Section III
BRAKES
CONTENTS

DATA AND SPECIFICATIONS
CENTER PLANE SERVICE BRAKES

MODELS	C-71, C-72, C-73, C-70
TYPE	Center Plane (Floating Shoe) Hydraulic
DRUM DIAMETER	12 in.
LINING	
Type	Moulded Asbestos
Attachment	Cyclebond
Width	2½ in.
Thickness	1 3/64 in.
BRAKE SHOE RETURN SPRING TENSION USING FISH SCALE HOOKED AT TOE OF SHOE	35 to 45 lbs. required to break contact between shoe and push rod
BRAKE PEDAL FREE PLAY	1/32 in. to 1/8 in.
WHEEL CYLINDER BORE	
Front—Upper and Lower	1⅛ in.
Rear	1⅛ in.
MASTER CYLINDER BORE	1⅛ in.
PISTON CLEARANCE	.003 in. to .0065 in.

HAND BRAKE

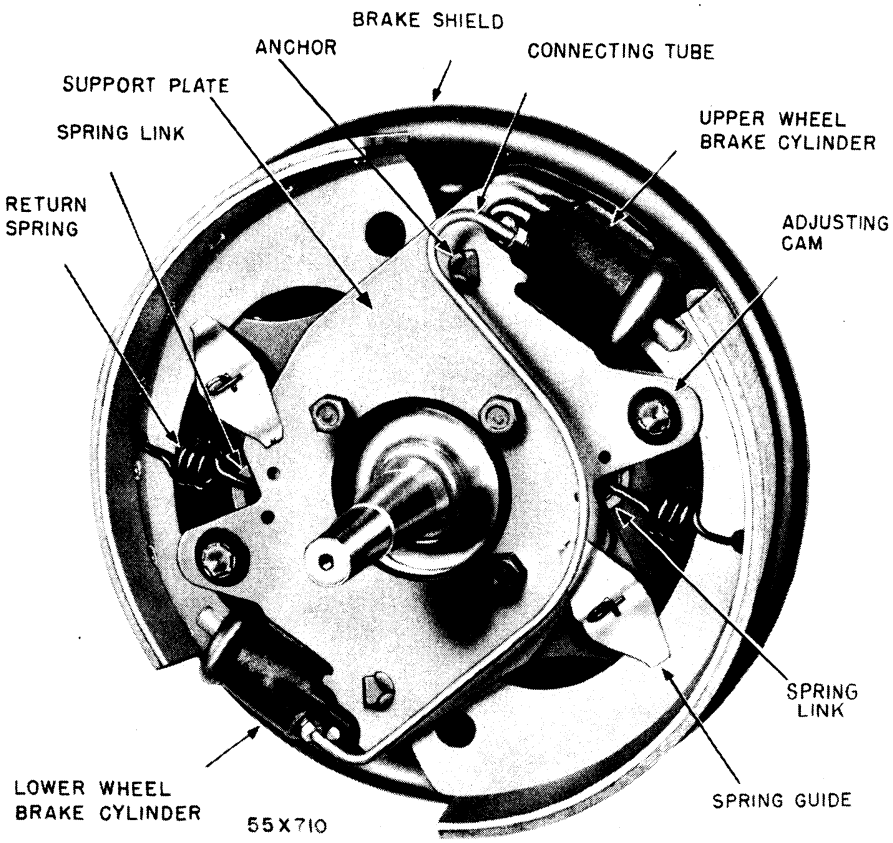
MODELS	C-71, C-72, C-73, C-70
TYPE	External Contracting (Std., 3-Spd. Trans.) Internal Expanding (PowerFlite Trans.)
LOCATION	Propeller shaft at rear of transmission
DRUM DIAMETER	6 inch (Std., 3-Spd. Trans.) 7 inch (PowerFlite Trans.)
LINING TYPE	Moulded and Compressed Asbestos
Length	13.52 inch (Std., 3-Spd. Trans.) 13.06 inch (PowerFlite Trans.)
Width	2 in.
Thickness	5/32 in.
Clearance	.015 in. to .020 in.

SPECIAL TOOLS

Tool Number	Tool Name
C-845	Wheel Puller
C-3462	Brake Shoe Return Spring Removing and Installing Wrench
C-3080	Brake Cylinder Hone
C-3496	Master Cylinder Refiller Air Pressure Tank
C-650	Brake Bleeder Hose
C-3281	Flange Holding Wrench
C-452	Universal Joint Flange Puller
C-3014	Brake Adjusting Spanner
C-3015	Brake Cable Installing Tool

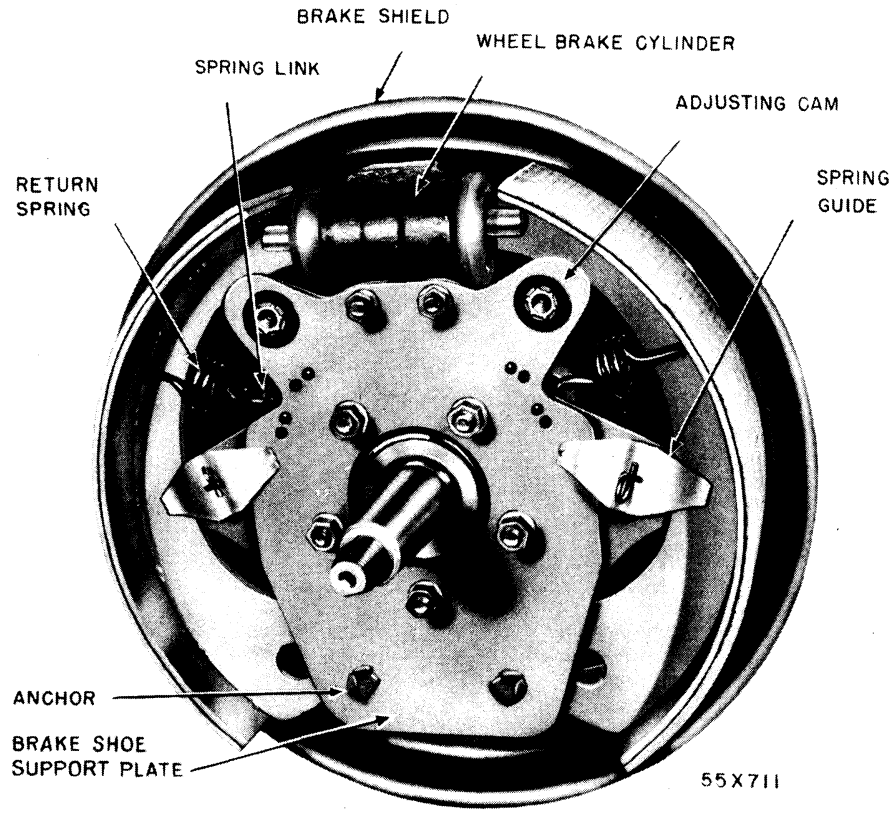
TIGHTENING REFERENCE

	Foot-Pounds
Rear Brake Support Plate Screws	35
Front Brake Support Plate Bolt Nuts	35
Wheel Cylinder Screws	20



55x710

Fig. 1—Center Plane Brake Assembly (Right Front)



55x711

Fig. 2—Center Plane Brake Assembly (Right Rear)

Section III
BRAKES

CENTER PLANE SERVICE BRAKES

Center Plane brakes are of drum type, with floating shoes mounted between two plates located on center plane of linings (Figs. 1 and 2).

With wheel cylinders mounted in same plane, braking forces are transmitted equally across width of lining. The web of shoe is calibrated in depth, so when brakes are applied, equal pressures are applied to brake drums along entire length of lining.

The shoes are held in position by brake shoe return springs. One end of each spring is hooked in loop of return spring links. The other end engages the web of shoe.

An anchor pin in the support plate assembly holds spring link in a fixed position at one end. The other end of link is positioned by brake shoe adjusting cam, providing a constant-loaded spring length.

Side rattle and twisting of shoe is controlled by spring guide, which maintains a constant spring pressure against side of web of shoe holding shoe against support plate. The spring guide also helps to eliminate brake noise.

Two wheel cylinders of single piston type (Fig. 3) are attached to support plate assembly. The location of cylinders is such that when brakes are applied, self-energizing action affects both front and rear shoes of front brake when vehicle is traveling forward.

The front shoe pivots in bottom of support plate and rear shoe pivots at top. Each shoe is actuated by its own wheel cylinder.

Each rear brake assembly uses one wheel cylinder of double-acting type (Fig. 4). Both shoes pivot in bottom of support plate and are actuated by wheel cylinder causing shoes to operate in opposition to each other. Self-energizing action is effective on rear brake front shoe when vehicle is traveling forward and effective on rear shoe when traveling in reverse.

SERVICE PROCEDURES

1. DISASSEMBLY OF FRONT BRAKE

Block brake pedal to prevent downward movement of pedal. Back off adjusting cams. Remove wheel, and hub and drum assembly. Using Tool C-3462, remove shoe return springs (Fig. 5). The end of tool should be inserted

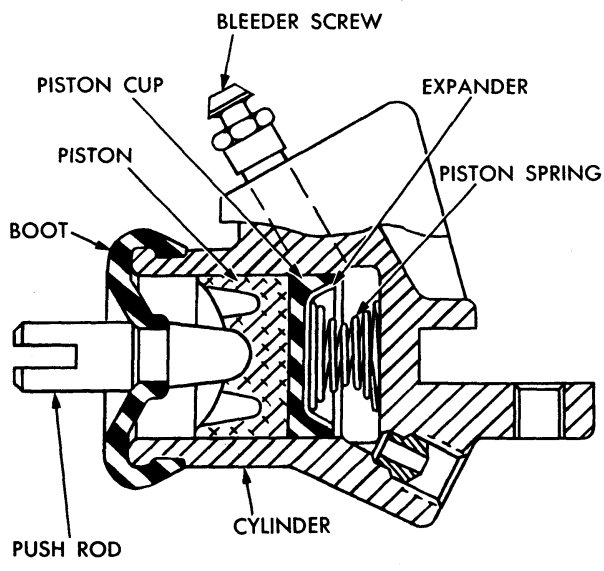


Fig. 3—Wheel Cylinder (Front) (Sectional View)

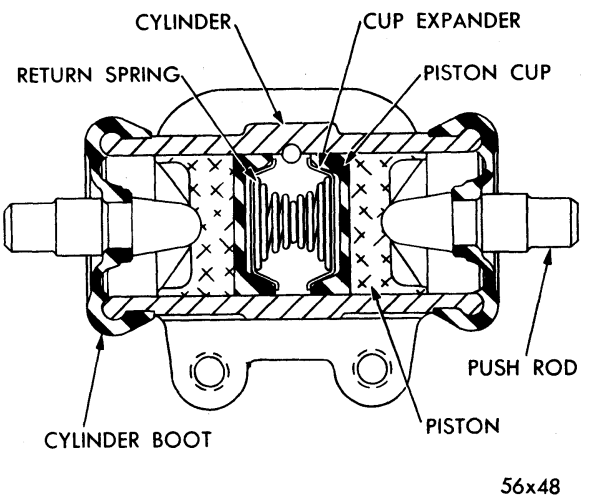


Fig. 4—Wheel Cylinder (Rear) (Sectional View)

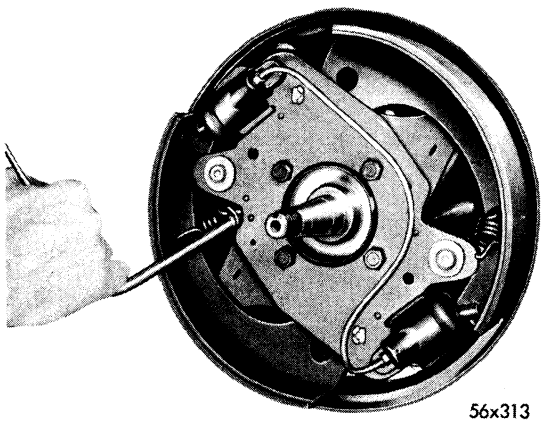


Fig. 5—Removing Front Brake Shoe Return Spring with Tool C-3462

between spring link and support plate assembly. With tool cam slot engaging spring hook, turn handle of tool to disengage spring.

NOTE

Do not use brake spring pliers or damage to lining will result.

Turn brake shoe guide retainer ¼ turn, then remove retainer and guide (Fig. 6). **The lip on end of guide is used for positioning guide on outer support plate.** Slide shoes from between support plates (Fig. 7). Disconnect flexible brake hose at upper wheel cylinder, and remove wheel cylinder mounting screw and lockwasher at rear of brake shield.

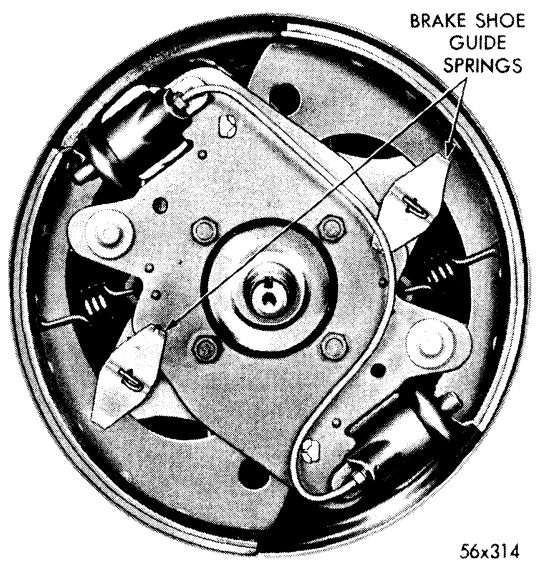


Fig. 6—Removing Front Brake Shoe Guide Spring

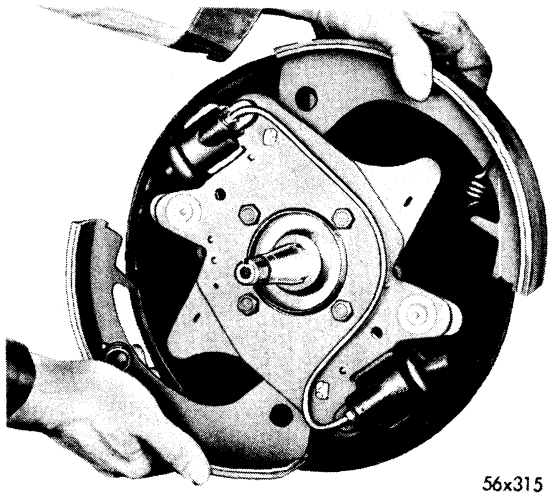


Fig. 7—Removing Front Brake Shoe from Support Plate

Remove four support plate mounting bolts, nuts and lockwashers, and remove support plate with wheel cylinders and cylinder connector tube attached. With assembly on bench, remove cylinder connector tube and wheel cylinders.

NOTE

Perform operations outlined in "Servicing the Wheel Cylinders."

2. ASSEMBLY OF FRONT BRAKE

Place wheel cylinders into position in support plate assembly and install connector tube. Position support plate on brake shield and install cylinder mounting screw and lockwasher, but do not tighten.

