Section III

BRAKES

SERVICE BULLETIN REFERENCE

NUMBER	DATE	SUBJECT	CHANGES

BRAKES
DATA AND SPECIFICATIONS

	C-67	C-68	C-69, C-300, C-67 T & C Wagon
SERVICE BRAKES			
Type	Hydraulic	Hydraulic	Hydraulic
Drum Diameter	12″	12″	12″
Clearance Between Lining and Drum Heel and Toe (All Shoes)	.006″	.006″	.006″
Lining Type	Molded Asbestos	Molded Asbestos	Molded Asbestos
Attachment to Shoes	Bonded	Bonded	Bonded
Width	2″	2″	2″
Thickness	.200″	.200″	.200″
Brake Shoe Return Spring Tension (Foot-Pounds)—Front	40 to 50 at 5 7/8″	40 to 50 at 5 7/8″	40 to 50 at 5 7/8″
Rear	50 to 60 at 5 11/16″	50 to 60 at 5 11/16″	50 to 60 at 5 11/16″
Per Cent of Braking Torque—Rear Wheels	40	40	40
Diameter of Wheel Cylinder Bore	1 1/8″	1 1/8″	1 1/8″
Diameter of Master Cylinder Bore	1″	.68″	1″ (C-67-2) .68″ (C-69)
Piston Cylinder Clearance (All Bores)	.003 to .0065″	.003 to .0065″	.003 to .0065″
Brake Pedal Return Spring—Min. Pounds	9 1/2 at 3 11/16″	None	None
Brake Pedal Free Play	1/8 to 1/4″	None	None Except C-67
HAND BRAKE (Except C-70 Model)			
Type	External Contracting**	Internal Expanding	Internal Expanding
*Location	Propeller Shaft at Rear of Transmission	Propeller Shaft at Rear of Transmission	Propeller Shaft at Rear of Transmission
Drum Diameter (Except 8-Pass. Models)	6″	7″*	7″
Lining Type	Woven and Compressed Asbestos	Molded and Compressed Asbestos*	Molded and Compressed Asbestos†
Width	2″	2″	2″†
Thickness	.160″	.160″	.160″†
Clearance	.015 to .020″	.015 to .020″	.015 to .020″†

*This data also applies for C-67 Models when equipped with PowerFlite.
†This data also applies for C-70 Models.
**With 3-speed transmission only.

HAND BRAKES (Contd.)

HAND BRAKE (C-70 Model with PowerFlite)

Type	Internal Expanding
Location	Propeller Shaft at Rear of Transmission
Drum Diameter	7″
Lining	
Type	Molded Asbestos
Width	2″
Thickness	.160″
Clearance	.015 to .020″

DISC BRAKES (C-70 MODEL)

Type	Hydraulic, Two-Cylinder Self-Energizing Disc
Housing—Material	Cast Iron
Face Diameter—Inside	9½″
Outside	12″
Pressure Plate (No. Per Wheel)	2
No. of Lining Segments Per Plate	6
Lining Type	Molded Asbestos
Attached to Segments By	Cyclebond
Thickness	.160″
Clearance Between Lining and Housing	Self Adjusting
Diameter of Wheel Cylinder Bore—	
Front	1¼″
Rear	1″
Diameter of Master Cylinder Bore	1″
Brake Booster	None

TIGHTENING REFERENCE

	Torque (Foot-Pounds)
BRAKE SHOE ANCHOR BOLT NUTS	75
REAR BRAKE SUPPORT TO AXLE HOUSING FLANGE BOLTS AND NUTS	35
FRONT BRAKE SUPPORT TO STEERING KNUCKLE SCREW	35
BRAKE SUPPORT TO WHEEL CYLINDER BOLTS	20
WHEEL CYLINDER BLEEDER SCREW (5/16 INCH)	10
WHEEL CYLINDER BLEEDER SCREW (⅜ INCH)	15
HAND BRAKE SUPPORT BOLTS	55
PEDAL BRACKET TO PEDAL	30
BRACKET TO DASH PANEL STUDS	20
BRACKET TO BOOSTER STUDS	20

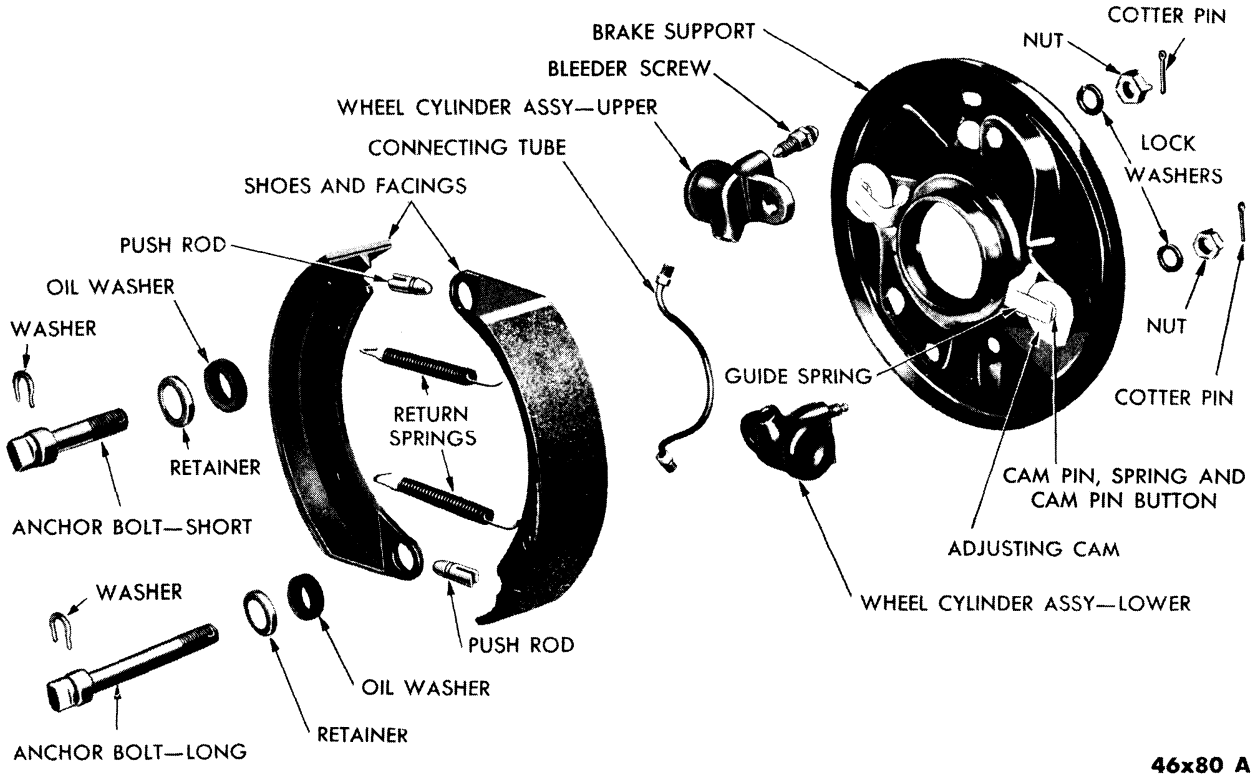

Fig. 1—Front Brake (Disassembled View)

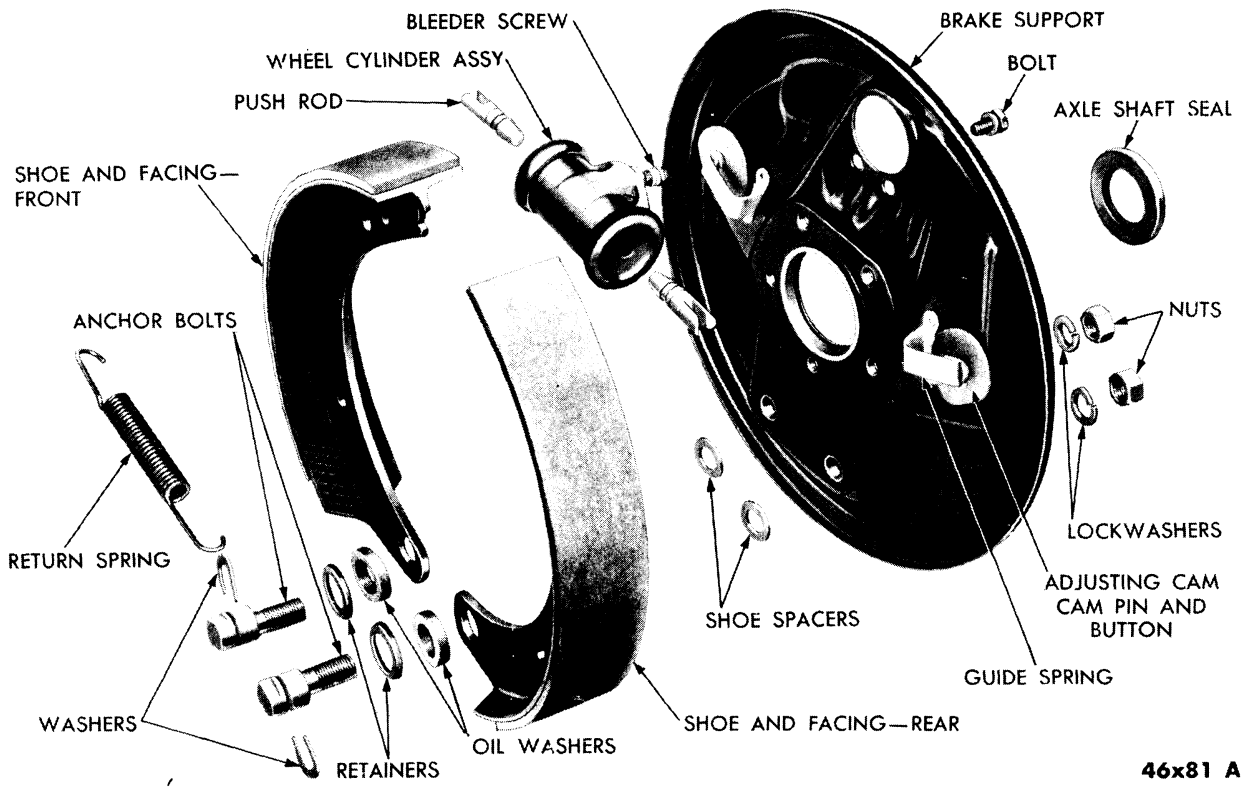

Fig. 2—Rear Brake (Disassembled View)

Section III

SHOE TYPE SERVICE BRAKES

(FIGS. 1 AND 2)

1. GENERAL

When servicing the hydraulic brake system, three important rules must be remembered:

(1) All vital parts of the system must be kept **CLEAN**, free from dirt, grease and oil.

(2) The system must be free of air and all connections sealed tight upon completion of the job.

(3) Only high boiling point brake fluid such as MOPAR Super Brake Fluid, should be used.

SERVICE PROCEDURES

2. SERVICING THE MASTER CYLINDER

To remove the master cylinder, refer to Figure 3, and proceed as follows:

(1) Remove pedal return spring.

(2) Disconnect push rod by removing shoulder bolt and nut.

(3) Disconnect brake line tube at master cylinder.

(4) Disconnect stop light switch leads.

(5) Remove bolts from master cylinder body and remove cylinder from firewall.

Clean the outside of the master cylinder thoroughly. Remove reservoir filler plug and drain all brake fluid. Refer to Figure 4 and disassemble master cylinder for inspection.

Replace master cylinder piston if it is badly scored or corroded. Piston cups and valve assembly should be replaced when reconditioning master cylinder.

Master cylinder walls that have light scratches or show signs of corrosion, can usually be cleaned up with crocus cloth. Cylinders that have deep scratches or scoring can be honed, providing the diameter of the 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 a new cylinder used. (Black stains on the cylinder walls are caused by the piston cups and will do no harm.)

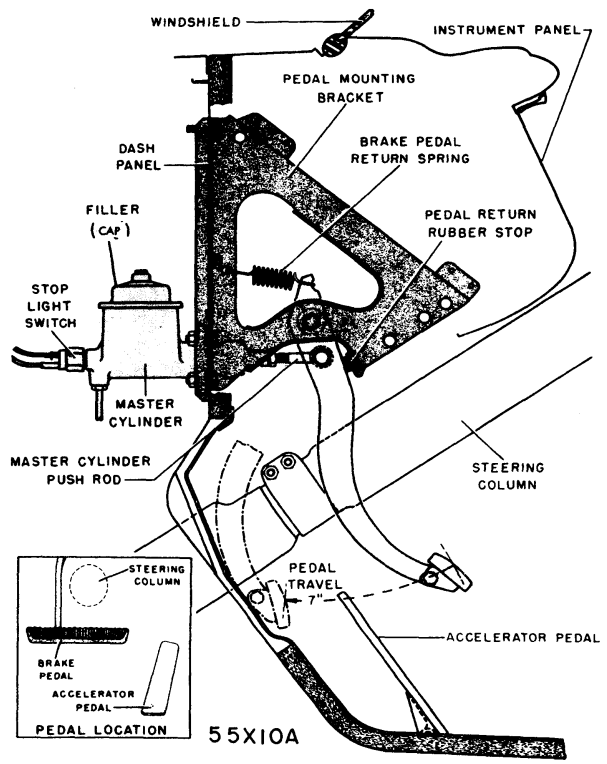

Fig. 3—Master Cylinder Location and Linkage

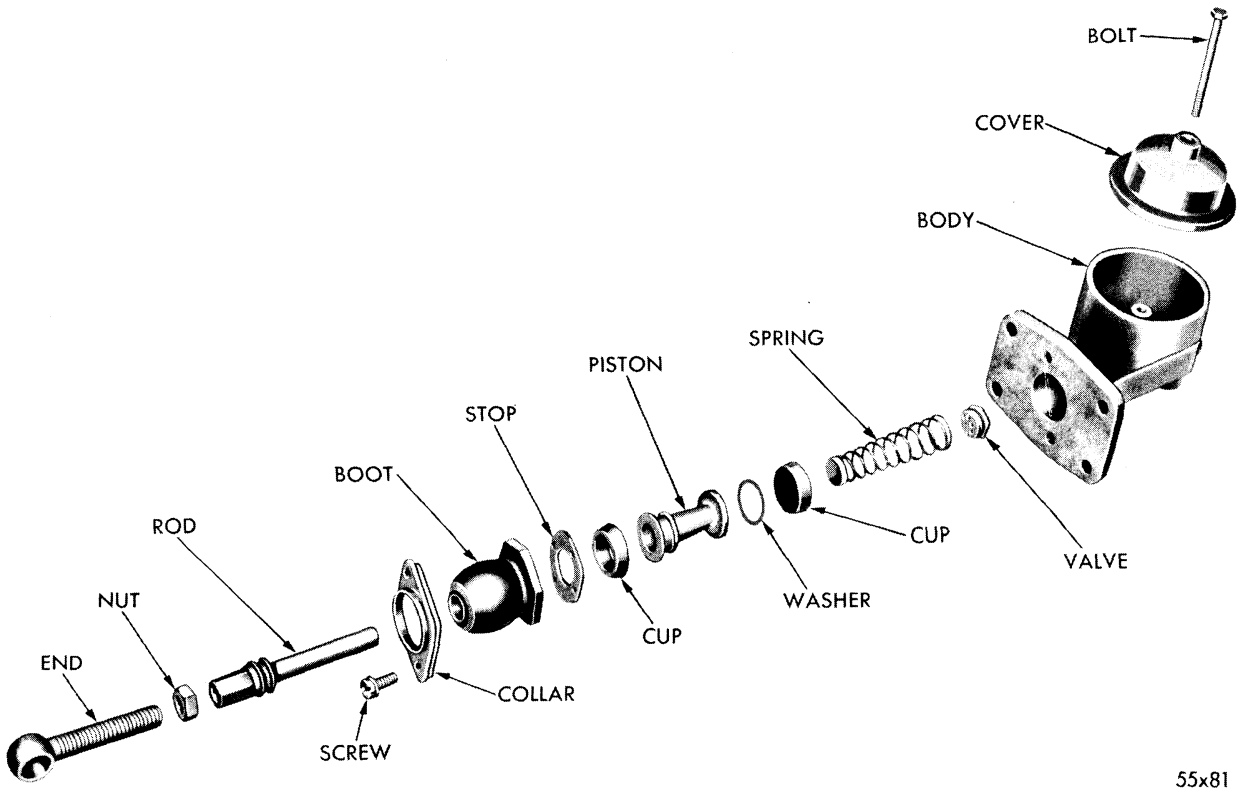

Fig. 4—Master Cylinder (Disassembled View)

NOTE

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

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

3. REMOVAL AND INSTALLATION OF BRAKE SHOES

a. Removal

(1) Block brake pedal in released position to prevent its downward movement. Remove wheel and hub assembly.

(2) Remove brake shoe return srings with pliers, Tool C-864.

Insert tool in spring hole so that slot in cam engages spring hook. Turn handle to disengage spring hook from hole. Turn handle in opposite direction to release, as shown in Figure 5. **Shoe return springs should never be gripped with pliers or side cutters.**

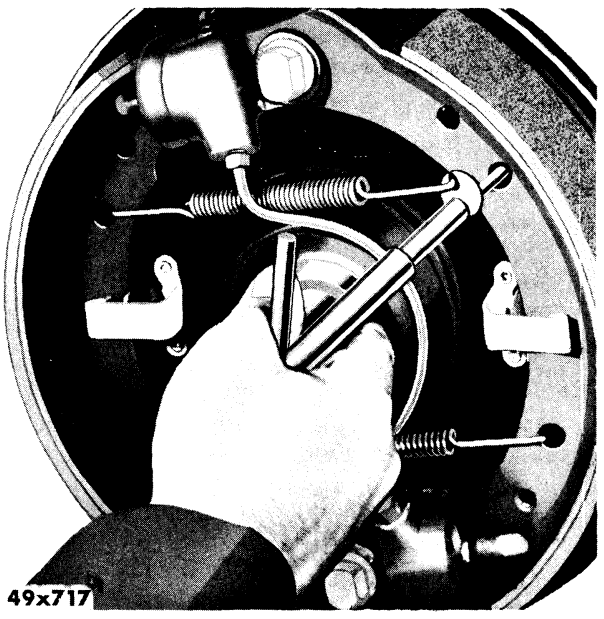

Fig. 5—Removing and Installing Brake Shoe Return Spring

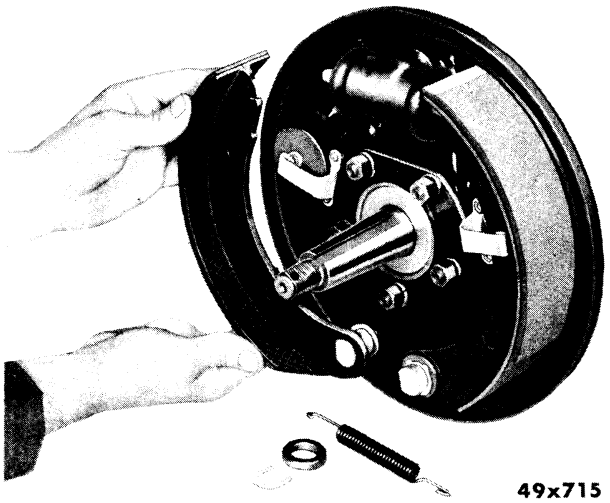

Fig. 6—Removing Brake Shoe

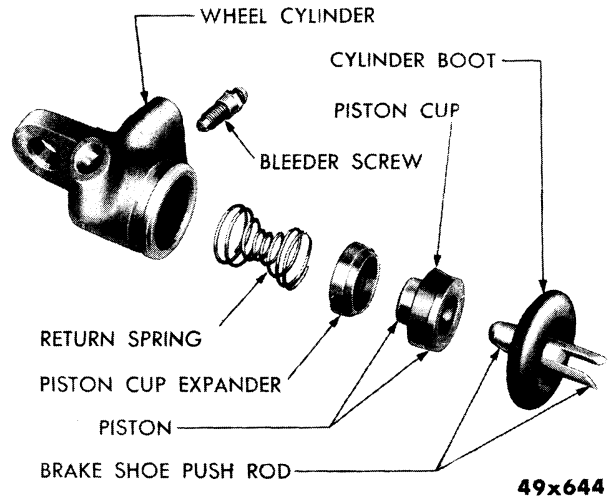

Fig. 7—Front Wheel Cylinder (Disassembled View)

(3) Remove anchor bolt horseshoe washers with Tool C-443. Remove oil washer retainers and oil washers and slide shoes off anchor bolts, as shown in Figure 6.

NOTE

Check brake shoe return springs for tension. Refer to Data and Specifications.

b. Installation

CAUTION

When installing brake shoes, exercise care to prevent brake fluid from leaking onto lining.

If one of the wheel cylinder pistons should accidentally be forced out of the cylinder, install and bleed brake lines. Make sure brake support plate is not sprung.

(1) Slide the shoes, oil washers, and oil washer retainers back on the anchor bolts. Secure by installing the anchor bolt washers.

(2) To install brake shoe return springs, use pliers, Tool C-864, and repeat procedure in reverse order.

4. SERVICING WHEEL CYLINDERS

Wheel cylinder pistons that are badly scored or corroded should be replaced. Old piston cups should be discarded when reconditioning the hydraulic system.

Cylinder walls that have light scratches, or show signs of corrosion, can usually be cleaned up with crocus cloth. Cylinders that have deep scratches or scoring may be honed, providing the diameter of the cylinder bore is not increased more than .002 inch. A cylinder that does not clean up at .002 inch should be discarded and a new cylinder used. (Black stains on the cylinder walls are caused by the piston cups.)

Before assembling the pistons and new cups in the wheel cylinder, dip them in new MOPAR Super Brake Fluid.

Refer to Figure 7 or 8 and assemble wheel cylinder. If the boots are faulty or do not fit tightly on the brake shoe pin, as well as the wheel cylinder casting, they should be replaced.

5. BLEEDING THE BRAKE SYSTEM

Clean all dirt off and around the master cylinder reservoir filler plug.

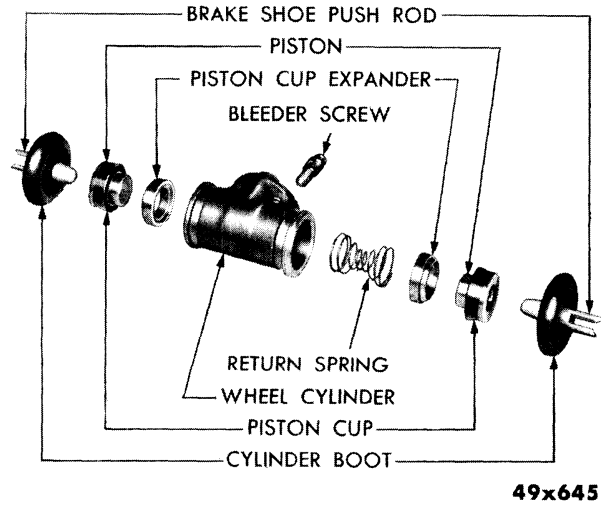

Fig. 8—Rear Wheel Cylinder (Disassembled View)

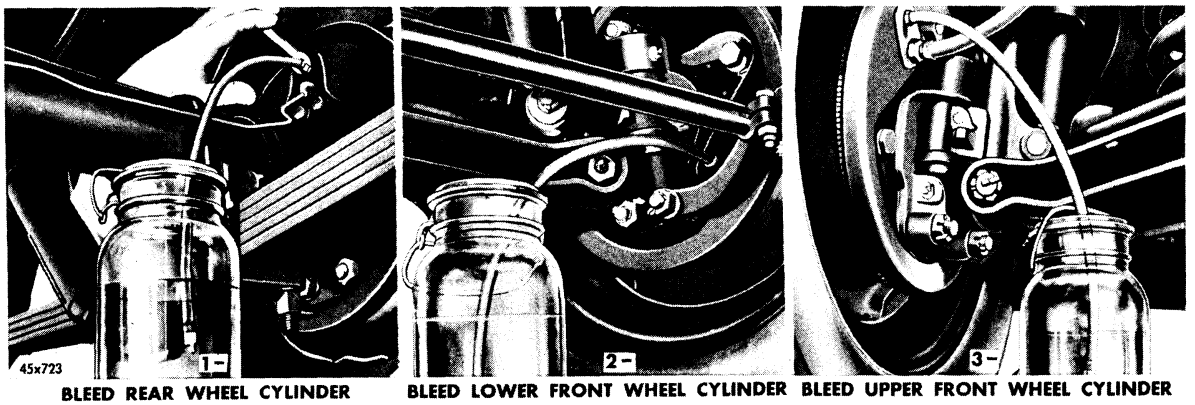

Fig. 9—Procedure for Bleeding Wheel Cylinders (Typical View)

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

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

(2) Starting with the right rear wheel cylinder, wipe the dirt off bleeder valve and attach bleeder hose, Tool C-650 to valve. Place other end of hose in a jar half full of brake fluid. This is to prevent air from being drawn in the system when the brake pedal is released.

(3) Pump fluid by pushing brake pedal down and let it return SLOWLY to avoid air being drawn into the system. Bleed intermittently, opening and closing valve about every four seconds. This causes a whirling action in the cylinder which helps expel the air. Continue this process until fluid runs out of bleeder hose in a solid stream without air bubbles.

(4) Continue bleeding by repeating this operation on the left rear wheel, the right front wheel and the left front wheel.

(5) At the front wheels, bleed the lower cylinder first so as to force all the air out of the connecting line. (Refer to Fig. 9.)

Repeat bleeding operation if there is an indication of air remaining in the system.

CAUTION

Be sure to adjust cams after the completion of the bleeding operation.

6. COMPRESSED AIR BLEEDER TANK (See Fig. 10)

When bleeding the brake system with the compressed type bleeder tank, Tool C-3496, first fill the tank half full with brake fluid and then bring the pressure up to 15 pounds. If more pressure is used, the brake fluid will absorb air. Always maintain a safe fluid level in the bleeder tank and do not allow the air pressure to drop to zero

Fig. 10—Compressed Air Refiller Tank, Tool C-3496

during bleeding operation. When the brake bleeder tank is not in use, it is advisable to relieve the air pressure to help prevent condensation of moisture from the air.

