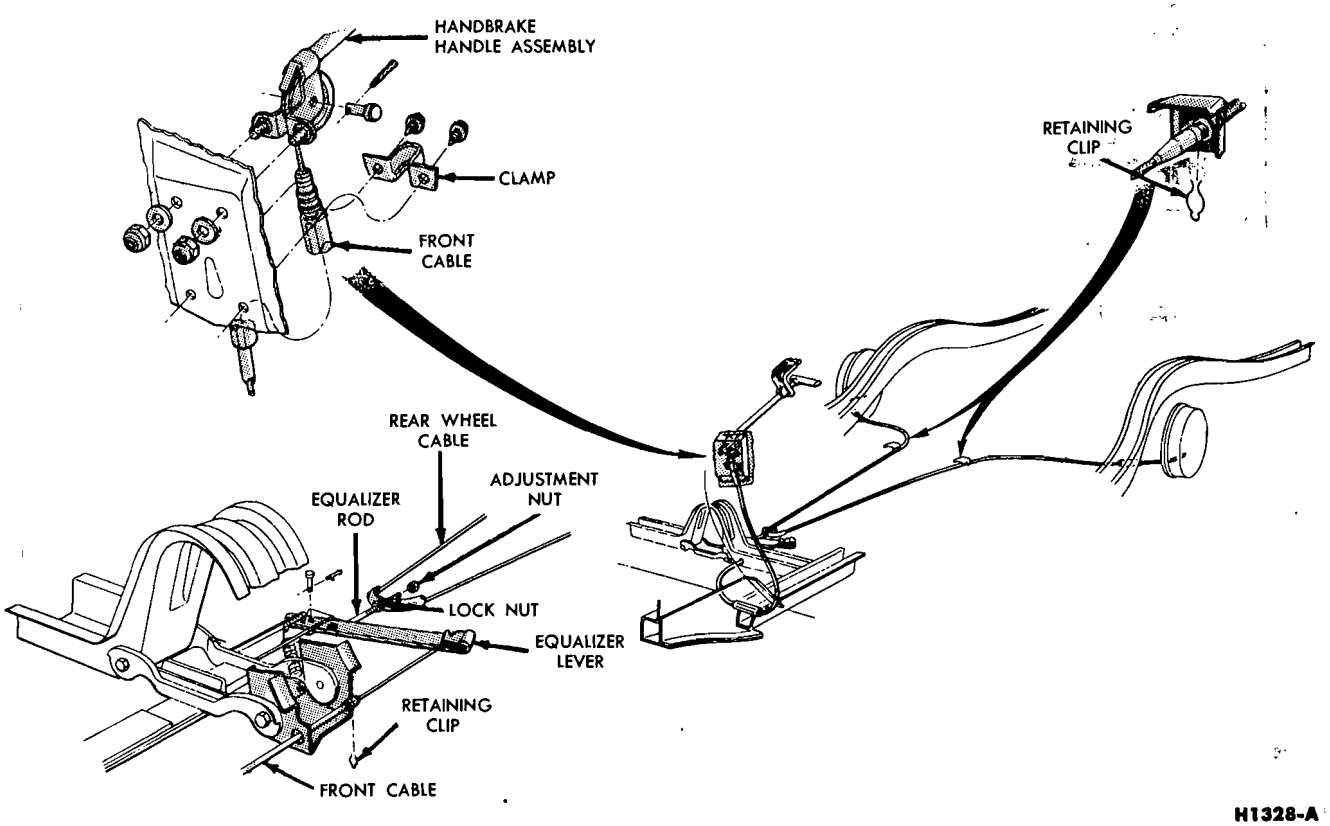


FIG. 1—Parking Brake Linkage

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 by turning the handle counterclockwise and pushing it inward.
2. Pull the parking brake handle outward one notch from its normal released position.
3. Raise the car.
4. Turn the lock nut in front of the equalizer (Fig. 1) several turns forward.
5. Turn the adjustment nut forward against the equalizer until a moderate drag is felt when turning the rear wheels.
6. When the cables are properly adjusted, tighten the lock nut in the direction of forward rotation against the equalizer.
7. Release the parking brake, and make sure that the brake shoes return to the fully released position and no drag is felt when turning the rear wheels.

MASTER CYLINDER PUSH ROD ADJUSTMENT—POWER BRAKES

The push rod is provided with an adjustment screw to maintain the correct relationship between the booster control valve plunger and the master cylinder piston. Failure to maintain this relationship will prevent the master cylinder piston from completely releasing hydraulic pressure and can cause the brakes to drag, or cause excessive brake pedal travel.

To check the adjustment of the screw, fabricate a gauge of the dimensions shown in Fig. 2. Then place the gauge against the master cylinder mounting surface of the booster body as shown in Fig. 3. 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. Do not set up side forces on the push rod. Side forces may break the valve plunger.

This is an approximate adjustment only. 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

When any part of the hydraulic

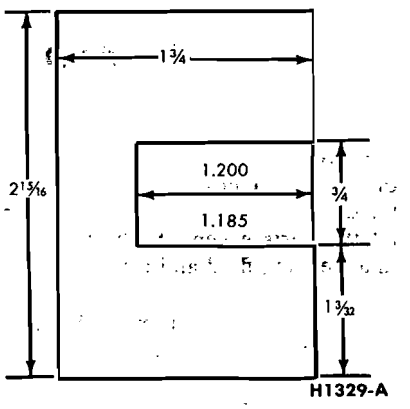


FIG. 2—Push Rod Gauge Dimensions

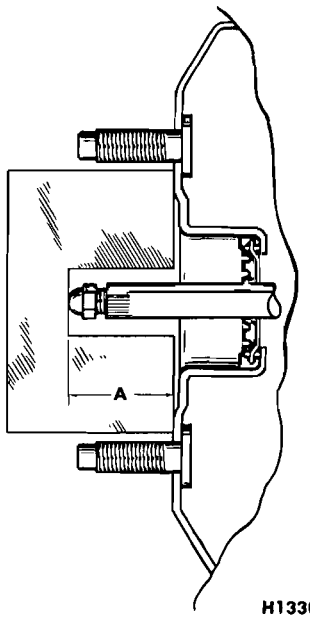


FIG. 3—Push Rod Adjustment

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.

The hydraulic system can be bled manually or with pressure bleeding equipment.

MANUAL BLEEDING

Bleed the longest lines first. Keep the master cylinder reservoir filled with new heavy-duty brake fluid during the bleeding operation.

Never use brake fluid which has been drained from the hydraulic system.

1. Position a suitable ⅜-inch box wrench (Fig. 4) on the bleeder fitting on the right rear brake wheel cylinder. Attach a rubber drain tube to the bleeder fitting. **The end of the tube should fit snugly around the bleeder fitting.**

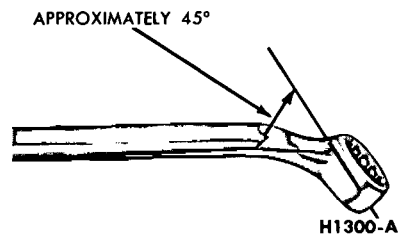


FIG. 4—Wrench for Bleeding Brake

2. Submerge the free end of the tube in a container partially filled with clean brake fluid, and loosen the bleeder fitting approximately ¾ turn.

3. Push the brake pedal down slowly thru 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.

4. When the fluid is completely free of air bubbles, close the bleeder fitting and remove the bleeder tube.

5. Repeat this procedure at each brake wheel cylinder in the following order: left rear, right front, and left front. Refill the master cylinder reservoir after each wheel cylinder is bled and when the bleeding operation is completed. The fluid level should be within ⅜ inch from the top of the reservoir.

PRESSURE BLEEDING

Bleed the longest lines first. **Never use brake fluid which has been drained from the hydraulic system.**

The bleeder tank should contain enough new heavy-duty brake fluid to complete the bleeding operation, and it should be charged with 10-30 pounds of air pressure.

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

2. Remove the master cylinder reservoir cap, install an adapter cap to the reservoir, and attach the bleeder tank hose to the fitting on the adapter cap. An adapter cap can be fabricated by cutting a hole in the center of a filler cap and soldering a right angle fitting in the hole. A right angle fitting must be used on power brakes to provide clearance at the body brace.

3. Position a ⅜-inch box wrench (Fig. 4) 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.**

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

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

6. 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.

7. Repeat this procedure at each brake wheel cylinder in the following order: left rear, right front, and left front.

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

9. Remove the adapter cap, refill the master cylinder reservoir to within ⅜ inch from the top of the reservoir, and install the filler cap.