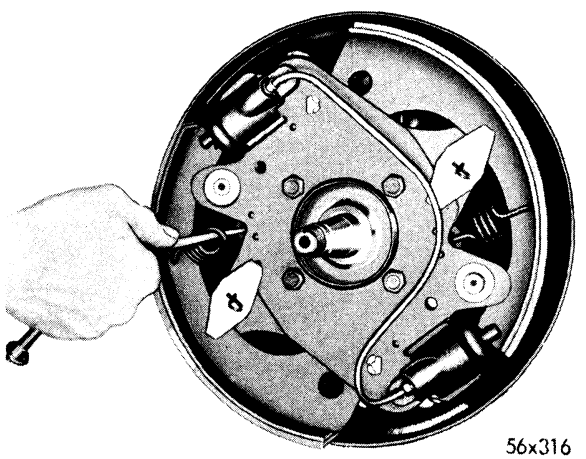


Fig. 8—Installing Front Brake Shoe Return Spring

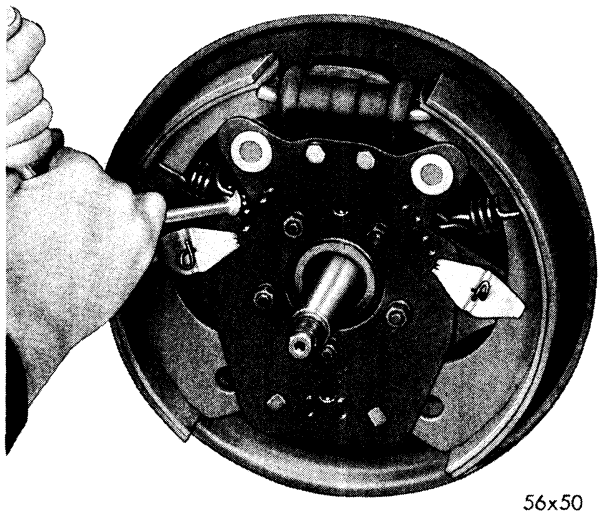


Fig. 9—Removing Rear Brake Shoe Return Spring with Tool C-3462

NOTE

Be sure brake adjusting cam rubber dust washers are in place and in good condition before installing support plate assembly.

Install four support plate bolts, lockwashers, and nuts. Tighten 35 foot-pounds and wheel cylinder mounting screw 20 foot-pounds torque.

Install wheel cylinder flexible brake hose, and tighten all connections securely. Install brake shoes, and brake shoe return springs, (Fig. 8).

3. DISASSEMBLY OF REAR BRAKE

Block brake pedal in "UP" (released) position. Raise car and remove wheels. Back off all adjusting cams.

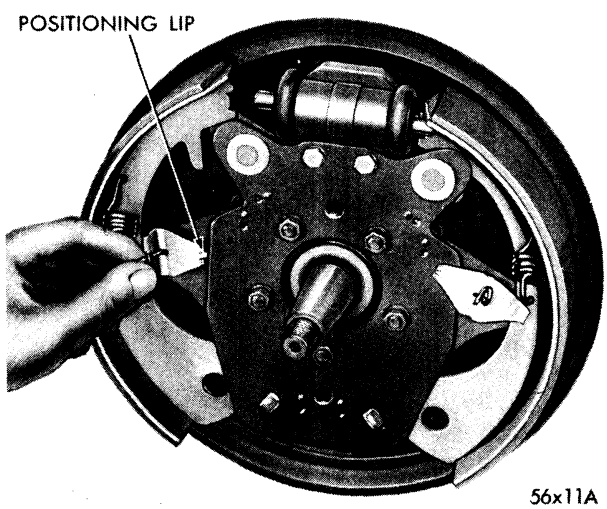


Fig. 10—Removing Rear Brake Shoe Guide Spring

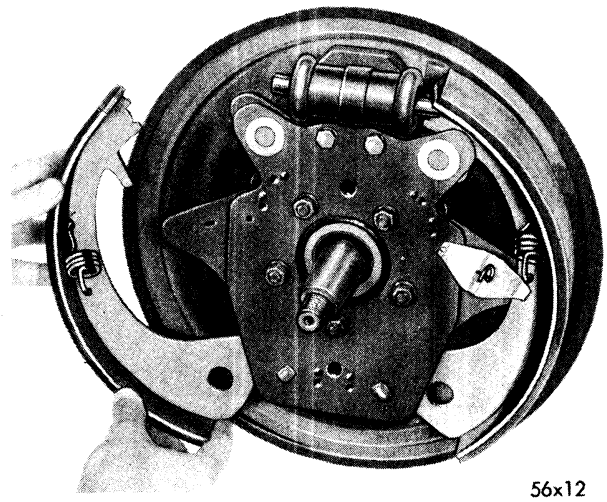


Fig. 11—Removing Rear Brake Shoe from Support Plate

Remove hub and drum assembly, using puller, Tool C-845. Insert wrench, Tool C-3462, in inner support plate hole, with tool cam slot engaging spring hook (Fig. 9). Turn tool handle to disengage spring from return spring link, and turn handle in opposite direction to release spring. Remove both springs in this manner. **Do not use brake spring pliers or damage to lining will result.**

Turn brake shoe guide spring retainer ¼ turn and remove guide spring. (Fig. 10). The lip on end of spring is for correct positioning on outer support plate. Remove brake shoes (Fig.

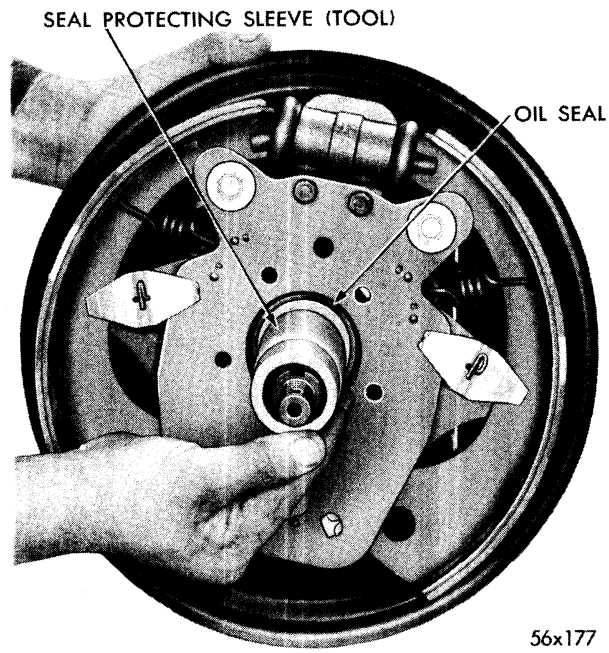


Fig.12 —Removing and Installing Rear Brake Support (Tool C-745)

11). Disconnect brake line at wheel cylinder. Install Tool C-745 to protect axle shaft outer seal. (Fig. 12).

Remove five nuts and lockwashers that retain brake support plate and brake shield to axle housing and remove support plate, wheel cylinder and dust shield as a unit. Remove wheel cylinder.

4. ASSEMBLY OF REAR BRAKE

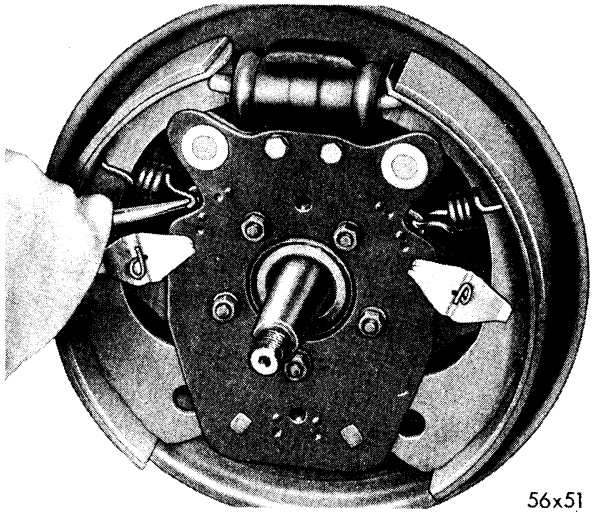
Assemble wheel cylinder on brake shoe support plate. Install screws and lockwashers finger tight. Assemble brake shoe support plate assembly to brake shield.

NOTE

Be sure brake adjusting cam rubber dust washers are in place and in good condition before installing brake support plate assembly. These washers are located between support plate and brake shield.

Position Tool C-745 (Fig. 12) and install brake shield, support plate and wheel cylinder. Tighten support plate screws 35 foot-pounds and wheel cylinder screws 20 foot-pounds torque. Connect brake fluid line to wheel cylinder.

Position brake shoes in support plate. **Make sure wheel cylinder push rods properly engage toe end of shoes and shoes are in alignment. Refer to "Brake Shoe Alignment," Paragraph 5.** If shoes have to be relined, refer to "Brake Lining Replacement," Paragraph 6. Install brake shoe return springs, using Tool C-3462 (Fig. 13).



56x51

Fig. 13—Installing Rear Brake Shoe Return Spring

Check tension of springs, by hooking fish scale at toe of shoe and pulling shoe away from wheel cylinder. Scale should read 35 to 45 pounds before contact is broken between web of shoe aid wheel cylinder push rod.

NOTE

Long end of brake return springs must be hooked in shoes. Otherwise, brake noise will be encountered due to coil of springs contacting shoes.

Install brake shoe guide springs, making sure positioning lip of spring engages hole in support plate (Fig. 10).

Loosen adjusting cams and install hub, drum and wheel assembly. Bleed brake system, refill master cylinder to proper level, and adjust brakes, as outlined in "Brake Adjustment," Paragraph 8.

5. BRAKE SHOE ALIGNMENT

To insure maximum braking effort, the entire length and width of lining must contact drum upon brake application. Examination of used lining will disclose if shoe is out of alignment. Misaligned shoes cannot be corrected by grinding and should be discarded. The brake shoe support plate assembly should also be checked. If it is sprung or damaged, replace with new support assembly.

6. BRAKE LINING REPLACEMENT

Pre-cemented Cyclebond brake lining can be successfully bonded to either new or used brake shoes.

NOTE

It is very important that equipment manufacturer's instructions be carefully observed for curing time, temperature, and clamping pressure (100 psi.), depending on type of equipment used.

7. GRINDING THE BRAKE LINING

NOTE

Brake shoe grinding must be done with brake shoes removed from vehicle.

Follow this procedure. Measure the drum diameter with an accurate micrometer. **Drum must not exceed .004 inch out-of-round at any point in drum.** The drum diameter is then transferred to grinding machine and lining is ground to specified clearance of .010 to .024 inch below drum diameter.

8. BRAKE ADJUSTMENT

NOTE

Whenever brakes have been relined or new shoe assemblies installed, always apply brake pedal prior to adjusting brakes. This action causes brake shoes to center themselves in brake drum and to assist in adjustment.

a. Front Brake Adjustment

Turn each adjusting cam (Fig. 14) on both front brakes in direction of forward wheel rotation (Fig. 15) until shoe lining is solid against drum and wheel is locked. Turn adjusting cams slowly in opposite direction (each cam a little at a time) until no drag is felt.

b. Rear Brake Adjustment

The forward rear wheel brake shoe adjusting cam are rotated in direction of forward wheel rotation. The rear wheel shoe adjusting cams are rotated in direction of reverse wheel rotation (Fig. 15).

9. SERVICING THE WHEEL CYLINDERS

Wheel cylinder pistons that are badly scored or corroded should be replaced. Use new piston cups when reconditioning cylinders.

Cylinder walls that have light scratches, or show signs of corrosion, can usually be cleaned

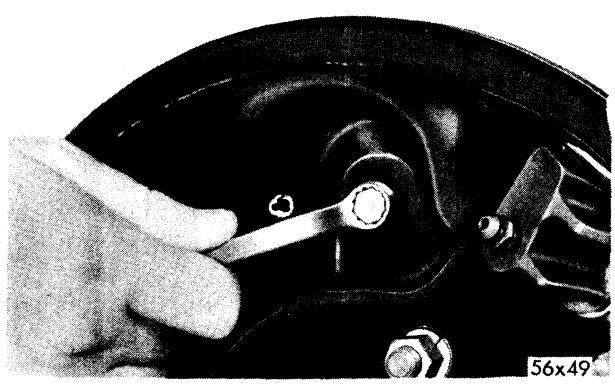


Fig. 14—Adjusting Brake Shoe at Cam

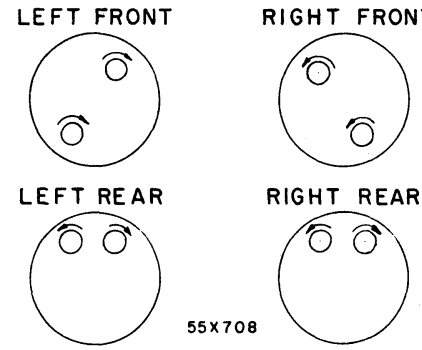


Fig. 15—Adjusting Front and Rear Brake Shoes (Orientation Diagram) (as Viewed Beneath Vehicle)

up with crocus cloth. However, cylinders that have deep scratches or scoring, may be honed, using Tool C-3080, providing diameter of cylinder bore is not increased more that .002 inch. A cylinder that does not clean up at .002 inch should be discarded and new cylinder used. (Black stains on cylinder walls are caused by piston cups and will do no harm.)

10. SERVICING THE MASTER CYLINDER

When servicing the hydraulic brake system, these important rules must be observed:

All vital parts of system must be kept **CLEAN,** free from dirt, grease and oil. The system must

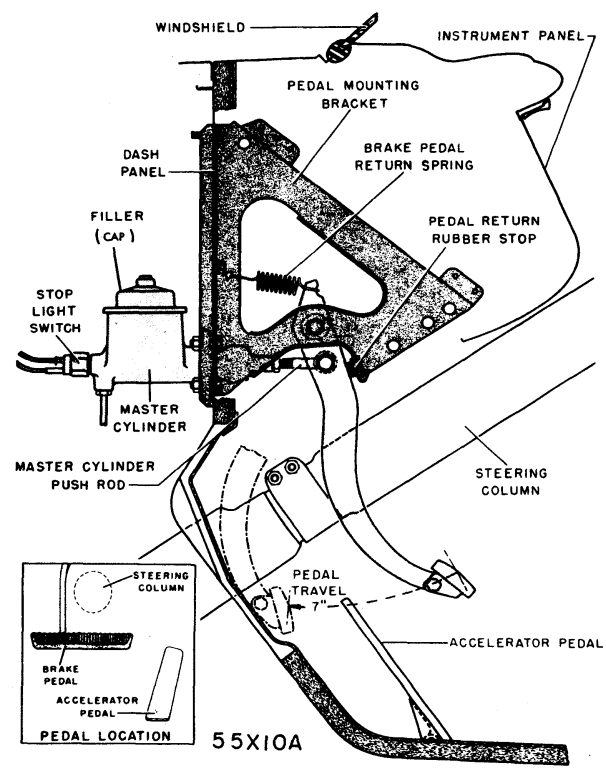


Fig. 16—Master Cylinder Location and Linkage

be free from air and all connections must be tightly sealed upon completion of job. Only high boiling point brake fluid, such a MOPAR Super Brake Fluid should be used.

To remove master cylinder, refer to Figure 16, and proceed as follows:

Remove pedal return spring, disconnect push rod, and brake line tube at master cylinder. Disconnect stop light switch leads and remove master cylinder.

Clean outside of master cylinder thoroughly, remove reservoir filler cap, and drain all brake fluid. Refer to Figure 17, and disassemble master cylinder for inspection. If master cylinder piston is badly scored or corroded, replace with new one. Piston cups and valve assembly should be replaced when re-conditioning master cylinder.