7. TESTING FOR FLUID CONTAMINATION

In order to determine if contamination exists in the brake fluid (indicated by swollen, deteriorated rubber cups) the following simple test can be made:

(1) Place a small amount of drained brake fluid in a small, clear glass bottle. Separation of the fluid into two distinct layers will indicate mineral oil content.

(2) Add water to contents and shake. If the contents become milky, oil is present. If the contents remain clear, it is not contaminated with mineral oil.

CAUTION

Discard old brake fluid that has been bled from the system. Fluid drained from the bleeding operation may contain dirt particles or other contamination.

ADJUSTMENTS

8. MINOR BRAKE ADJUSTMENT

Pedal travel can be adjusted to compensate for lining wear by adjusting the cams.

(1) Check the "free play." It should be approximately ⅛ to ¼ inch. ("Free Play" is the movement of the pedal before the push rod touches the master cylinder piston. This movement can readily be felt when depressing the brake pedal by hand.) If necessary, this adjustment can be made by changing the length of the master cylinder push rod.

(2) Lift the car with jack or hoist so that the wheel can be rotated freely.

(3) Rotate the wheel backward and forward and at the same time turn one of the adjusting cams, as shown in Figure 11, until a slight drag can be felt. Repeat this operation for the other shoe.

(4) Perform this adustment procedure at the other wheels.

9. MAJOR BRAKE ADJUSTMENT

Major brake adjustments may be necessary after relining brake shoes, replacing or refacing brake drums, or when correcting heavy heel contact.

A major brake adjustment is performed by moving both the toe and the heel of the brake shoe in order to centralize the brake shoe in relation to the diameter of the brake drum.

NOTE

For satisfactory brake operation, always reline both brake shoes for BOTH front wheels with linings of same material. This also applies to rear wheels.

a. Inspection and Reconditioning

(1) Remove wheel hub and drum assembly.

(2) Remove brake shoe return springs and test spring tension. Discard springs that do not meet specifications.

(3) Inspect lining for abnormal wear and glazed

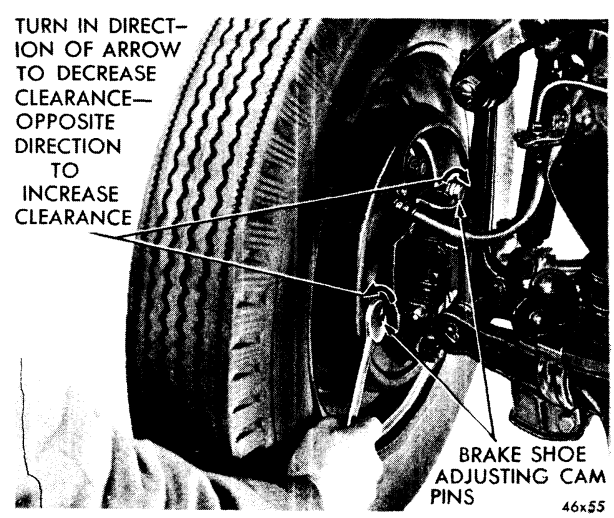

Fig. 11—Turning Brake Adjusting Cam (Typical View)

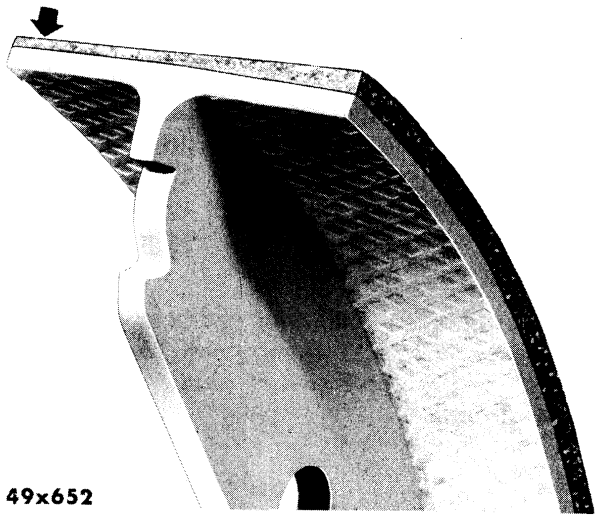

Fig. 12—Brake Lining Edge Wear

braking surfaces. Inspect for uniform brake lining wear on opposite wheel.

(4) Remove all traces of roughness or high spots. If spindle type grinder is used, do not grind the lining thinner on one side of the shoe than on the other.

(5) Clean drums, and inspect for concentricity, scoring and deep cuts. If necessary to reface the brake drums, do not remove more than .030 inch of stock (which will increase original diameter of drum .060 inch). Replace drums if damaged surface requires removal of more than .030 inch of material.

b. Aligning Brake Shoes

Improperly aligned brake shoes are not apt to cause squeaking. This condition is very often caused by the cam pins being either too high or too low with respect to the front wheel cylinder anchor lugs or the rear wheel brake support anchor surface. If this condition exists, the shoes will not meet the drums squarely (one edge of the lining will be worn excessively, as shown in Fig. 12). Uneven wear is not always apparent, so measure lining thickness to be sure.

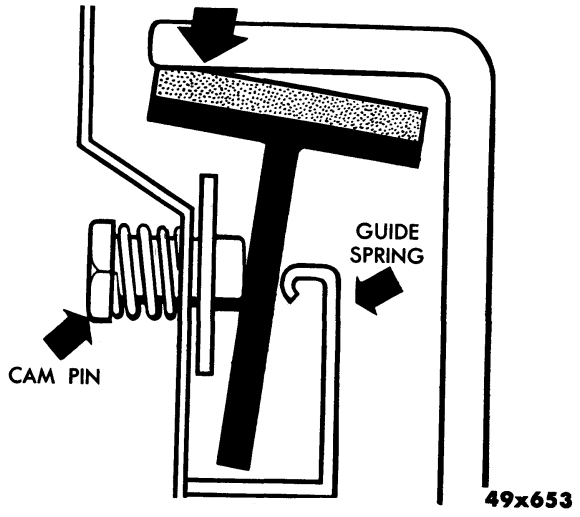

Fig. 13—Cam Pin Too High

With the cam pin too high, the inside edge of the lining will strike the drum first, as shown in Figure 13, and the cam pin will prevent the shoe from straightening up. The lining will be worn unevenly and vibrations and brake noise will result.

With the cam pin too low, the guide spring twists the shoe and the outside edge of the lining strikes the drum first, as shown in Figure 14. This results in localized braking pressure. As pressure, exerted by the wheel cylinder, forces the lining against the drum, the shoe straightens to its normal position. Thus, too much clearance between the cam pin and the web of the shoe does not do as much harm as too little clearance.

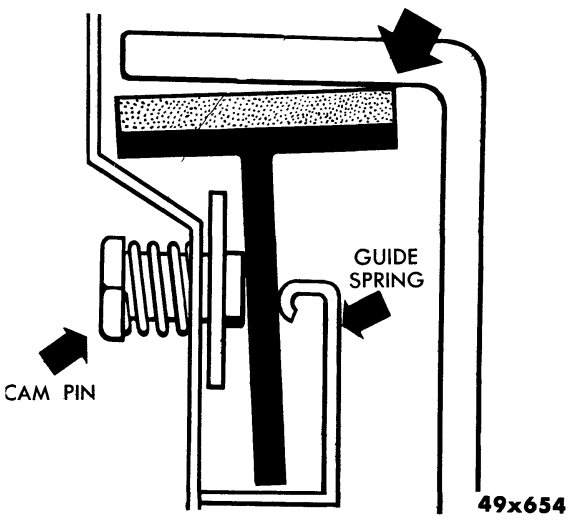

Fig. 14—Cam Pin Too Low

c. Straightening the Shoes

If the shoe is bent or distorted, filing the cam pin will not correct this condition. The shoe will have to be straightened or replaced. To check for a twist in the shoe, support the anchor bolt end of the web on a surface plate. Holding it flat, test the shoe by swinging the toe end up to the plate, as shown in Figure 15.

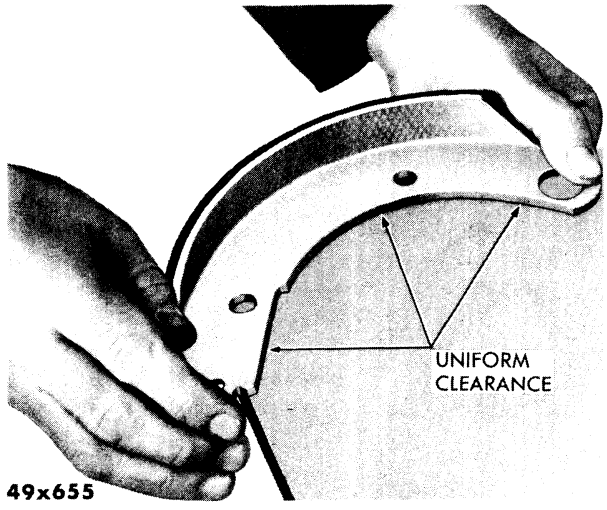

Fig. 15—Checking Shoe for Twist

If the shoe is in alignment, the web at the toe end will slide across the plate without binding. If the shoe is twisted, the web will either strike the plate or ride above it. After straightening shoe, reline or grind the lining flat to make sure it fits squarely with the drum.

CAUTION

A misaligned shoe can never be corrected by merely grinding the lining to make it square with the drum. The shoe itself must be aligned or replaced.

d. Adjusting Pins for Proper Alignment

The clearance between the web and brake shoe adjusting cam pin can be determined by removing brake shoes and by checking the height of the pin with gauge, Tool MT-19-L, as shown in Figure 16.

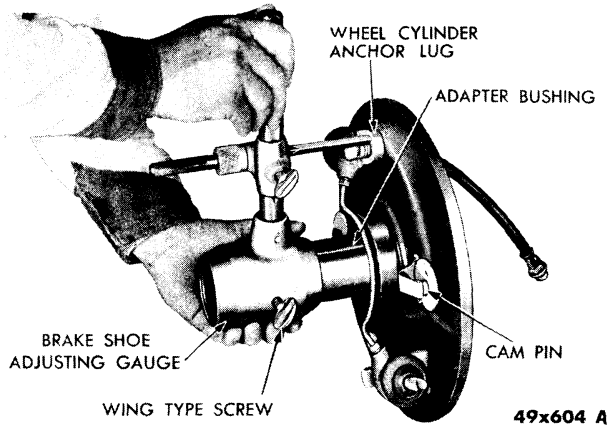

Fig. 16—Checking Height of Brake Shoe Adjusting Pin, Using Tool MT-19-L

(1) To check height of cam pin on the front brake, adjust the gauge to the wheel cylinder mounting lug at the anchor bolt. Rotate the gauge to check the height of the pin, using this dimension.

(2) If the cam pin is higher than the face of the wheel cylinder mounting lug, the brake shoe guide spring should be raised and the cam pin should be filed down to the same height, using an ordinary mill file. If the pin is low, a spacer (available through MOPAR Motor Parts Corporation) should be used.

(3) Checking height of cam pin on rear brake is accomplished in exactly the same manner as on front brake, except that the gauge is adjusted to the face of the rear wheel brake support at the anchor bolt and this dimension is checked with pin.

(4) Install brake shoes and return springs and set cam in released position.

e. Adjustment Procedure

CAUTION

Before attempting an adjustment, check the position of the arrows on the anchor bolts. Be sure that the anchor bolts are installed so that the arrows point AWAY from the heels of the shoes they control. (See Figs. 17 and 18.)

(1) Insert gauge, Tool MT-19-L, in wheel hub and check inside diameter of brake drum, as shown in Figure 19. Set gauge pin to drum diameter.

(2) Transfer inside drum diameter from drum gauge by setting the brake shoe gauge arbor so that the finger marked "DRUM" just contacts the point of the brake drum gauge pin, as shown in Figure 20.

(3) Install the proper adapter bushing on the steering knuckle assembly (Fig. 17), or rear axle shaft (Fig. 18). Turn the finger of the brake shoe gauge arbor from DRUM to point marked HEEL and slide the brake shoe gauge over the adapter bushing. This gauge setting allows the correct .006 inch clearance between lining and drum.

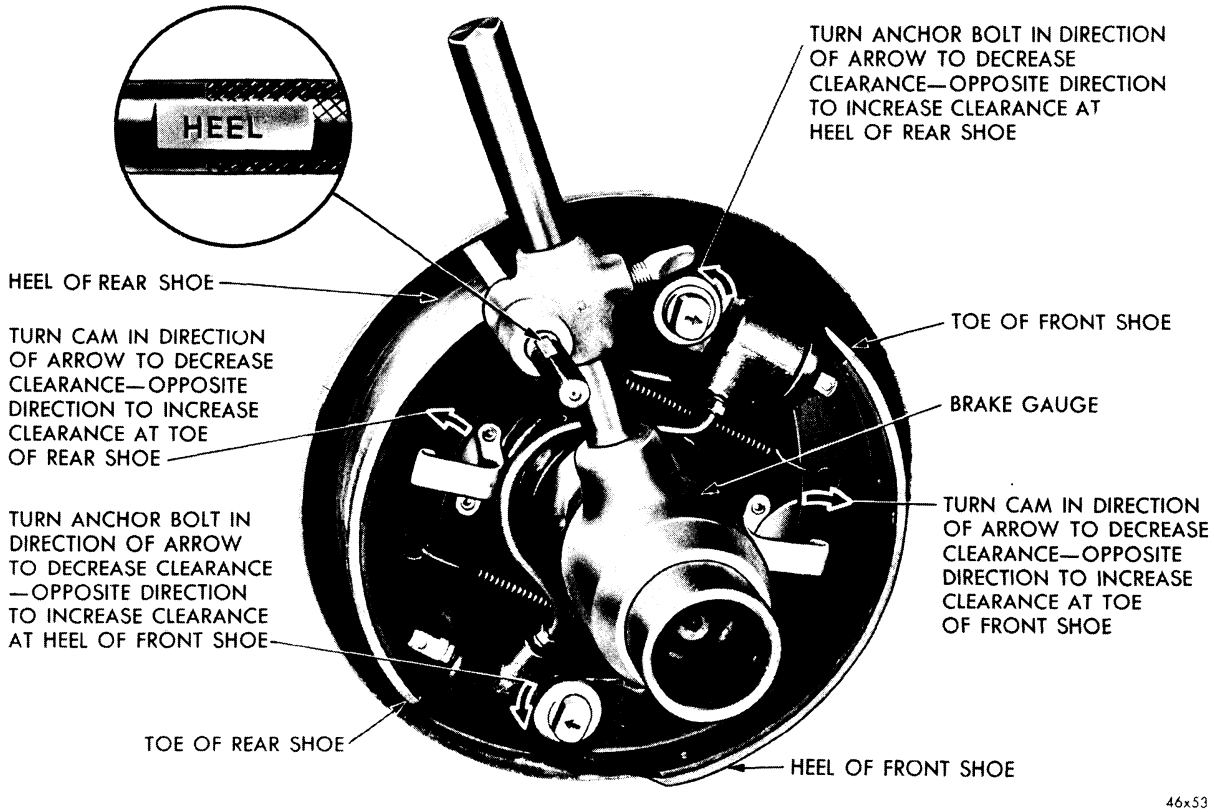

Fig. 17—Positioning Finger from "Drum" to "Heel" (Front Wheel)

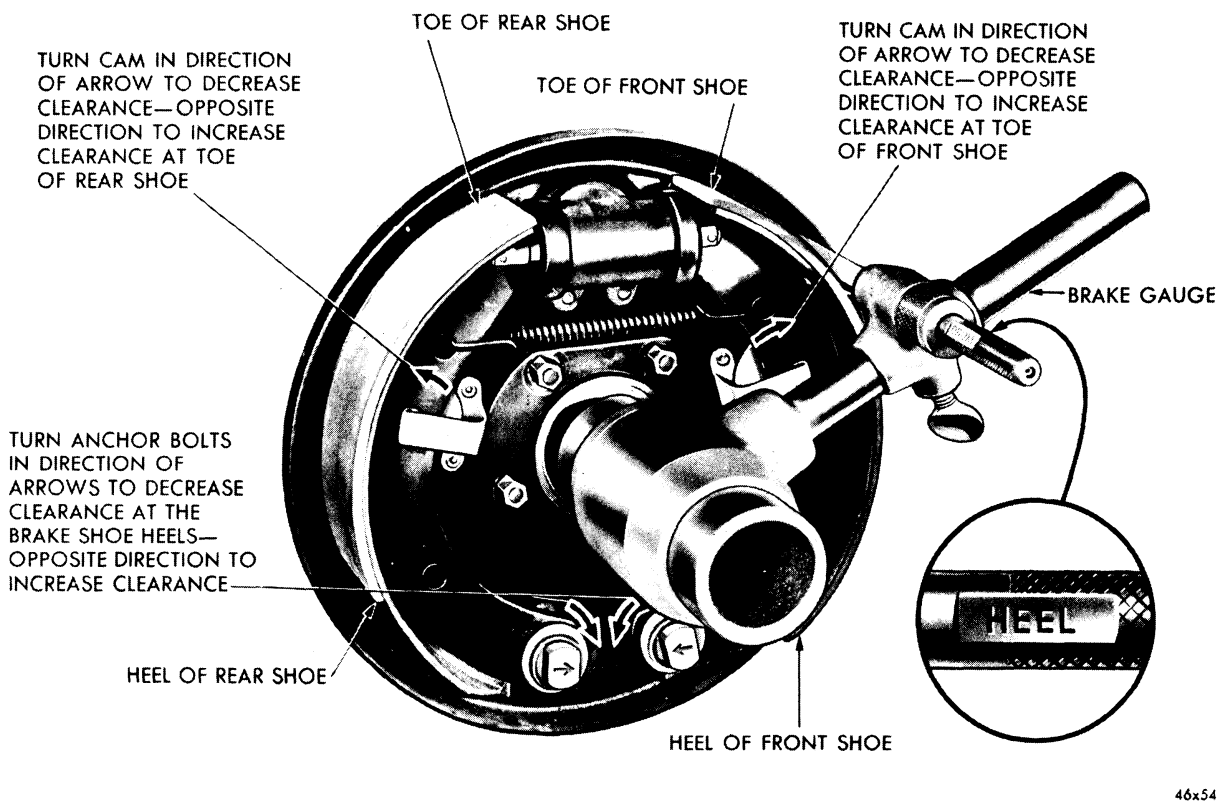

Fig. 18—Positioning Finger from "Drum" to "Heel" (Rear Wheel)

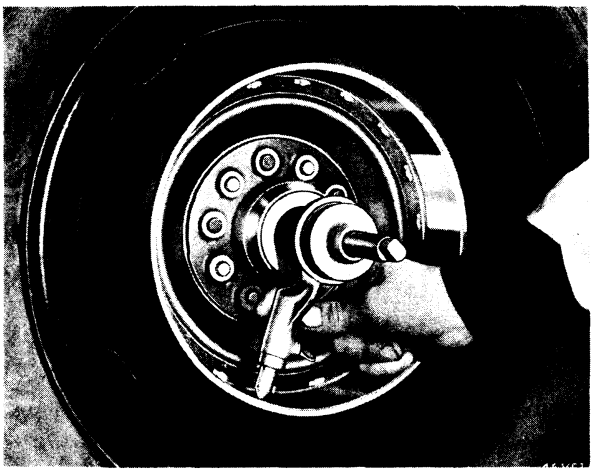

Fig. 19—Checking Brake Drum Diameter

CAUTION

Since .006 inch is the correct clearance for both toe and heel on all wheels, the finger of the brake shoe arbor should remain at the point marked HEEL, when adjusting either toe or heel clearance. DO NOT turn finger of brake shoe arbor to point marked TOE.

(4) Swing brake gauge around until finger is over "toe" of brake shoe. Turn shoe adjusting cam until lining at toe of shoe just contacts gauge finger, as shown in Figure 21.

(5) Swing finger of brake gauge over "heel" of brake shoe and turn anchor bolts until lining at that point just contacts gauge finger, as shown in Figure 22.

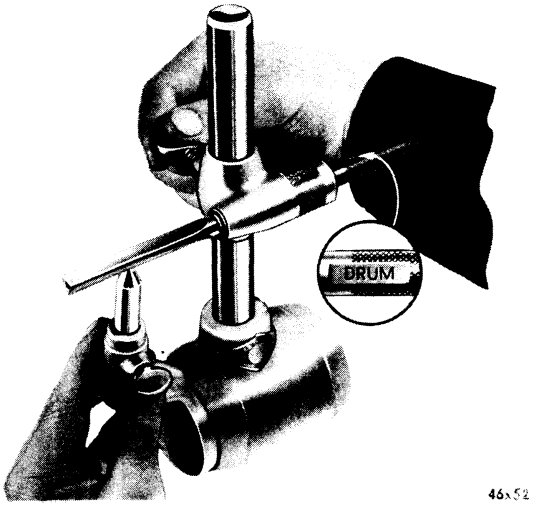

Fig. 20—Setting Brake Shoe Gauge

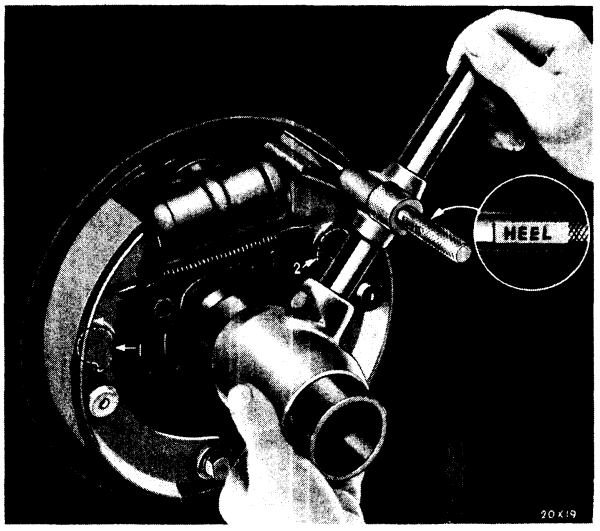

Fig. 21—Checking Toe Adjustment

(6) As anchor bolts are being adjusted for correct "heel" clearance, the "toe" adjustment may change. Therefore, change "heel" adjustment gradually and, at the same time, keep "toe" in proper adjustment as anchor bolt adjustment progresses by adjusting the shoe adjusting cam.

f. Cam Adjustment

To adjust the cams (toe clearance), pull the handle of the wrench DOWN to decrease clearance and UP to increase clearance, as shown in Figure 11.

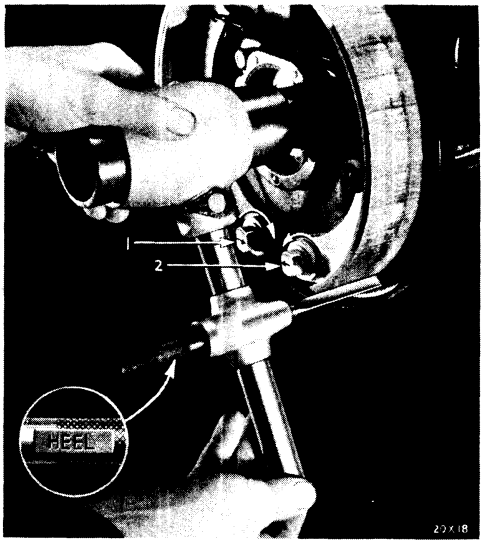

Fig. 22—Checking Heel Adjustment
(Items 1 and 2 are Anchor Bolts)

g. Anchor Adjustment

To INCREASE the heel clearance, turn the anchor bolt so the point of the arrow moves slightly AWAY from the drum. To DECREASE the heel clearance, turn the anchor bolt so the point of the arrow moves slightly TOWARD the drum. A very small movement of the anchor bolt is usually sufficient.

(1) Check to see if the lining is ground properly. This is done by swinging the gauge over the center or arc of the shoe assembly. If gauge finger binds slightly against lining so that it cannot swing past center, or if it touches lining as it swings over center of shoe, the lining is properly ground.

A clearance between the gauge finger and lining (when finger is passed over center of shoe assembly) indicates the shoe is improperly ground. Thus, the lining will have to be cam ground or ground under drum diameter so that the proper clearance of .006 inch may be obtained at the heel and toe.

(2) After shoe adjustment is completed, tighten anchor bolt nuts securely and install wheel and hub assembly.

CAUTION

After adjusting brakes on one wheel, do not use same gauge setting for another. The gauge must be reset according to the inside drum diameter of each drum separately.

