

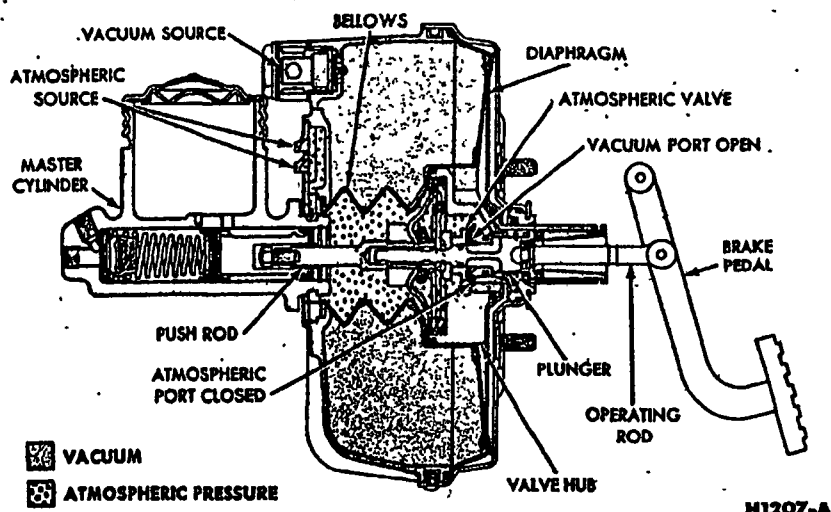


FIG. 4—Booster in Released Position

the control valve plunger forward. However, the unbalanced forces of atmospheric pressure and vacuum on each side of the diaphragm will continue to move the outer sleeve of the control valve plunger forward keeping the vacuum porting closed. At the same time, the reaction force acting through the reaction ring and lever assembly will tend to move the atmospheric valve to the closed position (Fig. 3). When these combined forces balance, the porting to the vacuum supply will remain closed and the atmospheric valve will cut off any further passage of atmospheric pressure to the area behind the diaphragm. Therefore, the power assist force acting on the

master cylinder piston will stabilize and the hydraulic force applying the brakes will be maintained at a constant level.

RELEASED POSITION

When the pedal pressure is released from the valve operating rod and plunger assembly, the plunger return spring moves the plunger away from the atmospheric valve allowing the valve to seat against the hub (Fig. 4). This seating of the valve closes off the bellows chamber from the hub porting that connects to the rear side of the diaphragm. At the same time, the rearward movement of the plunger opens the porting from the vacuum chamber

and draws out the air from the rear side of the power diaphragm. With vacuum on both sides of the diaphragm, the assist force against the master cylinder push rod is eliminated. The brake shoe retracting springs will, therefore, cause the hydraulic fluid to return the master cylinder piston, push rod, control valve plunger assembly and the diaphragm to the released position.

With the piston and push rod in the released position, the hydraulic compensating port in the master cylinder is open. The open port permits fluid either to return from the brake system to the fluid reservoir, or enter the brake system from the reservoir.

PARKING BRAKE

An independent foot-operated parking brake control actuates the rear wheel brake shoes through a cable linkage. The operating cable is routed from the parking brake control assembly to the equalizer lever which is attached to the equalizer assembly. The rear brake cables connect the equalizer assembly to the parking brake lever at each rear secondary shoe (Fig. 1).

When the pedal is depressed the secondary brake shoes are forced against the rear brake drums. The pedal is held in the applied position by the engagement of a spring loaded pawl with a ratchet. Pushing down on the release handle disengages the pawl from the ratchet to release the brakes.

2 IN-CAR ADJUSTMENTS AND REPAIRS

BRAKE SHOE ADJUSTMENTS

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

The hydraulic service brakes are self-adjusting and require a manual adjustment only after the brake shoes have been relined, replaced, or when the length of the adjusting screw has been changed while performing some other service operation.

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

drag when the drums are cool and contracted.

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

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

2. Remove the adjusting hole cover from the carrier plate and, from the carrier plate side, turn the adjusting screw upward to expand the shoes (Fig. 5). Expand the shoes until a drag is felt when the drum is rotated.