3 CLEANING AND INSPECTION

BRAKE ASSEMBLY

1. Remove the wheel from the drum, then 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 them with compressed air.

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

3. Inspect the brake shoes for excessive lining wear or shoe damage. If the lining is worn to within 1/32 inch of any rivet head or if the shoes are damaged, they must be replaced. Replace any lining that has been oil saturated. 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 the brake shoes, retracting springs, and drum for signs of overheating. If the springs show any loss of load or change in free length, indicating overheating, replacement of the retracting and hold down springs is necessary. **Overheated springs lose their pull and could cause the new lining to wear prematurely, if they are not replaced.**

5. If the car has 24,000 or more miles of operation on the brake linings or signs of overheating are present when relining brakes, the wheel cylinders should be disassembled and inspected for wear and entrance of dirt into the cylinder. The cylinder cups should be replaced, thus avoiding future problems.

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

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

BOOSTER UNIT

A disassembled view of the brake booster is shown in Fig. 5.

After disassembly, immerse all metal parts in a suitable solvent. Use only alcohol on rubber parts or parts containing rubber. After the parts have been thoroughly cleaned and rinsed in cleaning solvent, the metal parts which come in contact with hydraulic brake fluid or rubber parts should be rewashed in clean alcohol before assembly. Use an air hose to blow dirt and cleaning fluid from the recesses and internal passages. When overhauling a power booster, use all parts furnished in the repair kit. **Discard all old rubber parts.**

Inspect all other parts for damage or excessive wear. Replace damaged or excessively worn parts. If the inside of the booster shells are rusted or corroded, polish them with steel wool or fine emery cloth.

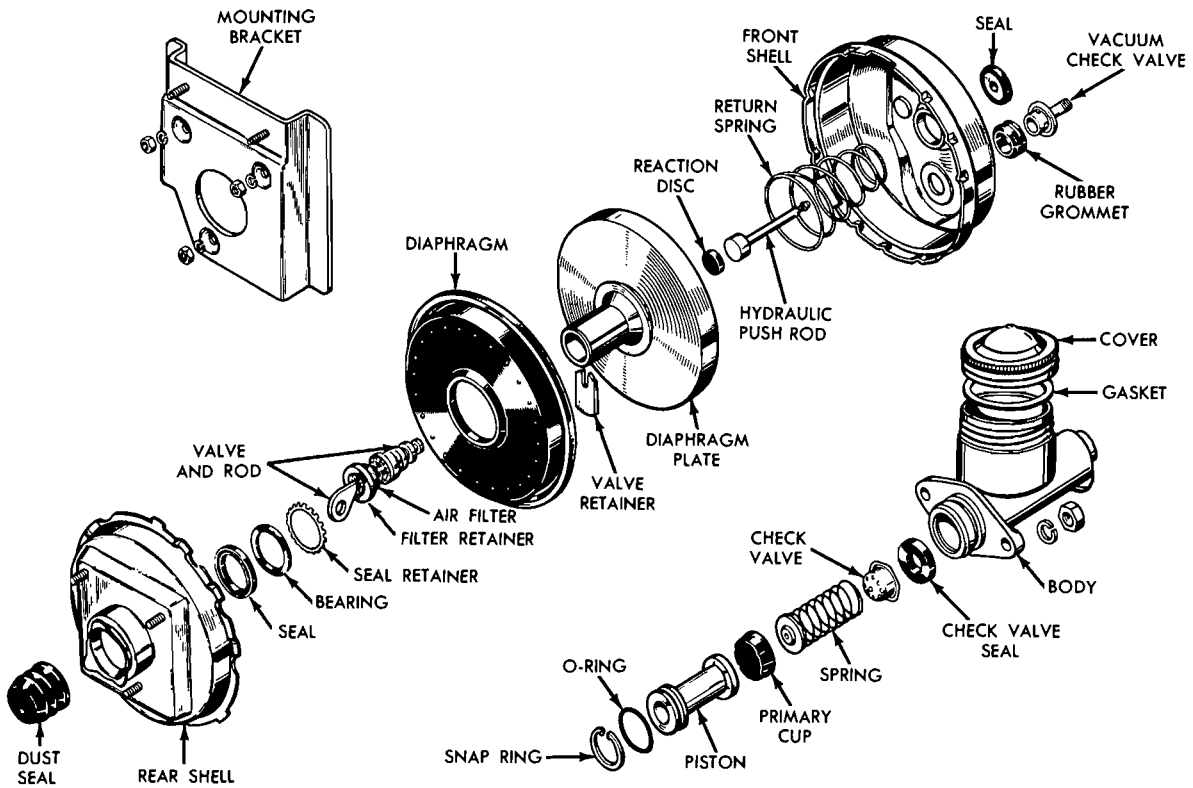


FIG. 5—Brake Booster and Master Cylinder Disassembled

PART 2-2 BRAKE SYSTEM

1 DESCRIPTION AND OPERATION

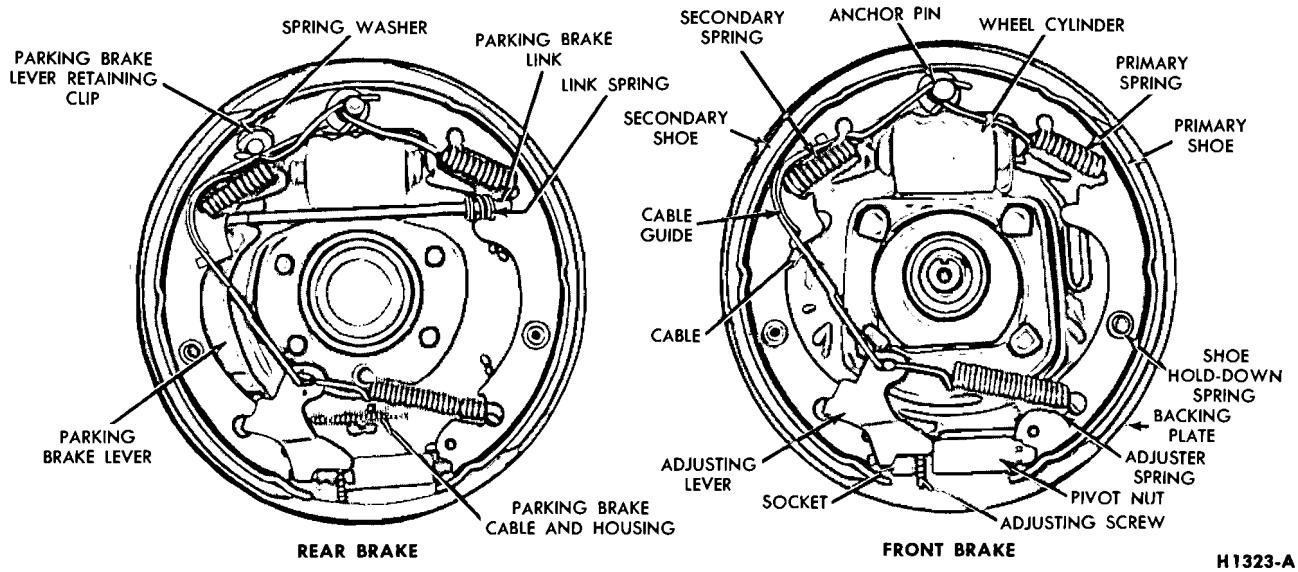


FIG. 1—Self Adjusting Brake Assemblies

HYDRAULIC SELF ADJUSTING BRAKE SYSTEM

The hydraulic brake system employs single anchor, internal expanding and self-adjusting brake assemblies. A vacuum booster is available as optional equipment on all cars equipped with an automatic transmission.

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. 1). 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 car is moving rearward and only when the secondary shoe is free to move toward the drum beyond a predetermined point.

With the car 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 level 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 car moving forward 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 are non-adjustable.

BOOSTER SYSTEM

The diaphragm type booster is a self-contained vacuum hydraulic power braking unit mounted on the engine side of the dash panel. It is of the vacuum suspended type which utilizes engine intake manifold vacuum and atmospheric pressure for its power. It consists of three basic elements combined into a single unit (Fig. 2).

The three basic elements are:

1. A vacuum power chamber which consists of a front and a rear shell, a power diaphragm, a hydraulic push-rod and a vacuum diaphragm return spring.