Master cylinder walls that have light scratches or show signs of corrosion, can usually be cleaned with crocus cloth. However, cylinders that have deep scratches or scoring may be honed, providing diameter of cylinder bore is not increased more than .002 inch. A master cylinder bore that does not clean up at .002 inch should be discarded and new cylinder used. (Black stains on the cylinder bore are caused by piston cups and will do no harm).

CAUTION

Use extreme care cleaning master cylinder after reconditioning. Remove all dust or grit by flushing cylinder with alcohol. Wipe dry with clean lintless cloth and clean second time with alcohol. Dry master cylinder with air pressure, and flush with clean brake fluid. (Be sure relief port in master cylinder is open.)

Before assembling, piston, cups and valve assembly should be dipped in new MOPAR Super Brake Fluid.

11. BLEEDING THE BRAKE SYSTEM

Remove any dirt around master cylinder reservoir filler cap so that dirt and grit will not drop into reservoir.

Compressed air refiller, Tool C-3496, filled with MOPAR Super Brake Fluid or high boiling point fluid, provides a convenient way for keeping master cylinder filled while bleeding brake system.

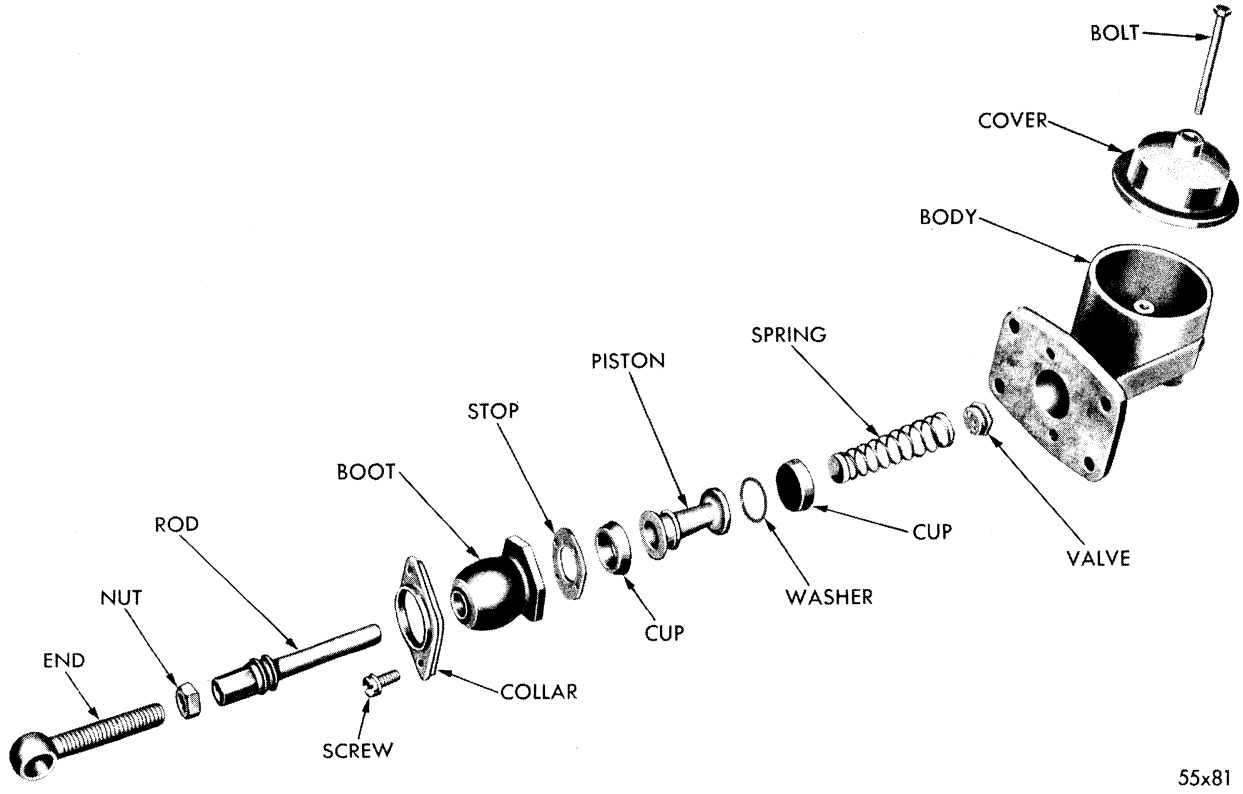


Fig. 17—Master Cylinder (Disassembled View)

Back brake adjusting cams all the way off. This allows pistons in wheel cylinders to move back and permits greater movement of piston to expel air faster.

Starting with right rear wheel cylinder, wipe dirt off bleeder valve, and attach bleeder hose, Tool C-650, to valve. Place other end of hose in jar half full of brake fluid.

Bleed intermittently, opening and closing valve (at wheel cylinder) about every four seconds. This causes a whirling action in cylinder to help expel air. Continue this process until fluid runs out of bleeder hose in a solid stream without air bubbles.

Continue bleeding by repeating this operation on left rear wheel, right front wheel, and left front wheel. At front wheels, bleed lower cylinder first to force all air out of connecting line.

If necessary, repeat bleeding operation when there is an indication of air remaining in system. **Be sure to adjust cams after completion of bleeding operation.**

12. TEST FOR FLUID CONTAMINATION

To determine if contamination exists in brake fluid (indicatd by swollen or deteriorated rubber cups), make following test:

Place small amount of drained brake fluid in small glass bottle. Separation of fluid into two distinct layers will indicate mineral oil content. Add water to contents and shake. If fluid becomes milky, oil is present. If fluid remains clear, it is not contaminated with mineral oil.

Be safe and discard old brake fluid that has been bled from system. Fluid drained from bleeding operation may contain dirt particles or other contamination and should not be used.

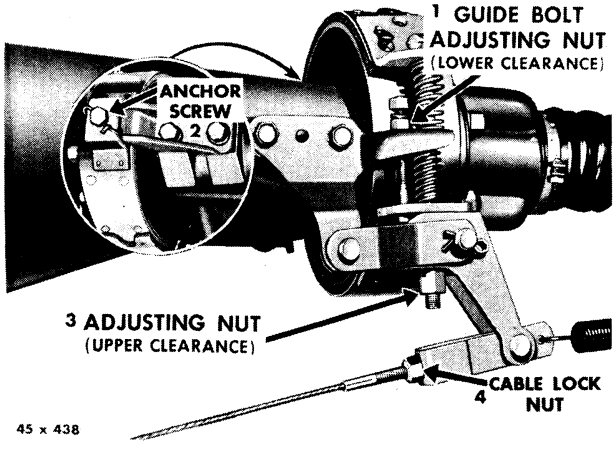


Fig. 18—Hand Brake Band Adjustment (External Contracting Type Hand Brake)

13. SERVICING THE HAND BRAKE (EXTERNAL CONTRACTING TYPE)

a. Removal and Installation

Remove adjusting bolt and nut. Remove guide bolt adjusting lock nut and guide bolt nut and bolt (Fig 18). Remove anchor adjusting screw and band assembly.

b. Relining Hand Brake Band (Band Removed)

When band is removed, proceed as follows: Remove old lining. Cut new lining ¼ inch longer than required length so there will be a slight bulge at center when it is installed in band. Drill and counterbore four rivet holes (two at each end of lining) to coincide with holes at extreme ends of band. These counterbores should be at least one-half thickness of lining.

Rivet two extreme ends of lining to respective extreme ends of band. Due to ¼ inch excess length, lining will now bulge slightly at center of band. Snap this lining in against band to make an even tight fit.

Install remaining rivets, starting from each end and working alternately toward center. End-chamfer two open ends of lining to reduce noise and grabbing effect.

14. ADJUSTING THE HAND BRAKE (EXTERNAL CONTRACTING TYPE)

Set hand brake lever in fully released position.

NOTE

Before adjusting brake, be sure that free play (between anchor bracket on center of band and sides of hand brake support) does not exceed .005 inch. Otherwise, band distortion may result upon application of brake. This free lay, if excessive, may be reduced by compressing anchor bracket in vise or tapping it gently with hammer against block or anvil.

Remove lock wire. Using feeler gauge, adjust anchor screw (Fig. 18) so that clearance between band and drum at anchor is .015 to .020 inch. Lock anchor screw securely.

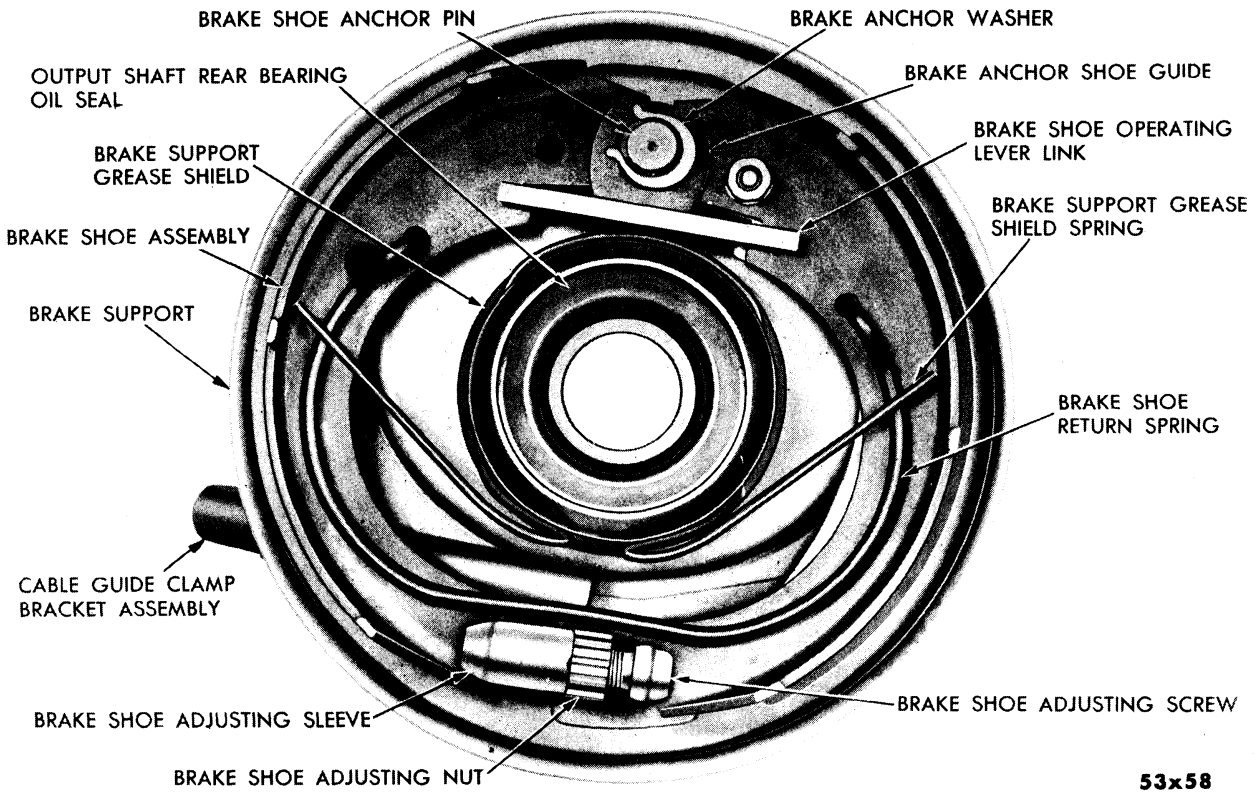


Fig. 19—Internal Expanding Type Hand Brake

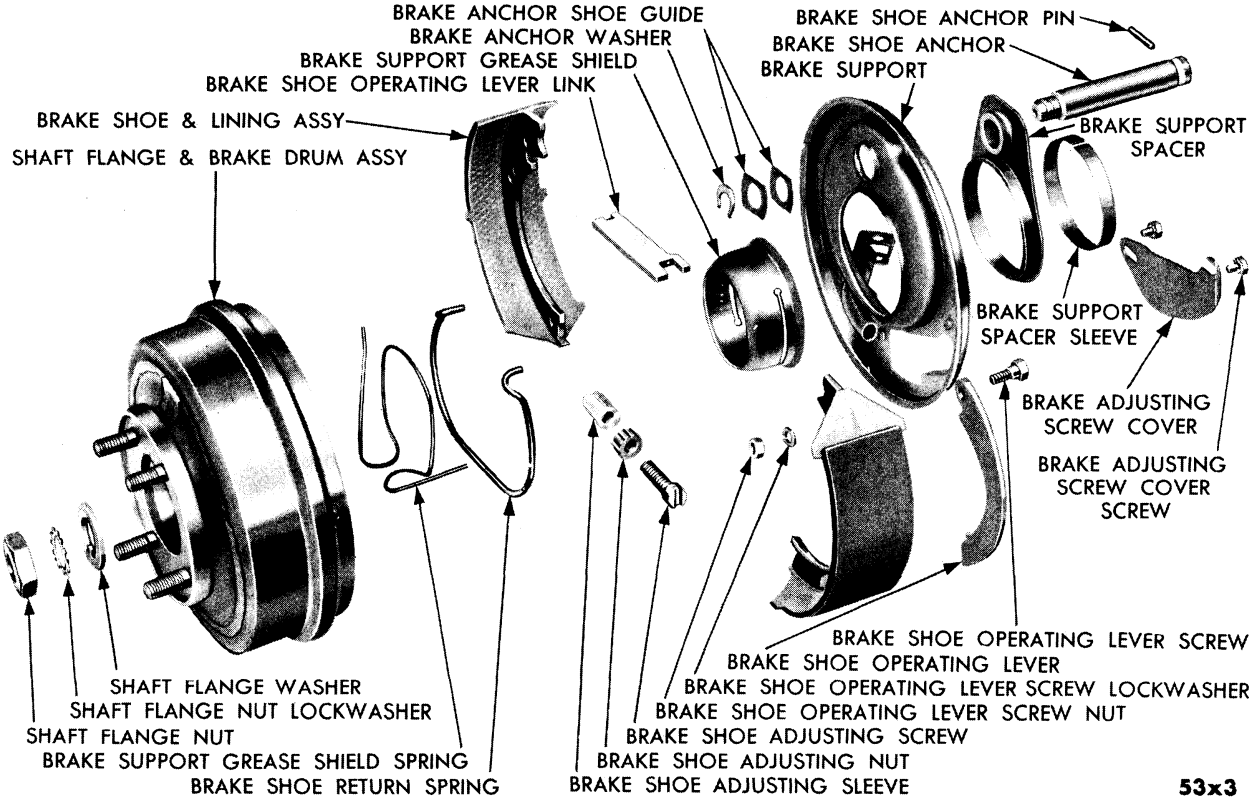


Fig. 20—Hand Brake (Internal Expanding Type) (Disassembled View)

Adjustment of guide bolt (Fig. 18) should be such that both upper and lower half of band has a like amount of clearance. The guide bolts move lower half of band up to keep upper half of band from dragging and causing premature wear. Adjusting bolt nut controls upper half of band.

Turn adjusting bolt nut (Fig. 18) until there is just a slight drag on drum, with upper and lower half having an equal amount of clearance.

CAUTION

The lockwire which retains anchor bolt must not be drawn up tight. This restriction will cause uneven wear and a poor brake.