3. Remove the drum. Mark the tooth on the star wheel where the lever contacts the adjusting screw. While holding the adjusting lever

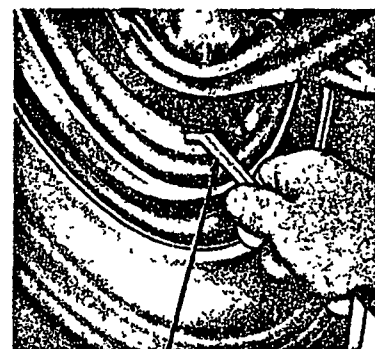


FIG. 5—Expanding Brake Shoes

out of engagement with the adjusting screw, back off the adjusting screw $\frac{3}{4}$ of a turn with the fingers. If finger movement will not turn the screw, free it up; otherwise, the self-adjusting lever will not turn the screw. Lubricate the screw with a thin uniform coating of Stanolube—HD Moly Grease—Grade 2.

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

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

On a front wheel, install the wheel outer bearing, washer, and adjusting nut, then adjust the wheel bearings as outlined in Part 3-5, Section 2.

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

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

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

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

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

FRONT BRAKE DRUM REMOVAL

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

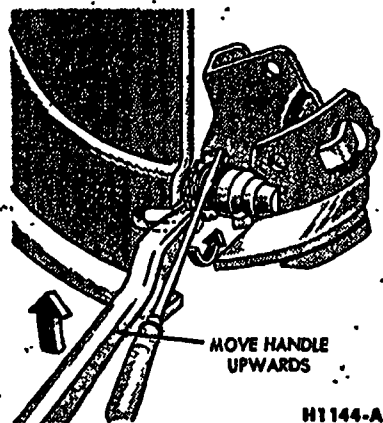


FIG. 6—Backing Off Brake Adjustment

2. Insert a narrow screwdriver through the brake adjusting hole at the inner side of the brake carrier plate, and disengage the adjusting lever from the adjusting screw. While holding the adjusting lever away from the screw, back off the adjusting screw with the brake adjusting tool (Fig. 6). Be very careful not to burr, chip, or damage the notches in the adjusting screw; otherwise the self-adjusting mechanism will not function properly.

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

4. Pull the hub and drum assembly of the wheel spindle.

INSTALLATION

1. If the drum is being replaced, remove the protective coating from the new drum with carburetor degreaser. Install new bearings and grease retainer. Soak the new grease retainer in light engine oil at least 30 minutes before installation. Pack the wheel bearings, install the inner bearing cone and roller assembly in the inner cup, and install the new grease retainer. See Part 3-5, Section 4.

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

2. Install the drum assembly and adjust the brakes as outlined under "Brake Shoe Adjustments" in this section.

3. Install the outer wheel bearing, washer and adjusting nut.

4. Adjust the wheel bearing as outlined in Part 3-5, Section 2, then install the grease cap. Install the wheel and hub cap.

REAR BRAKE DRUM REMOVAL

1. Raise the car so that the wheel is clear of the floor.

2. Remove the hub cap and wheel. Remove the three Tinnerman nuts and remove the brake drum. Insert a narrow screwdriver through the brake adjusting hole in the carrier plate, and disengage the adjusting lever from the adjusting screw. While holding the adjusting lever away from the adjusting screw, back off the adjusting screw with the brake adjusting tool (Fig. 6). Be very careful not to burr, chip, or damage the notches in the adjusting screw; otherwise, the self-adjusting mechanism will not function properly.

INSTALLATION

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

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

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

BRAKE SHOES AND ADJUSTING SCREW

REMOVAL

1. With the wheel and drum removed, install a clamp over the ends of the brake cylinder as shown in Fig. 7.

2. Contract the shoes as follows:

a. Disengage the adjusting lever from the adjusting screw by pulling backward on the adjusting lever (Fig. 1).

b. Move the outboard side of the adjusting screw upward and back off the pivot nut as far as it will go.

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

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

5. Remove the primary shoe to anchor spring with the tool shown in Fig. 7. With the same tool, remove the secondary shoe to anchor spring and unhook the cable eye from the anchor pin.