2. A mechanically actuated control valve integral with the vacuum power diaphragm controls the degree of

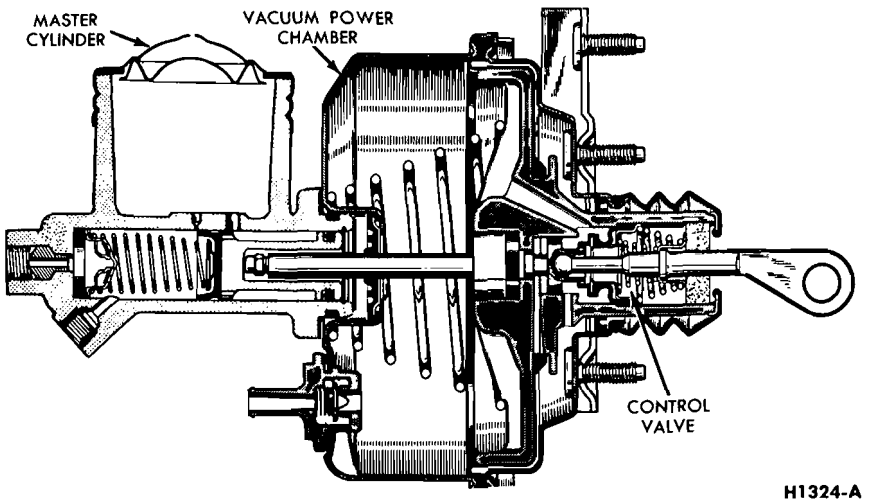


FIG. 2—Cutaway View of Vacuum Booster

power brake application or release in accordance with the foot pressure applied to the valve operating rod through the brake pedal linkage. The control valve consists of a single poppet with an atmospheric port and a vacuum port. The vacuum port seat is a part of the valve hub and diaphragm plate assembly. The atmospheric port seat is a part of the valve plunger which moves within the vacuum power diaphragm assembly.

3. A hydraulic master cylinder which contains all of the elements of the conventional brake master cylinder except for the hydraulic pushrod which has a self locking adjustment screw at one end with a piston head at the other end.

The vacuum power diaphragm and the components which make up the valve assembly are connected to the brake pedal through the valve operating rod and pedal linkage. The valve operating rod is connected to the valve plunger which moves within the power diaphragm assembly. A valve return spring holds the valve plunger and rod in the released position when pressure is released from the brake pedal. The valve poppet is of the flexible rubber type and is supported by the valve body. In the released position, the poppet return spring holds the poppet against the atmospheric port seat. A synthetic rubber seal is used to seal the opening between valve body sleeve and the rear shell. Vacuum is supplied to the booster through a vacuum check valve located in the front shell. Air for operation is admitted through the air cleaner located at the end of the valve sleeve. A rubber guard attached to a flange on the rear shell and over the air cleaner protects the valve housing and seal sleeve against dirt. A seal located in the front vacuum chamber seals the opening between the vacuum chamber and the hydraulic plunger. The hydraulic push rod forms the link between the vacuum power diaphragm assembly and the hydraulic piston of the master cylinder.

RELEASED POSITION

With the engine running and the brakes released (Fig. 3), vacuum from the intake manifold is admitted through the check valve to the front (constant vacuum) chamber of the power unit. In the released position (no pressure applied to the brake pedal), the valve operating rod and valve plunger are held to the right in the valve housing by the valve return spring to CLOSE the atmospheric port and OPEN the vacuum port. With the valve in this position, the rear (control vacuum) chamber is also open to vacuum through the porting in the vacuum diaphragm and valve housing assembly. The vacuum power diaphragm is then "balanced" or suspended in vacuum, since vacuum is present on both sides of the power diaphragm. With the power diaphragm balanced in vacuum, the diaphragm return spring holds the diaphragm and hydraulic push rod in the fully released position. With the hydraulic push rod in this position, the hydraulic compensating port in the hydraulic master cylinder is OPEN to permit brake fluid to either return from the brake system to the fluid reservoir or enter the brake system from the fluid reservoir to compensate for any gain or loss in fluid volume.

APPLIED POSITION

When the brakes are applied (Fig. 4), the valve operating rod and valve

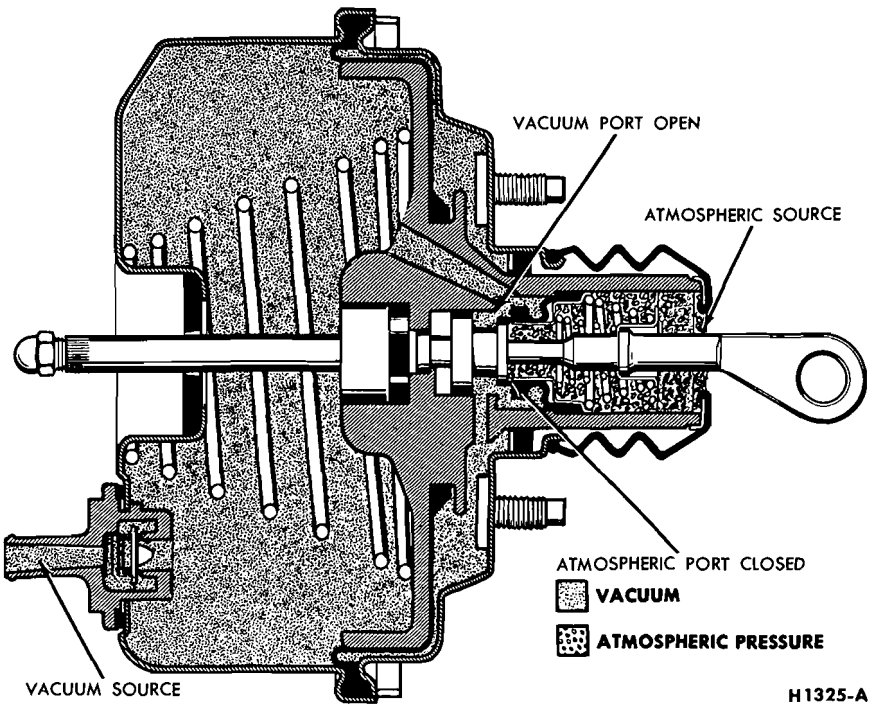


FIG. 3—Booster in Released Position

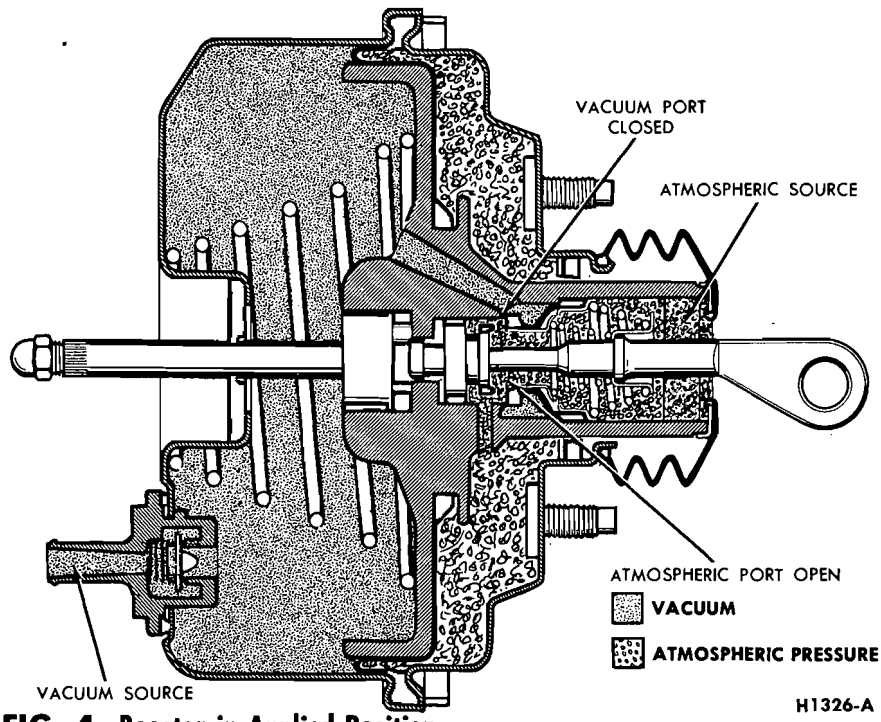


FIG. 4—Booster in Applied Position

plunger move to the left in the power diaphragm assembly to compress the valve return spring and bring the poppet valve into contact with the vacuum valve seat in the valve housing to "CLOSE" the vacuum port. Any additional movement of the valve operating rod in the applied direction moves the valve plunger away from the poppet valve to "OPEN" the atmospheric port and admit atmosphere through the air cleaner and passages in the diaphragm plate to the right side of the power chamber. With vacuum present on the left side of the diaphragm and valve housing and atmospheric pressure present on the right side of the diaphragm, a force is developed to move the vacuum power diaphragm assembly, hydraulic push rod and hydraulic piston to the left to close the compensating port and force hydraulic fluid under pressure through the residual check valve and brake tubes into the brake wheel cylinders. As hydraulic pressure is developed in the hydraulic cylinder, a counter force (to the right) acting through the hydraulic push rod, sets up a reaction force against the vacuum power diaphragm and valve plunger through the rubber reaction disc (located at the end of the hydraulic push rod). The rubber reaction disc acts similar to a column of fluid to distribute the pressure between the vacuum power diaphragm assembly and the valve plunger in proportion to their respective contact areas. The pressure acting against the valve plunger and valve operating rod tends to move the valve plunger slightly to the right in relation to the diaphragm and valve housing assembly to close off the atmospheric port. The driver is thus assured a "feel" of the brake, since part of the counter force reacts through the valve plunger, valve operating rod, and pedal linkage against the driver's foot. This reaction force is in direct proportion to the hydraulic pressure developed within the brake system.