15. ADJUSTING HAND BRAKE CABLE (EXTERNAL CONTRACTING TYPE)

After long service, the cable may stretch to such an extent that pulling back on hand brake lever will not apply band to drum. Loosen cable lock nut (Fig. 18), remove clevis pin from yoke, and turn yoke until cable slack is taken up. Make certain that lock nut is tightened after assembly. (This is not a substitute for hand brake adjustment.)

16. SERVICING THE HAND BRAKE (INTERNAL EXPANDING TYPE)

The hand brake (Fig. 19) is internal expanding type and is used only on cars equipped with PowerFlite Transmission.

The brake is fully enclosed to keep out dirt and oil and requires very little servicing. Longer lining life is assured by protection against dirt and by use of Cyclebond linings. Adjustments, when needed, are very simple for both steel control cable and shoes.

a. Disassembly

To service the internal expanding hand brake, refer to Figure 20, and proceed as follows:

Disconnect propeller shaft at transmission. Engage holding tool, C-3281, with companion flange. Loosen and remove companion flange nut, lockwasher and flatwasher. Install puller, Tool C-452, on companion flange and remove flange and brake drum. Remove brake adjusting screw cover and disengage ball end of cable from operating lever. Separate shoes at bottom, allowing brake shoe adjusting nut, screw and sleeve to drop out, and release shoes. Remove brake shoe return spring.

Pry out brake shoe anchor washer and remove outer shoe guide. Slide each shoe out from under brake support grease shield spring. (As shoes are removed, operating strut lever will drop out of place.) Separate operating lever from right-hand brake shoe by removing nut, lockwasher and bolt. The brake is now disassembled as necessary for replacement of worn or damaged parts.

b. Assembly

Assemble operating lever to right-hand brake shoe. Slide right and left-hand brake shoes under brake support grease shield spring and up against inner anchor shoe guide. Spread shoes and insert operating lever strut, with wide slot toward operating lever and word "top" facing up.

Replace outer brake anchor shoe guide and washer. Replace brake shoe return spring. Spread both shoes apart at bottom and install brake shoe adjusting nut, screw and sleeve. **Be sure to install adjusting nut, screw and sleeve in proper position.**

Turn brake shoe adjusting nut until shoes are in released position, and install brake drum. **Be sure brake shoes are centered on backing plate and are free to move.** Connect brake control cable and adjust brakes and control cable. See "Adjustment." Replace the adjusting screw cover plate as follows:

c. Adjustment

Push in Neutral (N) push botton. Be sure hand brake is released. Disconnect front end of propeller shaft to permit turning of brake drum by hand (if not previously disconnected). Remove adjusting screw cover plate. Turn brake shoe adjusting nut to decrease shoe-to-drum clearance until slight drag is felt on drum. Back off adjusting nut at least one full notch (using spanner wrench, Tool C-3014) to give approximately .010 inch clerance. **Be sure two raised shoulders on adjusting nut are seated in grooves on adjusting sleeve.**

Test hand brake lever for travel. When it is properly adjusted, there should be from 3 to 5 notches on lever rod visible beyond face plate. **Never substitute for a brake shoe adjustment by**

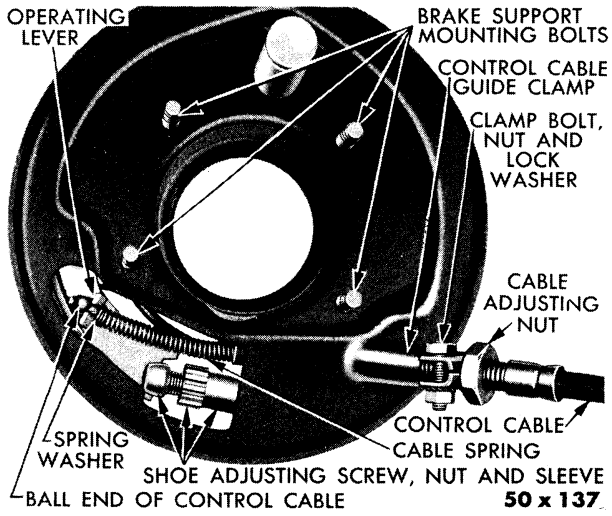


Fig. 21—Rear View of Brake (Typical)

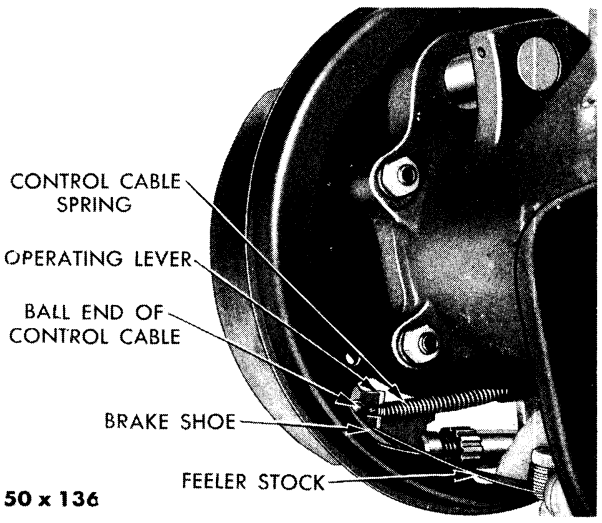


Fig. 22—Clearance Between Lever and Brake Shoe Table (Typical)

adjusting cable. Install adjusting screw cover plate and connect propeller shaft.

17. SERVICING HAND BRAKE CABLE (INTERNAL EXPANDING TYPE)

a. Removal (At Transmission End)

If removal of control cable is required for replacement or repair, refer to Figure 21, and proceed as follows. Loosen guide clamping bolt and remove adjusting screw cover plate. Pry ball end of cable up and out of operating lever slot with a screwdriver. Remove control cable from guide.

b. Installation

Slide cable into guide. Insert installer, Tool C-3015, between spring retainer washer and ball on end of cable. Hook cable into slot in operating lever, with lever between ball and washer.

c. Adjustment

After installation has been completed, adjust cable as follows: The cable length adjusting nut should be positioned against cable housing so there is at least .005 inch, but not more than .010 inch, clearance between operating lever and brake shoe cable (Fig. 22).

To lock adjustment, tighten cable housing clamp securely and tighten cable adjusting nut against housing. **Never substitute cable adjustment for brake shoe adjustment.**

18. CYCLEBOND BRAKE LINING

Pre-cemented Cyclebond brake lining can be applied to either new or used shoes. See instructions in MOPAR Shop Replacement Packages.

POWER BRAKE UNIT (PISTON TYPE)

19. REMOVAL, DISASSEMBLY, AND ASSEMBLY OF POWER BRAKE UNIT

a. Removed (Fig. 23)

Place wood wedge between power brake lever and forward edge of triangular hole in pedal bracket. This will prevent trigger arm from extending beyond extremities of bracket.

NOTE

If pedal linkage is allowed to extend through hole in the dash panel, the trigger arm may be damaged.

Disconnect vacuum hose at power unit. Remove complete power unit and bracket assembly by removing four nuts and lockwashers. Carefully withdraw unit from dash panel.

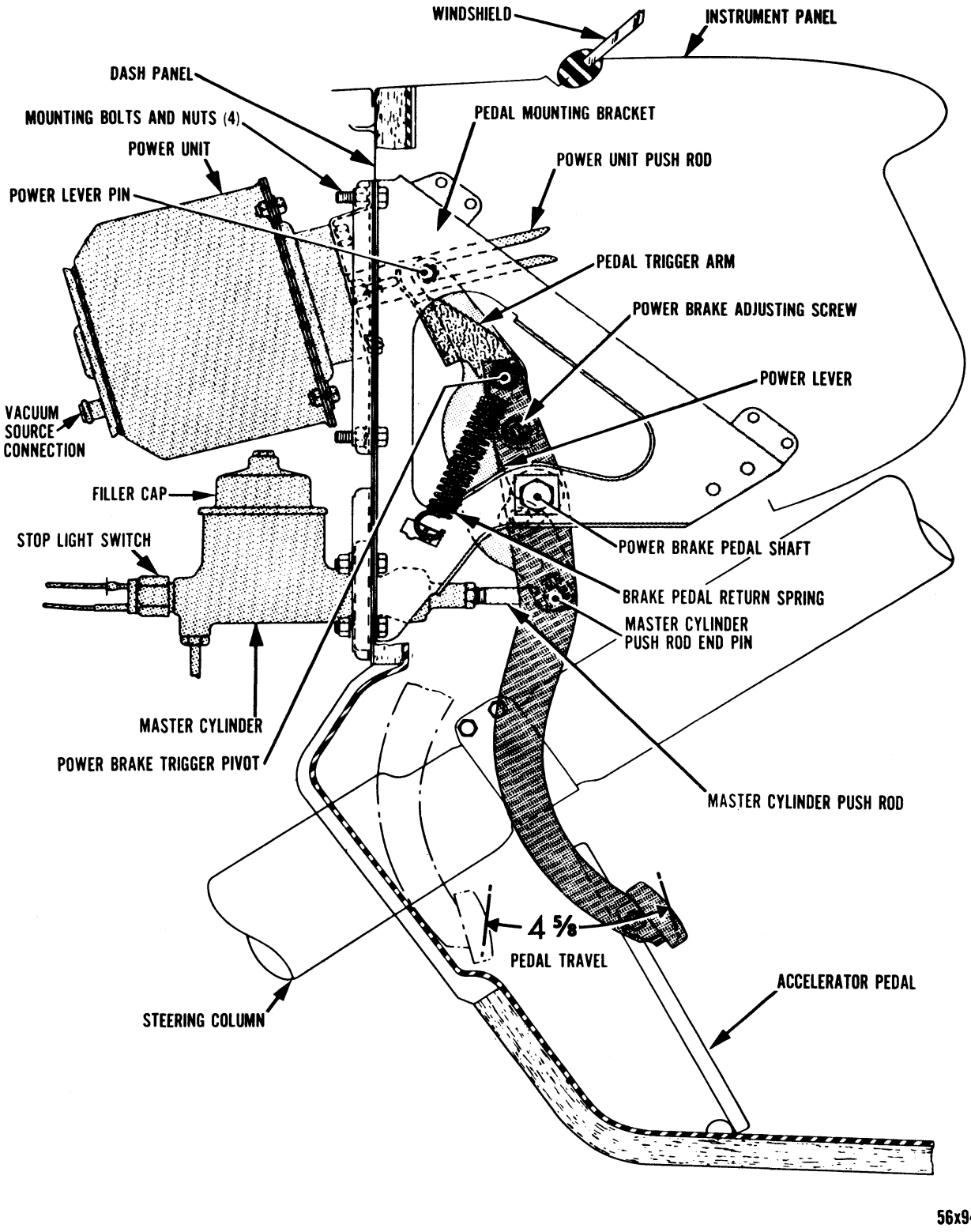


Fig. 23—Power Unit and Linkage Installation (Piston Type)

NOTE

Use care to prevent loss of nylon bushings on pedal linkage cross pin.

b. Disassembly

CAUTION

Do not clamp yoke in vise during any operation.

(Refer to Figs. 24 and 25.) Scribe line across air cleaner cover, vacuum tube and plate, and cylinder shell as a guide to correct assembly. Remove three air cleaner cover screws, air cleaner cover, and filter hair. Remove four remaining tube plate screws, separate tube and plate, and gasket from vacuum cylinder. Slide end of hose from vacuum tube.

Scribe line across flange of cylinder and end plate as guide to correct assembly. Remove four cylinder bolts and nuts, and remove cylinder shell and rubber ring gasket.

Scribe line across tube plate and piston plate to insure correct assembly. Remove hose from vacuum plate and rubber diaphragm from end of tube fitting. Using thin nose pliers, pull out diaphragm balancing pin. Remove four tube and plate attaching screws, separate tube and valve poppet parts from piston plate; and separate plate, poppet spring, and diaphragm from poppet.

From opposite end of assembly, remove valve rod rubber seal. Use Tru-Arc snap ring pliers and remove snap ring, retainer washer, spring, and friction collar. Remove valve rod from piston rod.

NOTE

Drive out piston retaining pin from piston (part way) and note if piston is free on piston rod. If piston is free on piston rod, hold spring compressed while removing retainer pin from piston. If piston is tight on piston rod, after retainer pin has been removed, use a 5/8 inch diameter brass rod with squared end to drive out piston rod from piston.

Separate piston rod, end plate, and return spring from piston: Remove rubber stop washer from piston rod.

Scribe line across mounting ring and end plate to insure correct reassembly of parts. Remove four bolts and lockwashers and separate mounting ring, seal retaining spring, seal retainer washer, piston rod leather seal, and mounting gasket from end plate.

Remove six screws and remove retainer plate, expander spring, wick, piston plate, and leather packing from piston plate.

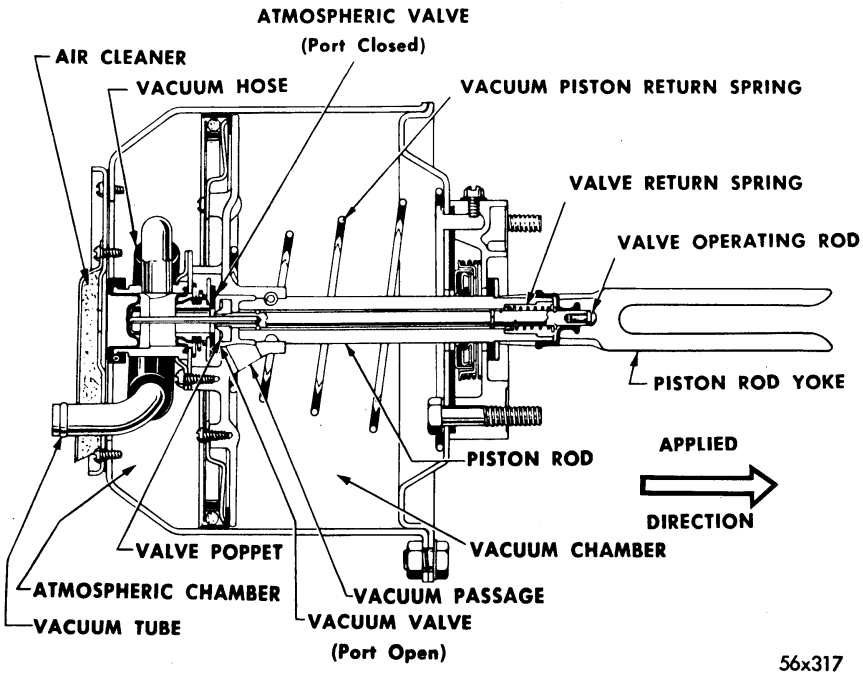


Fig. 24—Power Cylinder—Piston Type (Cutaway View)