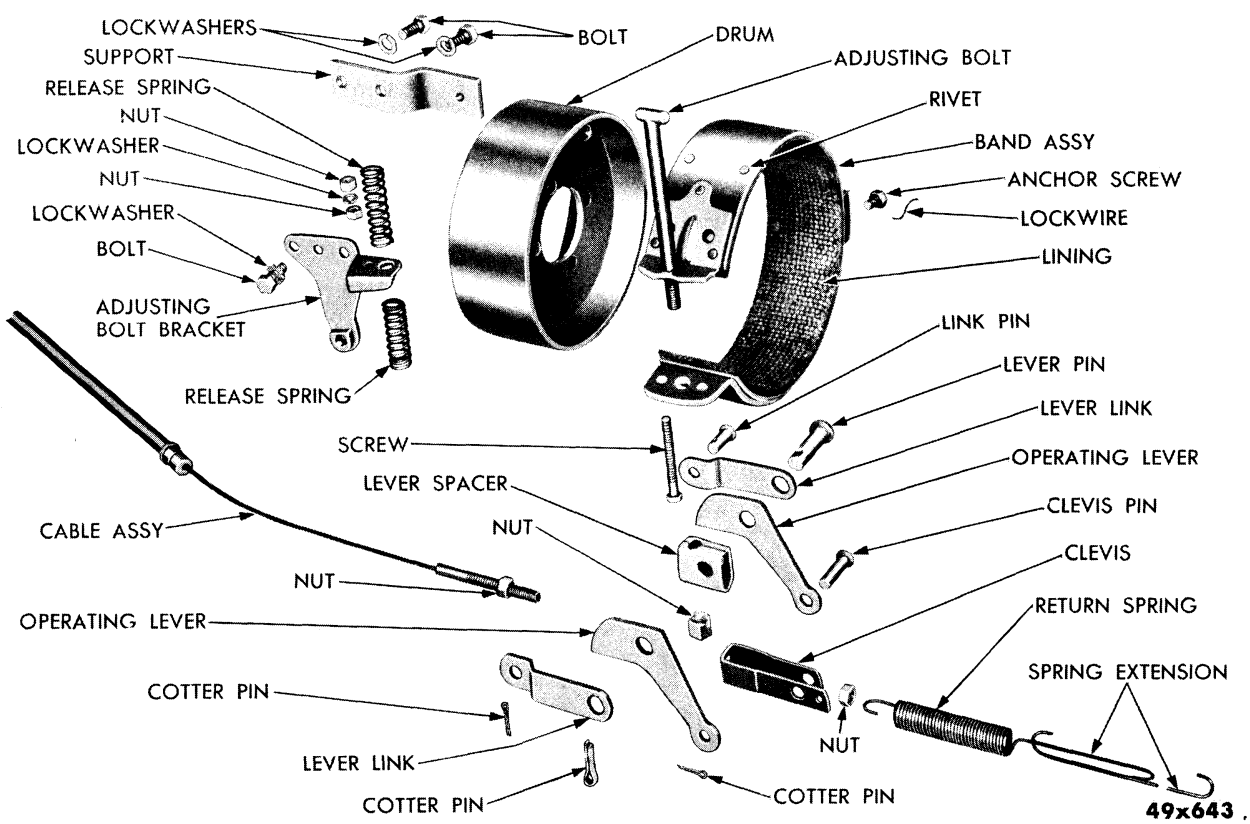

Fig. 23—Hand Brake (Disassembled View—External Type)

SERVICING THE HAND BRAKE

10. SERVICING THE EXTERNAL TYPE HAND BRAKE (Refer to Fig. 23)

a. Removal and Installation

(1) Remove adjusting bolt and nut. Remove guide bolt adjusting nut, lock nut and guide bolt (3 and 1, Fig. 24).

(2) Remove anchor adjusting screw. Pull band assembly away from transmission and off propeller shaft.

When installing band, be sure clearance between anchor and bracket does not exceed .005 inch. Adjust band.

b. Relining Hand Brake Band (Band Removed)

When band is removed, proceed as follows:

(1) Cut off lining rivet heads.

(2) Cut the new lining ¼ inch longer than the required length so that there will be a slight bulge at the center when it is first installed in the band.

(3) Drill and counterbore four rivet holes (two at each end of the lining) to coincide with the holes at the extreme ends of the band. These counterbores should be at least one-half the thickness of the lining.

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

(5) Install the remaining rivets, starting from each end and working alternately toward the center.

(6) End-chamfer the two open ends of the lining to reduce noise and grabbing effect.

NOTE

Excessive squeal or chatter may be eliminated by bending the end of band slightly away from drum.

11. ADJUSTING THE EXTERNAL TYPE HAND BRAKE

(1) Set hand brake lever in fully released position.

CAUTION

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

(2) Remove lock wire. Using feeler gauge, adjust anchor screw (2, Fig. 24) so that clearance between band and drum at anchor is .015 to .020 inch. Lock anchor screw securely.

(3) Adjustment of the guide bolt (1, Fig. 24) should be such that both upper and lower

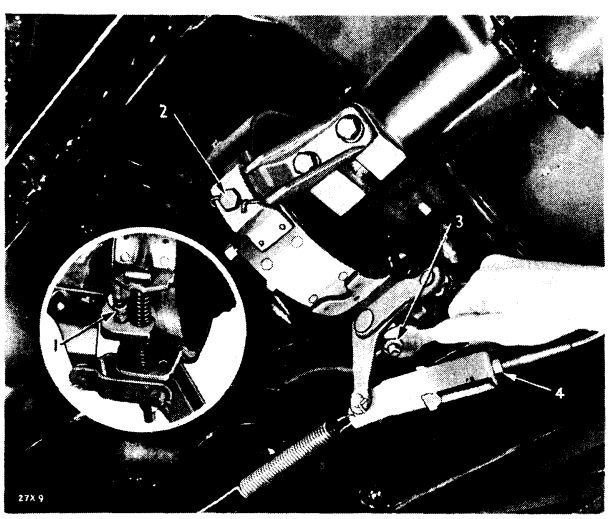

Fig. 24—Hand Brake Band Adjustments

1—Guide bolt adjusting nut and lock nut
2—Anchor screw
3—Adjusting bolt nut
4—Hand brake cable lock nut

half of band has a like amount of clearance. The guide bolt moves the lower half of band up to keep the upper half of the band from dragging and causing premature wear. Adjusting bolt nut (3, Fig. 24) controls the upper half of the band.

(4) Turn adjusting bolt nut (3, Fig. 24), until there is just a slight drag on the drum, with upper and lower half having an equal amount of clearance.

CAUTION

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

12. ADJUSTING EXTERNAL TYPE HAND BRAKE CABLE

Sometimes, after long service, the cable will stretch to such an extent that pulling back on the hand brake lever will not apply band to drum. Loosen lock nut (4, Fig. 24), 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.)**

13. SERVICING THE INTERNAL TYPE HAND BRAKE

The hand brake shown in Figure 25 is the internal expanding type and is used only on cars equipped with PowerFlite Transmission.

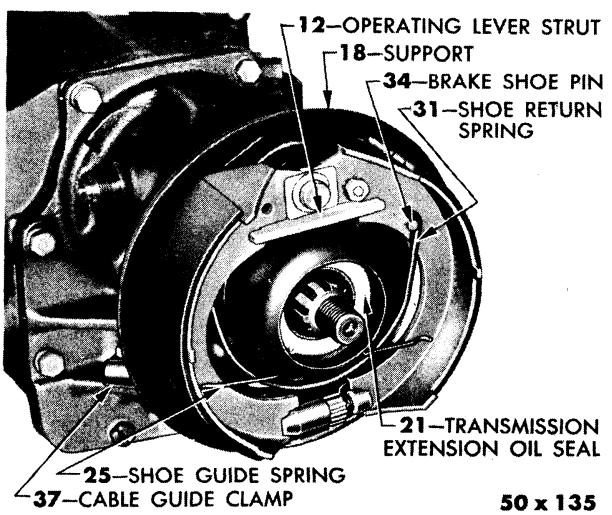

Fig. 25—Internal Expanding Hand Brake

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 the use of Cyclebond lining. The adjustments, when needed, are very simple for both the steel control cable and the shoes.

a. Disassembly

To service the internal expanding hand brake, refer to Figure 26, and proceed as follows:

(1) Disconnect the propeller shaft at the transmission.

(2) Engage holding Tool C-784 with the companion flange. Loosen and remove the companion flange nut (1), lockwasher (2) and flatwasher (3).

(3) Install puller, Tool C-452, on the companion flange. Remove flange and brake drum (4).

(4) Disengage the ball end of cable (35) from the operating lever (27).

(5) Separate shoes (8) at the bottom, allowing the brake shoe adjusting nut (6), screw (5) and sleeve (7) to drop out. Release the shoes.

(6) Pry the brake shoe return spring (31) up and over the right hand brake shoe pin (34) and work the spring out of the assembly.

(7) Pry out the brake shoe retaining washer (11) and remove outer guide (9).

(8) Slide each shoe out from under the guide spring (25). (As the shoes are removed, the operating lever strut (12) will drop out of place.)

(9) Separate the operating lever from the right hand brake shoe, by removing nut (30), lockwasher (29) and bolt (26).

The brake now has been disassembled, as far as necessary, for replacement of worn or damaged parts.

b. Assembly

(1) Assemble the operating lever to the right hand brake shoe.

(2) Slide the right and left hand brake shoes under the guide spring (25) and up on top of the inner anchor guide (10).

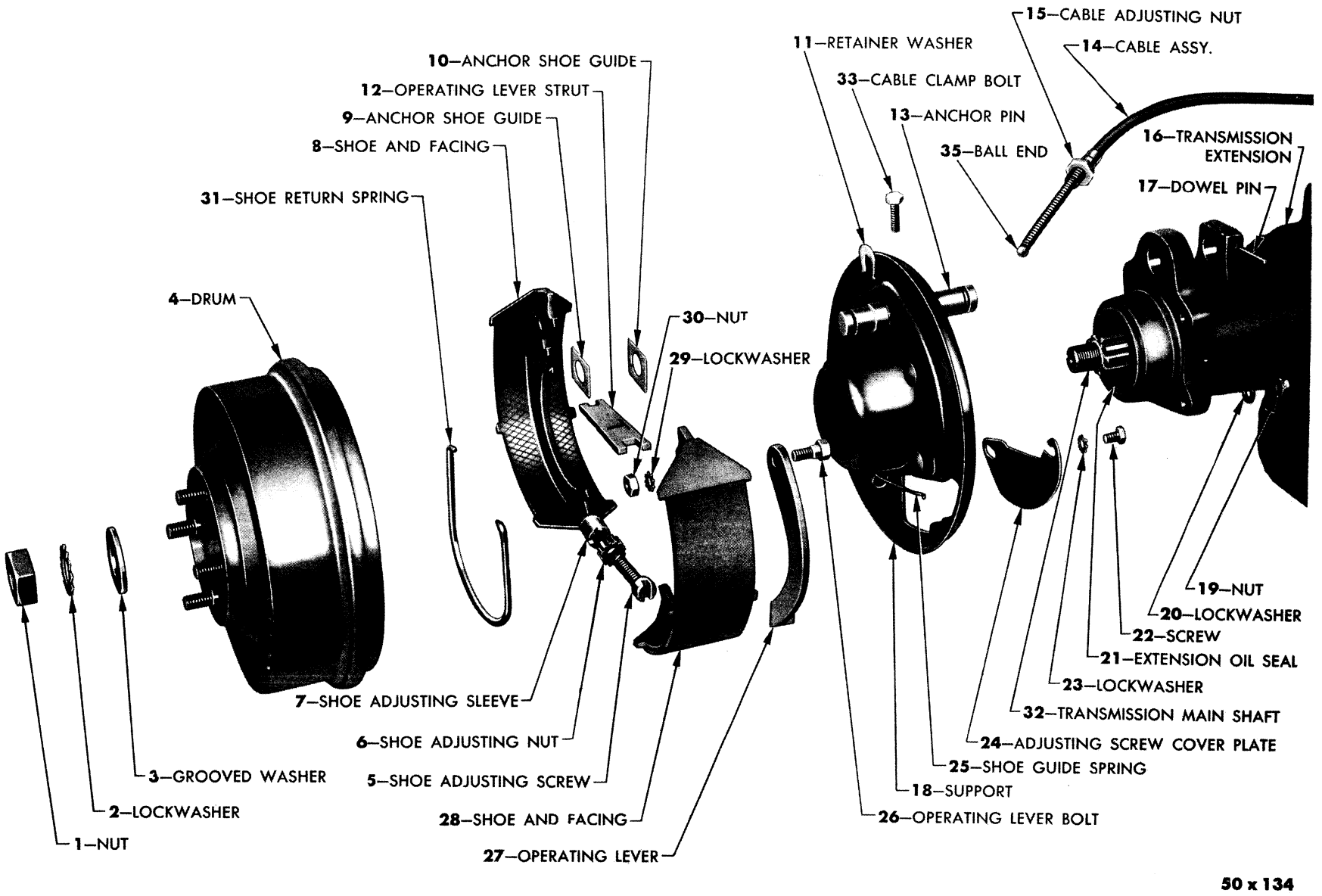

Fig. 26—Hand Brake (Disassembled View—Internal Type)

(3) Spread the shoes and insert the operating lever strut (12) with the wide slot toward the operating lever.

(4) Work the return spring (31) under the guide spring (25) and engage the retaining pin on the left hand shoe. Force the other end of the return spring up and over the retaining pin on the right hand shoe.

Be sure the return spring is securely anchored on both retaining pins.

(5) Spread the bottom of both shoes apart and install the brake shoe adjusting nut, screw and sleeve.

NOTE

Be sure to install the adjusting nut, screw and sleeve in the proper position, as shown in Figure 25. If installed in the reverse position, adjustment will be difficult.

(6) Place the outer anchor guide (9) over the anchor, and secure shoes with retaining washer (11).

(7) Turn the brake adjusting nut until the shoes are in a released position and install the brake drum.

CAUTION

Be sure the brake shoes are centered on the backing plate and are free to move.

c. Adjustment of Brake Shoes

(1) Place the transmission shifting lever in neutral position and release the hand brake.

(2) Disconnect front end of propeller shaft to permit turning of the brake drum by hand (if not previously disconnected).

(3) Remove adjusting screw cover plate (24).

(4) Turn the brake shoe adjusting nut to decrease shoe-to-drum clearance until a slight drag is felt on the drum. Back off adjusting nut at least one full notch (using spanner wrench, Tool C-3014) to give approximately .010 inch clearance.

NOTE

Be sure the two raised shoulders on the adjusting nut are seated in the grooves on the adjusting sleeve.

(5) Test the hand brake level for travel. When properly adjusted, there should be from 3 to 5 notches on the lever rod visible beyond the face plate.

CAUTION

Never substitute a cable adjustment for a brake shoe adjustment.

(6) Install the adjusting screw cover plate (24) and connect the propeller shaft.

14. SERVICING INTERNAL TYPE HAND BRAKE CABLE

a. Removal (At Transmission End)

If removal of the control cable is required for replacement or repair, refer to Figure 26 and proceed as follows:

(1) Loosen the guide clamping bolt (33) and remove adjusting screw cover plate (24).

(2) Pry the ball end of the cable, up and out of the operating lever slot with a screwdriver.

(3) Remove the control cable from the guide.

b. Installation

(1) Slide cable into the guide and insert in-

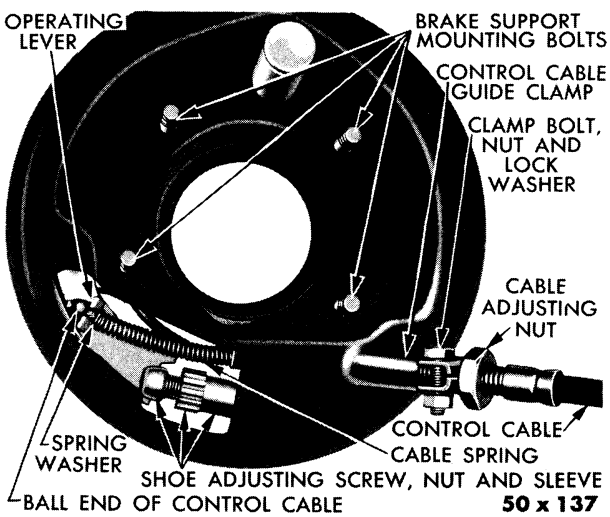

Fig. 27—Rear View of Brake

staller Tool C-3015 between the spring retainer washer and the ball on the end of cable.

(2) Hook the cable into the slot in the operating lever, with the lever between the ball and the washer, as shown in Figure 27.

c. Adjustment

After the installation has been completed, adjust the cable as described in the following paragraphs.

(1) The cable length adjusting nut should be positioned against the cable housing so that there is at least .005 but not more than .010 inch clearance between the operating lever and the brake shoe table, as shown in Figure 28.

(2) To lock the adjustment, tighten the cable housing clamp securely and tighten the cable adjusting nut against the housing.

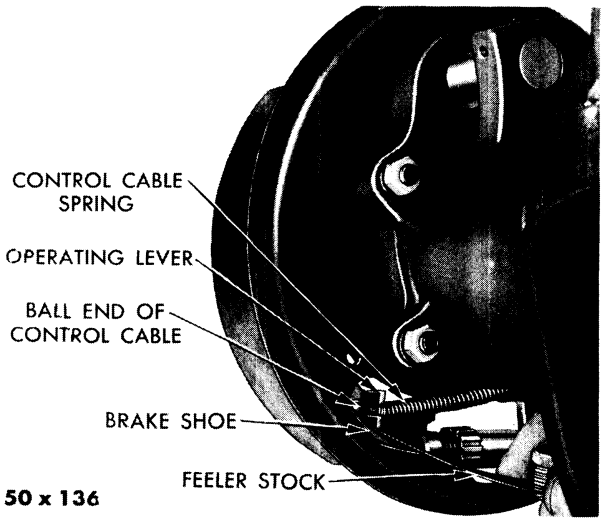

Fig. 28—Clearance Between Lever and Brake Shoe Table

RELINING PROCEDURE

15. CYCLEBOND BRAKE LINING

Pre-cemented Cyclebond brake lining can be successfully bonded to either new or used shoes, providing certain steps are followed. If the following instructions are adhered to, all the advantages of Cyclebond brake lining will be made possible. Basically, there are some items which must be carefully governed in order to insure a successful bonding operation, namely: Condition of brake shoes, correct oven temperatures and correct clamping pressures.

16. REMOVAL OF WORN LINING

Remove bonded type lining by placing brake shoe in a vise and inserting a chisel, or similar tool under the center of lining at either end of shoe. Chip or pry the lining off. (Never use a torch or heat to remove bonded lining as it may result in distortion of shoe.)

17. PREPARING BRAKE SHOES FOR RELINING

a. Degreasing Shoes

Clean shoes to remove accumulation of grease and dirt. (If a cleaning tank is available, immerse shoes, using a suitable grease solvent.) If a cleaning solution is used, flush shoes with warm water and dry with air pressure.

b. Inspection of Shoes

Carefully check shoes for distortion and straighten if necessary. Cracked or damaged shoes should not be used and must be replaced.

c. Sanding Shoe Face

Using sanding attachment, Tool C-797, as shown in Figure 29, sand face of shoe until all traces of old lining, rust scale, oxidation and plating are removed, leaving a bright, clean bonding surface. This applies to all shoes—NEW or USED.

CAUTION

Check date stamped on the MOPAR Cyclebond Brake Lining package before using. If expiration date has passed, lining should be reactivated by applying MOPAR Cyclebond Reactivating Cement over originally cemented surfaces.

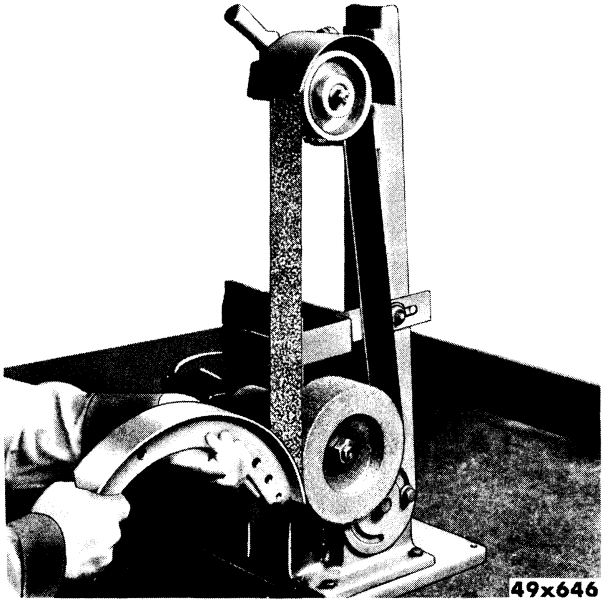

Fig. 29—Sanding Brake Shoe

d. Clamping Operation

Care must be taken in handling pre-cemented linings and sanded shoes as grease or oil smears may destroy the bond. The following instructions cover use of clamp, Tool C-786. (See Fig. 30.) A follow-up spring built into the clamp insures the required pressure over the entire length of lining, while shoes are in the oven.

With lining in proper position, slip toe end of shoe into wedge end of clamp, as shown in Figure 31. Pull flexible metal band tightly around lining. Insert clamp pin into anchor hole in the shoe, as shown in Figure 32. Tighten the wing nut against follow-up pressure spring, as shown in Figure 33, until pressure spring is fully compressed, as shown in Figure 34. Do not tighten further.

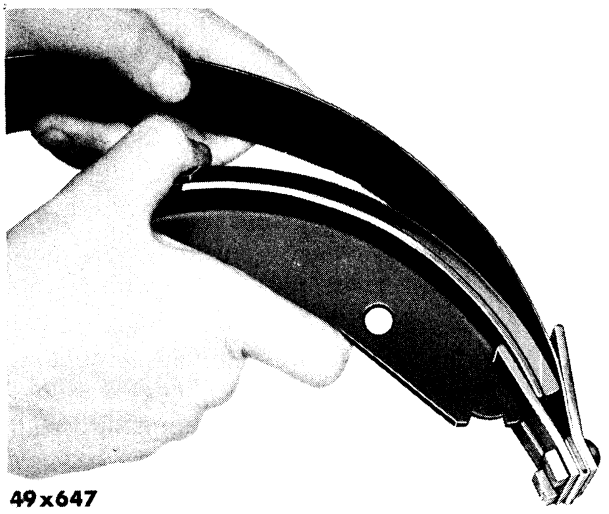

Fig. 31—Installing Shoe and Lining in Clamp

e. Pre-Heating Oven

Using the Miller-Trent Insulated Oven C-794, as shown in Figure 35, follow these pre-heating steps:

(1) Ventilator cap on top of oven must be wide open.
(2) Set toggle switch (1) to the "ON" position.
(3) Set thermostat (2) to 550° F.
(4) Set timer (3) for 1 hour (60 on the dial). The timer and thermostat light (4 and 5) will go "ON" while oven is heating.

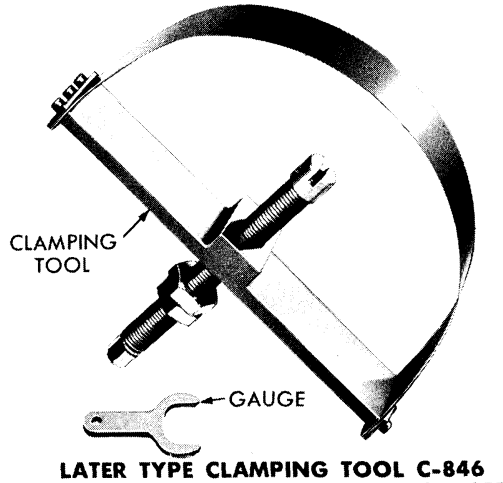

Fig. 30—Clamping Tool C-846

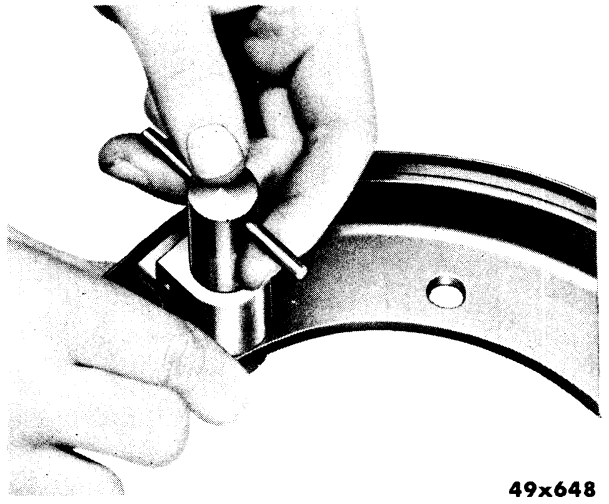

Fig. 32—Inserting Clamp Pin Anchor Hole

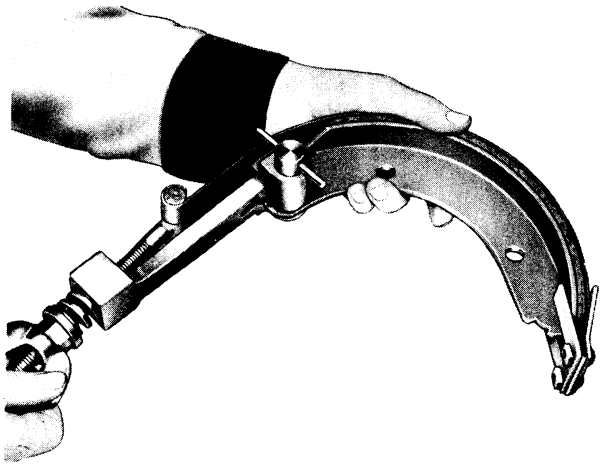

Fig. 33—Tightening Wing Nut Against Pressure Spring

(5) When thermometer (6) in oven door reaches 400° F., turn the thermostat down until thermostat light just goes out.

(6) Let empty oven heat for five minutes. Gradually adjust the thermostat until thermometer stabilizes at 400° F. (This need only be done when starting with a cold oven.)

With oven operating empty, thermostat must be set to make dial thermometer in door read a stable 400° F. When oven is loaded and brake shoes are coming up to heat, the dial thermometer reading may vary. DO NOT CHANGE THE THERMOSTAT SETTING DURING CURING PROCESS.

f. Cyclebonding Time

After oven temperature has reached 400° F. and cold shoes and clamps are placed inside, the temperature will drop. The time required for oven to again reach 400° F. will depend upon the number of shoes included in the recommended cyclebonding time, which is based only on the use of clamping fixtures, Tool C-786 or C-846.