HOLDING POSITION

During brake application, the "reaction" force which opposes the force applied by the driver, tends to close the atmospheric port. When both atmospheric and vacuum ports are CLOSED, the booster is said to be in the holding position. With both valves closed, any degree of brake application attained will be held until either the atmospheric port is **reopened** by an increase in pedal pressure to further increase the brake application or by a decrease in pedal pressure to **reopen** the vacuum port to decrease the brake application. Whenever the pressure applied to the brake pedal is held constant for a moment, the valve returns to its holding position. However, upon reaching the fully applied position the force applied to the brake pedal overrules the reaction force. In this position the valve plunger and atmospheric valve seat are held away from the valve poppet to admit maximum atmosphere pressure to the rear (right) chamber. With the front (left) chamber open to manifold vacuum, full power application is

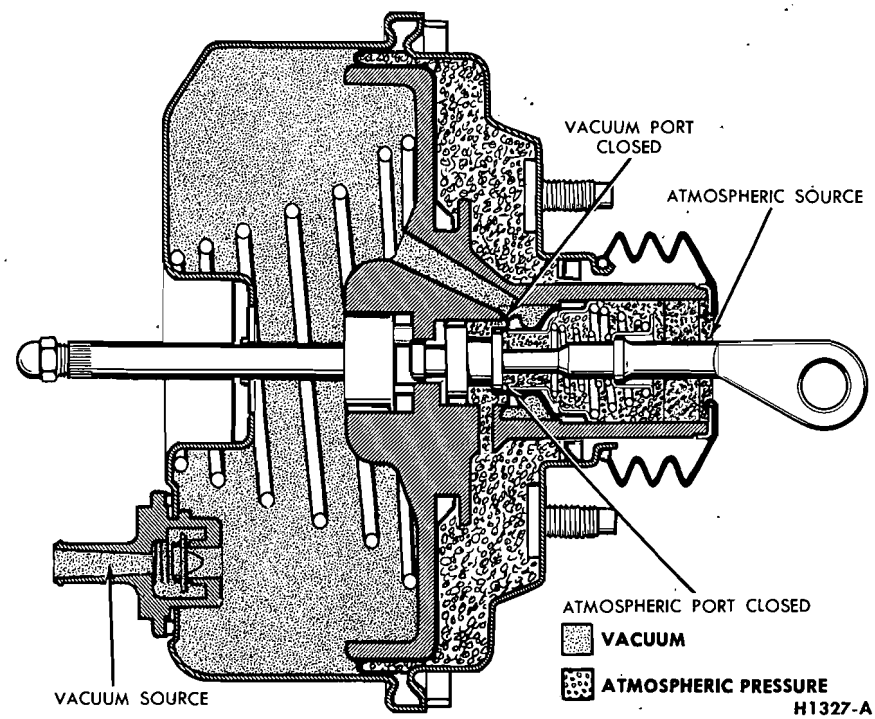


FIG. 5—Booster in Holding Position

attained which is referred to as the "run-out" of the power unit. Any increase in hydraulic pressure beyond this point must be supplied by physical effort of the driver.

NO POWER CONDITION

It should be noted that in case of engine failure and consequent loss of engine vacuum, at least one full power brake application may be made from the vacuum in the booster. With the engine off and no vacuum in the power system, the brakes can be applied in the conventional manner by applying more physical effort to the brake pedal.

PARKING BRAKES

An independent hand - 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 lever which is attached to the equalizer assembly. The rear brake cables connect the equalizer assembly to the parking brake lever at each rear secondary shoe as shown in Fig. 1, Part 3-1.

When the handle is pulled the primary and secondary brake shoes are forced against the rear brake drums. The handle is held in the applied position by the engagement of a spring loaded pawl with a ratchet. Turning the handle counterclockwise disengages the pawl from the ratchet to release the brakes.

2 IN-CAR ADJUSTMENTS AND REPAIRS

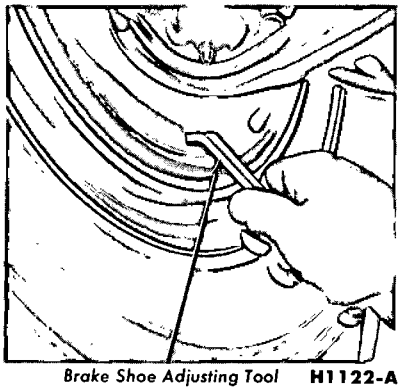
BRAKE SHOE ADJUSTMENTS

The car should be in a raised position with the wheels off the floor. **If the car is raised on a frame-contact hoist, disconnect the parking brake cables to prevent the rear brakes from being partially applied due to the rear axle and spring sag on the hoist.**

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 brake drums should be at normal room temperature when adjusting the brake shoes. If the shoes are adjusted when the drums are hot and expanded, the shoes may drag when the drums are cool and contracted.

1. After the shoes have been installed or the adjusting screw has been turned, install the drum. Be sure that all excess grease, oil, and other foreign material are wiped off the backing plate and drum.



Brake Shoe Adjusting Tool H1122-A

FIG. 6—Adjusting Brake Shoes

Before installing the brake drum on the front wheel spindle, wipe the spindle completely free of grease. Install the drum carefully so that the grease seal retainers within the hub will not be damaged.

2. Remove the adjusting hole cover from the backing plate. Working from the backing plate side, turn the adjusting screw upward to expand the shoes (Fig. 6). Expand the shoes until a drag is felt when the drum is rotated.

3. **Remove the drum.** Mark the tooth on the star-wheel where the adjusting lever contacts it. While holding the adjusting lever out of engagement with the adjusting screw, back off the adjusting screw ¾ of a turn with the fingers. If finger movement will not turn the screw, free it up; otherwise, the self-adjusting lever will not turn the screw. Lubricate the screw with a thin uniform coating of Stanolube – HD-Moly Grease – Grade 2.

Any other adjustment procedure may cause damage to the adjusting screw with consequent self adjuster problems.

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

On front wheels, install the wheel outer bearing, washer, and adjusting nut, then adjust the wheel bearings as outlined in Part 3-4, Section 2.

On the rear wheels, install the three Tinnerman nuts and tighten securely.

5. Install the wheel on the drum and tighten the mounting nuts to specification.

6. Install the adjusting hole cover on the brake backing plate.

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

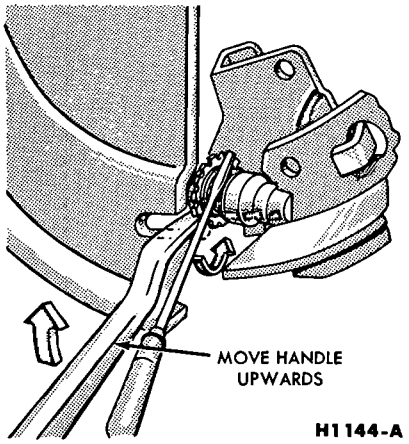
8. After the brake shoes have been properly adjusted, check the operation of the brakes.

FRONT BRAKE DRUM

REMOVAL

1. Raise the car until the wheel and tire clear the floor. Remove the wheel cover or hub cap, and remove the wheel and tire assembly from the drum.

2. If the brake drum will not come off easily, insert a narrow screwdriver through the brake adjusting hole in the backing plate, and disengage the adjusting lever from the adjusting screw. While thus holding the adjusting lever away from the adjusting screw, back off the adjusting screw with the brake adjusting tool shown in Fig. 7. **Back off the adjustment only if the drum cannot be removed. Be very careful not**



H1144-A

FIG. 7—Backing Off Brake Adjustment

to burr, chip, or damage the notches in the adjusting screw; otherwise, the self-adjusting mechanism will not function properly. If the adjustment was backed off, make sure that the adjuster lever is properly seated in the shoe web.

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.