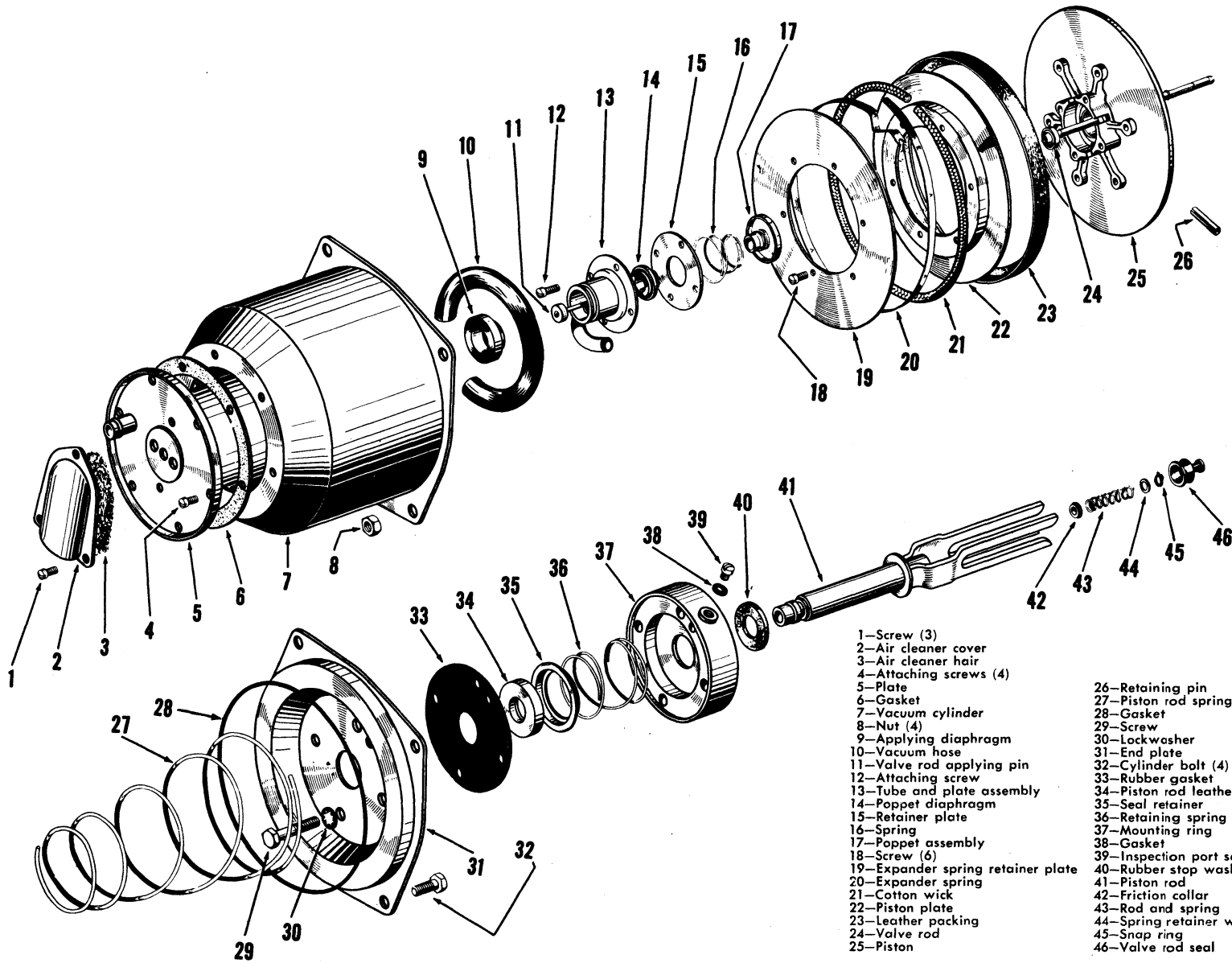


Fig. 25—Power Brake Unit (Disassembled View)

c. Cleaning and Inspection

Thoroughly wash all metal parts in Bendix Metaclene (or recommended MOPAR Cleaner), and **wash rubber parts in alcohol.** Use air hose to blow out dirt and cleaner fluid from recesses and internal passages. Place washed parts on clean paper or lintless cloth. When overhauling power unit, use all parts in repair kit. Discard matching parts from original unit. Inspect all other parts and replace damaged or excessively worn parts. If inside of vacuum cylinder is rusted or corroded, polish with steel wool or fine emery cloth. If inspection reveals nicks or scratches on piston rod, valve seat at end of valve rod, or valve seat at center of piston plate, replace parts. If piston leather packing or piston rod leather seal are worn excessively, replace.

d. Assembly

Assemble piston plate with threaded hole side up (Fig. 26). Assemble leather packing on piston with lip side up. Place packing retainer plate on packing, with raised side up, and align holes in piston. Coil cotton wick inside of packing lip and cut wick to required length. Remove and dip wick in Bendix Vacuum Cylinder Oil. Let excess oil drip off, and again coil wicking inside of lip of packing. Install expander spring inside of wicking, with gripper points next to wicking. Engage notch at loop end of spring with hook at opposite end of spring. Align holes in expander spring retainer plate with threaded holes in piston plate. Install six screws and tighten securely. Assemble vacuum inspection port screw and screw gasket to mounting ring, if screw was removed (Fig. 27.)

Insert four bolts and lockwashers through holes in end plate and assemble mounting ring rubber gasket over bolts.

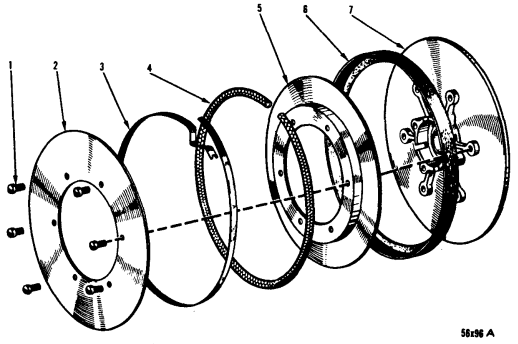


Fig. 26—Assembly of Piston Packing and Retainer

1—Screw
2—Expander spring retainer plate
3—Expander spring
4—Cotton wick
5—Piston plate
6—Leather packing
7—Piston

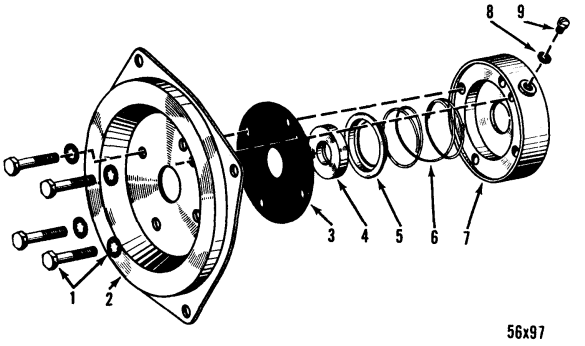


Fig. 27—Assembly of Mounting Ring, Gasket and Piston Rod Seal to End Plate

1—Screw (4)
2—End plate
3—Rubber gasket
4—Piston rod leather seal
5—Seal retainer
6—Retaining spring
7—Mounting spring
8—Gasket
9—Inspection port screw

NOTE

Align gasket inspection hole with holes in mounting ring and end plate.

Assemble new piston rod leather seal on gasket, with lip side away from gasket, and center seal over hole in gasket. Place seal retainer over seal and install retaining spring. Coat bearing surface of mounting ring with silicone grease and assemble mounting ring on end plate, making certain inspection port hole in mounting ring lines up with hole in gasket. Thread four bolt into mounting ring and securely fasten bolts. When bolts are tight, outer rim of mounting ring should be in contact with end plate.

Slide rubber stop washer over piston rod up against steel washer on piston rod, and insert rod through seal in end plate (Fig. 28). Assemble piston return spring on end plate, with large diameter end next to end plate. Align slot in piston rod with vacuum test port in end plate. Align piston so that two of four threaded holes in valve side of piston are in line with slot in piston rod. Press piston on piston rod up against shoulder of rod and install retaining pin. Insert valve rod in piston until end of rod protrudes at opposite end of plate. (Fig. 29). Assemble friction collar, valve rod spring, and spring retainer washer over valve rod. Compress spring and install snap ring in groove of valve rod. Install valve rod seal over end of valve rod and piston rod.

NOTE

To aid in seal installation, turn seal partially inside out. Assemble small diameter end of seal

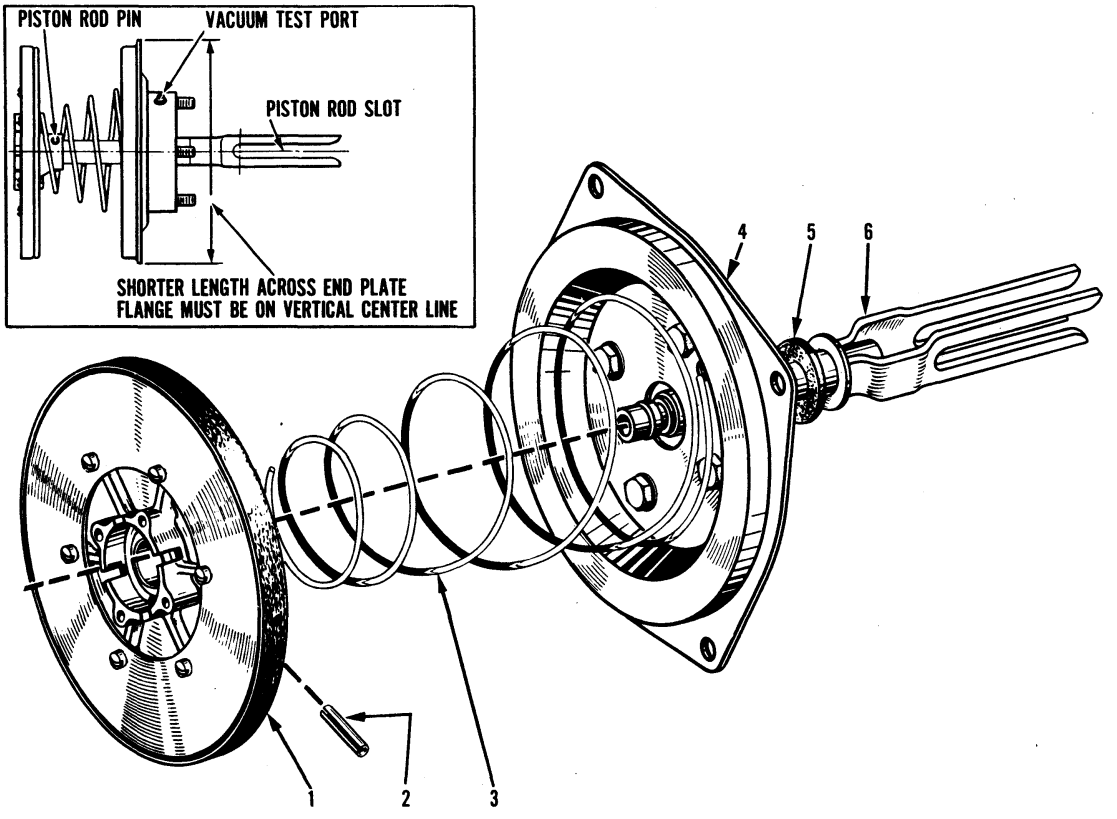


Fig. 28—Assembly of Piston, Piston Retainer Springs, and Piston Rod to End Plate

1—Piston
2—Retaining pin
3—Piston rod spring
4—End plate
5—Rubber stop washer
6—Piston rod

over valve rod and assemble large diameter over end of piston rod.

Assemble small diameter of poppet diaphragm in recess of poppet assembly (Fig. 29). Assemble poppet spring over diaphragm with small diameter end next to poppet plate. Assemble retainer plate over large diameter of diaphragm and center poppet on piston plate. Align holes in retainer plate with holes in piston plate. Place vacuum tube and plate on retainer plate and align.

WARNING

Vacuum tube must be in the lower left quadrant, as shown in at right in Figure 29. Insert when slot in push rod is horizontal and vacuum test port is at location indicated, regardless of scribe marks on tube plate and piston.

Make certain bead at outer diameter of diaphragm is in the annular groove of tube and plate assembly. Replace four tube and plate attaching screws and tighten screws uniformly. Install applying diaphragm over end of tube and plate assembly. Slide vacuum hose on vacuum tube approximately 5/8 inch, and coil hose so hose is parallel to piston plate.

Place new rubber gasket on end plate (Fig. 30). Align vacuum cylinder and end plate to scribe marks. Assemble four bolts and nuts from side shown. Securely tighten all four bolts.

Place new gasket on end of vacuum cylinder (Fig. 31). Align tube and plate and vacuum cylinder to scribe marks, and slide vacuum hose on vacuum tube approximately 5/8 inch. Assemble four tube plate attaching screws. Align air cleaner cover with tube plate and replace

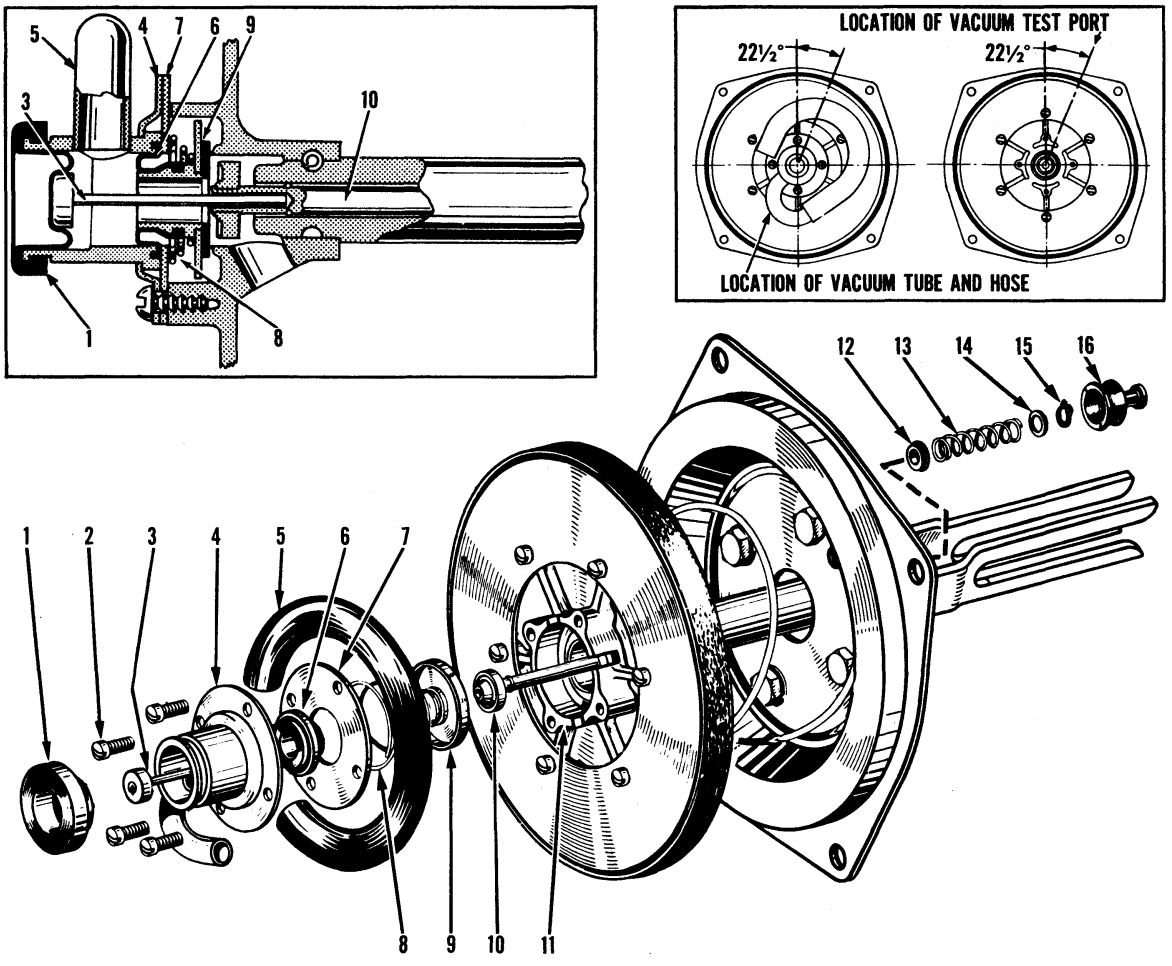


Fig. 29—Assembly of Valve Rod, Valve Poppet Parts, Vacuum Tube and Plate

1—Applying diaphragm
2—Screw (4)
3—Valve rod applying pin
4—Tube and plate assembly
5—Vacuum hose
6—Poppet diaphragm
7—Retainer plate
8—Spring
9—Poppet assembly
10—Valve rod
11—Piston
12—Friction collar
13—Spring
14—Spring retainer washer
15—Valve rod seal
16—Snap ring

remaining three screws. Tighten all screws uniformly. Insert air cleaner hair into opening at bottom of air cleaner cover.

e. Installation (Fig. 23)

Position power unit on dash panel of vehicle so that its axis inclines down toward front of car.