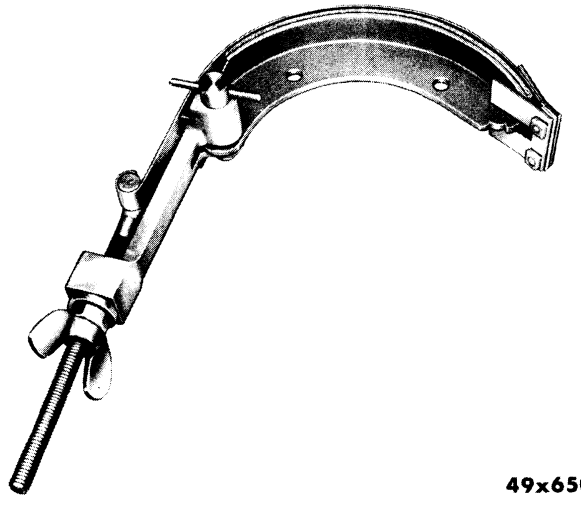

Fig. 34—Tightening Wing Nut to Compress Pressure Spring

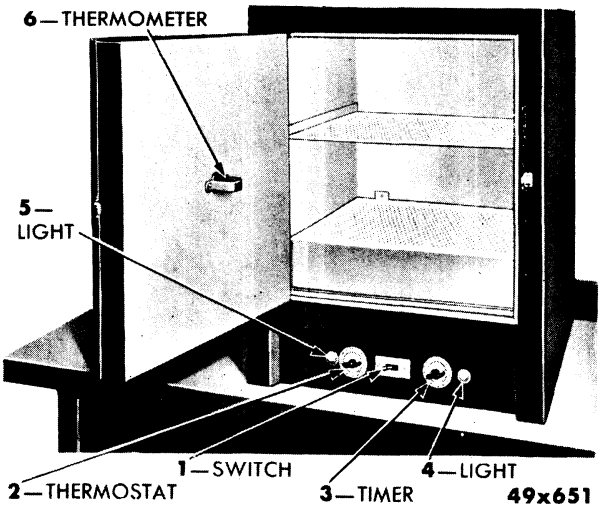

Fig. 35—Miller-Trent Oven

g. For Bonding Linings on 1 to 8 Shoes

After having pre-heated the oven, reset timer for "30" minutes (neither more nor less) immediately after the shoes are placed in oven.

h. For Bonding Linings on 9 to 12 Shoes

After having re-heated the oven, reset timer for "45" minutes (neither more nor less) immediately after the shoes are placed in oven.

NOTE

When other than Miller Clamping Fixtures are used, the required time to heat the additional bulk will change the bonding time. Ovens other than Miller-Trent may produce varying results. In such cases, recommendations of vendors of such equipment must be carefully followed.

Using asbestos gloves, remove shoes and clamp assemblies from oven. Remove clamps from shoes immediately, allowing shoes to cool slowly. DO NOT PUT SHOES IN WATER OR ATTEMPT TO USE AIR PRESSURE BECAUSE OF POSSIBLE WARPAGE OF THE METAL SHOE.

CAUTION

Always be sure switch (1) is in the "OFF" position when oven is not in use.

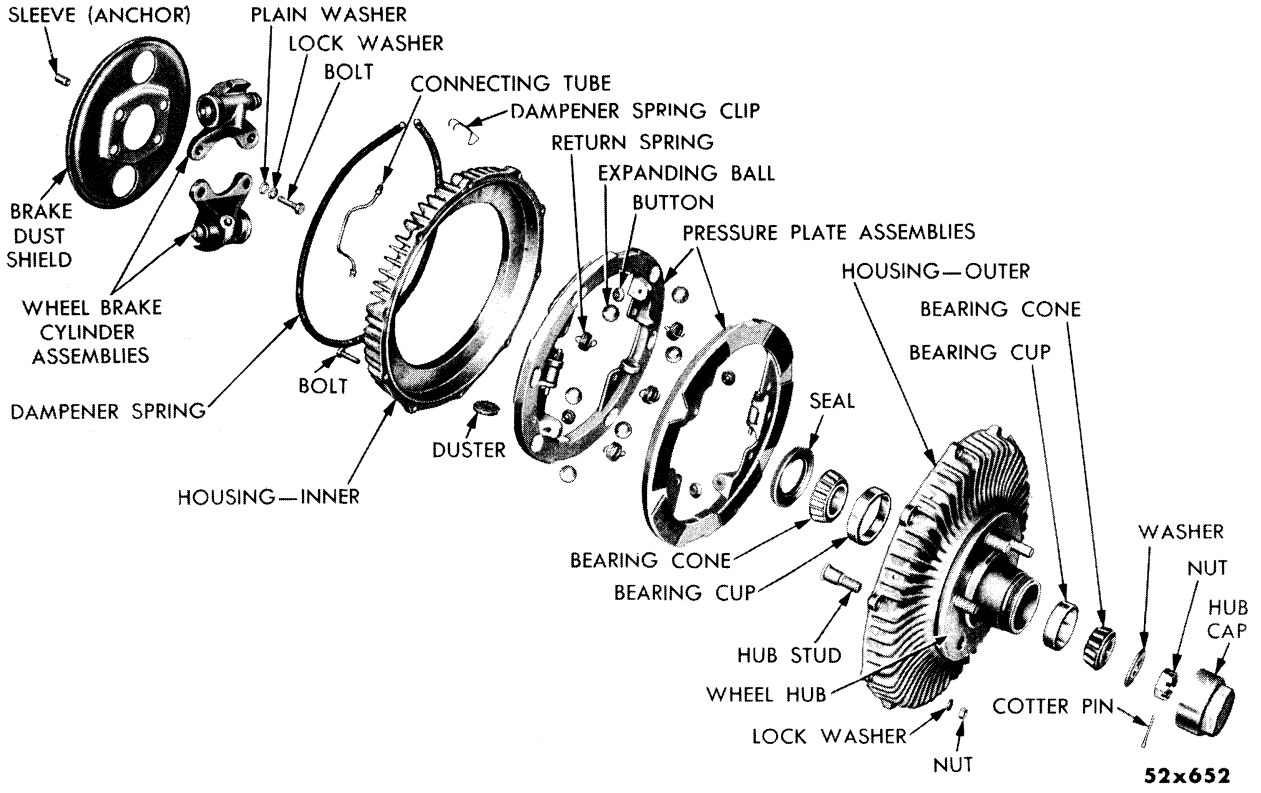

Fig. 36—Front Disc Brake (Disassembled View)

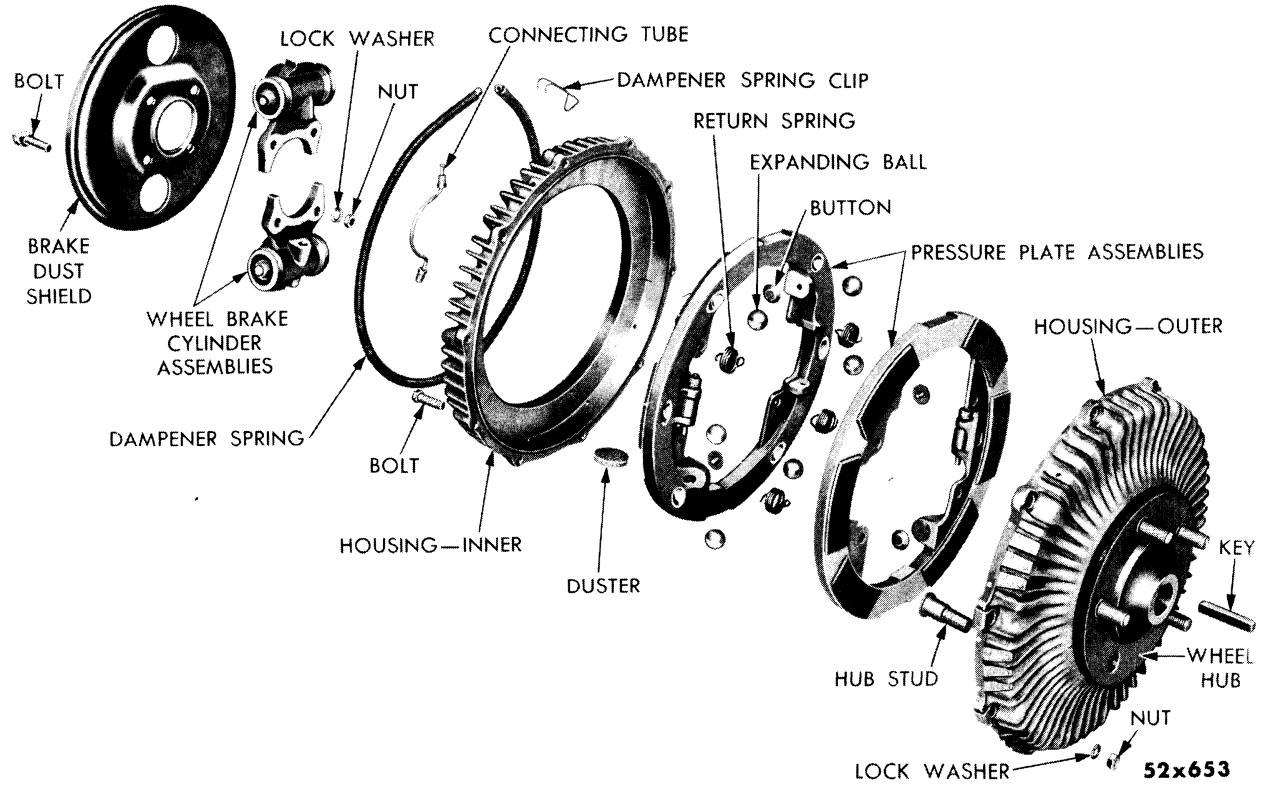

Fig. 37—Rear Disc Brake (Disassembled View)

DISC BRAKES

(Figs. 36 and 37)

18. OPERATION

a. Basic Principle (Refer to Fig. 38)

The self-energizing disc brake utilizes two pressure plates inside a brake housing. To obtain braking power, these plates are moved apart along the axis of the housing until they contact the inside flat surface of the rotating brake housing.

The basic principle can be illustrated by two discs mounted on a shaft. One disc is held rigidly so it cannot rotate, and the other disc is set spinning. If the two discs are brought into contact, friction between the discs will stop the rotation of the spinning disc.

In the disc brake, Figures 36 and 37, the pressure plates are flat annular rings with segments of lining bonded onto the outside surfaces. When the outer plate is rotated with respect to the inner plate by movement of the wheel brake cylinder push rod, steel balls between the plates are forced up on the ramps located on the inside surfaces of the pressure plates. Therefore, the pressure plates are forced apart and contact is provided between the linings and the brake housing.

Disc brakes have more reserve, less fade, and more lining area than the shoe-type brake, with less effort required on the brake pedal to obtain the same amount of braking. The driver of a car equipped with disc brakes can make a greater number of successive high speed stops without noticeable increase in required pedal pressure or reduction in braking effort.

Another advantage of disc brakes is the eliminating of the need for brake adjustment through the incorporation of a self-adjusting mechanism which automatically compensates for lining wear during the long life of the lining.

Fade is considerably less in the disc brake as compared with the shoe-type brake because of its greater lining area with superior heat transfer and cooling properties. Greater reserve is obtained with the disc brake because the critical distortion of the housing is across its width, parallel to its axis, rather than along its diameter. As the distance across the housing is only about one quarter of the diametral distance, the expansion of the housing away from the lining is negligible.

b. Self-Energization

Self-energization (Fig. 39) is the key to a sucessful automotive disc brake. It is obtained by utilizing the friction force that tends to rotate the pressure plates in the direction of brake housing rotation, when contact is established between the linings and the brake housing. When the brakes are applied, the outer plate is rotated forward by the action of the brake cylinder push rods and the plates are separated. During forward motion of the car, the inner plate is held rigid. When the linings contact the housing, only the outer plate is free to move. The resulting additional forward movement of the outer plate, with respect to the inner plate, forces the balls higher on the ramps and provides greater pressure contact between the plates and the housing. Thus some of the energy,

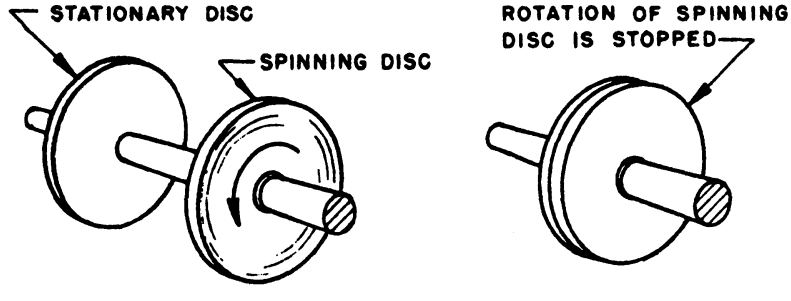

Fig. 38—Relation of Spinning and Stationary Discs

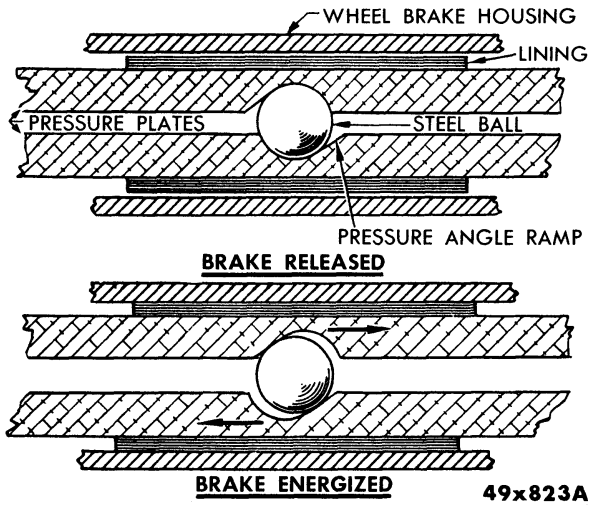

Fig. 39—Self-Energization Illustrated

due to forward motion of the car, is used to increase the braking effect.

When the car is in reverse, the outer plate becomes the fixed plate on the rear wheels. Self-energization is provided by the movement of the inner plate when it contacts the housing. The front wheel brakes are not self-energizing when in reverse, as the inner plate is still the fixed plate.

Because of these factors, the desired braking effect is obtained with a lighter pedal pressure. Also, the pedal pressure required does not noticeably increase even when making a number of high speed stops in rapid succession, or when descending a steep hill requiring constant use of the brakes.

When the brakes are applied, the outer plate is rotated with respect to the inner plate and a lug contacts the adjuster rod. If the brake linings are new, the linings contact the brake housing before the adjuster rod is pushed forward. However, if the linings have worn, a lug pushes the adjuster rod through the bracket guide flanges until the linings contact the brake housing, and the relative rotation of the outer plate stops. When the brakes are released, the brake return springs cause the outer plate to tend to return to its former position. However, when the lug comes into contact with the adjuster rod, the locking action (provided by the automatic adjuster) prevents the adjuster rod from being pushed back, and the outer plate cannot return completely to its former position. Because the difference between the length of the rod and the distance between the finished surfaces of the lugs has been calculated to provide the desired clearance between the linings and the housing when the brakes are released, proper clearance is maintained (regardless of the wear on the linings). Consequently, no service adjustment of the brake, to compensate for lining wear is required during the useful life of the linings.

c. Wheel Brake Cylinders (Figs. 40 and 41)

The two front wheel brake cylinders are mounted on the steering knuckle in each brake assembly. The two rear brake cylinders are mounted on the rear axle flange. As in the shoe-type hydraulic brake system, hydraulic pressure forces the brake cylinder push rods out. Each push rod contacts a boss on the pressure plate. The push

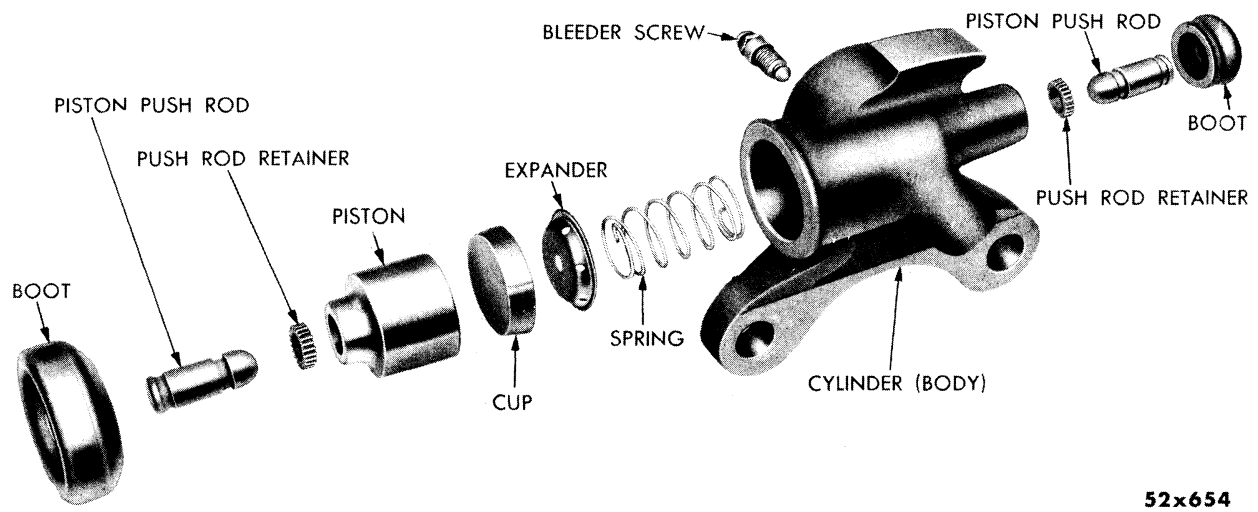

Fig. 40—Front Wheel Brake Cylinder (Disassembled View)

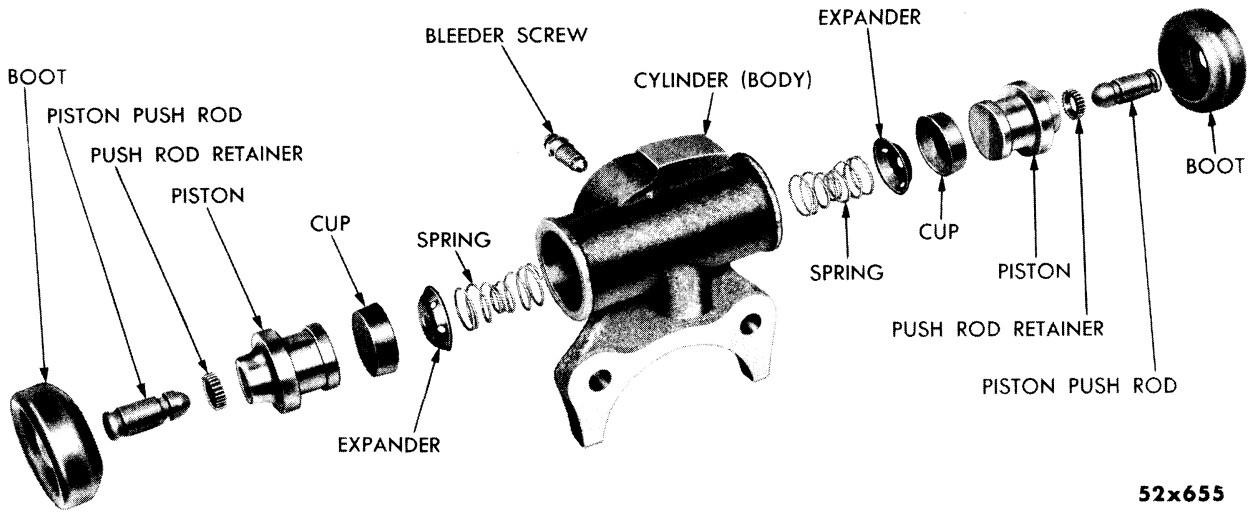

Fig. 41—Rear Wheel Brake Cylinder (Disassembled View)

rod action provides the desired rotation of the outer plate with respect to the inner plate on the front and rear brakes.

Because of no direct connection between pressure plates and wheel cylinders the brake assemblies can be removed as a unit from the car without opening the housings or disrupting the hydraulic system.

Normal inspection or replacement of the front brake cylinder parts does not require the removal of cylinder from the steering knuckle.

On the rear brakes the double action individual cylinders force the push rods against the inner and outer plate.

The rear outer plates energize for forward braking and the rear inner plates energize for reserve braking.

Brake cylinders of 1¼ inch diameter are used on the front brakes and 1 inch diameter brake cylinders are used on the rear brakes. This provides the desirable ratio of braking effect between the front and rear wheels.

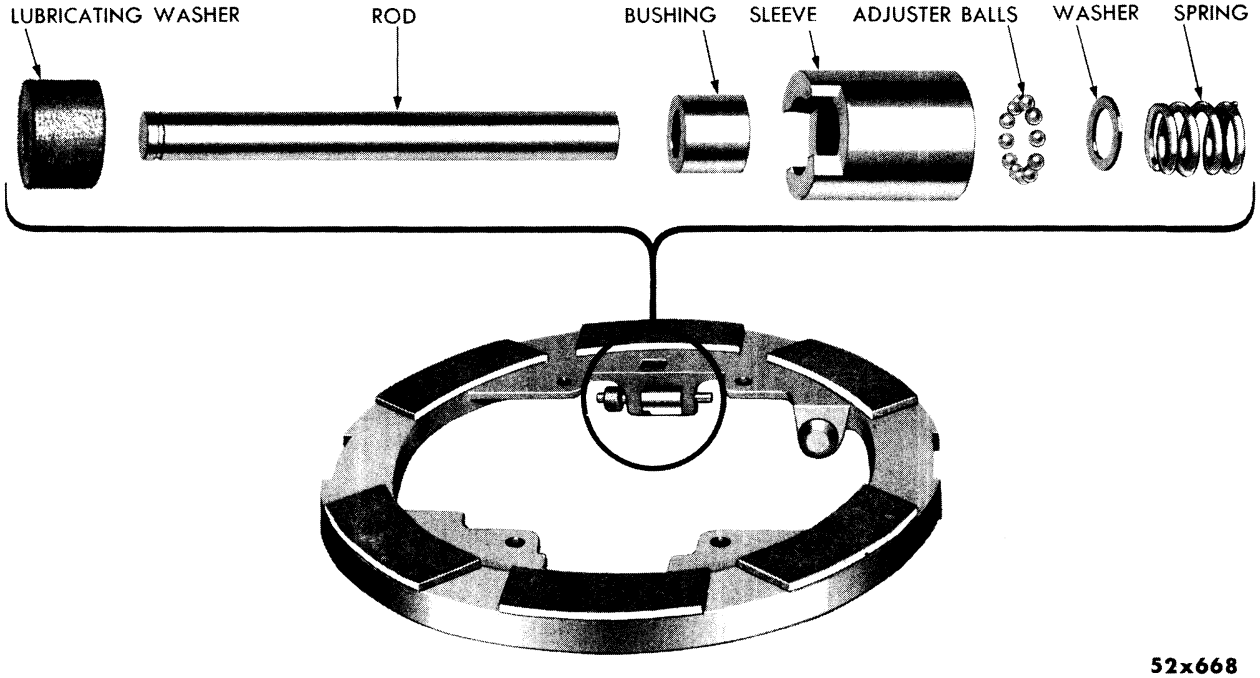

Fig. 42—Automatic Adjuster (Disassembled View)

d. Automatic Adjusters (Fig. 42)

There are two identical automatic adjusters mounted at 180 degrees to each other on the inside surface of each inner pressure plate. The adjusters are identical in operation for either front or rear brakes. Two lugs are provided on the inside surface of each outer pressure plate. They are placed so that they straddle the automatic adjusters.

The wheel brake automatic adjusters are self-adjusting, to compensate for lining wear. The desired clearance is maintained, at all times, between the pressure plates and the brake housing, and full pedal effectiveness is provided.

Each self-adjusting unit is composed of a sleeve, bushing, rod, 11 adjuster balls, washer, spring and lubricating washer. The bracket for each adjusting unit is an integral part of the individual pressure plate.

SERVICE PROCEDURES

19. DISASSEMBLY OF FRONT DISC BRAKE

With the tire and wheel assembly removed, it will be noted that the brake assembly is composed of two cast iron halves. The outer wheel brake housing is bolted to the inner housing by 10 bolts, located around the circumference. The wheel is bolted to the outer housing. Both housings incorporate radial fins to provide greater area for better cooling. The brake assembly incorporates a damper spring attached by 10 clips. Balance weights are attached by means of "easy" rivets and also are held rigidly by the housing attaching bolts. (See Fig. 43.)

It will also be noted that the hydraulic brake hose should not be removed when removing the brake housing, pressure plate and hub assembly. The hydraulic hose is disconnected from the wheel cylinders only when the dust shield is to be removed from the steering knuckle.

To remove the front brake housing, pressure plate and hub assembly, refer to Figures 36 and 44 and proceed as follows:

(1) Remove hub cap, cotter key, spindle nut and washer. Slip complete brake assembly from the steering knuckle, as shown in Figure 44. Transfer to clean bench with the assembly resting on the outer hub section.

(2) With the assembly resting on the outer hub section, remove dampener spring and clips. These can be easily removed, as shown in Figure 45.