4. Pull the hub and drum assembly off the spindle.

INSTALLATION

1. If the drum is being replaced, remove the protective coating from the new drum with carburetor degreaser. Install new bearings and grease retainer. Soak the new grease retainer in light engine oil at least 30 minutes before installation. Pack the wheel bearings, install the inner bearing cone and roller assembly in the inner cup, and install the new grease retainer. See Part 3-4, Section 4.

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

2. Install the drum assembly, outer wheel bearing, washer and the adjusting nut.

3. Adjust the wheel bearing as outlined in Part 3-1, Section 2. Install the nut lock and cotter pin. Then install the grease cap.

4. Install the wheel and hub cap. If the adjustment was backed off, adjust the brake as outlined under "Brake Shoe Adjustments".

REAR BRAKE DRUM

REMOVAL

1. Raise the car 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 brake drum will not come off, insert a narrow screwdriver through the brake adjusting hole in the backing plate, to 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. 7). **Back off the adjustment only if the drum cannot be removed easily. Be very careful not to burr, chip, or damage the notches in the adjusting screw which may cause malfunction in the self-adjusting mechanism.** If the adjustment was backed off, make sure that the adjuster lever is properly seated in the shoe web.

INSTALLATION

1. Remove the protective coating from a new drum with carburetor degreaser.

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

3. Install the three Tinnerman nuts and tighten them securely. Install the wheel on the axle shaft flange studs against the drum, and tighten the retaining 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. 8.

2. Contract the shoes as follows:
   a. Disengage the adjusting lever from the adjusting screw by pulling backward on the adjusting lever (Fig. 1).
   b. Move the outboard side of the adjusting screw upward and back off the pivot nut as far as it will go.

3. Pull the adjusting lever, cable and automatic adjuster spring down and toward the rear to unhook the pivot hook from the large hole in the secondary shoe web. **Do not attempt to pry the pivot hook out of the hole.**

4. Remove the automatic adjuster spring and adjusting lever (Fig. 1).

5. On cars equipped with a 6-cylinder engine, remove the secondary shoe to anchor spring with the tool shown in Fig. 8. Unhook the cable eye from the anchor pin. With the same tool, remove the primary shoe to anchor spring. On cars equipped with an 8-cylinder engine, unhook

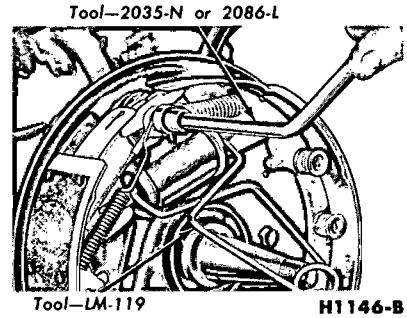


FIG. 8—Retracting Spring Removal

the secondary and the primary shoe to anchor springs. Unhook the cable eye from the anchor pin.

6. Remove the cable guide from the secondary shoe (Fig. 1).

7. Remove the shoe hold-down springs, shoes, adjusting screw, pivot nut, and socket.

8. On rear brakes, remove the parking brake link and spring. Disconnect the parking brake cable from the parking brake lever.

9. After removing the rear brake secondary shoe, disassemble the parking brake lever from the shoe by removing the retaining clip and spring washer (Fig. 1).

INSTALLATION

1. Before installing the rear brake shoes, assemble the parking brake lever to the secondary shoe and secure it 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 them 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.

4. On a car equipped with an 8-cylinder engine, position the adjuster cable eye over the anchor pin with the crimped side toward the backing plate.

Install the cable guide on the secondary shoe web with the flanged hole properly fitted into the hole in the secondary shoe web. Install the secondary shoe to anchor spring. Install the primary shoe to anchor spring.

5. On a car equipped with a 6-cylinder engine, install the cable guide on the secondary shoe web with the flanged hole properly fitted into the hole in the secondary shoe web. Install the secondary shoe to anchor spring (Fig. 1).

Place the cable eye over the anchor pin with the crimped side toward the backing plate. Install the primary shoe to anchor spring with the tool shown in Fig. 9.

6. Thread the cable around the cable guide groove.

It is imperative that the cable be positioned in this groove and

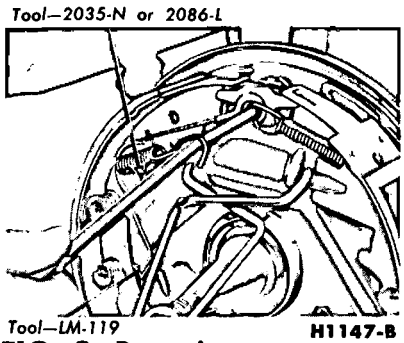


FIG. 9—Retracting Spring Installation

not between the guide and the shoe web. 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.

7. Apply high-temperature grease (Stanalube Poly) 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 ½ turn.

Interchanging the brake shoe adjusting screw assemblies from one side of the car to the other would cause the brake shoes to retract rather than expand each time the automatic adjusting mechanism operated. To prevent accidental installation of the adjusting screw on the wrong side of the car the socket end of the adjusting screw is stamped with an R or L (Fig. 10). The adjusting pivot nuts can be distinguished by the number of grooves machined around the body of the nut. Two grooves indicate a right-hand nut; one groove indicates a left-hand nut.

8. 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.

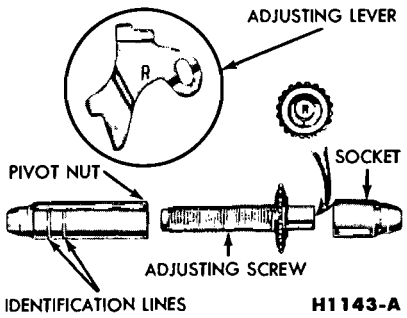


FIG. 10—Adjusting Screw and Lever Identification

9. 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-hand brake assembly (Fig. 10).

10. 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 (Fig. 1).

11. 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.

12. After installation, check the action of the adjuster by pulling the section of the cable between the cable guide and the adjusting lever 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 teetn 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 8 3/16 inches on 6-cylinder models or 10 1/8 inches on 8-cylinder models from the end of the cable anchor to the end of the cable hook.

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

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

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

WHEEL CYLINDER REPAIR

It is not necessary to remove the brake cylinder from the backing plate to disassemble, inspect, or hone and overhaul it. 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. The 6-cylinder models are not provided with links. Remove the pistons, cups, and return spring from the cylinder bore (Fig. 11).

2. Remove the bleeder screw from the cylinder.

INSPECTION

1. Wash all parts in clean denatured alcohol. If alcohol is not available, use specified brake fluid. Dry with compressed air.

2. Check all internal parts for excessive wear or damage. **If any of the internal parts require replacing, all should be replaced.**

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.** A baffle in the front wheel cylinder of the 6-cylinder models prevents honing, therefore, they must be replaced.

4. Check the bleeder hole to be sure that it is open.

ASSEMBLY

1. Apply a 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. 11). Place a boot over each end of the cylinder.

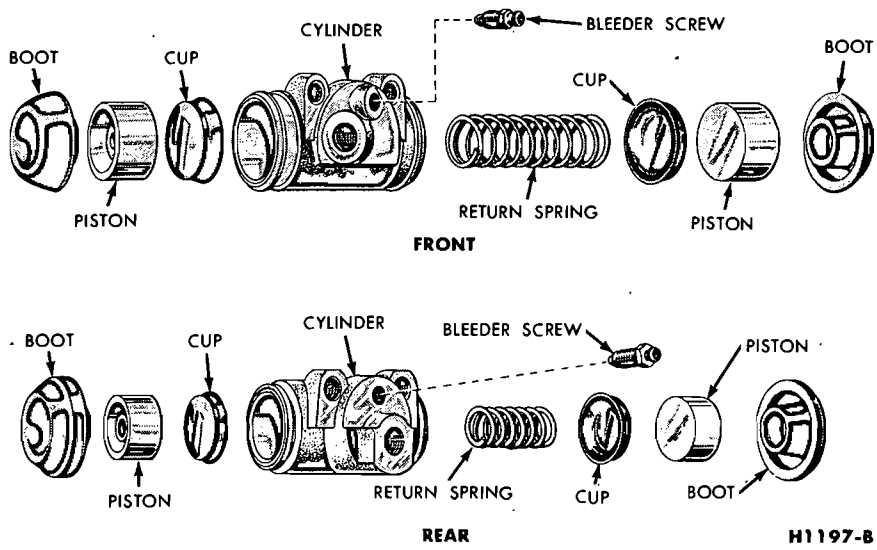


FIG. 11—Front and Rear Wheel Cylinders

WHEEL CYLINDER REPLACEMENT

REMOVAL

1. With the wheel in a raised position, remove the wheel and the drum.

2. Place a clamp over the ends of the brake cylinder as shown in Fig. 9.

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

4. Disconnect the brake line from the brake cylinder. **On a car 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.

5. Remove the wheel cylinder attaching bolts and lock washers and remove the cylinder.

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 in place against the backing plate. Install the two lock washers and attaching bolts. Torque them to specifications.
   b. Install a new copper gasket over the hose fitting. Thread the hose assembly into the cylinder and tighten it securely.
   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 specifications.