NOTE

As yoke passes through dash panel, be sure that it engages pedal linkage correctly by sliding over nylon bushings on power brake lever cross pin.

Replace four hex nuts and lockwashers, tighten nuts securely, and remove wedge from pedal bracket.

20. TESTING BRAKE SYSTEM

With unit completely assembled and installed on vehicle, make following vacuum and hydraulic leakage test. Operational test should also be made to determined that brake power unit and hydraulic brake system is operating up to standard.

Road test car and make brake applications at about 20 m.p.h. If brake pedal has a spongy feel when brakes are applied, air is present in hydraulic system and lines must be bled. Bleed

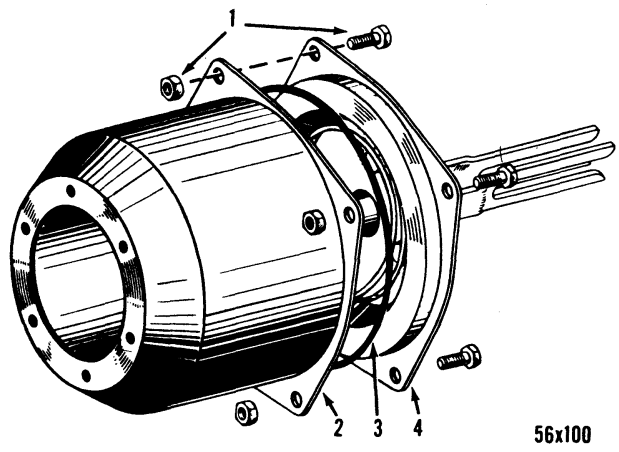


Fig. 30—Assembly of Vacuum Cylinder to Piston End Plate Assembly

1—Cylinder bolt (4)
2—Vacuum cylinder
3—Gasket
4—End plate

brake system at each wheel cylinder.

With engine not running, apply brakes several times to exhaust all vacuum in system. Depress brake pedal, hold foot pressure on pedal, and start engine. As soon as engine begins to operate, brake pedal will tend to fall away under foot pressure, and less pressure will be required to hold pedal in applied position.

If there is **NO** noticeable difference in pedal effect with or without engine running, vacuum system is not functioning. Check for restriction in vacuum supply line, restriction on air cleaner, faulty pedal adjustments, or faulty power unit operation.

Stop engine and again exhaust all vacuum in system. Depress brake pedal and hold foot pressure on pedal. If pedal gradually falls away under foot pressure, hydraulic system is leaking. If brake pedal travels to within one inch of toe board, brake shoes require re-adjustment or relining.

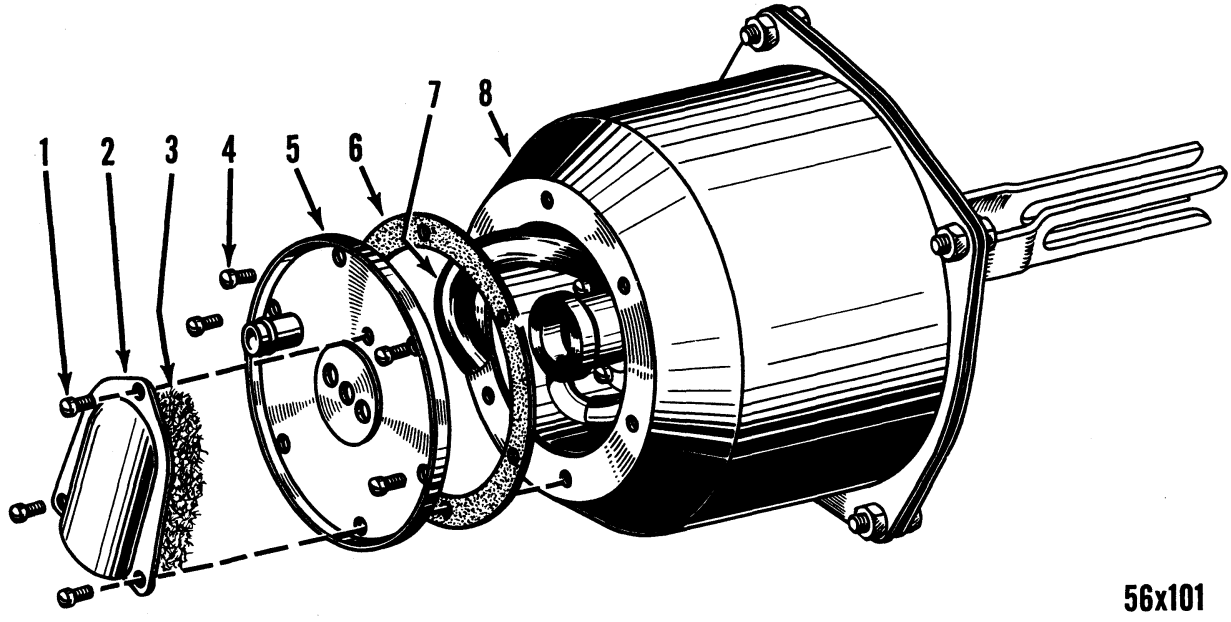


Fig. 31—Assembly of Air Cleaner, Tube and Plate to Vacuum Cylinder

1—Screw (3)
2—Air cleaner cover
3—Air cleaner hair
4—Screw (4)
5—Plate
6—Gasket
7—Vacuum tube
8—Vacuum cylinder

POWER BRAKE UNIT (BELLOWS TYPE) SERVICE PROCEDURES

The bellows type booster unit is an oval-shaped, air-vacuum bellows mounted on engine side of dash panel, and is connected mechanically to brake pedal linkage through power unit push rod (Figs. 32 and 33).

21. REMOVAL OF POWER BRAKE UNIT

Place a wood wedge between power brake lever and forward edge of triangular hole in pedal bracket (Fig. 34). This will prevent trigger arm from extending beyond extremities of bracket.

NOTE

If pedal linkage is allowed to extend through hole in dash panel, trigger arm may be damaged.

Disconnect vacuum hose at power vent. Remove complete power unit and bracket assembly by removing four hex nuts and lockwashers. Carefully withdraw unit from dash panel (Fig. 33).

NOTE

Use care to prevent loss of nylon bushing on pedal linkage cross pin.

22. DISASSEMBLING POWER BRAKE

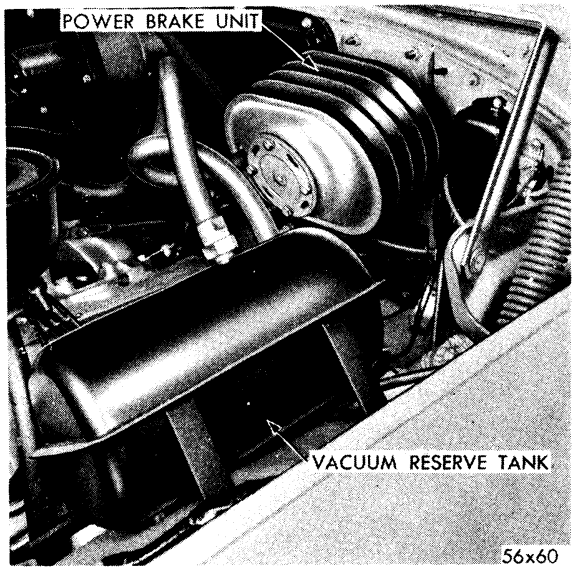


Fig. 32—Power Brake (Installed)

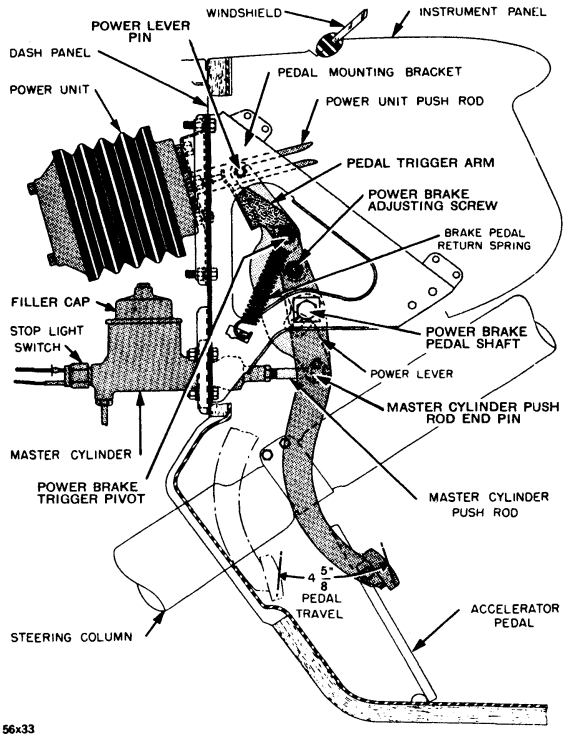


Fig. 33—Bellows Type Power Brake Unit and Linkage Installation

Should it be necessary to disassemble bellows type power brake unit for overhaul or repair, refer to Figures 35 and 36, and proceed as follows:

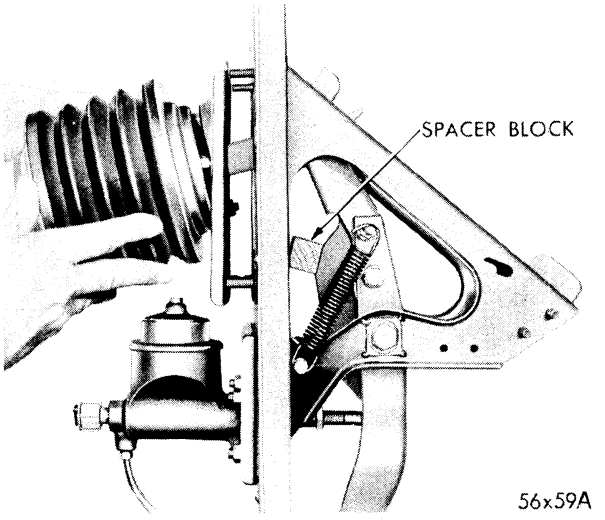


Fig. 34—Removing or Installing Power Brake Unit (Bellows Type Shown)

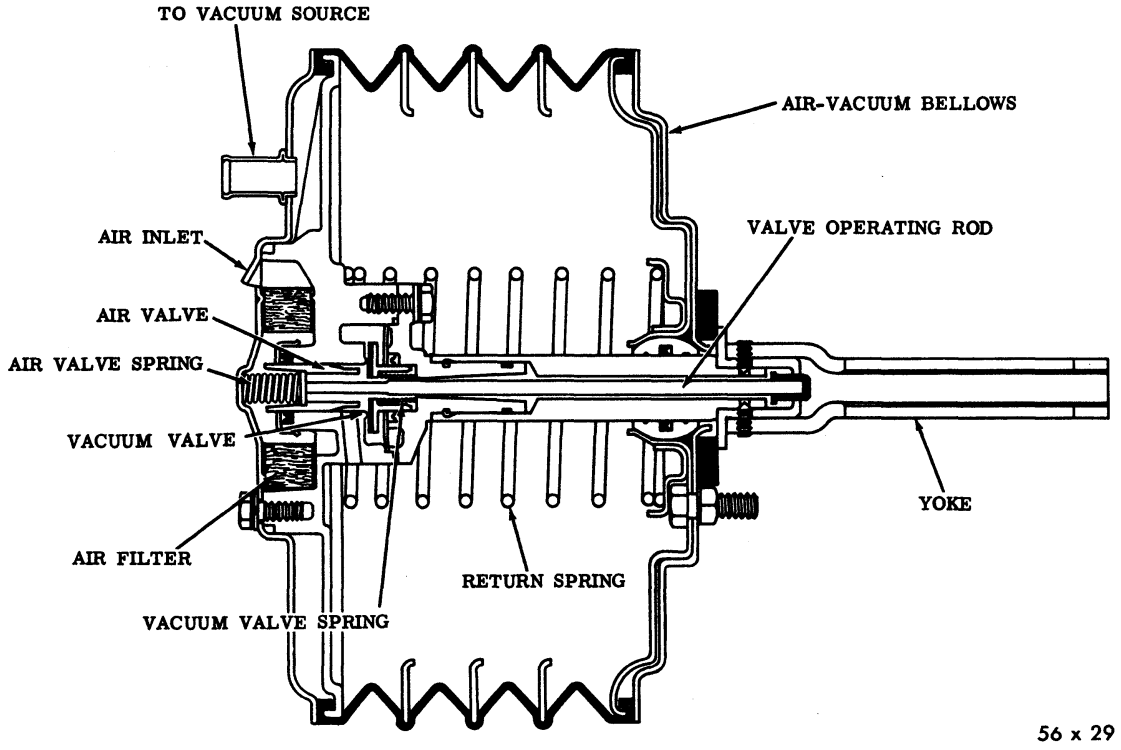


Fig. 35—Bellows Type Power Brake (Sectional View)

Remove nuts that attach mounting plate to unit. Slide plate off and away from unit. Remove and discard mouning plate "O" ring.

Using an Allen wrench, back out two set screws sufficiently to allow removal of yoke (Fig. 37). Slide yoke off end of guide and away from unit. (Slightly compress bellows by hand for clearance when loosening set screw.) Remove rubber stop seal washer. Lift valve operating rod out of unit, remove, and discard valve operating rod button seal (Fig. 38).