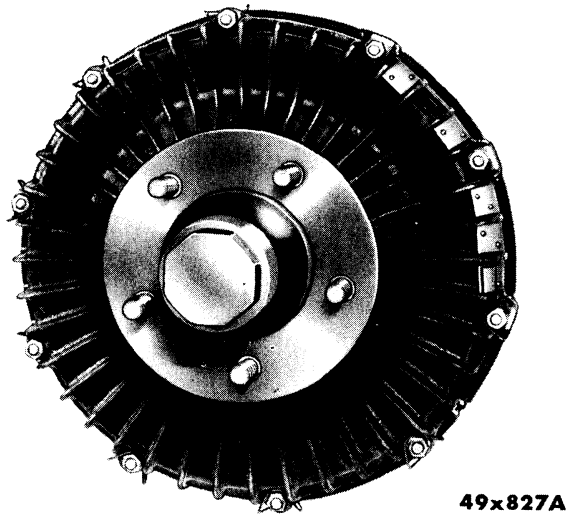

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Fig. 43—Front Disc Brake

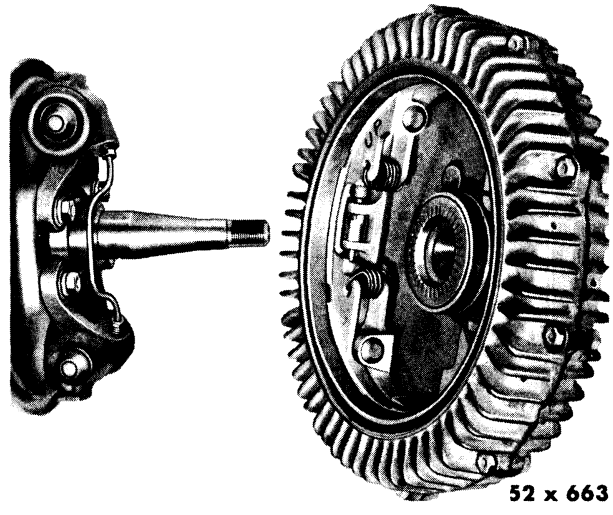

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Fig. 44—Removing or Installing Hub and Brake Housing Assembly (Front Disc Brake)

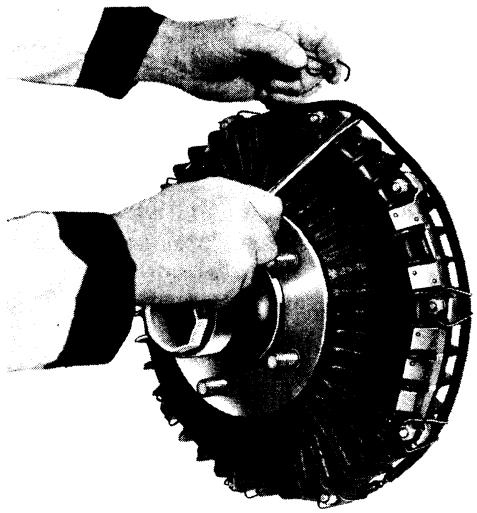


Fig. 45—Removal and Installation of Dampener Springs and Clips (Front Disc Brake)

(3) Remove the housing attaching bolts around the outside diameter of the brake housing, as shown in Figure 46. The inner and outer housings are matched sets and must remain as such. A cut-out is cast in each housing and should be mated. Check housings before separating and make sure they are marked before disassembly. (See Fig. 47.)

(4) Separate inner and outer housings by tapping lightly (at one of the attaching bolt hole flanges) with a fibre-nose hammer. (Refer to Fig. 48.) Remove the pressure plate assemblies, being careful not to lose the small round duster located in each housing, as shown in Figure 49.

(5) Place brake pressure plate assembly on a clean surface or cloth on the bench. This is necessary because the lining segments are located on the outer surface of both pressure plates and can be damaged by dirt, grease, brake fluid, or other foreign matter.

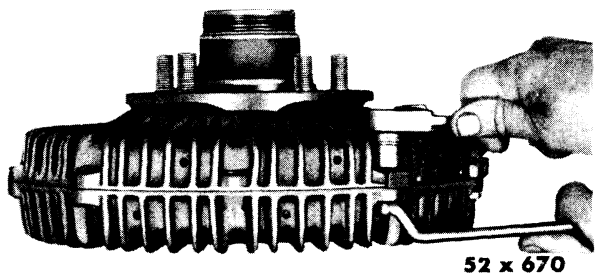


Fig. 46—Removing Housing Attaching Bolts (Front Disc Brake)

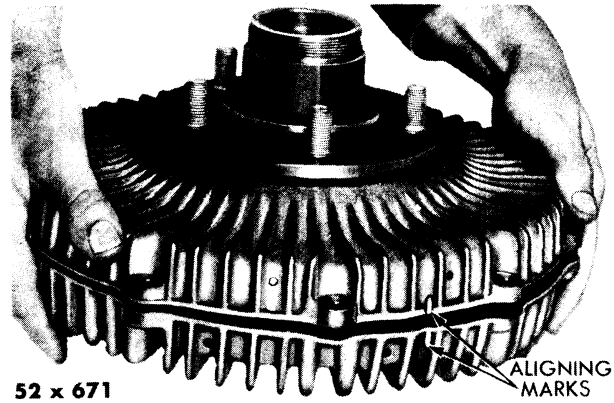


Fig. 47—Brake Housing Aligning Marks (Front Disc Brake)

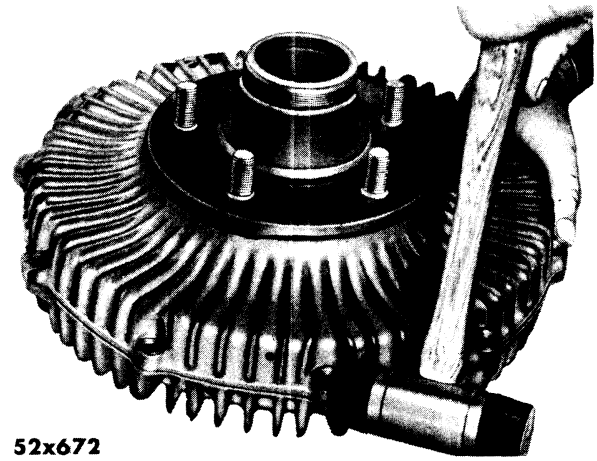


Fig. 48—Separating Inner and Outer Housings (Front Disc Brake)

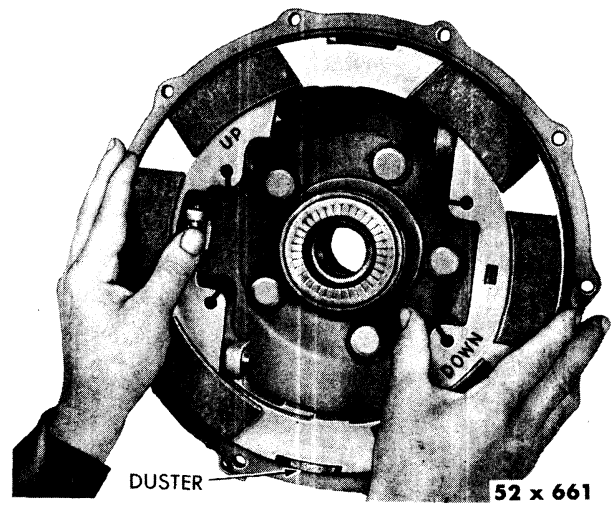


Fig. 49—Removal and Installation of Pressure Plate Assembly (Front Disc Brake)

20. INSPECTION OF BRAKE HOUSINGS

(1) Examine inner and outer halves of brake housing for cracks. If any cracks are present, the housing assembly should be replaced.

(2) If the braking surfaces of the housing contain light radial markings or bluish heat spots, these may be polished out with fine emery cloth.

CAUTION

Do not mate a 40-fin housing with a 60-fin housing on the opposite side of car.

21. ASSEMBLY OF FRONT DISC BRAKE

To assemble front disc brakes refer to Figures 36 and 44 and proceed as follows:

CAUTION

Do not install left pressure plates or wheel cylinders on the right side or vice versa.

(1) Release both automatic adjusters, as shown in Figure 50, for easy assembly of pressure plate.

NOTE

Refer to Paragraph 28 for servicing of automatic adjusters.

(2) Install brake pressure plate assembly in the outer housing half, as shown in Figure 49.

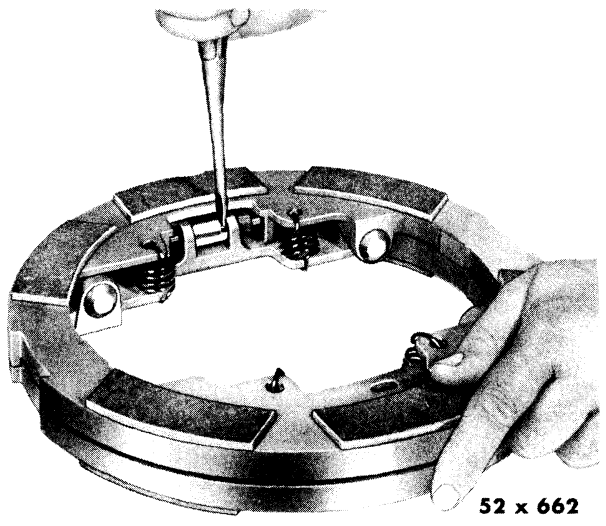


Fig. 50—Releasing Automatic Adjuster (Front or Rear Pressure Plate)

(3) Place duster in "down" position at bottom of the pressure plate, as shown in Figure 49.

(4) Install inner housing and line up aligning marks (cut outs) in each housing as indicated in Figure 47, and tighten the 10 attaching bolts.

NOTE

Inner and outer housings are balanced as an assembly and should be assembled accordingly.

(5) Install damper spring and clips. (See Fig. 45.)

(6) Apply pressure on the push rods of the front cylinders to retract the pistons for easy installation of pressure plate.

NOTE

It may be necessary to open the bleeder screws to allow the pistons to retract. It is recommended that the bleeder screws be tightened with the pistons retracted. This will hold the pistons in the desired position until pressure plates are installed.

(7) Making sure that marking on the pressure plates are in the down position and the duster is in position, position the housing pressure plate and hub assembly, as shown in Figure 44. Slip the complete assembly over the steering knuckle and wheel cylinders.

NOTE

Care should be taken to line up pressure plates perfectly with wheel cylinders to avoid damaging or dislocating wheel cylinder boots.

(8) Install the outer bearing, spacer washer, nut, and adjust front wheel bearings. Install cotter key, hub cap, and wheel assembly.

NOTE

Whenever the front disc brakes are removed for service, the front wheel bearings should be checked for grease before reassembly. It is not necessary to take the brake housing apart to grease the front wheel bearings.

(9) **To grease front wheel bearings, replace bearings on grease seal, remove hub cap, cotter pin bearing adjusting nut, washer and outer bearing.**

(10) **Remove brake housing assembly, grease seal and inner bearing. Clean bearings, grease seal and hub assembly with a suitable cleaning solution.**

(11) **Repack brake housing hub assembly with Short Fiber Wheel Bearing Grease (Medium). Replace hub assembly and adjust front wheel bearings.**

22. DISASSEMBLY OF REAR DISC BRAKE

With tire and wheel assembly removed, it will be noted that the rear disc brake assembly is almost identical to the front brake. (Refer to Figs. 37 and 51.)

To remove the rear disc brake refer to Figure 37, and proceed as follows:

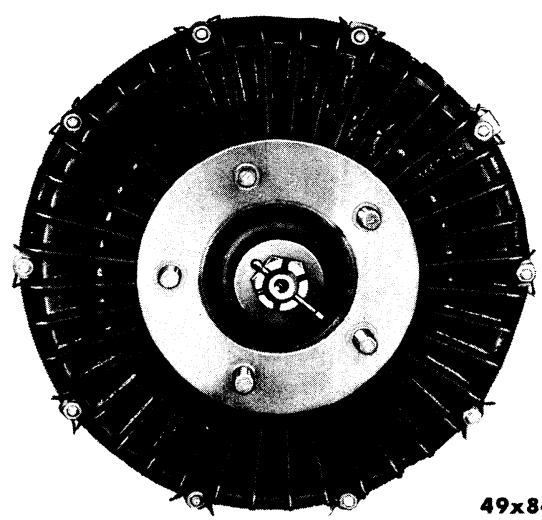
(1) Remove cotter pin, axle nut and washer.

(2) Install wheel puller, Tool C-844 and remove the brake housing, pressure plate and hub assembly. (Refer to Fig. 52.)

(3) Remove axle shaft key.

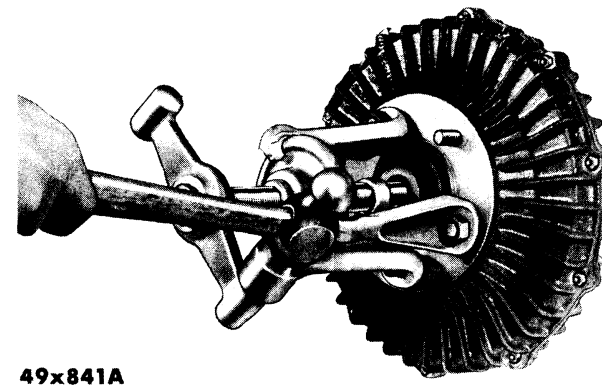
(4) Remove dampener spring and clips. These can be easily removed, as shown in Figure 45.

(5) Remove the housing attaching bolts around the outside diameter of the brake housing,



49x840

Fig. 51—Rear Disc Brake



49x841A

Fig. 52—Removing Hub and Outer Brake Housing Assembly (Rear Disc Brake)

as shown in Figure 46. The inner and outer housings are matched sets and must remain as such. A cut-out is cast in each housing, as shown in Figure 47, and should be mated in assembly. Check housings before separating and make sure they are marked before disassembly.

(6) Separate inner and outer housings by tapping lightly (at one of the attaching bolt hole flanges) with a fibre-nose hammer, as shown in Figure 48. Remove the outer brake housing pressure plate and hub assembly, being careful not to lose the small round duster.

(7) Place brake pressure plate assembly on a clean surface or cloth on the bench. This is necessary because the lining segments are located on the outer surface of both pressure plates and can be damaged by dirt, grease, brake fluid, and other foreign matter.

23. INSPECTION OF BRAKE HOUSINGS

(1) Examine inner and outer halves of brake housing for cracks. If any cracks are present, the housing assembly should be replaced.

(2) If the braking surfaces of the housings contain light radial markings or bluish heat spots, these may be polished out with fine emery cloth.

CAUTION

Do not mate a 40-fin housing with a 60-fin housing on the opposite side of car.

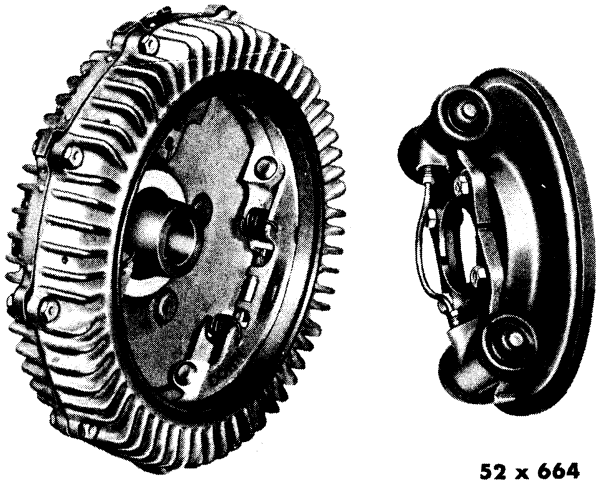


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Fig. 53—Removing or Installing Rear Disc Brake Hub and Housing

NOTE

Whenever the disc brake hub and housing assemblies are removed from the rear axle housing, the oil seals should be inspected for any wear or rupture that may cause an oil seal leak. To replace the oil seals refer to the Rear Axle Section of this manual.

24. ASSEMBLY OF REAR DISC BRAKE

To assemble the rear disc brake refer to Figures 37 and 53 and proceed as follows:

(1) Release both self-adjusters on pressure plate as shown in Figure 50.

NOTE

For servicing of the automatic adjusters, refer to Paragraph 28.

(2) Install pressure plate assembly in outer housing half, as shown in Figure 54.

(3) Place duster in the "down" position at bottom of pressure plate, as shown in Figure 49.

(4) Mount inner housing to outer housing and line up aligning marks in each housing, as indicated in Figure 47.

(5) Install and tighten attaching bolts.

NOTE

Inner and outer housings are matched and balanced in production and should be assembled accordingly.

(6) Install dampener springs and clips. (See Fig. 45.)

(7) Apply pressure on push rods of the rear brake cylinders to retract the pistons for easy access of pressure plate.

NOTE

It may be necessary to open the bleeder screws on the wheel cylinders to allow the pistons to retract sufficiently for easy installation of pressure plate. Bleeder screws should be tightened with the pistons retracted to hold them in the desired position until pressure plates are installed.

Before installing housing and pressure plate assembly to axle shaft, place the marking on the plate in the "down" position.

(8) Mount housing and pressure plate assembly to axle shaft making sure that the plates are piloted properly over the wheel cylinders. Position key-way, install key, washer and nut.

(9) Tighten axle shaft nut to 140 (minimum) foot-pounds torque, and install cotter key, tire and wheel assembly.

25. DISASSEMBLY OF INNER AND OUTER PRESSURE PLATES

(1) Release automatic adjusters. By inserting a thin shank screwdriver between the release sleeve in the automatic adjuster and

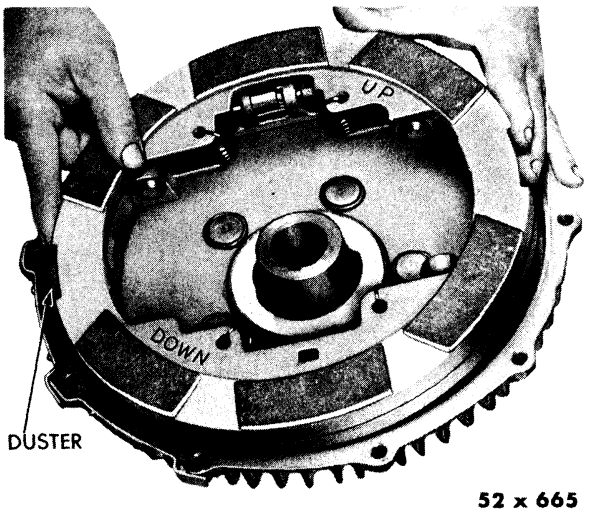

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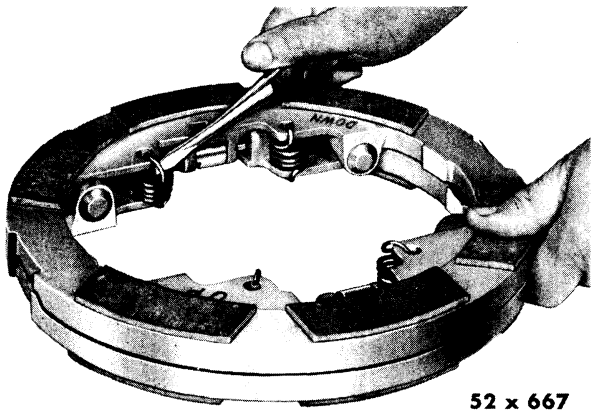
Fig. 54—Removing or Installing Pressure Plate Assembly (Rear Disc Brake)



52 x 667

Fig. 55—Removal or Installation of Pressure Plate Retaining Springs (Front or Rear Disc Brake)

the adjuster guide of each adjuster, and then twisting screwdriver, the pressure plates will snap back into fully released positions. (See Fig. 50.)

(2) Remove the four pressure plate retaining springs as shown in Figure 55. These coil springs, like the return spring in the shoe-type brake, pull the pressure plates together when hydraulic pressure is released and prevent the plates from maintaining friction contact with the brake housing. A "V" slot cut into one side of a screwdriver will facilitate spring removal.

(3) Note that on each case aluminum pressure plate, six ball ramps are machined into the inside surface. (See Fig. 56.) Located in two groups of three on a circle, whose center is the axis of the housing, each ramp has a 32½ degree pressure angle. The pressure angle determines the amount of self-energization of the brake. The front brakes are not self-energizing in reverse.

26. SERVICING PRESSURE PLATE EXPANDING BALLS

Plate expanding balls should be clean and free of flat spots, rust or nicks.

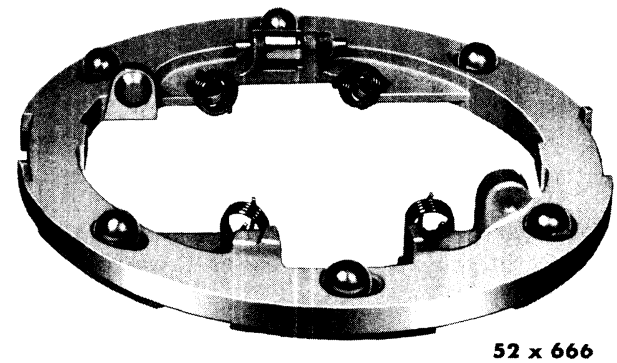


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Fig. 56—Pressure Plate Expanding Balls in Ramps (Front or Rear Disc Brake)

NOTE

A dull coating on expanding balls is not reason for rejection. This is a protective coating and does not affect the operation of the balls. Rusted expanding balls may be cleaned by placing them in a cloth bag partially filled with sand and shaking the bag vigorously.

27. ASSEMBLY OF INNER AND OUTER PRESSURE PLATES

Refer to Paragraph 28 for assembly of Automatic Adjusters.

(1) With the automatic adjuster properly installed on each of the pressure plates, place the six steel pressure expanding balls (⅞ inch diam.) in the six ramps, as shown in Figure 56.

(2) Place the outer plate into position on inner plate. Automatic adjuster rods must also be centered so that operating lugs on the matching plate will straddle the rods.

(3) Install the four pressure plate retaining springs. (See Fig. 50.)

(4) Continue assembly as outlined in Paragraphs 21 or 24.

SERVICING THE AUTOMATIC ADJUSTERS

28. DISASSEMBLY OF AUTOMATIC ADJUSTER (Refer to Fig. 42)

For instructions covering disassembly and assembly of the disc brake, refer to Paragraphs 19 or 22.

a. Removal of Rod and Sleeve

The rod in the automatic adjuster will only move in one direction and can be pushed or pulled out by hand. The adjuster sleeve can be removed by sliding the sleeve out from between the pressure plate lugs.

b. Adjuster Rod Identification

Correct adjuster rods may be identified by any of the following:

(1) A radial groove machined near one end of rod.

(2) Rod has purple dye on surface.

(3) Length of rod is 2.445 to 2.446 inches.

NOTE

Rods that do not come within these specified qualifications should not be used.

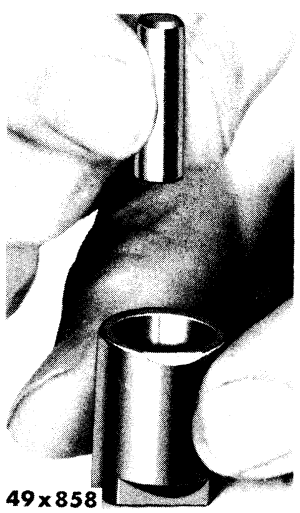

Fig. 57—Inserting Dummy Shaft in Adjuster Sleeve

c. Inspecting Rods for Scoring or Brinelling

Insert a small screwdriver between adjuster bushing and bracket to release adjuster balls, as shown in Figure 50. Move the rod to one end. Wipe off pin surface and inspect. Move pin to opposite extreme to inspect other end of pin. Pin should be free of scoring or brinelling.

NOTE

Do not lubricate the automatic adjuster.

29. ASSEMBLY OF AUTOMATIC ADJUSTER (Refer to Fig. 42)

(1) To assemble the automatic adjuster, it will be necessary to make a dummy shaft out of round stock ¼ inch in diameter by ¾ inch long, chamfered on one end.

(2) Place adjuster sleeve (slotted end down) upright on finger and insert dummy shaft (chamfered end up) in sleeve, as shown in Figure 57.

(3) Position bushing over dummy shaft, as shown in Figure 58.

(4) Dummy shaft and bushing can be held in proper position by the large end of a common paper clip, as shown in Figure 59.

Fig. 58—Positioning Adjuster Bushing Over Dummy Shaft

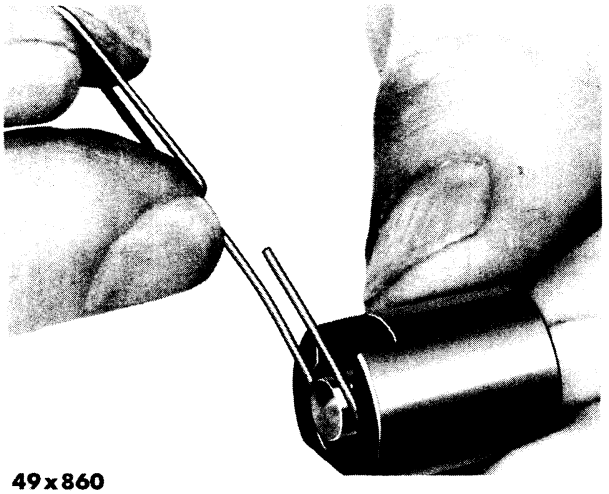

Fig. 59—Securing Dummy Shaft and Bushing in Position

(5) Install the 11 adjuster balls, as shown in Figure 60. Tap lightly to position balls.

(6) Install adjuster washer, as shown in Figure 61.

(7) Position adjuster spring in sleeve, as shown in Figure 62.

(8) Holding thumb over spring, carefully remove paper clip, as shown in Figure 63.

(9) Continue to hold pressure on spring and compress sufficiently to slide sleeve into position on the bracket, as shown in Figure 64.