2. **To install a rear cylinder:**
   a. Position the rear wheel cylinder in place against the backing plate. Enter the tubing into the cylinder, and start the tube fitting nut into the threads of the cylinder.
   b. Secure the cylinder to the backing plate with the attaching bolts and lock washers.
   c. Tighten the tube fitting nut to specifications.

3. Install the links in the ends of the wheel cylinder (8-cylinder models only).

4. Install the brake shoes as detailed in this section.

5. Install the brake drums and wheels.

6. Bleed the brakes as detailed in Part 2-1, Section 2.

7. Adjust the brakes as detailed in Part 2-2, 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, rotate the axle shaft so that the hole in the axle shaft flange lines up with the backing plate retaining nuts and remove the nuts. Pull the axle shaft assembly out of the housing with tool #4235-C and a slide hammer (Part 4-2), then remove the backing plate.

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

INSTALLATION

1. Position a new **rear** backing plate on the retaining bolts in the axle housing flange. Insert the axle shaft into the housing so that the splines engage the differential side gear with the bearing retainer sliding onto the retaining bolts and against the backing plate. Install the retaining nuts through the access hole in the axle shaft flange.

Position a new **front** backing plate to the wheel spindle and install the retaining 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. Install the brake drum and wheel.

4. Adjust the brake shoes (Section 2), and bleed the brake system 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 connector (Fig. 12).

Always bleed the entire hydraulic system after any hose or line replacement.

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 flared properly to provide good leak-proof connections. Clean the brake tubing by flushing with clean denatured alcohol, 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 screw 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.

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 screw the hose assembly 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.

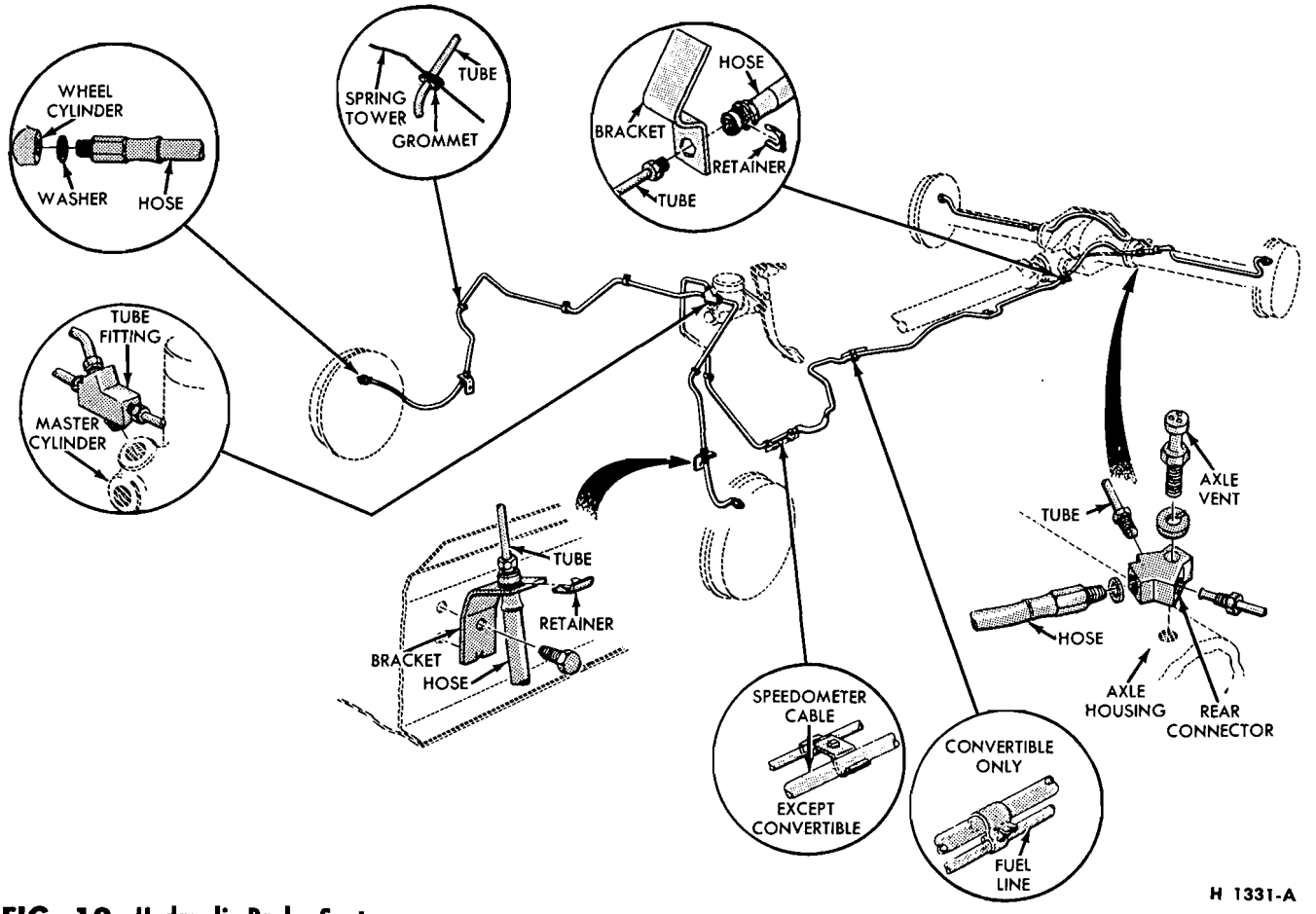


FIG. 12—Hydraulic Brake System

3 REMOVAL AND INSTALLATION

MASTER CYLINDER—STANDARD BRAKES

REMOVAL

1. Disconnect the rubber boot from the rear end of the master cylinder in the passenger compartment.
2. Disconnect the brake line from the master cylinder. Disconnect the stop light switch wires from the switch (Fig. 13).
3. Remove the bolts that secure the master cylinder to the dash panel and lift the cylinder out and away from the push rod. Remove the rubber boot from the push rod.

INSTALLATION

1. With the rubber boot on the push rod, guide the master cylinder over the end of the push rod, and position the cylinder against the dash panel.
2. Install and torque the mounting

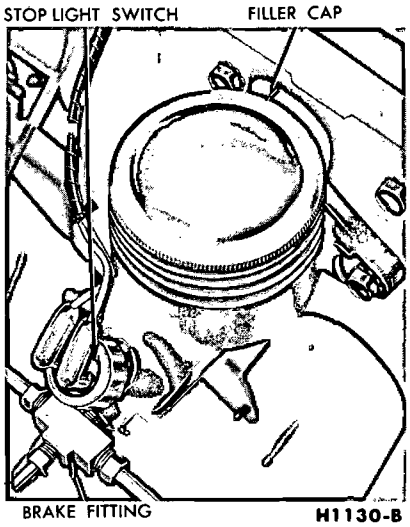


FIG. 13—Brake Master Cylinder Installed

bolts to specification.

3. Connect the brake line to the master cylinder fitting, but leave the brake line fitting loose.

4. Fill the master cylinder reservoir with heavy-duty brake fluid to within ⅜ inch of the top. Install and tighten the filler cap.

5. Bleed the master cylinder to let air escape from the cylinder at the brake line fitting. Then tighten the fitting.

6. Remove the filler cap and fill the reservoir to the level specified. Install the cap and wipe off any fluid from the cylinder.

7. Connect the wires to the stop light switch and the rubber boot to the master cylinder.

MASTER CYLINDER—POWER BRAKES

REMOVAL

1. Disconnect the battery ground cable from the battery.
2. Disconnect the stop light switch wires from the switch.
3. Disconnect the hydraulic line from the master cylinder and from the multiple fitting on the bridge (Fig. 14). Disconnect the three remaining lines from the fitting.
4. Remove the two nuts and lock washers that attach the master cylinder to the booster.
5. Remove the bridge and the master cylinder from the vacuum booster.

INSTALLATION

1. Before installing the master cylinder, check the distance from the outer end of the push rod to the master cylinder mounting surface at the end of the vacuum cylinder (Fig. 3, Part 2-1). If the push rod dimension is not correct, see "Master Cylinder Push Rod Adjustment," Part 2-1, Section 2.
2. Position the master cylinder over the push rod onto the two studs that are integral with the booster body.
3. Position the bridge and the tail light wire clip (Fig. 13) on the studs. Install, but do not tighten the attaching nuts and lock washers.
4. Connect the hydraulic lines to the multiple fitting.
5. Connect the line from the cylinder to the multiple fitting.
6. Tighten the two master cylinder attaching nuts.
7. Tighten all hydraulic line fittings.