6. Remove the anchor pin plate.

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

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

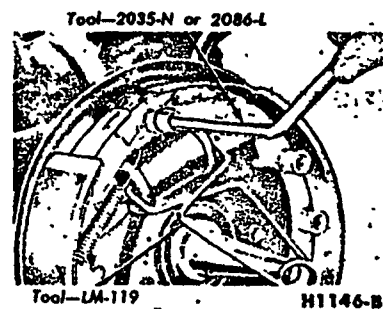


FIG. 7—Retracting Spring Removal

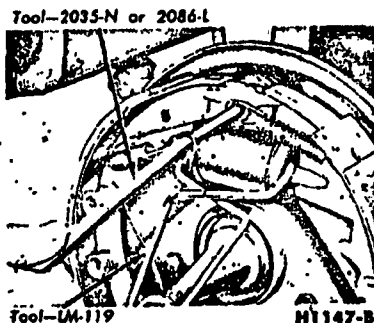


FIG. 8—Retracting Spring Installation

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

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

INSTALLATION

1. Before installing the rear brake shoes, assemble the parking brake lever to the secondary shoe and secure with the spring washer and retaining clip.

2. Apply a light coating of high-temperature grease at the points where the brake shoes contact the carrier plate.

3. Position the brake shoes on the carrier plate and secure the assembly with the hold down springs. On the rear brake, install the parking brake link and spring. Connect the parking brake cable to the parking brake lever (Fig. 1).

4. Install the anchor pin plate on the anchor pin.

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

6. Install the secondary shoe to anchor spring (Fig. 8).

7. Install the cable guide on the secondary shoe web with the flanged hole fitted into the hole in the secondary shoe web. Thread the cable around the cable guide groove (Fig. 1).

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

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

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

Remove the brake cylinder clamp.

9. Apply high-temperature grease to the threads and the socket end of the adjusting screw. Turn the adjusting screw into the adjusting pivot nut to the limit of the threads and then back off $\frac{1}{2}$ turn.

Interchanging the brake shoe adjusting screw assemblies from one side of the car to the other would cause the brake shoes to retract rather than expand each time the automatic adjusting mechanism operated. To prevent installation on the wrong side of the car, the socket end of the adjusting screw is stamped with an R or L (Fig. 9). The adjusting pivot nuts can be distinguished by the number of grooves machined around the body of the nut. Two grooves indicate a right hand nut; one groove indicates a left hand nut.

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

11. Hook the cable hook into the hole in the adjusting lever. The adjusting levers are stamped with an R or L to indicate their installation on a right or left hand brake assembly (Fig. 9).

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

13. Pull the adjuster lever, cable and automatic adjuster spring down and toward the rear to engage the pivot hook in the large hole in the secondary shoe web (Fig. 1).

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

If pulling the cable does not produce the action described, or if the lever action is sluggish instead of positive and sharp, check the position of the lever on the adjusting screw toothed wheel. With the brake in a vertical position (anchor at the top), the lever should contact the

adjusting wheel $\frac{3}{16}$ inch plus or minus $\frac{1}{32}$ inch) above the centerline of the screw. If the contact point is below this centerline, the lever will not lock on the teeth in the adjusting screw wheel, and the screw will not be turned as the lever is actuated by the cable.

To determine the cause of this condition:

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

b. Check the cable length. The cable should measure $11\frac{1}{4}$ inches (plus or minus $\frac{3}{4}$ inch) from the end of the cable anchor to the end of the cable hook.

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

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

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

WHEEL CYLINDER REPAIR

It is not necessary to remove the brake cylinder from the carrier plate to disassemble, inspect, or hone and overhaul the cylinder. Removal is necessary only when the cylinder is damaged or scored beyond repair.

DISASSEMBLY

1. Remove the links and the rubber boots from the ends of the brake cylinder. Remove the pistons, cups, and return spring from the cylinder bore (Fig. 10).