NOTE

The sleeve is grooved and the pressure plate is

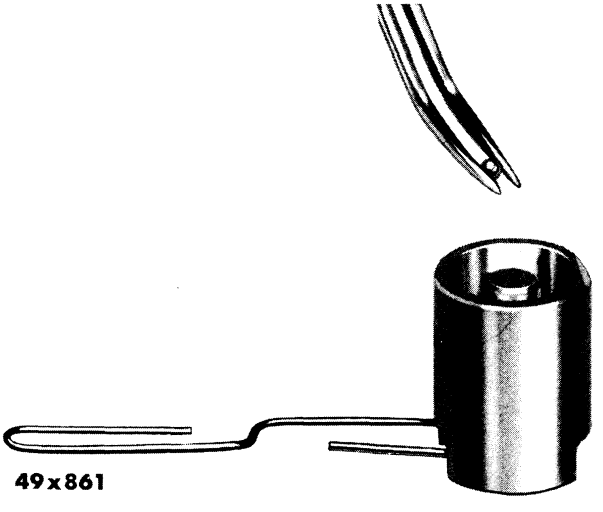

Fig. 60—Installing Adjuster Balls in Sleeve

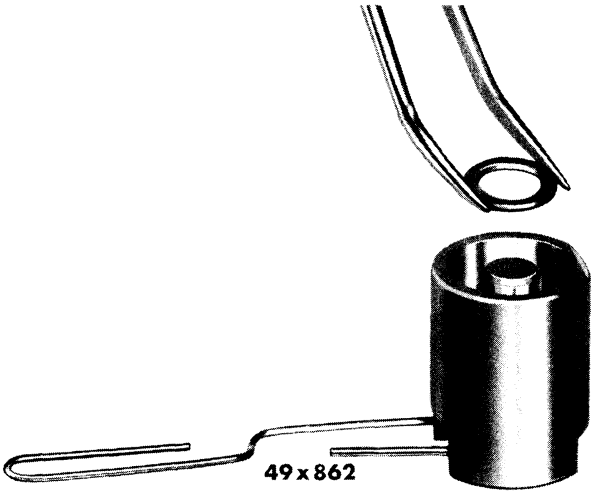

Fig. 61—Installing Adjuster Washer in Sleeve

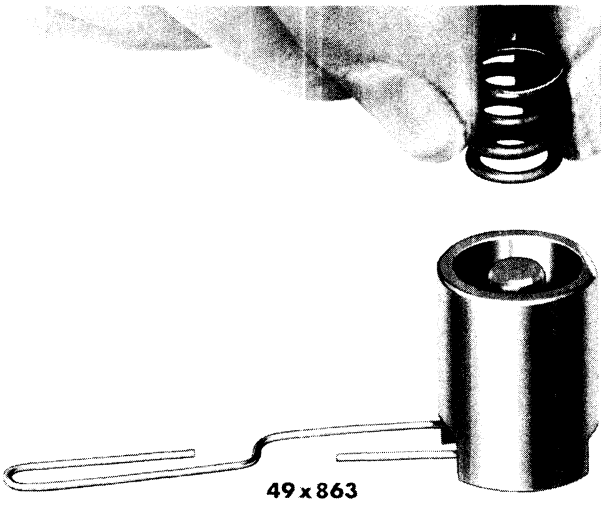

Fig. 62—Positioning Adjuster Spring in Sleeve

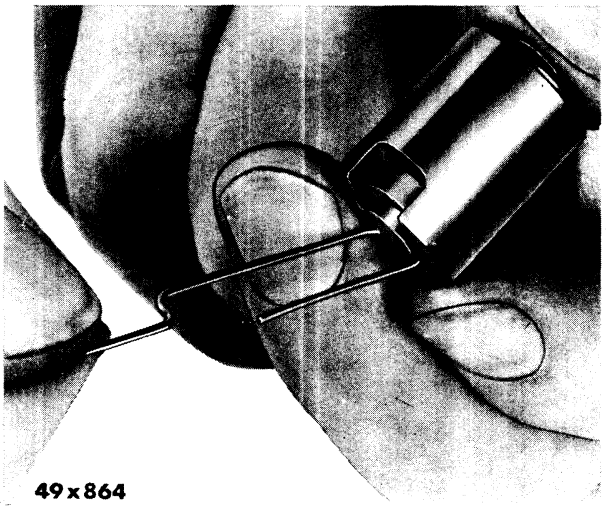

Fig. 63—Removing Paper Clip From Sleeve

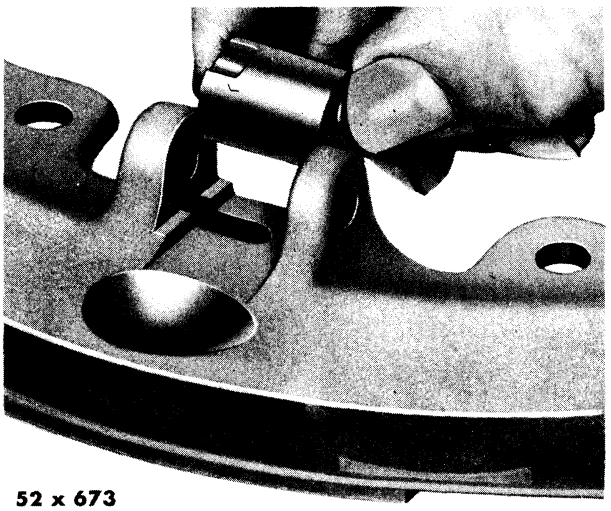

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Fig. 64—Positioning Sleeve on Pressure Plate

stepped, so that installation can only be made the right way.

(10) Align sleeve assembly so that dummy shaft is in line with the holes in the pressure plate. Insert the adjuster rod into the pressure plate hole (Fig. 65) and force dummy shaft out. (Fig. 66.)

Center adjuster rod as accurately as possible, as shown in Figure 67.

(11) Install lubricating washer on adjuster rod at stepped end of adjuster bracket. (Refer to Fig. 68.)

30. SERVICING WHEEL CYLINDERS

(1) Examine the bore of each cylinder. There must be no score marks or pits in the cylinders.

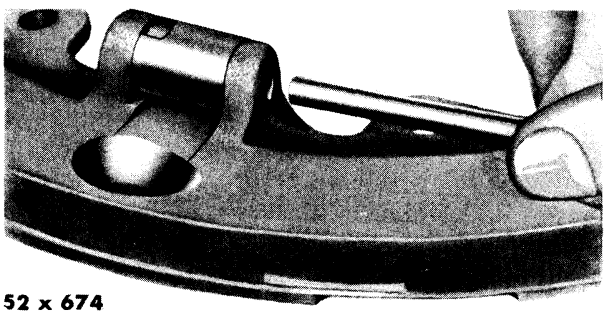

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Fig. 65—Inserting Adjuster Rod Into Pressure Plate

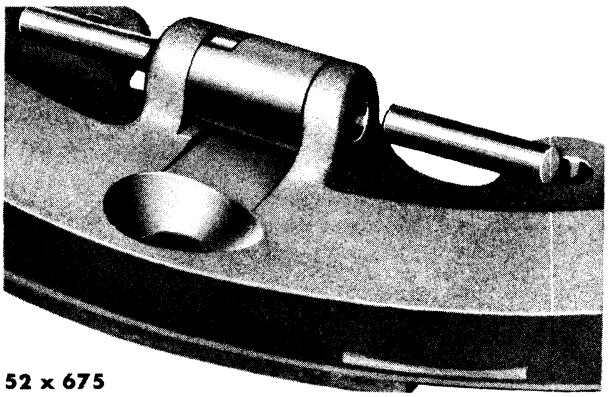

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Fig. 66—Forcing Dummy Shaft Out of Adjuster Sleeve

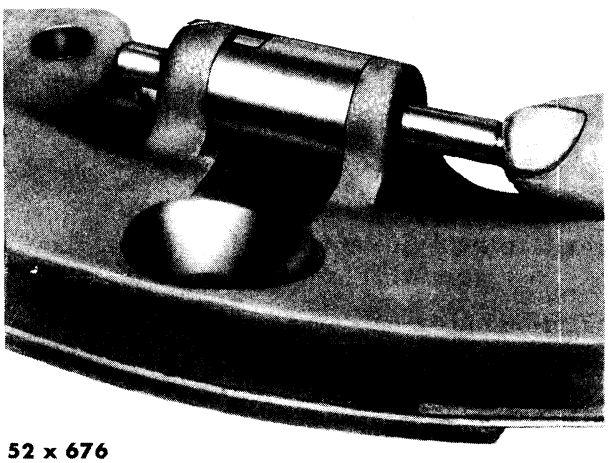

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Fig. 67—Centering Adjuster Rod

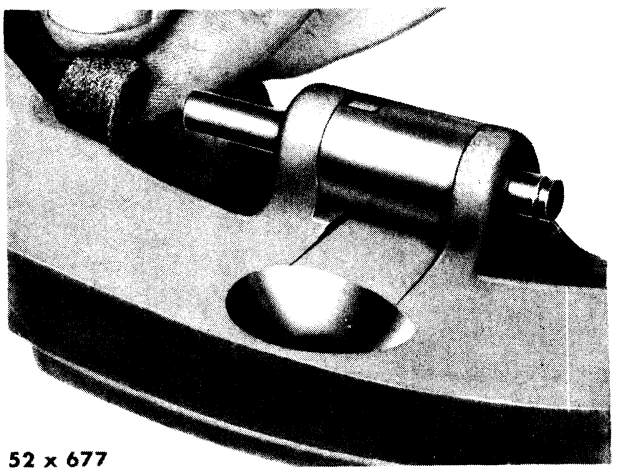

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Fig. 68—Installing Lubricating Washer on Adjuster Rod

(2) Examine the pistons. They must be free of pits or scores.

(3) Use new wheel cylinder piston cups.

CAUTION

Only front wheel cylinder piston cups (Part No. 77526) bearing the letters "AA" or "DT" should be used. Do not use cups bearing letters "BQ."

(4) Assemble the wheel cylinders, using new dust boots and piston cups.

31. ASSEMBLING THE BRAKES

(1) Assemble the inner and outer pressure plates. Make sure all expanding balls, automatic adjusters and cylinder push rods are properly installed.

(2) Install the coil return springs on each assembly. Do not use pliers or side cutters to install springs. Lift them into position with the proper tool or with a screwdriver having a notched blade.

NOTE

Return springs with four coils only should be used.

(3) Continue to assemble brakes as outlined in Paragraphs 21 or 24.

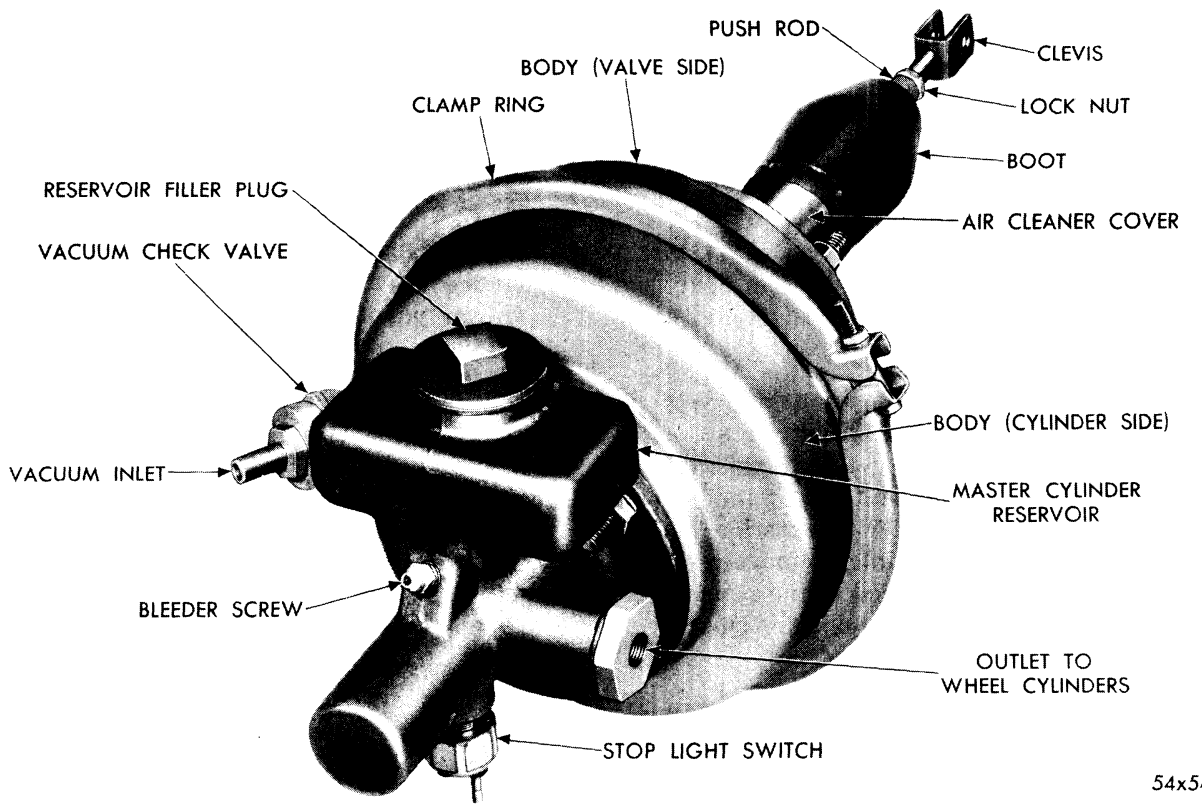

Fig. 69—Power Brake Unit

POWER BRAKES

32. DESCRIPTION (Refer to Fig. 69)

The power brake unit is an integral, self-contained unit which incorporates the air-vacuum housing, hydraulic cylinder, fluid reservoir, air cleaner and vacuum check valve. No additional accessories, such as a vacuum reserve tank or a remote fluid reservoir, are required.

The power brake unit is mounted on the firewall (engine side) which eliminates a great deal of the dirt and mud which accumulated on the unit in previous locations.

The vacuum source tube is connected to the engine intake manifold by a short length of hose, and tubing connects the fluid cylinder to the wheel cylinders.

The unit is connected to the brake pedal through a push rod and a pendulum type linkage which provides the proper amount of mechanical advantage for the driver.

When the brake pedal is depressed the push rod moves into the unit and in doing so actuates valves which create a pressure differential causing movement of the diaphragm and power piston assembly. This results in fluid being forced to the wheel cylinders.

SERVICE PROCEDURES

33. REMOVAL OF POWER BRAKE UNIT

Procedures for removing the Power Brake Unit is the same as that for the conventional master cylinder except the line to the vacuum source tube must be removed. Refer to Paragraph 2 of this Section.

Immediately after removing unit from vehicle, and before starting any disassembly, stroke the unit for at least two full applications to dissipate the vacuum in the unit and pump out (through the wheel cylinder connection) as much hydraulic fluid as possible. Remove reservoir filler cap assembly and gasket and pour out all brake fluid which is in reservoir. Discard fluid.

NOTE

The stop light switch, which is in the boss on the bottom of the hydraulic cylinder, should not be removed except for replacement or to correct an existing fluid leak.

34. DISASSEMBLY OF MAJOR COMPONENTS (Refer to Fig. 70)

(1) Remove push rod from unit. Do this by sliding push rod boot down on rod. Clamp end of push rod in vise. Grip power unit firmly and pull away from push rod with a quick jerk, as shown in Figure 71.

CAUTION

Push rod is held in place in cavity of air valve seat assembly by push rod retainer clip. Whenever the push rod is removed from the unit, a NEW push rod retainer clip must be used at assembly.

(2) Open boot retainer strap and remove push rod boot and air cleaner cover boot. Discard retainer strap.

NOTE

Unit may be clamped in vise with hydraulic cylinder end down. Vise should be clamped on

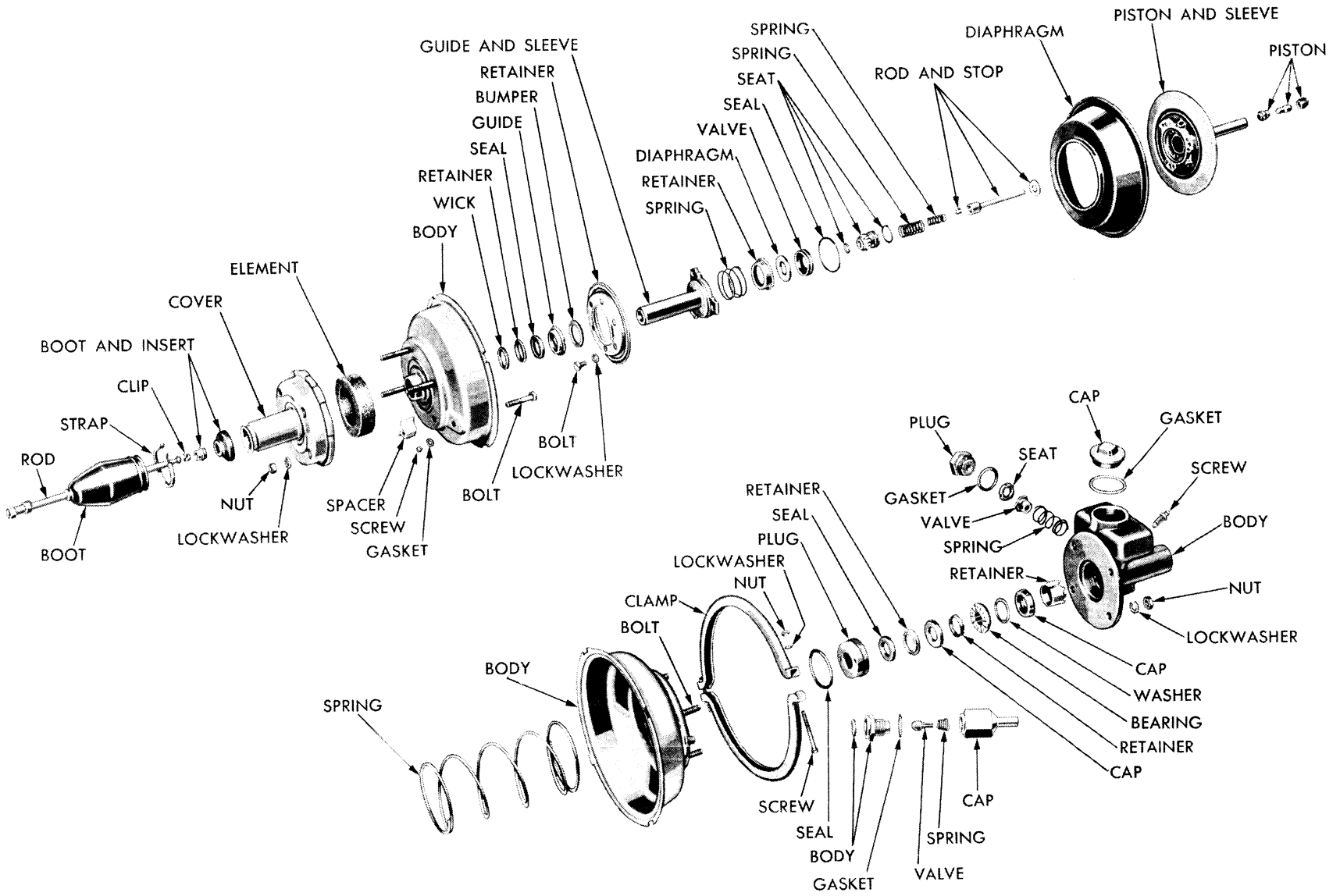

Fig. 70—Power Brake (Disassembled View) (Late Design)

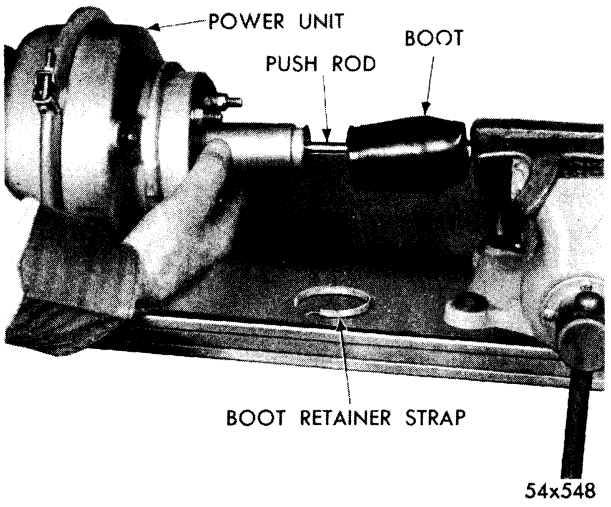

Fig. 71—Removing Push Rod from Unit

hydraulic cylinder only tight enough to hold securely: clamping too tight will crack or distort cylinder.

(3) Remove reinforcement plate and air cleaner cover assembly. With cover assembly removed, lift out four spacers and air cleaner core, as shown in Figure 72.

(4) Remove valve side body from cylinder side body by removing two clamp rings. These are held in position by two clamp ring screws, hex nuts and lockwashers.

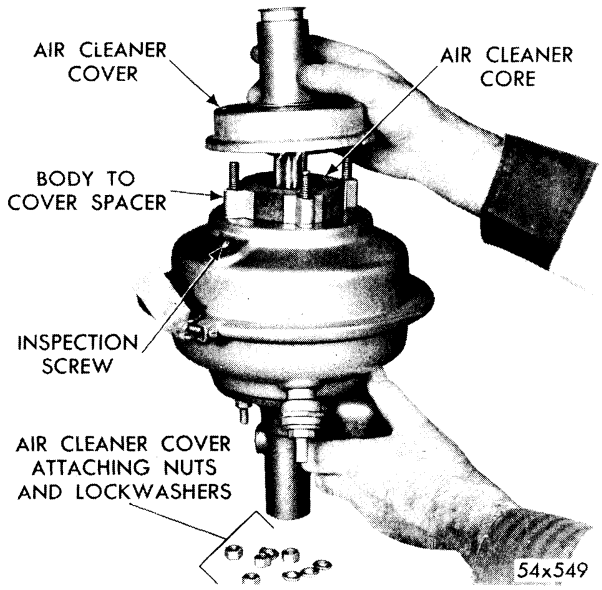

Fig. 72—Removing or Installing Air Cleaner Cover

NOTE

If a small amount of brake fluid is present in the body this is not an indication of a leak but is fluid accumulated as a result of manufacturing tests.

To facilitate correct assembly, loosen both clamp ring screws but remove only one. Keep the two clamp ring parts held together in their proper relationship.

CAUTION

The power piston and guide assembly is spring-loaded by the return spring.

(5) Remove body assembly (valve side) from body assembly (cylinder side) by lifting straight up, as shown in Figure 73. This is to prevent damaging the power piston sleeve and bearing.

NOTE

If edge of diaphragm did not free itself from flange of body assembly (cylinder side) when body assembly (valve side) was removed, hold power piston and guide assembly down against return spring while loosening edge of diaphragm. Allow return spring to lift power piston and guide assembly.

(6) Remove return spring.

(7) Remove body and cylinder assembly from vise, invert, and place body assembly (cyl-

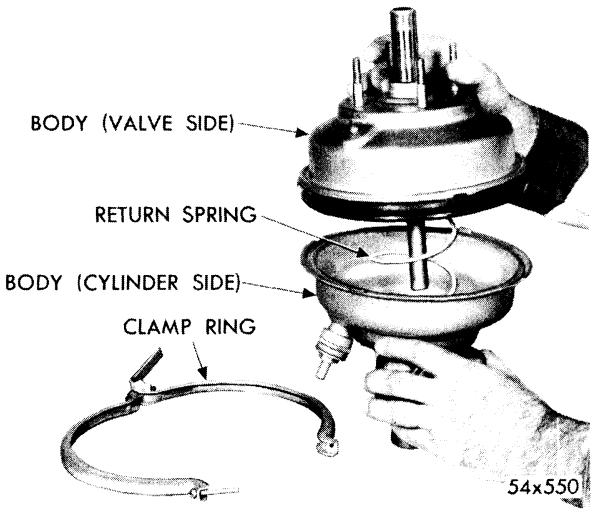

Fig. 73—Removing Power Piston and Guide

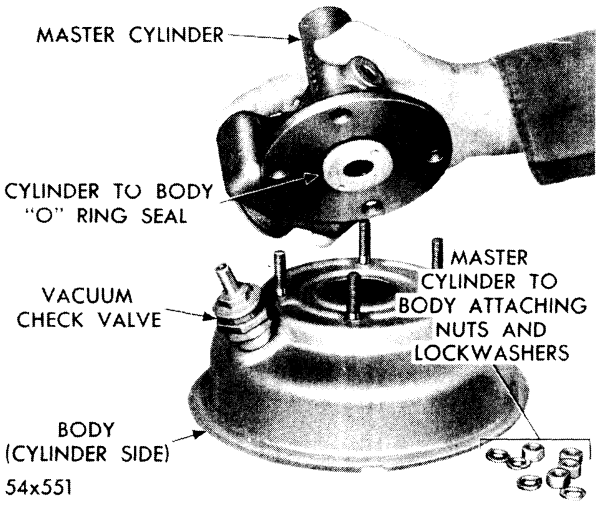

Fig. 74—Removing or Installing Hydraulic Cylinder

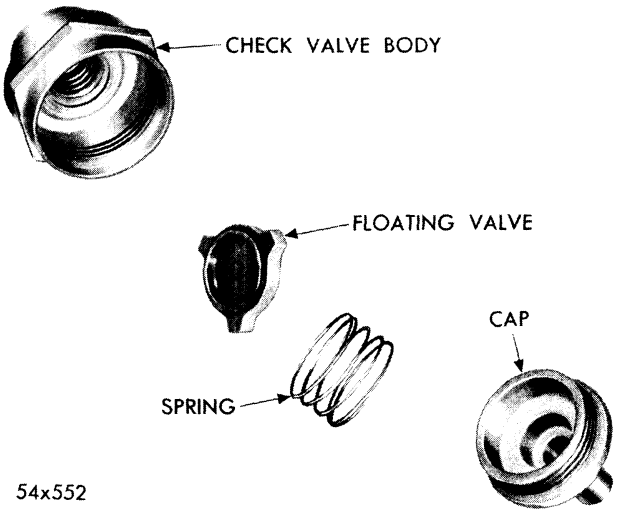

Fig. 75—Check Valve (Disassembled View)

inder side) flange down, on bench. Remove flange of hydraulic cylinder assembly. Lift hydraulic cylinder assembly off body assembly (cylinder side), as shown in Figure 74. Remove and discard cylinder-to-body "O" ring seal.

35. DISASSEMBLY OF BODY ASSEMBLY

a. Cylinder Side

(1) With body assembly (cylinder side) on bench (flange down) remove vacuum check valve assembly. Remove and discard check valve to body "O" ring.

(2) Position check valve assembly in vise (clamp on large hex on body) and remove check valve body cap.

(3) Lift out check valve spring and floating valve assembly. Discard floating valve assembly but do not discard spring. (Refer to Fig. 75.)

NOTE

On later design power units the vacuum check valve floating valve (metal) has been replaced by the rubber plug type valve, as shown in Figure 75.

b. Valve Side

(1) From hub of body assembly (valve side) remove and discard guide seal and seal lubricating wick, as shown in Figure 76. This can be done with small pointed pliers. Use care not to damage guide bearing or wick retainer.

CAUTION

Do not remove guide bearing.

(2) Examine inspection screw and gasket. Remove only if damaged or not sealing properly.