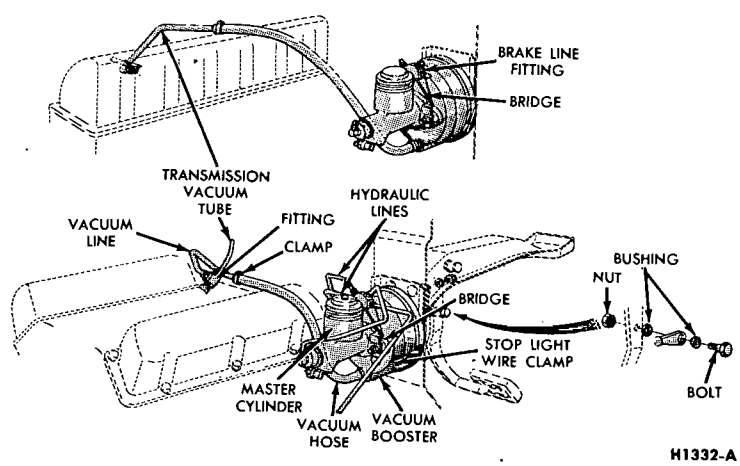


FIG. 14—Vacuum Booster Installation

8. Connect the stop light switch wires to the switch.
9. Bleed the brake system. Fill the master cylinder to ⅜ inch from the top of the filler opening. Install the filler cap and gasket.

VACUUM BOOSTER

REMOVAL

1. Disconnect the battery ground cable.
2. Remove the master cylinder from the booster.
3. Disconnect the vacuum hose from the booster.
4. If working on a car equipped with an eight-cylinder engine, remove the left valve rocker arm cover to provide clearance when removing the booster.
5. Working from inside the car, remove the bolt that attaches the booster push rod to the brake pedal (Fig. 14).
6. Working from inside the car, remove the five nuts and lock washers that attach the booster to the dash panel.
7. Remove the booster from the dash panel.

INSTALLATION

1. Position the booster and mounting bracket on the dash panel (Fig. 14).
2. Secure the booster with the five attaching nuts and lock washers.
3. Lubricate the bushings with engine oil before installation. Connect the push rod to the brake pedal with the bolt and bushing.
4. If working on a car equipped with an eight-cylinder engine, install the left valve rocker arm cover.
5. Connect the vacuum hose to the booster and secure it with a hose clamp.
6. Install the master cylinder as detailed on this page.
7. Connect the battery ground cable.
8. Bleed the hydraulic system and check the operation of the booster.

BRAKE PEDAL—MANUAL SHIFT TRANSMISSION

REMOVAL

1. Back off the clutch pedal over-center spring adjusting nut and disconnect the equalizer rod. Remove the clutch pedal bumper, and the over-center spring bracket from the support bracket.
2. Remove the over-center adjusting nut and bolt. Remove the brake

push rod, bushings and retaining clip.

3. Remove the clip (Fig. 15) from the clutch and brake pedal shaft and remove the clutch pedal, brake pedal, and bushings.

INSTALLATION

1. Dip the bushings in engine oil and install them in the brake pedal. Hold the brake pedal in place on the support.

2. Insert the clutch pedal shaft through the brake pedal support bracket, brake pedal, and install the washer retaining clip (Fig. 15).

3. Connect the clutch pedal rod to the clutch pedal, and adjust the free travel.

4. Secure the brake push rod to the pedal with the bushings retaining clip.

5. Connect the clutch link to the release lever. Adjust the over-center spring nut to the correct stud length specifications.

BRAKE PEDAL—AUTOMATIC TRANSMISSION

REMOVAL

1. Remove the retainer clip and bushings from the brake pedal pin and disconnect the brake pedal push rod. If vehicle is equipped with power brakes, remove the nut, bushings, bolt and disconnect the brake pedal push rod.

2. Remove the retaining clip from the end of the brake pedal shaft, and remove the spring washer and nylon thrust washer.

3. Remove the brake pedal shaft. Remove the shaft bushing and remove the pedal.

4. Remove the brake pedal pad and the pedal bumper.

INSTALLATION

1. Install the brake pedal pad and the bumper on the pedal assembly.

2. Dip the pedal bushings in engine oil and install them in the brake pedal. Hold the brake pedal in place on the support. Install the brake pedal shaft. Insert the spacer washer.

3. Install the brake pedal shaft nylon washer.

4. Install the nylon bushing, spring washer, and the retaining clip (Fig. 15) on the pedal shaft.

5. Install the bushings in the push rod and connect the push rod to the pedal pin and install the retaining clip. On power brakes, install the bushings in the push rod and connect the push rod to the pedal with the nut and bolt.

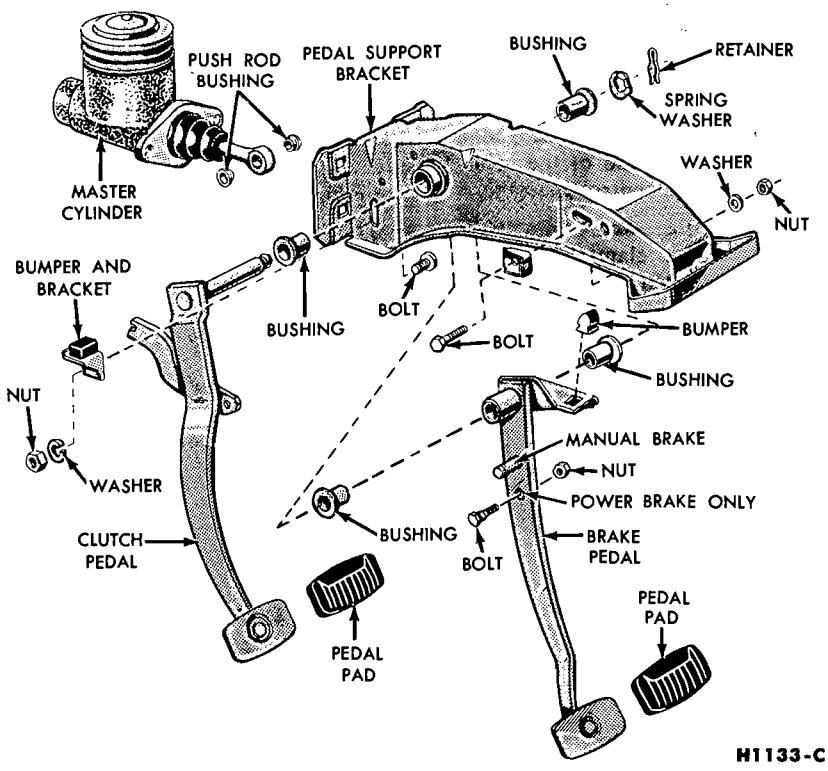


FIG. 15—Brake Pedal and Related Parts

PARKING BRAKE HANDLE

REMOVAL

1. Remove the two screws that hold the handle bracket on the instrument panel. Remove the two screws that secure the cable clamp to the dash panel.

2. Remove the two nuts and lock washers that secure the control to the dash panel.

3. Remove the clevis pin that secures the pulley to the control handle assembly.

4. Disengage the locking rod and remove the ball on the cable from the slot in the control assembly.

INSTALLATION

1. Disengage the locking rod and connect the ball end of the cable to the slot on the control assembly.

2. Assemble the pulley to the control handle and the clevis pin.

3. Position the assembly against the dash panel and instrument panel. Secure the assembly to the instrument panel with the two screws.

4. Secure the cable and clamp to the dash panel with two screws.

5. Working from under the left front fender, install the two lock washers and attaching nuts.

PARKING BRAKE EQUALIZER TO HANDLE CABLE

REMOVAL

1. Remove the two screws that attach the cable clamp to the dash panel.

2. Remove the parking brake handle assembly.

3. Disengage the locking rod and remove the ball on the cable from the slot in the control assembly.

4. Push the cable down through the hole in the dash panel.

5. From the underside of the car, remove the cable and housing from the holes in the left front side member. If working on a convertible remove the cable from the bracket.

6. Remove the horseshoe-type clip and remove the cable from the hole in the frame crossmember or torque box on convertibles.

7. Loosen the adjusting nut on the equalizer bar and remove the cable.

INSTALLATION

1. Thread the cable through the crossmember or torque box on convertibles and install the hairpin clip. Attach the rear of the cable to the equalizer bar.

2. Thread the forward end of the cable and housing through the two

holes in the left front side member or bracket on convertibles.