Remove nuts that attach outer mounting plate. Using screwdriver, pry up gently on plate to loosen. Lift plate straight up and away from

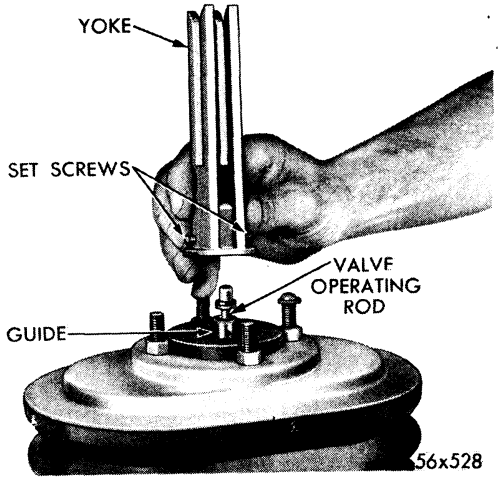


Fig. 37—Removing or Installing Yoke

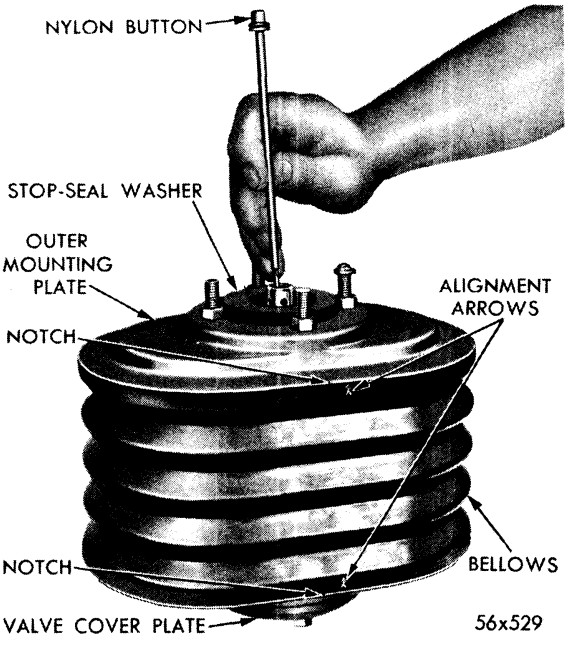


Fig. 38—Removing or Installing Operating Rod

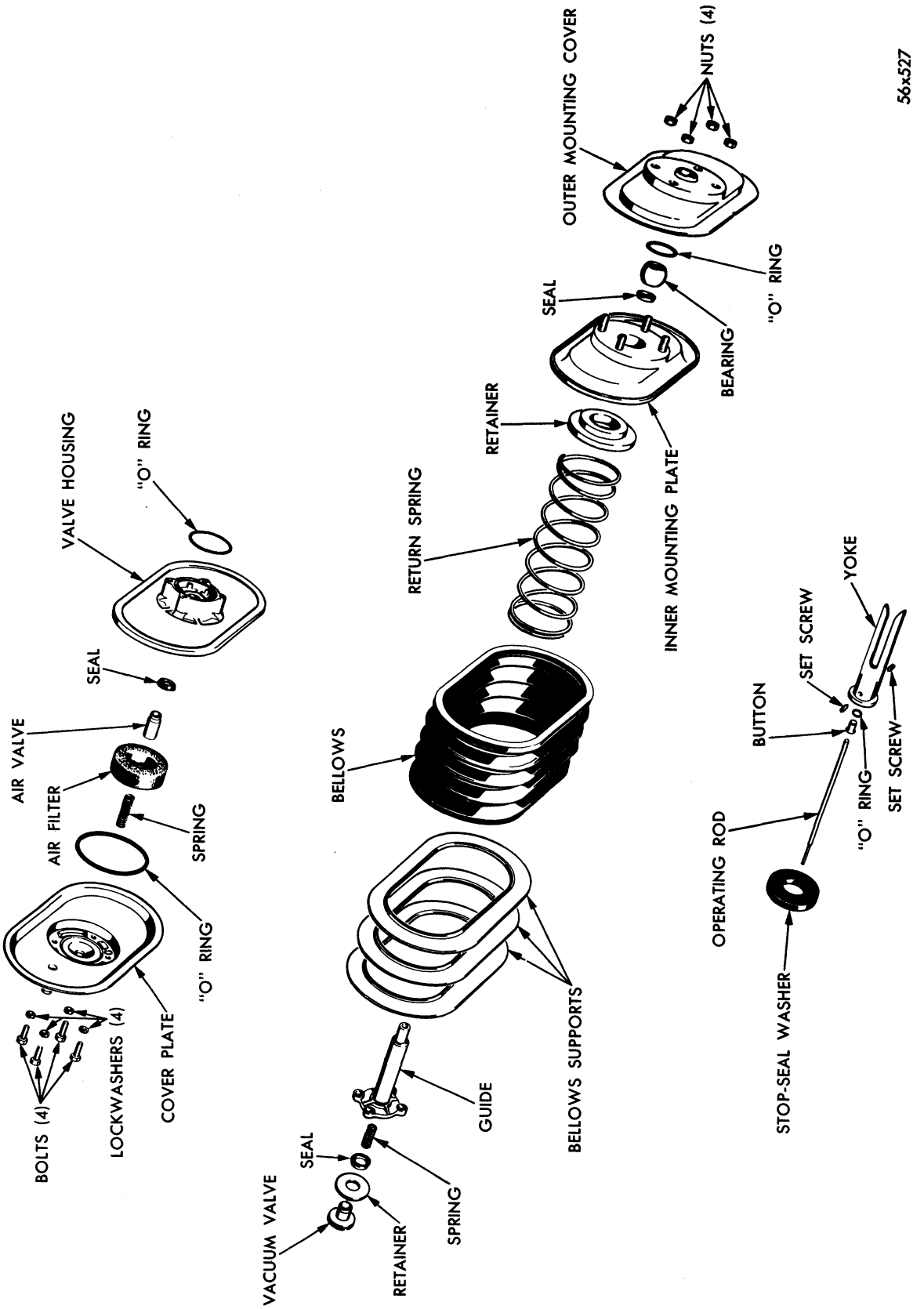


Fig. 36—Bellows Type Power Brake (Disassembled View)

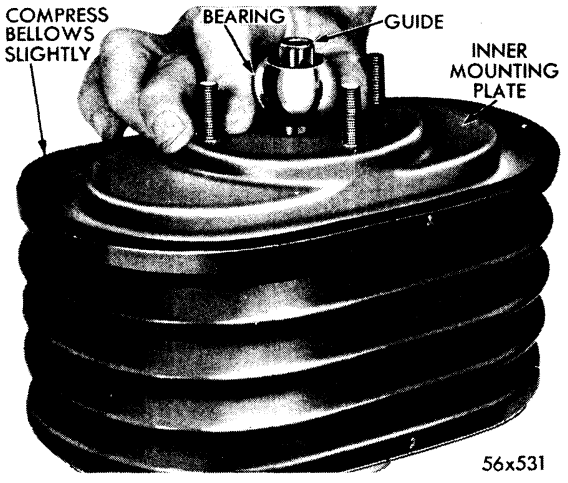


Fig. 39—Removing Guide Bearing

unit. Discard "O" ring. Compress bellows by hand sufficiently to expose guide bearing. Slide bearing off end of guide (Fig. 39). Remove and discard bearing seal from inside bearing.

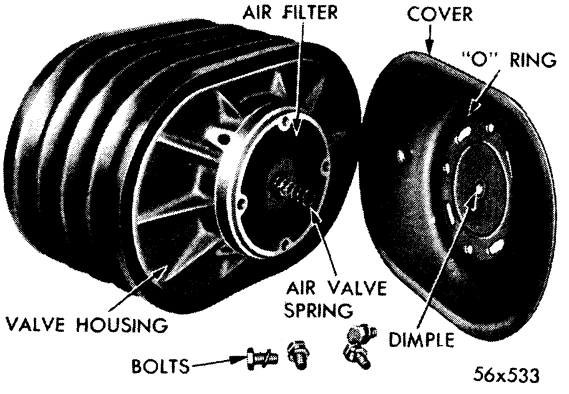


Fig. 40—Removing Valve Housing Cover

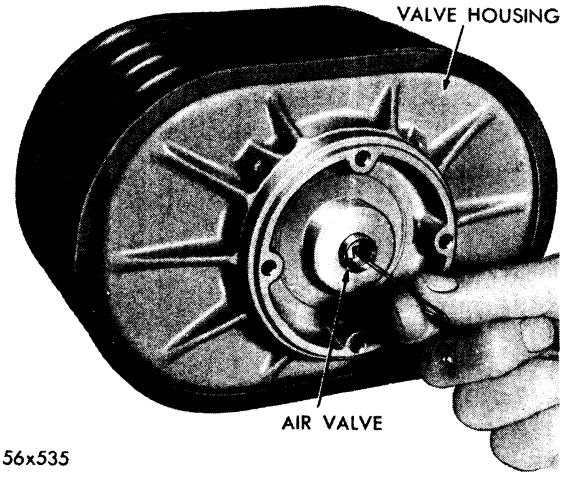


Fig. 41—Removing Air Valve

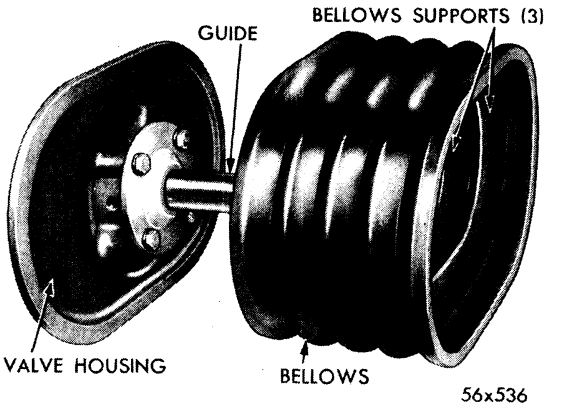


Fig. 42—Removing Bellows

Peel back outer lip of bellows completely around inner mounting plate. (Keep one hand on inner mounting plate to prevent it from snapping up.) Remove plate and lift out return spring and return spring retainer.

Place unit on its side and remove bolts and lockwashers that attach valve cover to valve. Lift off cover (Fig. 40). (If it is necessary, use a flat blade to separate cover plate from bellows flange.) Extreme care should be taken to avoid marking or scratching inner face of plate where it clamps to bellows flange. A scratch on this surface could cause a leak.

Remove "O" ring from valve cover and discard. Remove air valve spring from center of valve. Remove air filter and slide air valve out of housing (Fig. 41). To remove valve, it may be necessary to use a hook formed from paper clip.

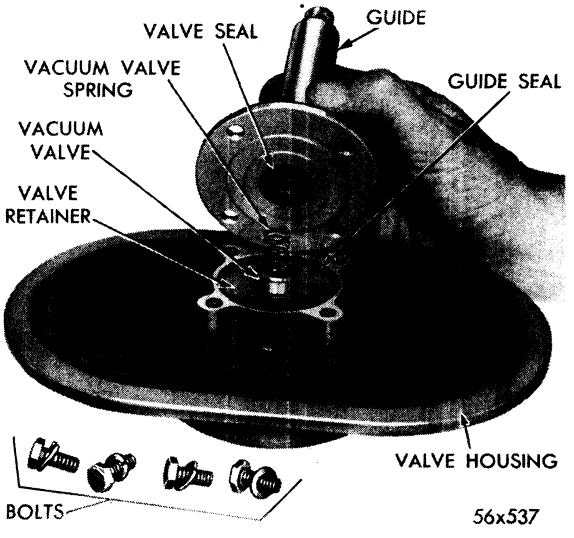


Fig. 43—Removing or Installing Guide

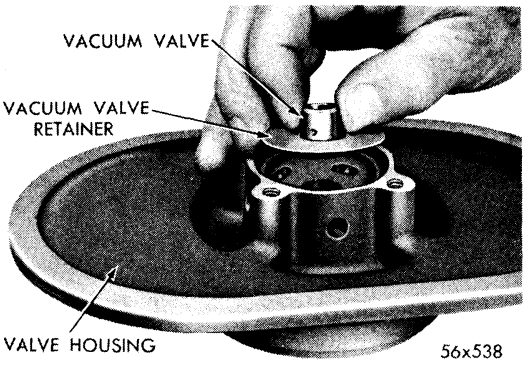


Fig. 44—Removing the Vacuum and Retainer

Place valve housing end down on bench. Remove bellows from valve by peeling back outer lip of bellows (Fig. 42). Lift bellows up and away from valve. If new bellows is to be installed, remove 3 bellows support.

Remove bolts and lockwashers that attach guide to valve body. Lift off guide to expose vacuum valve, valve spring and seals (Fig. 43). Remove seals and discard them.

Lift out vacuum valve and retainer (Fig. 44). Remove and discard valve housing to guide seal. Invert valve housing and remove air valve seal from its groove in valve body (Fig. 45).

CAUTION

Work carefully to avoid marking or scratching inside diameter bore of valve housing.

The bellows type power brake now has been disassembled as much as necessary for cleaning and inspection. Clean all parts (except bellows, bearing and air filter) in solvent and blow dry with compressed air. Place cleaner parts on clean paper for reassembly. If necessary, bellows may be washed with water and mild soap.

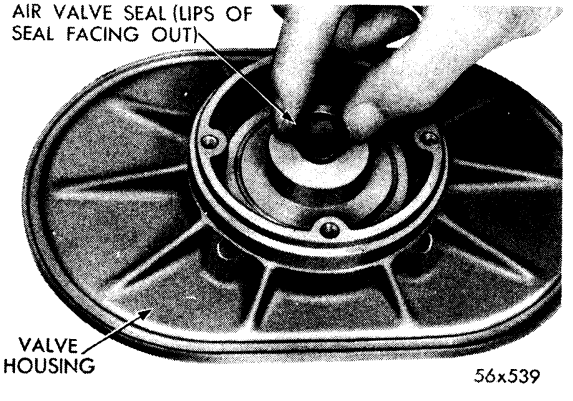


Fig. 45—Removing or Installing the Air Valve Seal

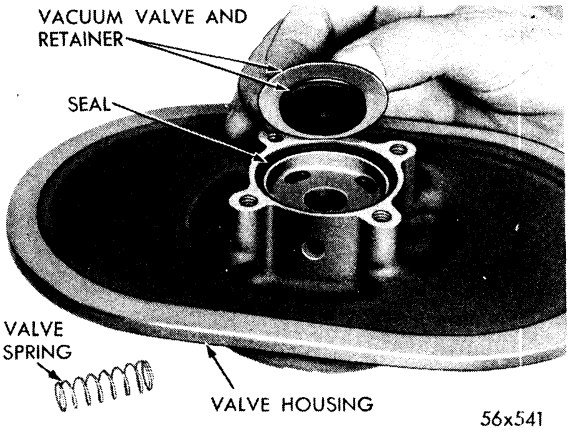


Fig. 46—Installing the Vacuum Valve and Retainer

Inspect all parts for wear or damage and check air valve for signs of scoring or wear. If valve body or valve is scored or worn, install new parts as required. **Always use new "O" and seal rings.**

23. ASSEMBLING THE POWER BRAKE

Be sure all seals and "O" rings are suitably coated with silicone grease (rings and seals precoated in Parts Kits). Refer to Figure 45, and assemble as follows:

Insert new air valve seal into bore of valve housing (lips of seal facing out when installed). (Refer to Fig. 46). Carefully position new vacuum valve in retainer. Invert valve housing and install vacuum valve and retainer in housing. Press down firmly on retainer to snap it in place.

Position new valve housing to guide seal in groove provided. Install new vacuum valve seal in bore of guide, with lips of seal toward bottom of bore (Fig. 47).