36. DISASSEMBLY OF POWER PISTON AND GUIDE ASSEMBLY

(1) Place power piston and guide assembly in holding fixture with power piston end down and guide end up. Lift guide return bumper from guide sleeve, and discard. Be careful not to scratch power piston sleeve.

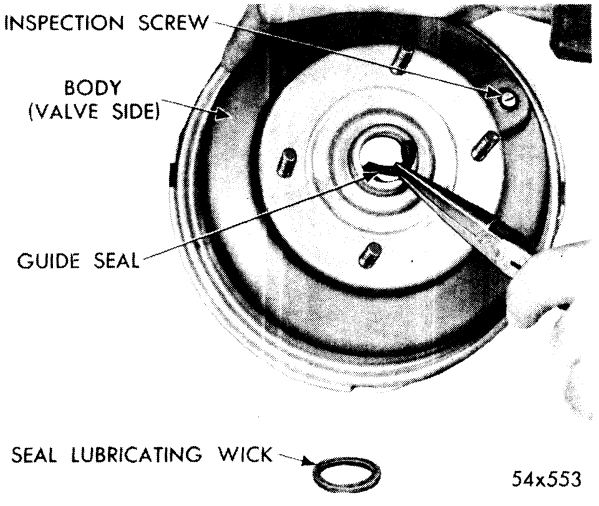

Fig. 76—Removing Guide Seal and Lubricating Wick

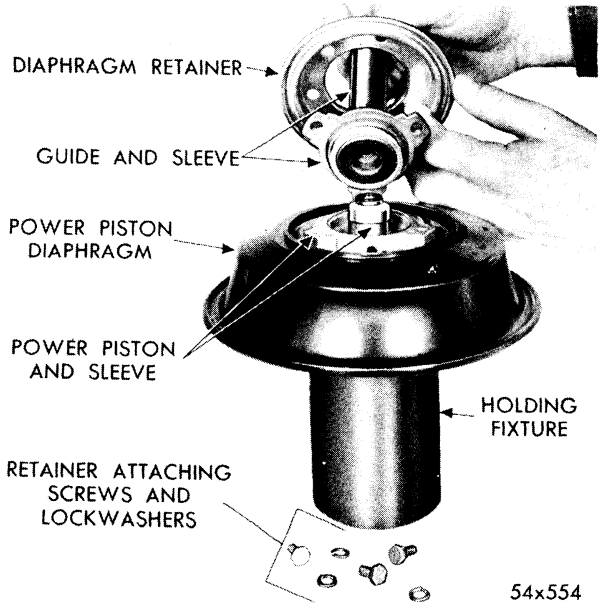

Fig. 77—Removing Guide Assembly from Power Piston Assembly

NOTE

Before discarding bumper, note its thickness. It is important that the new bumper, supplied in kit, (to be installed at assembly) be the same thickness as the one removed. Except on very early production models, the thicker bumper has a groove on each side to make it easily identified. The thinner bumper is smooth on both sides.

(2) Remove flange of power piston guide assembly. Lift off diaphragm retainer. Remove diaphragm.

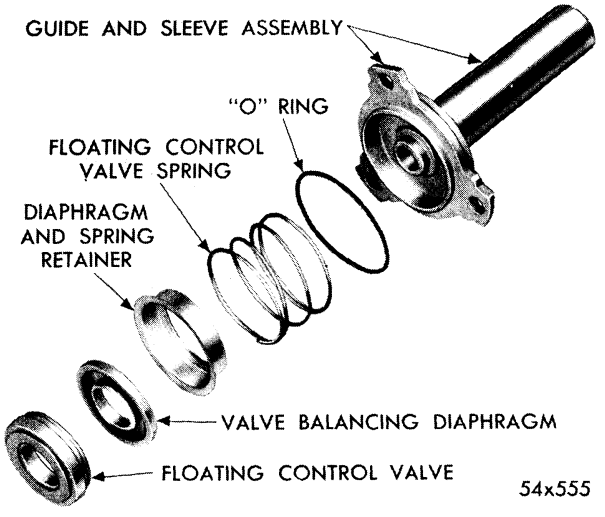

Fig. 78—Guide and Sleeve Assembly (Disassembled View)

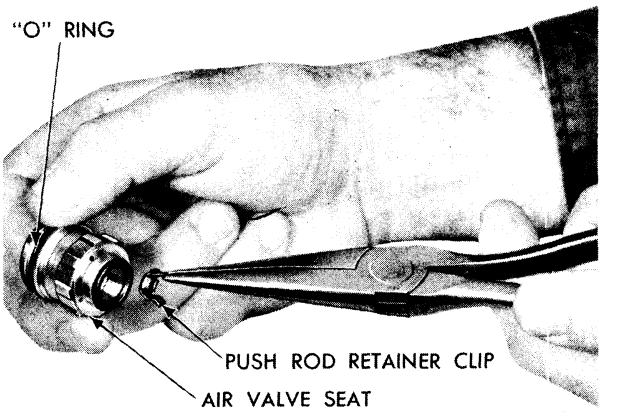

Fig. 79—Removing Push Rod Retainer Clip

(3) Refer to Figure 77 and lift guide assembly off power piston assembly. Remove and discard "O" ring seal from between these two assemblies.

(4) From guide assembly remove and discard floating control valve assembly and valve balancing diaphragm, but do not discard spring, or spring retainer. (See Fig. 78.)

(5) With power piston assembly still in holding fixture, lift out air valve seat assembly and discard.

NOTE

If air valve seat assembly is to be re-used, use suitable tool to remove push rod retainer clip, as shown in Figure 79.

(6) Lift out control spring and reaction spring.

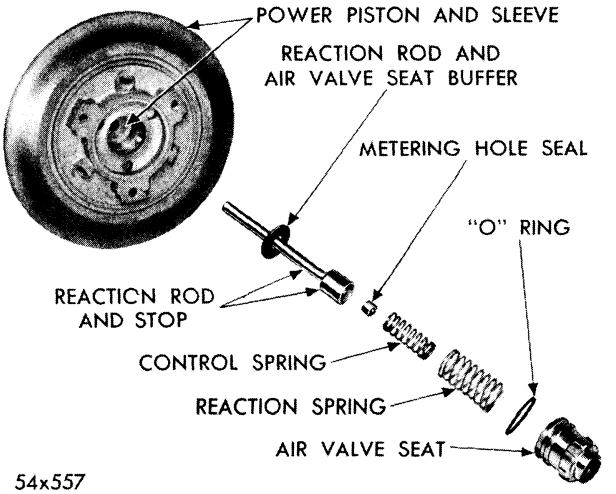

Fig. 80—Power Piston (Disassembled View)

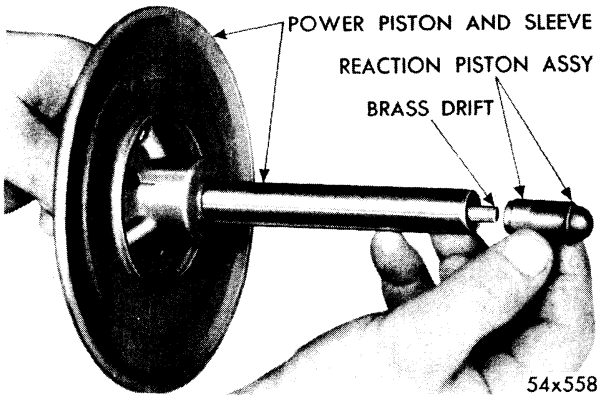

Fig. 81—Removing Reaction Piston Assembly

(7) Lift out reaction rod assembly. From reaction rod, remove and discard metering hole seal and buffer. (Refer to Fig. 80.)

(8) Remove power piston assembly from holding fixture. Insert a drift pin into center of power piston, as shown in Figure 81, and push out reaction piston insert and dome cup assembly.

(9) Use extreme care to avoid marring reaction piston or dome cup insert. Remove and discard reaction cup. Reaction piston and cup insert can be popped out of cup by pinching dome between thumb and forefinger.

37. DISASSEMBLY OF HYDRAULIC CYLINDER ASSEMBLY

(1) Place cylinder assembly in vise with flange end up. Do not clamp tightly. Using a suitable face spanner wrench, remove cylinder plug assembly; turn counter-clockwise.

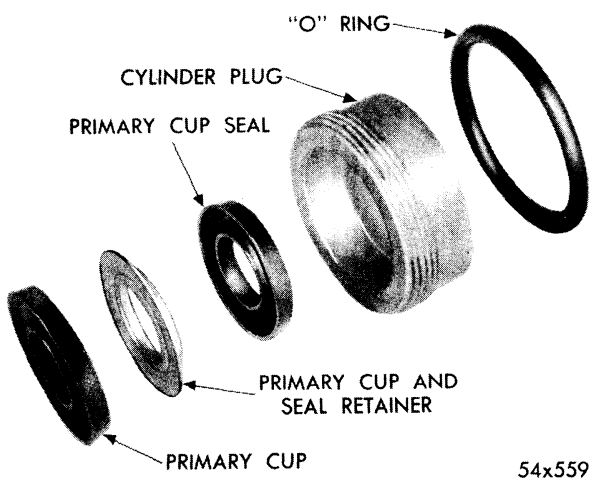

Fig. 82—Primary Cup Parts (Disassembled View)

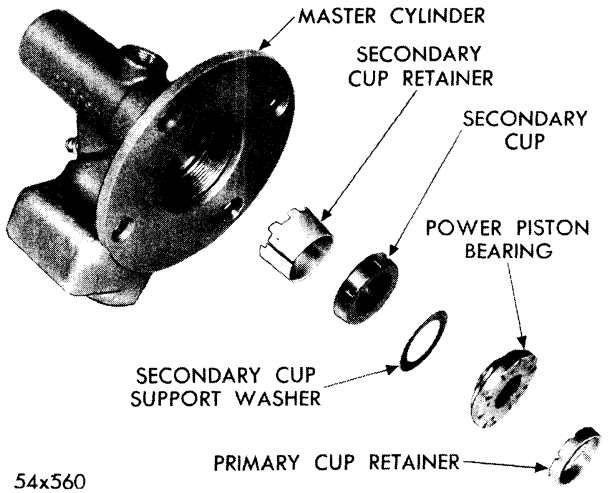

Fig. 83—Secondary Cup Parts (Disassembled View)

(2) Disassemble cylinder plug assembly (by hand) by removing primary cup, retainer and primary cup seal from cylinder plug. Primary cup is easily removed by gripping the inner cup lip between thumb and forefinger. Discard cup and seal; do not discard retainer. (Refer to Fig. 82.)

(3) From hydraulic cylinder, lift out primary cup retainer, power piston bearing, and secondary cup support washer. Remove secondary cup. Discard secondary cup only. Lift out secondary cup retainer. Refer to Figure 83.

(4) Clamp cylinder in vise across flat of cylinder flange. Use wrench to remove secondary

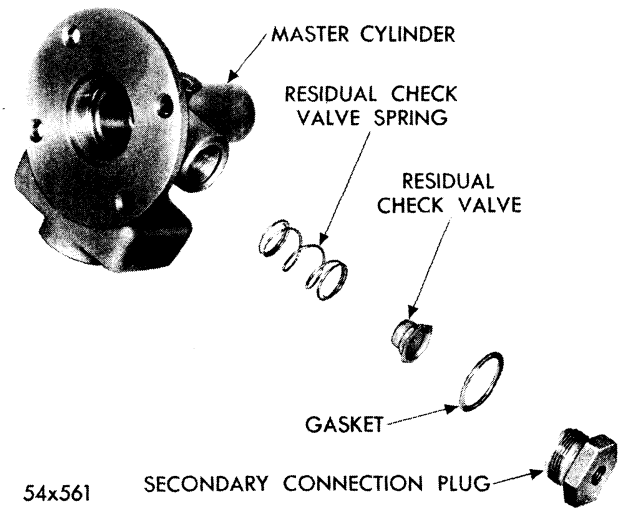

Fig. 84—Residual Check Valve (Disassembled View)

connection plug, and residual check valve seat. Lift out residual check valve assembly, and residual check valve spring. Discard residual check valve assembly and seat. (Refer to Fig. 84.)

NOTE

Residual check valve spring may make residual check valve and seat pop out as soon as secondary connection plug is removed.

(5) From secondary connection plug remove and discard gasket.

(6) Remove bleeder screw.

38. ASSEMBLY OF POWER BRAKE UNIT

CAUTION

Before any part of the Power Brake unit is assembled, all metal parts must be thoroughly cleaned (using diacetone alcohol or clean brake fluid) and wiped dry. Avoid allowing any grit or dirt to get into the unit during assembly. When assembling unit, be sure to discard all parts specified and replace with clean NEW parts.

a. Assembly of Hydraulic Cylinder Assembly

Refer to Figures 70 and 84 and proceed as follows:

(1) Position hydraulic cylinder in vise with secondary connection boss facing up. Insert residual check valve spring and NEW residual check valve assembly.

(2) Place NEW residual check valve seat on residual check valve and center carefully.

(3) Assemble secondary connection plug and NEW gasket to hydraulic cylinder. Tighten to 125 foot-pounds torque.

(4) Position hydraulic cylinder in vise with flange end up, and wet inside of cylinder with brake fluid. Insert secondary cup retainer (small end up) being sure that it rests evenly on shoulder in hydraulic cylinder bore. After wetting NEW secondary cup with brake fluid, insert into cylinder. **Cup lips must be down.** Be sure that cup lip is not turned back at any point as cup slides into cylinder. Place secondary cup support washer in position on secondary cup.

(5) Insert power piston bearing into cylinder on top of secondary cup support washer. Notched face of bearing must face up, and bearing must be centered in cylinder bore.

(6) Place primary cup retainer (notched edge down) in hydraulic cylinder, centering it on notched surface of power piston bearing. THIS IS VERY IMPORTANT. Be sure that retainer is centered as closely as possible by eye, so it will not be damaged when cylinder plug assembly is installed.

(7) Assemble cylinder plug assembly by inserting NEW seal, seal retainer (flat side out) and NEW primary cup, into plug. Both the seal and cup must enter the plug with lips facing out.

NOTE

Use finger to force outside lip of both seal and primary cup down and outward against bore of plug to insure sealing contact.

(8) Install cylinder plug assembly in hydraulic cylinder. Recheck alignment of primary cup retainer with finger after tightening plug assembly by hand. Using a suitable face spanner wrench, tighten to 25 foot-pounds torque.

b. Assembly of Guide Assembly

Refer to Figure 78 and proceed as follows:

(1) Inspect inner end surface of guide casting where it seats assembly. This must be smooth and clean.

(2) Position guide assembly in holding fixture with sleeve end down. Assemble new valve balancing diaphragm on NEW floating control valve—after wetting the O.D. of the diaphragm with hydraulic brake fluid. Press spring retainer over diaphragm floating valve assembly using thumb pressure only. Wet I.D. of diaphragm slightly with hydraulic brake fluid and place spring on retainer.

(3) Press complete assembly down on power piston guide stop. Install NEW power piston to guide "O" ring seal on power piston guide hub.

c. Assembly of Power Piston and Guide

(1) Assemble stainless steel reaction piston into bronze dome cup insert, as shown in Figure 85. Small diameter of bronze insert must be toward spherical end of reaction piston.

(2) Assemble NEW pre-greased dome reaction cup (pre-greased as supplied in kit) over spherical end of reaction piston and insert assembly. Force cup back firmly to assure snug fit of cup bead in groove of insert.

CAUTION

Do not use any grease on dome reaction cup other than what is already on it.

(3) Place power piston and sleeve assembly on bench, sleeve end up, and after lubricating O.D. of dome reaction cup with brake fluid, press reaction piston end dome cup assembly into power piston sleeve (dome out). Use care to avoid damaging cup. Press down into sleeve firmly until it bottoms. Check to be sure that O.D. of reaction cup is not obstructing compensating ports, and that all of these port holes are open and clean.

(4) Assemble NEW buffer and NEW metering hole seal to reaction rod and stop assembly.

(5) Invert power piston and sleeve assembly and place in holding fixture, as shown in Figure 86 (sleeve end down). Drop complete reaction rod assembly into center of power piston.

(6) Place reaction spring in center of reaction stop cavity, and control spring around outside of reaction stop, in power piston cavity.

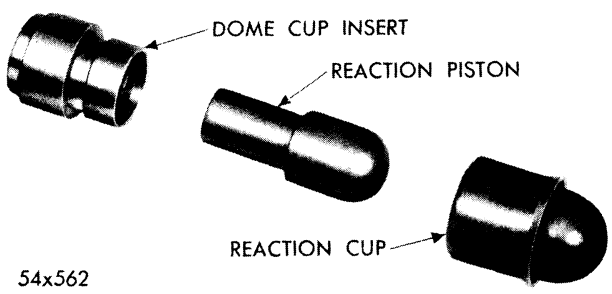

Fig. 85—Reaction Piston Insert and Dome Cup

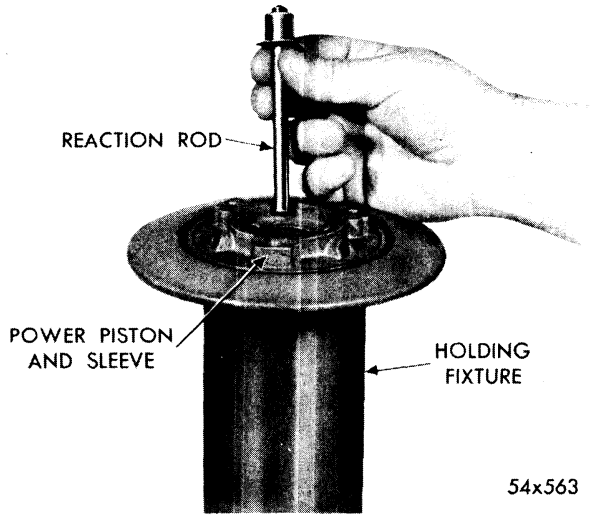

Fig. 86—Installing Reaction Rod

(7) Install NEW air valve seat "O" ring seal (pre-greased as received in kit) in groove on outside diameter of NEW air valve seat assembly. Use care to prevent silicone grease on seal.

(8) Install complete air valve seat assembly in center of power piston cavity, over control spring reaction spring and reaction rod stop. Use a twisting motion as seal enters bore of power piston. (Refer to Fig. 80.) Use thumb pressure to test air valve seat against springs for freedom of movement.

CAUTION

Air valve seat is steel while power piston cavity is an aluminum casting. Use extreme care to avoid any damage, especially on aluminum vacuum valve seat.

(9) Position diaphragm retainer over guide and sleeve assembly, with three of the six holes in the retainer lined up with the three holes in the guide. (Refer to Fig. 77.)

(10) Position diaphragm on flange of power piston and sleeve assembly with flange of diaphragm down. Be sure that inside diameter of diaphragm is nested snugly all around in groove of power piston flange.

(11) With power piston diaphragm retainer and guide assembly held directly above power piston assembly, insert push rod WITHOUT RETAINING CLIP through

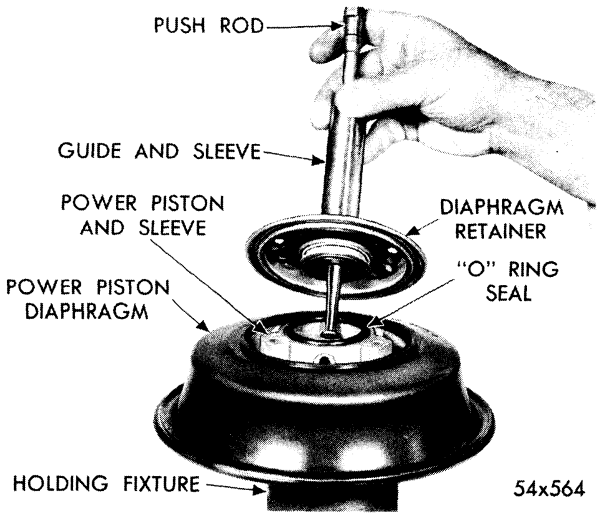

Fig. 87—Installing Guide and Sleeve to Power Piston

center bore of guide and into push rod cavity in center of air valve seat assembly. Holding air valve seat down against control and reaction springs, position guide assembly so that the three holes in the guide line up with the three tapped holes in the power piston, as shown in Figure 87. Be sure that the "O" ring seal is properly positioned between guide and power piston.

(12) Install the three lockwashers and hex bolts through holes in diaphragm retainer and into tapped holes in power piston. Tighten all three bolts evenly to 100 inch-pounds torque. Using push rod, check for freedom of movement of air valve seat against control and reaction springs.

(13) Place NEW rubber guide return bumper over guide sleeve.

NOTE

The replacement kit contains two guide return bumpers, each of a different thickness. It is important to install the bumper which is the same thickness as the one which was taken out of the unit at disassembly.

d. Assembly of Body Assembly (Valve Side)

(1) With body assembly (valve side) resting on bench (hub end up) insert NEW guide seal into hub. Be sure that lips of seal are facing up, away from bearing, and that seal is installed between bearing and wick retainer which is inside hub.

NOTE

Seal will slip easily into place if held between thumb and forefinger, in an elliptical shape, and inserted through hub of body. This seal is supplied pre-greased in cellophane envelope in the replacement kit.

(2) Insert NEW wick into hub in same manner as seal was inserted, using care to preserve grease on wick. This wick is supplied pre-greased in cellophane envelope in the replacement kit. After wick is installed, be sure that wick retainer is positioned snugly against wick and away from cup lips.

(3) Apply any grease remaining in seal and wick envelopes to inside of hub, to provide maximum lubrication for seal, wick and guide bearing.

(4) Check inspection screw and gasket to be sure they are tight.

e. Assembly of Body Assembly (Cylinder Side)

(1) Refer to Figure 75 and position vacuum check valve body in vise and insert NEW floating valve assembly. Be sure that bonded rubber seal is facing down, against seat. Assemble spring. Tighten with wrench.

NOTE

If rubber plug type valve is used, assemble, as shown in Figure 75.

(2) With body assembly (cylinder side) on bench, flange down, place NEW washer in position around hollow check valve bolt, then assemble vacuum check valve assembly to body.

39. FINAL ASSEMBLY OF COMPLETE POWER BRAKE UNIT

(1) Place NEW cylinder-to-body seal in groove around cylinder plug assembly. Be careful to avoid twisting seal.

(2) With body assembly (cylinder side) on bench, flange down, assemble hydraulic cylinder assembly to body. (See Fig. 74.) Position cylinder on body in such a way that, when viewing assembly from cylinder end, vacuum check valve is to the left of

the hydraulic cylinder. Assemble hex nuts and lockwashers to studs, finger tight only.

(3) Position cylinder assembly, with body assembly (cylinder side) in vise with cylinder end down and body assembly flange facing up. Place return spring in body assembly, centering it around cylinder plug assembly and inside the four cylinder flange bolt heads in housing.

(4) Assemble power piston and guide assembly to body assembly, (valve side) by inserting guide sleeve through hub of body assembly. Be careful to avoid damaging felt wick in hub.

(5) Hold assembled power piston and guide assembly and body assembly (valve side) by guide sleeve, which now protrudes out of hub of body. Wipe power piston sleeve with brake fluid and carefully position power piston on return spring so that spring nests around shoulder of power piston.

(6) Press power piston and guide assembly down into unit against return spring, being careful to avoid misalignment as power piston sleeve enters bore of cylinder plug assembly.

(7) Holding power piston and guide assembly down against return spring, place edge of diaphragm in groove of flange of body assembly (cylinder side).

(8) Still holding power piston and guide assembly down, position flange of body assembly (valve side) over edge of diaphragm and flange of body assembly (cylinder side) and press firmly into position.

CAUTION

The two sides of the body assembly must be so assembled that the notches on one side mate with the keys on the other, and the cutaway portions of the flanges match.

(9) With two sides of the body assembly properly mated, place two half ring clamps over body flanges. Be sure that the flat portions of the rings match the cutaway portions of the body flanges. Fasten half ring clamps with two clamp ring screws, lockwashers and hex nuts. Tap ring clamps snugly into place with a rubber mallet and tighten securely. "Do not Lubricate" tab should be attached on either side of unit, under one of these two nuts.

(10) Press power piston and guide assembly down as far as possible against return spring three or four times to be sure that power piston sleeve and hydraulic cylinder are properly centered.

(11) Remove unit from vise, invert and while holding unit down, push power piston and guide assembly into fully applied position. Tighten the four cylinder flange nuts to 200 inch-pounds torque. After all flange nuts are tight the power piston and guide assembly must return freely to off position as soon as pressure is released. If power piston does not return freely, loosen cylinder flange nuts and realign cylinder to housing. Tighten nuts and test again for free return.

(12) Return unit to vise and clean or replace air cleaner core. Center it around hub of body assembly. Place one spacer around each of four mounting bolts. (Refer to Fig. 72.)

(13) Assemble air cleaner cover assembly to unit over air cleaner core and spacers. Position cover so that air inlets will face down when unit is mounted in position on vehicle.

(14) Assemble reinforcement plate to unit over air cleaner cover assembly, positioning plate so that its longest dimension will be below unit when mounted in position on vehicle. Install lockwashers and nuts on two top booster studs and tighten to 200 inch-pounds torque.

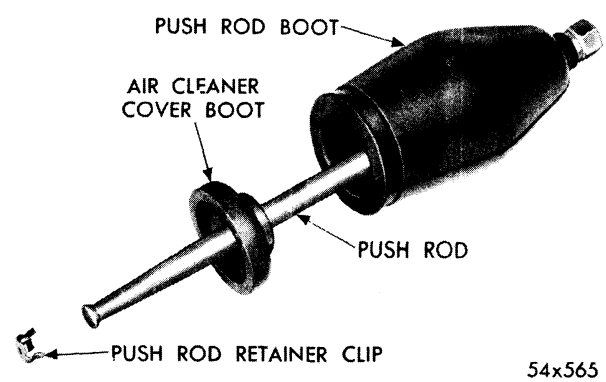

Fig. 88—Push Rod (Disassembled View)

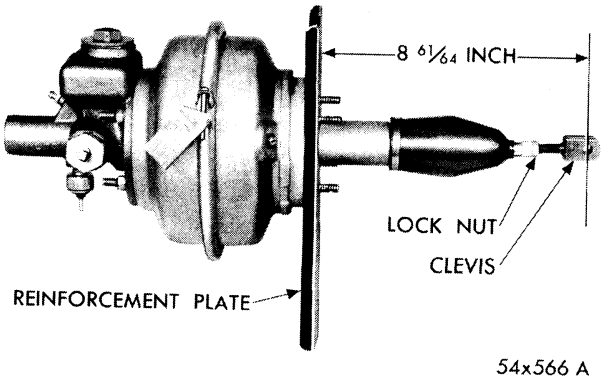

Fig. 89—Push Rod Adjustment (Unit Removed from Vehicle)

(15) Be sure guide sleeve and air cleaner cover sleeve are concentric. If necessary, tap cover sleeve lightly with rubber mallet to align.