3. Insert the cable and housing through the hole in the dash panel.

4. Disengage the locking rod and connect the ball end of the cable to the slot in the control assembly.

5. Install the two screws that retain the cable clamp to the dash panel and tighten.

6. Install the parking brake handle.

7. Adjust the parking brake at one notch to stop the forward rotation of the rear wheels.

8. Release the handle.

PARKING BRAKE EQUALIZER TO REAR WHEEL CABLE

REMOVAL

1. Disconnect the parking brake equalizer rod from the equalizer lever.

2. Remove the clips from the cable guide brackets on the floor pan.

3. Remove the parking brake cable and housing from the clamp type brackets.

4. Back off the adjustments on the rear brake shoes.

5. Remove both rear hub caps, wheel and tire assemblies, and the rear brake drums.

6. Disconnect the parking brake housings from the backing plates.

7. Disconnect the parking brake cable from the brake shoe lever, and remove the cable and housing from the car.

8. Remove the cable equalizer and the equalizer rod from the parking brake cable.

INSTALLATION

1. Install the cable equalizer and the equalizer rod on the cable.

2. Install the ends of the cable through the holes in the backing plates and connect the brake shoe levers.

3. Connect the parking brake housings to the backing plate.

4. Install the rear drums, wheel and tire assemblies, and hub caps.

5. Install the cable and housing in the clamp type brackets.

6. Install the cable in the guide brackets on the floor pan and insert the cotter pins.

7. Attach the parking brake equalizer rod to the equalizer lever.

8. Adjust the rear brake shoes, and then adjust the equalizer rod to three notches to stop the forward rotation of the rear wheels.

9. Release the handle.

4 MAJOR REPAIR OPERATIONS

BRAKE DRUM REFINISHING

The 6-cylinder models are equipped with 9-inch brake drums and the 8-cylinder are equipped with 10-inch drums.

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

If the drum diameter is less than 0.030 inch oversize, 9.030 inches 6-cylinder, or 10.030 inches 8-cylinder after refinishing, standard lining may be installed. If the drum diameter is more than 9.030 inches or 10.030 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.

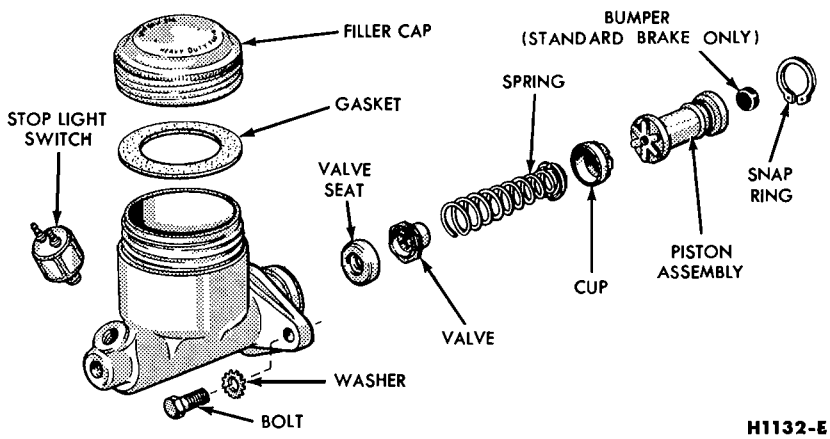


FIG. 16—Brake Master Cylinder Disassembled

BRAKE SHOE RELINING

Brake linings that are worn to within 1/32 inch of any rivet or have been saturated with grease or oil should 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 should 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. If the diameter is less than 9.030 or 10.030 inches, standard lining may be installed. If the diameter is 9.030 to 9.060 or 10.030 to 10.060 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. **Genuine 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 .005 inch clearance between any two rivets.

MASTER CYLINDER DISASSEMBLY

1. Clean the outside of the cylinder, and remove the filler cap and gasket. Pour out any remaining fluid.

2. Remove the stop light switch, brake fitting, and gaskets (Fig. 16).

3. Remove the snap ring from the push rod end of the cylinder.

4. Remove the piston, cup, spring, valve assembly, and valve seat.

5. Remove the rubber bumper from the piston.

MASTER CYLINDER ASSEMBLY

1. Dip all parts except the cylinder body in clean **heavy-duty** brake fluid.

2. Install the brake fitting (Fig. 16) on the forward end of the cylinder.

3. Thread the stop light switch into the cylinder and tighten it securely.

4. Insert the valve seat, valve and spring assembly, cup, and piston into the cylinder bore.

5. Compress the piston against the valve spring and install the snap ring.

6. Install the rubber bumper in the piston (standard brakes only).

MASTER CYLINDER INSPECTION AND REPAIR

1. Clean all parts in clean denatured alcohol and inspect the parts for wear or damage, replacing them as required. When using a master cylinder repair kit, install all of the parts supplied.

2. Check all openings to be sure they are open and free from foreign matter.

3. Check the spring valve at the forward end of the piston. If the spring is loose or has moved so that the piston ports are open, replace the piston.

4. Inspect the cylinder bore for score marks or rust. If either condition is present, the cylinder should be honed. When honing, **do not remove more than 0.003 inch as oversize parts are not available.**

5. Remove any burrs or loose metal that may have resulted from honing. Then clean the cylinder with denatured alcohol.

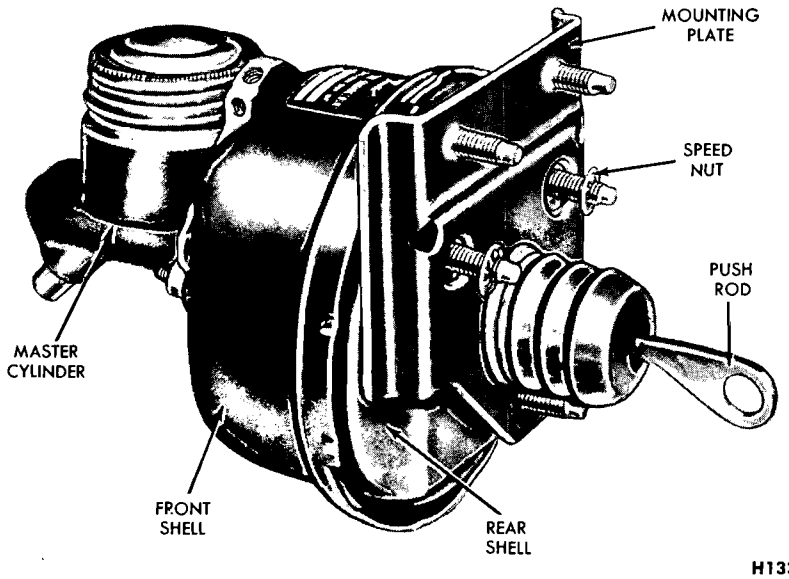


FIG. 17—Vacuum Booster

DISASSEMBLY OF BOOSTER

1. Remove the speed nuts that attach the mounting plate (Fig. 17) to the rear shell and remove the plate.

2. Pull the push rod and front seal (Fig. 18) from the front shell.

3. Scribe an index mark across the front and rear shells.

4. Place the booster in a vise as shown in Fig. 20. Press downward on the rear shell and at the same time, turn it counterclockwise with a flat bar to release it from the front shell. Release the pressure on the rear shell slowly to prevent the diaphragm plate return spring from flying out.

5. Separate the two shells and remove the return spring.

6. Withdraw the diaphragm plate and diaphragm from the front shell.

7. Remove the diaphragm from the diaphragm plate as shown in Fig. 21.

8. Pry the filter retainer off the diaphragm plate being careful not to chip or damage the plate.

9. Hold the diaphragm plate so that the valve retainer is facing downward. Press the valve push rod inward to release the tension on the retainer and allow it to drop out of the plate (Fig. 22).

10. Withdraw the valve and rod from the plate.

11. Press the reaction disc out of the diaphragm plate.

12. Pry the seal retainer (Fig. 19) out of the rear shell.

13. Lift the bearing and the seal from the rear shell.

14. Working from the inside of the front shell, cut the bead off the check valve grommet. Remove the check valve.

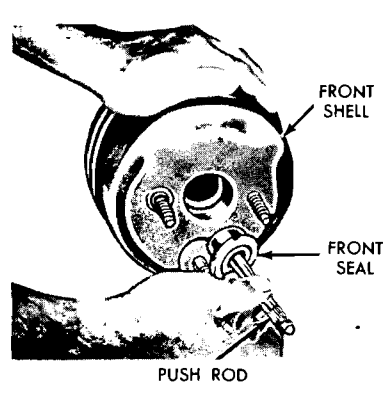


FIG. 18—Removing Front Seal and Push Rod

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