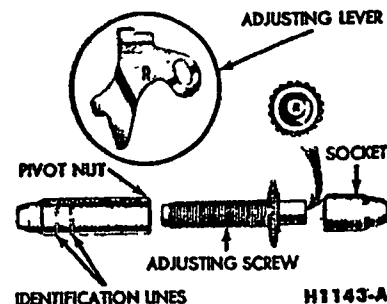


FIG. 9—Adjusting Screw and Lever Identification

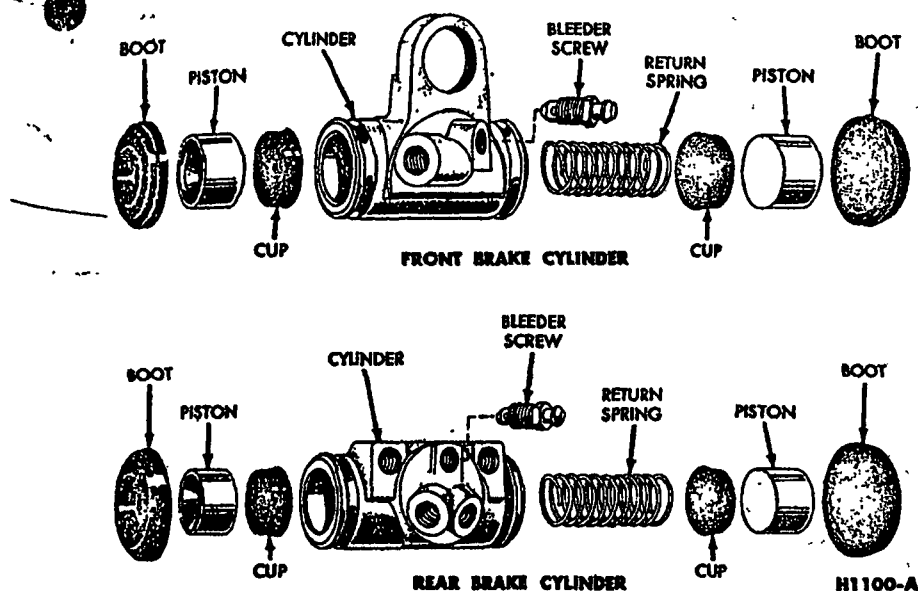


FIG. 10—Front and Rear Wheel Cylinders

2. Remove the bleeder screw from the cylinder.

INSPECTION

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

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

3. Inspect the cylinder bore for score marks or rust. If either condition is present, the cylinder bore must be honed. However, the cylinder should not be honed more than 0.003 inch beyond its original diameter.

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

ASSEMBLY

1. Apply a coating of heavy-duty brake fluid to all internal parts.

2. Thread the bleeder screw into the cylinder and tighten securely.

3. Insert the return spring, cups, and pistons into their respective positions in the cylinder bore (Fig. 10). Place a boot over each end of the cylinder. Bleed the brake system.

WHEEL CYLINDER REPLACEMENT

REMOVAL

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

2. Place a clamp over the ends of the brake cylinder as shown in Fig. 7.

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

4. Disconnect the brake line from the brake cylinder. On a car with a vacuum brake booster, be sure the engine is stopped and there is no vacuum in the booster system before disconnecting the hydraulic lines.

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

At a rear cylinder, unscrew the tube fitting that connects the tube to the cylinder. Do not pull the metal tube away from the cylinder. Pulling the tube out of the cylinder connection will bend the metal tube and make installation difficult. The tube will separate from the cylinder when the cylinder is removed from the carrier plate.

5. On the rear wheel, remove the wheel cylinder retaining bolts and lock washers and remove the cylinder. On the front wheel, remove the nut and washer that retains the cylinder to the anchor pin. Remove the cylinder from the anchor pin, and remove the clamp from the cylinder.

INSTALLATION

Wipe the end(s) of the hydraulic

line to remove any foreign matter before making connections.

1. To install a front cylinder:

a. Position the cylinder on the anchor pin against the carrier plate. Install the washer and cylinder retaining nut on the anchor pin, and torque to specification.

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

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

2. To install a rear cylinder:

a. Place the rear wheel cylinder into position. Enter the tubing into the cylinder, and start the tube fitting nut into the threads of the cylinder.

b. Secure the cylinder to the carrier plate by installing the retaining bolts and lockwashers.

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

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

4. Install the brake drum and wheel, adjust the brakes (Part 2-2, Section 2), and bleed the brakes as outlined in Part 2-1, Section 2.

BRAKE CARRIER PLATE REPLACEMENT

REMOVAL

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

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

3. If the rear carrier plate is being replaced, rotate the axle shaft so that the hole in the axle shaft flange lines up with the carrier plate retaining nuts and remove the nuts. Pull the axle shaft assembly out of the housing with tool-4235C and a slide hammer (Part 4-2), then remove the carrier plate.