(16) Insert push rod into push rod boot then into air cleaner cover boot and insert assembly. Snap NEW push rod retainer clip into position on small end of push rod. Be sure that small end of boot is nested snugly in groove on outer end of push rod. (Refer to Fig. 88.)

(17) Holding boots back toward outer end of push rod, press push rod with retainer clip straight down through center of guide sleeve and into air valve seat cavity. Exert approximately 40 pounds of pressure until end of push rod snaps into place. When properly installed, push rod is held securely in place so that it can be used to lift the weight of the unit.

(18) Fit boots on flange of sleeve of air cleaner cover assembly fitting first the cover boot assembly, then the push rod boot. Be sure that they fit snugly. Install NEW boot retainer strap.

(19) Install bleeder screw and reservoir filler cap and gasket. Also, install stop light switch if it has been removed. Be sure all are in position and secure before installing unit on vehicle.

40. INSTALLING UNIT ON VEHICLE (See Figs. 89 and 90)

(1) Install clevis on push rod and adjust so that the distance between reinforcing plate and centerline of hole in clevis is $8\frac{61}{64}$ inches.

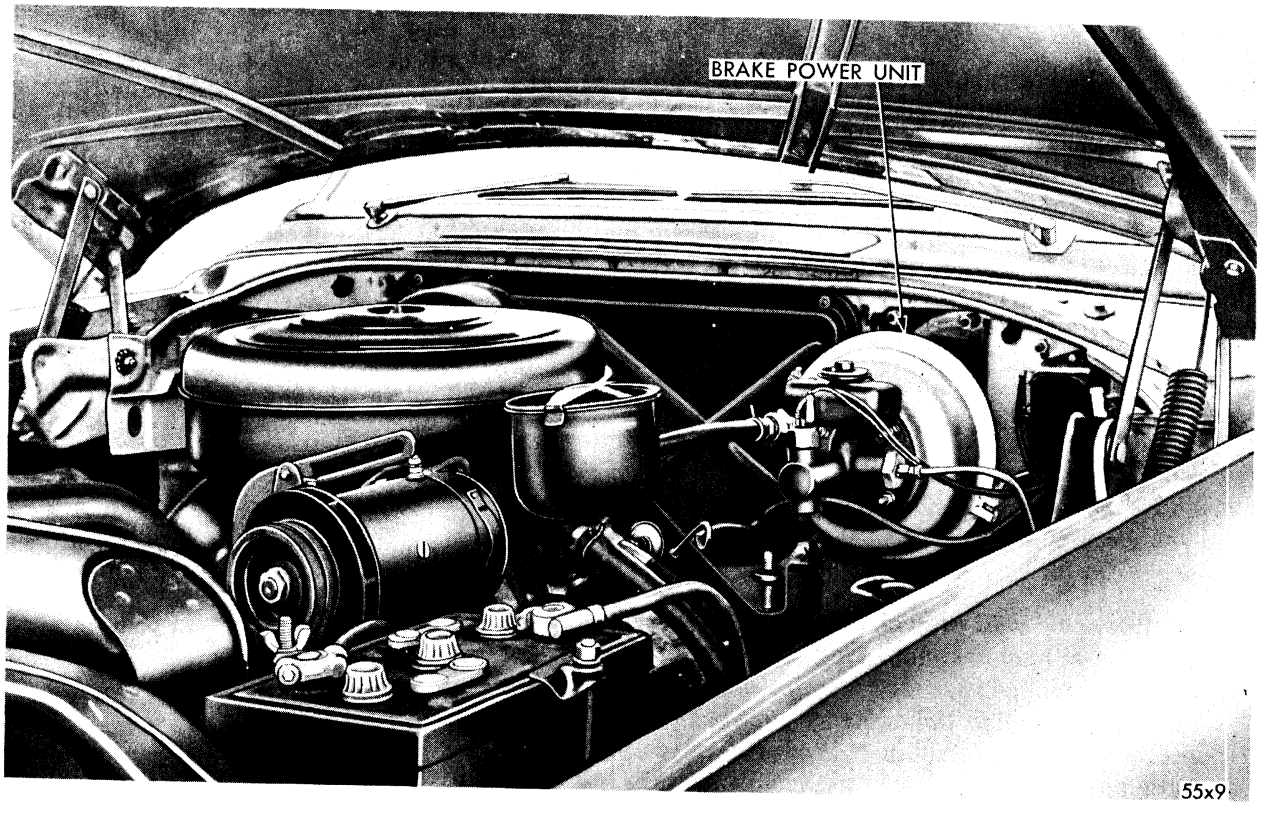

Fig. 90—Brake Power Unit Installed

(2) Tighten the locknut on the clevis.

(3) Install unit on vehicle and connect clevis to pedal arm. Connect wheel cylinder line to wheel cylinder outlet on side of cylinder. Connect the vacuum source to the vacuum inlet tube of the vacuum check valve mounted on the unit housing.

41. BLEEDING THE SYSTEM AFTER INSTALLATION

(1) Attach a pressure bleeder to the fluid reservoir of the unit.

(2) Open bleeder screw and bleed at both output and bleeder opening until unit is free of air.

(3) Close bleeder screw.

(4) Connect (loosely) hydraulic line to hydraulic outlet in secondary connection plug.

(5) Apply pressure to reservoir with tank again until no air bubbles form around hydraulic outlet connection. Tighten connection.

(6) Disconnect bleeder tank.

(7) Pump brake pedal several times.

(8) With pressure applied by pedal, crack open bleeder screw to eliminate all air.

(9) If pedal is still not firm, bleed wheel brakes.

CAUTION

After bleeding is complete, fill the reservoir to no higher than 1/8 inch below the filler cap neck.

CAUTION

The brake system itself is serviced in the conventional manner. Therefore, before servicing the unit, test the operation of the complete brake system. Examine all connections to be sure they are tight. Fluid loss may occur at any point in the system; wheel cylinder cups or line connections from unit to wheel cylinders.

42. PEDAL ADJUSTMENT

No adjustment of power unit for "free play" or return stop is required. The power brake unit has a built-in pedal return spring and a pedal return stop, and therefore, requires no "free play" adjustment. The pedal height and travel are determined by the combined length of the push rod and push rod clevis, which is adjustable.

If adjustment is made while unit is installed on car—slide a scale next to boot (inside of pedal bracket up to and against dash panel) and measure distance back to centerline of clevis pin. This distance should be $8\frac{57}{64}$ inches.

If adjustment is made on rod before unit is installed on car, measure from reinforcing plate mounted on unit to centerline of clevis pin hole. This dimension should be $8\frac{61}{64}$ inches, as indicated in Figure 89.

This pedal adjustment determines the pedal height in the car with the unit in the unapplied position.

SERVICE DIAGNOSIS STANDARD BRAKES

43. HARD PEDAL

Possible Causes:

a. Improper lining.

b. Piston cups swollen due to fluid contamination.

c. Improper shoe adjustment.

Remedies:

a. Replace lining with new MOPAR Brake Lining.

b. Remove master cylinder. Replace cups, clean cylinder and change fluid.

c. Adjust brakes.

44. PUMPING OF PEDAL NECESSARY

Possible Causes:

a. Worn linings.

b. Improper brake adjustment.

c. Worn wheel cylinders or cups.

d. Hydraulic fluid supply low.

Remedies:

a. Replace worn linings with new MOPAR Brake Lining.

b. Adjust brakes.

c. Recondition worn wheel cylinders as required.

d. Replenish fluid supply.

45. BINDING BRAKE PEDAL

Possible Causes:

a. The overall width of the brake pedal hub plus the nylon bushing flanges exceeds the length of the pedal pivot spacer, pinching the hub and bushings.

b. Binding of nylon bushings.

Remedies:

a. Remove small amount of metal from pedal hub until pedal pivots freely.

b. Replace bushings if damaged.

46. POOR BRAKES

Possible Causes:

a. Water soaked lining.

b. Improper linings (not factory approved).

c. Glazed linings.

d. Improper shoe adjustment.

e. Improper pedal adjustment.

Remedies:

a. Dry brake lining by applying brakes while driving.

b. Replace improper lining with new MOPAR Brake Lining.

c. Glazed linings are usually an indication of hard lining. Replace with new MOPAR Brake Lining; adjust brakes.

d. Adjust brakes. Heel and toe clearances should be .006 inch (all shoes).

e. Adjust pedal free play.

47. GRABBING BRAKES

Possible Causes:

a. Grease, oil or brake fluid soaked linings.

b. Charred linings.

c. Scored or cracked drums.

d. Improper lining.

e. Improper shoe adjustment.

f. Hard spots on drums.

Remedies:

a. Linings that become oil or grease soaked must be replaced. Use new MOPAR Brake Lining. Check for oil or grease leaks and replace seals as necessary.

b. Replace charred linings with new MOPAR Brake Lining.

c. Replace cracked drums. Reface scored drums, being careful not to cut over .030 inch of stock. If drums will not clean up at .030 inch, replace as required.

d. Replace improper linings with new MOPAR Brake Lining.

e. Readjust brakes. Heel and toe clearances should be .006 inch (all shoes).

f. Replace defective drums.

48. SIDE PULL

Possible Causes:

a. Grease or oil soaked linings.

b. Improper shoe adjustment.

c. Loose anchor pins.

d. Clogged or crimped wheel line.

e. Excessive wear in drum.

f. Different makes of lining.

g. Tires not properly inflated.

h. Charred linings.

i. Scored drums.

j. Water and mud in brakes.

k. Weak chassis springs.

Remedies:

a. Linings that become oil or grease soaked must be replaced. Use new MOPAR Brake Lining. Check for oil or grease leaks and replace seals as necessary.

b. Readjust brakes. Heel and toe clearances should be .006 inch (all shoes).

c. Tighten anchor bolts (pins) and check for heel clearance of .006 inch. Inspect lining for possible excessive wear or damage. Readjust brakes.

d. Replace crimped wheel line. If line is clogged, clear with air pressure. Bleed lines.

e. Reface scored drum being careful not to cut over .030 inch of stock. If the drum will not clean up at .030 inch, replace drum. Check lining and replace if necessary.

f. Replace lining with new MOPAR Brake Lining.

g. Refer to Wheels and Tires for recommended tire inflation pressures.

h. Replace charred lining with new MOPAR Brake Lining.

i. Reface scored drum, being careful not to cut over .030 inch of stock from drum. If the drum will not clean up at .030 inch, replace drum. Check lining and replace if necessary.

j. Remove drums and clean brake assemblies. Check for possible scoring and replace parts as required. Lubricate all moving parts with MOPAR Lubriplate.

k. Check height of front and rear springs, as outlined in Frame, Springs and Shock Absorbers Section.

49. SQUEALING BRAKES

Possible Causes:

a. Incorrect lining.

b. Distorted brake drum.

c. Bent brake support plate.

d. Sprung or bent brake shoes.

e. Foreign material embedded in lining.

f. Dirt in brake drum.

g. Loose anchor bolts.

h. Brake shoe cocked by cam post.

Remedies:

a. Replace lining with new MOPAR Brake Lining.

b. Replace distorted brake drum.

c. Replace bent support plate.

d. Check shoes for alignment. If shoes cannot be corrected as indicated replace shoes.

e. Remove foreign material embedded in lining. If lining or drum shows signs of heavy scoring, replace lining and reface drum.

f. Remove drum and clean thoroughly. Check drum and lining for possible scoring; if necessary, recondition drum and replace lining.

g. Tighten anchor bolts (pins) and check for heel clearance of .006 inch. Inspect lining for possible excessive wear or damage. Readjust brakes.

h. Remove drums, and insert rubber insulating washer around cam post between shoe web and adjusting cam, as shown in Figure 91. If necessary, groove the lining as described in Paragraph 50.

50. BRAKE SQUEAKS

NOTE

When brake squeak is encountered, it has been found in most complaints that only the front wheels squeak so, first correct the condition at both front wheels.

a. Cam-Pin Insulator Installation

Occasional brake squeaks will be encounted even after specified standard brake shoe adjustments have been made. In such case, the following instructions for the installation of the cam pin insulator should be followed:

(1) Remove the brake drums. Release and remove the brake shoe return springs. (This will allow the shoes to be rotated far enough apart to partially expose the cam pin.)

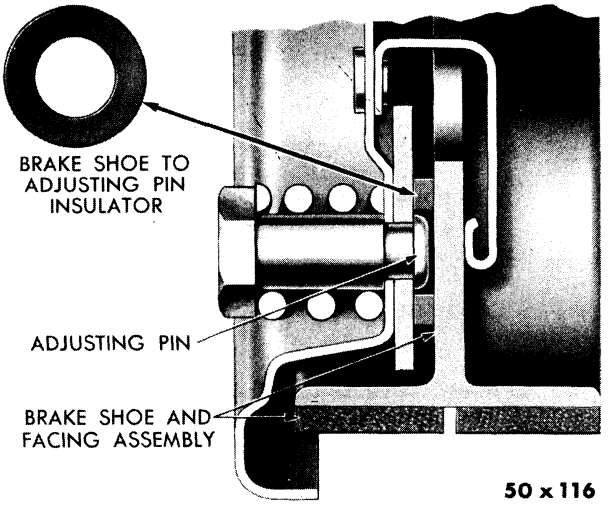

Fig. 91—Insulating Washer Installed

(2) Hold the shoe guide spring back and insent the insulating washer around the campin between the web of the shoe and the cam, as shown in Figure 91.

(3) Rotate the shoe back into position, allowing the insulating washer to support the web so that there is no contact between the campin and the web of the shoe.

If contact is apparent, file the campin until a satisfactory clearance is obtained.

If brake squeak persists after these adjustments have been made, height gauge readings should be taken, using the insulating washer instead of the campin as the indicating surface. Readings should run from 0 to minus .020 inch. (The support plate can be bent to conform to these dimensions.)

If the preceding instructions have been accomplished, and a squeak still exists, remove the drums and groove the lining as outlined herein:

b. Grooving Lining

(1) Remove tire, wheel and brake drum assemblies.

(2) Remove brake shoes and place each in a vise, scribing a line and grooving, as shown in Figure 92.

(3) Cut the groove in the brake lining, using two fine hack saw blades (in one holder) cutting lining through to the face of the brake shoe.

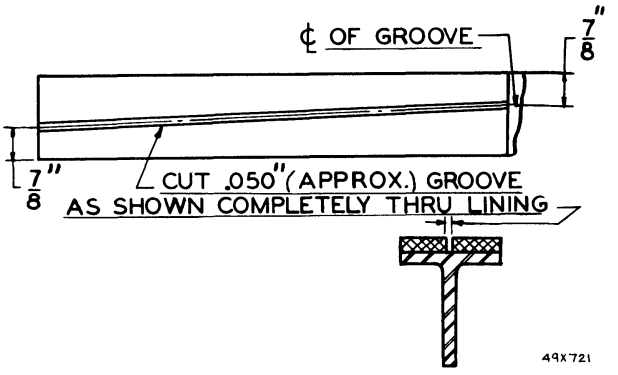

Fig. 92—Grooved Brake Lining

CAUTION

The lining grooving operation should not be attempted on any linings which are riveted or on any of the edge bonded, wire backed, cycle-bonded linings.

If the squeak (front or rear brakes), is still evident after grooving the lining, the following procedure is suggested:

(1) Remove brake shoe and clamp shoe in vise.

(2) With a hack saw, slot the web of the shoe to a depth of 1⅜ inches, as close to the table of the shoe as possible, as shown in Figure 93.

NOTE

If the front brake shoes have four ⅝-inch holes drilled through the table, the slotting procedure should be omitted.

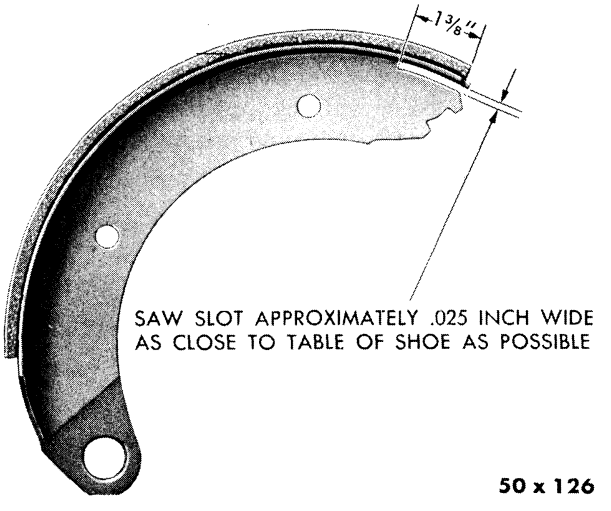

Fig. 93—Slot in Web of Shoe

51. OVERHEATING BRAKES

Possible Causes:

a. Dragging brakes.

b. High spots on drums.

c. Improper adjustment.

d. Defective master cylinder.

e. Dirt and grime on drums.

f. Incorrect push rod clearance.

Remedies:

a. Adjust brakes, See Paragraph 53 for additional possible causes.

b. Check diameter of drum. If refacing of drum does not correct this condition, replace drum.

c. Adjust brakes.

d. Check master cylinder for dirt, rust or corrosion back of piston, which may prevent piston from making a full return. Check also for swollen primary cup. If necessary, recondition master cylinder.

e. Clean brake drums and lining. Check for possible scoring.

f. Adjust pedal push rod clearance.

52. FADING BRAKES

Possible Causes:

a. Improper lining.

b. Poor lining contact.

Remedies:

a. Replace lining with new MOPAR Brake Lining.

b. Adjust brakes. Heel and toe clearances should be .006 inch (all shoes).

53. DRAGGING BRAKES

Possible Causes:

a. Improper brake adjustment.

b. Distorted cylinder cups.

c. Brake shoe seized on anchor bolt.

d. Weak brake shoe return spring.

e. Anchor bolts loose or improperly installed.

f. Sprung brake shoes.

g. Loose wheel bearing.

h. Obstruction in brake line.

i. Warped brake drum.

Remedies:

a. Adjust brakes.

b. Replace rubber cylinder cups, drain and flush system. Refill system with MOPAR Super Brake Fluid. Bleed lines.

c. Free up brake shoe and lubricate anchor bolt with MOPAR Lubriplate.

d. Brake shoe return spring tension should be 40 to 50 foot-pounds extended to 5⅞ inches on front and 50 to 60 foot-pounds extended 5 11/16 inches on rear. Springs that have lost their tension should be replaced.

e. Tighten loose anchor bolts and check position of arrows.

f. Check shoes for alignment.

g. Readjust front wheel bearings by turning bearing adjusting nut up tight. Turn nut back two slots to the nearest cotter pin slot and install pin. Adjust rear wheel bearings.

h. Disconnect brake lines and clear with air pressure. Refill system with MOPAR Super Brake Fluid. Bleed lines.

i. Replace warped drum. Check lining for excessive wear, and replace as required.

54. WHEEL LOCKS

Possible Causes:

a. Oily fluid on linings.

b. Torn brake lining.

c. Loose lining.

d. Loose or improperly installed anchor bolts.

Remedies:

a. Replace lining with new MOPAR Brake Lining. Clean drum thoroughly. Check for possible grease or brake fluid leaks. Replace parts as necessary to correct this condition.

b. Replace torn lining with new MOPAR

Brake Lining. Check shoes for possible distortion.

c. Replace loose lining.

d. Tighten loose anchor bolts, being careful to keep .006 inch clearance at heel, between the lining and drum.

55. ALL BRAKES DRAG

Possible Causes:

a. Improper adjustment.

b. Improperly adjusted push rod.

c. Swollen cylinder cups.

d. By-pass port hole in master cylinder.

e. No free pedal travel.

f. Lining too thick.

g. Weak brake shoe return springs.

h. Mineral oil in brake system.

Remedies:

a. Adjust brakes.

b. Adjust brake pedal free play.

c. Replace cylinder cups, drain and flush brake system. Refill with MOPAR Super Brake Fluid. Bleed lines.

d. Remove master cylinder, clean or recondition as necessary.

e. Adjust push rod setting to approximately $\frac{1}{8}$ to $\frac{1}{4}$ inch, until free pedal travel is obtained.

f. Check lining thickness. Lining should be no more than $\frac{3}{16}$ inch thick.

g. Check brake shoe return spring tension.

h. Mineral base oil, such as Engine Oil and kerosene, when present in the brake system, will cause the cylinder cups to swell and bind, making it necessary to replace all rubber parts. Brake system should be flushed with alcohol, and refilled with MOPAR Super Brake Fluid.

56. NO PEDAL RESERVE

Possible Causes:

a. Normal wear on linings (on shoe type brakes).

b. Leaks in brake system.

Remedies:

a. As brake linings wear, it becomes necessary to set shoe type brake closer to the brake drums. Adjust brakes.

b. A leak in tube connections will allow the pedal, under pressure, to go gradually to the toeboard. A master cylinder cup leak does not necessarily result in loss of pedal travel, but is indicated by a loss of fluid in supply tank. If no leaks are found, either at wheels or connections, master cylinder should be removed and bore checked for scratches and scores.

POWER UNIT SERVICE DIAGNOSIS

57. BRAKE SYSTEM LOSES FLUID

Possible Causes:

a. Loose or broken connections in brake hydraulic system or loose stop light switch, located at front of hydraulic cylinder.

b. Worn or damaged primary cup, primary cup seal, "O" ring cylinder to body, or "dome" reaction cup.

Remedies:

a. Replace or tighten all faulty connections.

b. Replace damaged cups and seals using replacement kit.

NOTE

If heavy abrasive action has taken place, due to severe contamination of the brake fluid, install

a new power piston and sleeve assembly after thoroughly flushing reservoir and wheel cylinder lines.

58. BRAKES DO NOT RELEASE PROPERLY

Possible Causes:

a. Failure of brake pedal to return properly.

b. Plugged compensating holes near end of sleeve of power piston assembly.

c. Broken, damaged, or weakened power piston return spring, control spring, or reaction spring.

d. Excessively dry air valve "O" ring.

e. Brakes improperly adjusted.

f. Inspection screw and gasket loose or missing.

g. Cylinder misalignment on unit after installation of repair kit.

h. The sleeve section of the air cleaner cover assembly is not concentric with power piston guide sleeve, causing excessive friction between nylon insert in cover boot with push rod.

i. Blocked compensation holes, after the installation of repair kit—caused by the "thick" power piston guide return bumper being installed when a "thin" bumper should have been used.

Remedies:

a. See Paragraphs 40 and 42.

b. Open unit and clean thoroughly, also flush lines.

c. Replace springs.

d. Install new air valve "O" ring lubricated with special silicone grease using replacement kit.

e. Adjust brakes.

f. Replace inspection screw and gasket.

g. Remove unit from car, loosen cylinder nuts, center the cylinder and tighten nuts as power unit is pushed in and out of cylinder. See installation procedure in this section.

h. Remove power unit with reinforcement plate, remove boot retaining strap, and slide boots back on push rod—rap lightly with rubber mallet the end of the boot retaining sleeve of the air cleaner cover assembly until retainer sleeve is concentric with power piston guide sleeve. Re-assemble boots in groove of air cleaner boot retainer sleeve.

i. Replace the thick bumper with the proper thin bumper, following the service instructions.

NOTE

Constant "riding" of the brake pedal by the operator, will also cause excessive generation of heat at the brake drums, resulting in excessive brake pedal travel and undue wear of the linings.

59. POWER UNIT DOES NOT BOOST

Test to determine if unit is operating. With the engine stopped, depress brake pedal several times to eliminate all vacuum from the system. Apply the brakes, and while holding foot pressure on the brake pedal, start the engine. If the unit is operating the brake pedal will move forward when engine vacuum power is added to the pedal pressure.

60. POWER UNIT DOES NOT OPERATE AFTER PERFORMING TEST (Par. 59)

Possible Causes:

a. Bent, broken or obstructed vacuum source line from engine manifold to check valve or a faulty check valve.

b. Blocked air passage in power piston guide sleeve assembly or in air cleaner element.

Remedies:

a. Replace line, hose or check valve as necessary.

b. Clean air passage in power piston guide after disassembly, and replace air cleaner core. Open unit and clean out foreign material, replacing all parts supplied in repair kit.

NOTE

When installing new boots or making push rod adjustment, be certain that large ends of boots are both properly installed in groove on air cleaner cover sleeve and that boot retaining strap is in place.

61. LOSS OF PEDAL

Possible Causes:

a. Foreign material lodged between the reaction piston and the reaction piston insert, under the reaction piston dome cup, resulting in excessive friction between the ports. Grease, fluid, or moisture on brake linings. Brakes improperly adjusted.

Remedy:

a. Open unit and clean out foreign material, replacing all parts supplied in repair kit.

62. SPONGY PEDAL

Possible Cause:

a. Air in brake lines or in hydraulic cylinder of power unit.

Remedy:

a. Bleed system thoroughly.

63. PEDAL TRAVEL TOO GREAT

Possible Causes:

a. Improperly adjusted brakes.

b. Air in brake system.

Remedies:

a. Adjust brakes.

b. Bleed system thoroughly.

64. PEDAL CHATTER

Possible Causes:

a. Air in brake lines or in hydraulic cylinder of power unit.

Remedy:

a. Bleed system thoroughly.