Install vacuum valve spring in center of valve. Position guide over vacuum valve, lining

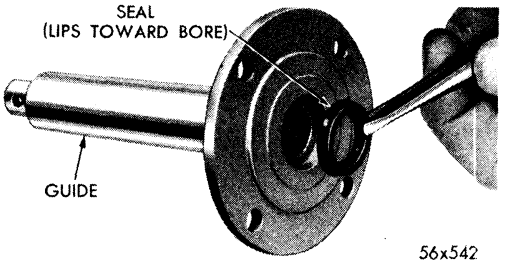


Fig. 47—Installing the Vacuum Valve Seal

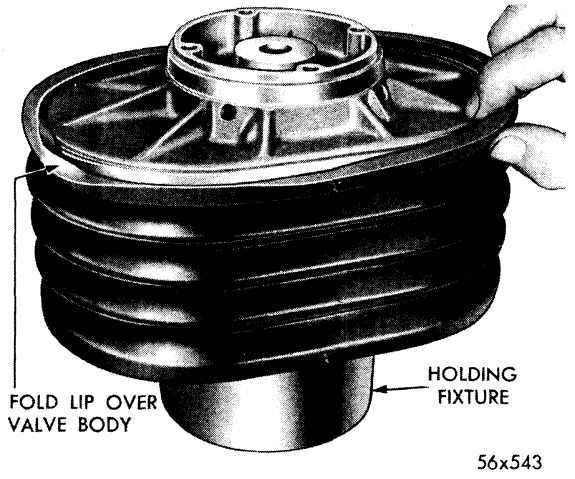


Fig. 48—Installing the Bellows

up bolt holes in guide with bolt holes in valve body. Carefully lower guide down against valve body, making certain tapered portion of vacuum valve enters seal evenly. Press down on guide to seat and install bolts and lockwashers. Tighten bolts evenly and securely.

CAUTION

Be sure countersunk holes at end of guide, line up with long centerline of valve housing.

If new bellows is being installed, position supports in bellows. (The supports must be centered in three center accordion folds, and aligned with bellows and each other.)

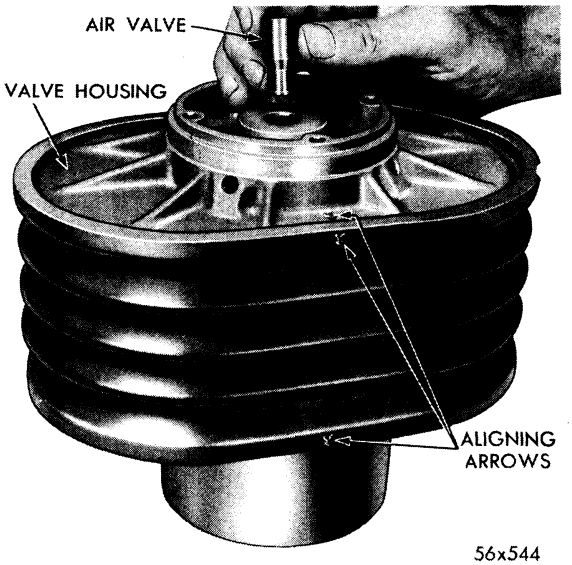


Fig. 49—Installing the Air Valve

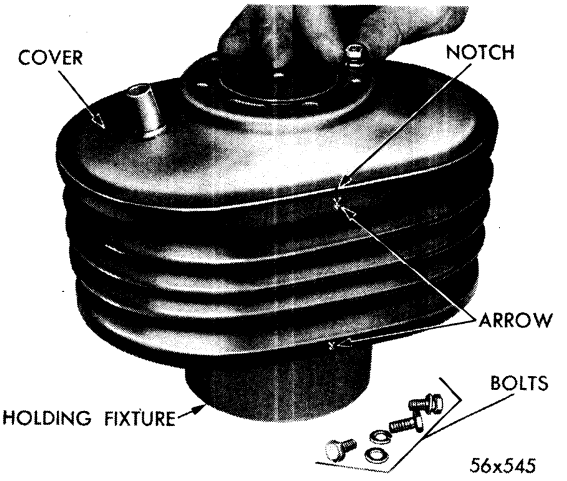


Fig. 50—Installing Valve Housing Cover

Using holding fixtures (made from piece of 4-inch pipe) to support guide and valve assembly, install bellows (Fig. 48). **Be sure arrows on edge of bellows and housing are aligned.**

With assembly in holding fixture, lightly coat outer surface of air valve with silicone grease (do not use any other kind of grease), and insert (small end first) into bore of housing (Fig. 49). Use finger pressure to test for free movement of valve against vacuum valve spring.

Install air valve spring in recess in air valve and air filter. Install new valve housing cover "O" ring on shoulder provided on valve body hub. Position valve body cover over valve housing, with notch in edge of cover matching arrow on bellows (Fig. 50). Be sure air valve spring nestles on dimple in center of cover. Press cover down evenly over valve housing to seat cover "O" ring, install bolts, and tighten securely.

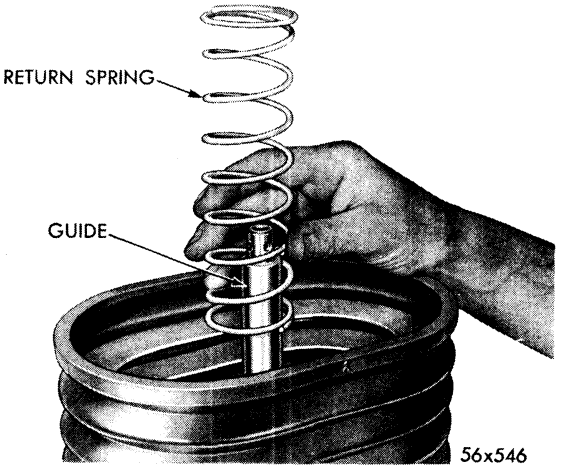


Fig. 51—Installing Return Spring

Remove assembly from holding fixture and invert unit. Coat guide lightly with silicone grease and install return spring. Position spring evenly around hub of valve housing and guide (Fig. 51).

Place spring retainer and inner mounting plate over spring, being sure arrow stamped on plate is in line with arrow on edge of bellows. Compress return spring and fold bellows lip over edge of plate. Be sure bellows fits evenly all around plate.

Install new guide bearing seal in groove inside bearing bore. The seal must nest snugly in bearing. Using silicone grease, lubricate inside of bearing and slide it over guide, while compressing bellows (Fig. 52). **Bearing must be installed with lip of seal facing out.** Push bearing down over guide and into pocket of plate. Release bellows and bearing will ride up guide with plate into position.

Install bearing to mounting plate "O" ring and lower outer mounting plate down on assembly. **The notch on edge of plate must be in line with arrow on bellows.** Install nuts and draw down finger tight.

Slide new valve operating rod seal ring over nylon bumper on end of rod and into groove. Install rod in center of guide. Press on end of rod to test for free operation or movement of air and vacuum valves. A "two step" movement should be felt when rod is depressed and released fully.

Place new stop-seal washer in position and install yoke on end of guide. Compress bellows slightly and alternately tighten set screws. **The hub of yoke must be down snug against shoulder of guide, with set screws aligned with tapered holes in guide.** Tighten mounting plate nuts securely.

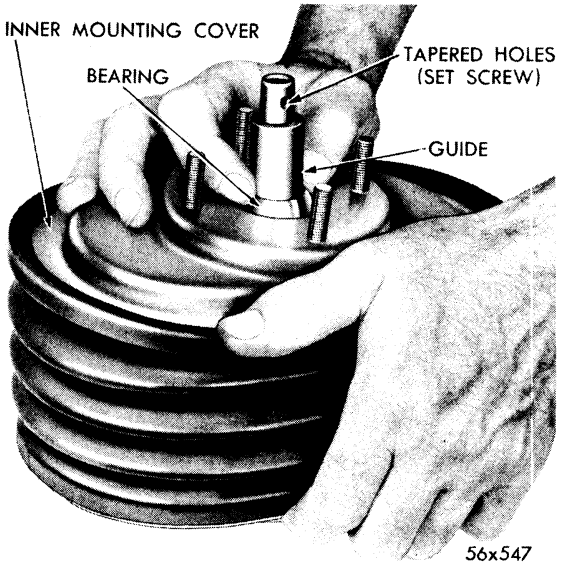


Fig. 52—Installing Guide Bearing

Place mounting bracket in position, with long centerline of bracket at right angle to long centerline of unit section. Install nuts and lockwashers and tighten securely.

24. INSTALLATION OF POWER BRAKE UNIT

Position power brake unit on dash panel of vehicle so that its axis inclines down toward front of car.

NOTE

As yoke passes through dash panel, be sure that it engages pedal linkage correctly by sliding over nylon bushings on power brake lever cross pin.

Replace four hex nuts and lockwashers, tighten nuts securely, and remove wedge from pedal bracket.

PEDAL LINKAGE ADJUSTMENTS (BELLOWS AND PISTON TYPE UNITS)

25. PEDAL LINKAGE ADJUSTMENTS (ON CAR) (FIG. 53)

It should seldom be necessary to adjust brake pedal trigger arm. However, additional adjustment may be necessary, occasionally, to eliminate following conditions:

If pedal pressure releases slowly, adjust by rotating adjustment screw in **counter-clockwise direction.** In a time delay (noted during a fast brake application), adjustment can usually be corrected by making a **clockwise** adjustment on adjusting screw. Should pedal vibrate (booster

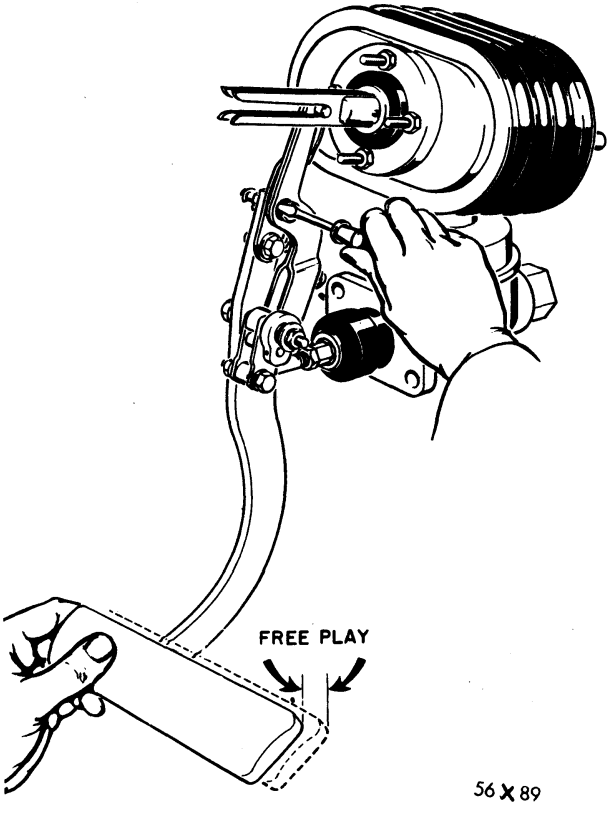


Fig. 53—Checking Pedal Free Play
(Bellows Type, Typical of Piston Type)

chatter), turn adjusting screw in counterclockwise direction (Fig. 53).

NOTE

Rotation of adjustment screw should be limited to plus or minus 90 degrees about original setting.

26. ASSEMBLY OF PEDAL LINKAGE IN PEDAL BRACKET

CAUTION

Use extreme care during assembly or handling of linkage as power brake pedal trigger arm is easily damaged.

After reinstalling brake pedal linkage in pedal bracket, a wooden wedge should be placed between power brake lever and forward edge of triangular hole in pedal bracket (if power unit has been removed). This will prevent trigger arm from extending beyond extremities of bracket.

27. LUBRICATION

Except for an occasional few drops of SAE 10-W Engine Oil on power brake lever pin bushings, brake pedal linkage requires no further lubrication. The power unit will require no lubrication under normal usage.

28. PEDAL FREE PLAY ADJUSTMENT

After master cylinder, booster, and pedal linkage are completely installed (and wooden wedge removed), a free play adjustment check should be made at **no vacuum** as follows:

NOTE

Removing vacuum hose and pressing brake pedal several times will aid in obtaining no vacuum condition.

Insert blade of screwdriver between rubber collar of power brake trigger pivot and rear side of elongated hole in power brake lever, forcing them apart.

NOTE

If brake pedal and power brake lever are not wedged apart, a false free play setting (which includes booster valve travel) will be measured at pad end of pedal.

Check free play with linkage in this position by pushing lightly at pad end of brake pedal (Fig. 53). Pedal free play travel should be between $\frac{1}{32}$ and $\frac{1}{8}$ inch. If pedal free play movement does not come within required limits, adjustment is made by lengthening or shortening push rod as required.

29. ALTERNATE METHOD OF MEASURING PEDAL FREE PLAY

Remove master cylinder push rod end pin. Using **light** finger pressure, move push rod forward until contact is made with master cylinder piston. Attempt to insert push rod end pin through power lever and push rod end hole. If push rod must be pulled back to allow passage of push rod end pin, free play is present.

If push rod must be pushed further into master cylinder to allow passage of push rod end pin, no free play is present and an adjustment must be made at push rod.

30. SERVICING THE MASTER CYLINDER

The master cylinder can be bled and push rod end assembled at proper length, as described in this section. However, the length from push rod end hole to master cylinder mounting face has changed because of difference in brake pedal linkage. The distance from push rod end hole to master cylinder face is 4.7 inches. The service procedures covering master cylinder are same as on standard master cylinder.

SERVICE DIAGNOSIS (STANDARD BRAKES)

31. PEDAL GOES TO FLOOR

a. Check fluid in master cylinder, refill with MOPAR Super brake fluid.

b. Check wear on brake lining, adjust or replace as necessary.

c. Check master cylinder for corrosion, repair or replace as necessary.

d. Check wheel cylinders, replace swollen cups.

e. Check loose connections or broken lines, repair or replace as necessary.

32. SPONGY PEDAL

a. Check brake fluid contamination, replace with MOPAR Super brake fluid.

b. Check brake drums, replace excessively refaced or broken drums.

c. Air in brake system, bleed brakes using air-less bleeder tank unit, Tool C-837.

33. BRAKES PULLING TO ONE SIDE

a. Check tires, inflate to proper specifications.

b. Check brakes, adjust for proper clearance.

c. Check drums for out-of-round, machine drums and replace with brake shoes to fit drum.

d. Check brake shoes for twist, straighten, reline or grind to fit drum.

e. Oil, grease or brake fluid on shoes, clean with alcohol.

f. Check brake lining, replace with matched lining.

g. Check front spring, repair or replace as necessary.

34. SQUEALING BRAKES

a. Check lining, replace with proper lining.

b. Check brake drum, clean or reface as necessary.

c. Check brake shoes, straighten or replace as necessary.

d. Check brake support plate, straighten or replace.

e. Check brake shoe return spring, replace as necessary.

35. DRAGGING BRAKE

a. Check hand brake, that it is fully released.

b. Check wheel cylinders, repair or replace as necessary.

c. Check brake shoe return spring, replace worn and broken springs.

d. Excessive brake adjustment, adjust to proper clearance.

e. Brake pedal binding, loosen pedal cross shaft.

36. HARD PEDAL

a. Check brake shoe lining, replace with proper lining.

b. Check by-pass port in master cylinder, repair or replace as necessary.

c. Check push rod, make proper adjustments.

37. WHEEL LOCKS

a. Check brake lining, replace torn or loose lining.

b. Check wheel bearings, adjust to proper clearance.

c. Check wheel cylinders, repair or replace as necessary.

38. BRAKE PEDAL FAILS TO RETURN

a. Check pedal return spring, adjust or replace as necessary.

b. Check master cylinder, tighten loose mounting bolts.

c. Check brake pedal mounting bracket, adjust bracket and tighten bolts.