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

control assembly to the dash side panel and secure with the retaining bolts.

5. Raise the car on a hoist. Route the cable over the frame side rail and through the cross member.

6. Secure the cable housing to the frame side rail by installing two retaining clips, one on each side of the side rail. Position the cable assembly so that the tape marker is located at the in-board clip.

7. Secure the cable housing to the rear side of the transmission rear support cross member by installing the hairpin retainer (Fig. 17). Install the spring seat and cable spring on the cable.

8. Assemble the rear end of the cable to the equalizer lever, and install the half moon-type adjusting nut on the end of the cable.

9. Adjust the parking brake linkage as outlined in Part 2-1, Section 2, and check the operation.

PARKING BRAKE EQUALIZER TO REAR WHEEL CABLE

REMOVAL

1. Raise the car and remove the hub cap and wheel.

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

3. Loosen the lock nut on the equalizer rod, and disconnect the cable from the equalizer (Fig. 2, Part 2-1).

4. Remove the hair pin retainer that holds the cable housing to the frame bracket and pull the cable and housing out of the bracket (Fig. 17).

5. Working on the wheel side (Fig. 1), compress the prongs on the cable retainer so that they can pass through the hole in the carrier plate. Draw the cable retainer out of the hole.

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

INSTALLATION

1. Pull enough of the cable through the housing so that the end of the cable may be inserted over the slot in the parking brake lever (Fig. 1).

2. Pulling the excess slack from the cable, insert the cable housing into the carrier plate access hole so that the retainer prongs expand.

3. Thread the front end of the cable housing through the frame bracket and install the hair pin retainer (Fig. 17).

4. Insert the ball end of the cable into the equalizer and tighten the lock nut on the equalizer end slightly (Fig. 2, Part 2-1).

5. Install the rear drum. Tighten the three Tinnerman nuts that retain the drum, and install the wheel and hub cap.

6. Adjust the rear brake shoes as outlined in Section 2. Adjust the parking brake linkage as outlined in Part 2-1, Section 2.

4 MAJOR REPAIR OPERATIONS

BRAKE DRUM REFINISHING

Minor scores on a brake drum can be removed with a fine emery cloth. A drum that is excessively scored or shows a total indicator runoff of over 0.007 inch should be turned down. Remove only enough stock to eliminate the scores and true up the drum. The refinished diameter must not exceed 0.060 inch oversize (11.090 inches).

If the drum diameter is less than 0.030 inch oversize (11.060 inches) after refinishing, standard lining may be installed. If the drum diameter is 11.060-11.090 inches, oversize linings must be installed.

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

BRAKE SHOE RELINING

Brake linings that are worn to within $\frac{1}{32}$ inch of the rivet or have been saturated with grease or oil should be replaced. Failure to replace worn linings will result in a scored drum. When it is necessary to replace linings, they must also be replaced on the wheel on the opposite of the car.

Inspect brake shoes for distortion,

cracks, or looseness. If this condition exists, the shoe should be discarded. Do not repair a defective brake shoe.

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

2. Check the inside diameter of the brake drum. If the diameter is less than 11.060 inches, standard lining may be installed. If the diameter is 11.060-11.090 inches, oversize lining should be installed.

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

4. Check the clearance between the shoe and lining. The lining must seat tightly against the shoe with not more than 0.005-inch clearance between any two rivets.

MASTER CYLINDER

DISASSEMBLY

1. Clean the outside of the cylinder, and remove the filler cap and gasket. Pour out any brake fluid that may remain in the cylinder or reservoir.

2. Remove the stop light switch and the brake line fitting from the

forward end of the cylinder (Figs. 18 and 19).

3. Remove the snap ring from the bore at the rear of the cylinder with tool 33621 (Fig. 20).

4. When disassembling a master cylinder used with the standard brake system, remove the piston assembly, cup, spring, check valve, and valve seat from the cylinder bore (Fig. 18).

When disassembling a master cylinder used with a booster, remove the piston assembly, cup, and the spring and check valve assembly from the cylinder bore. Remove the O-ring from the piston (Fig. 19).

CLEANING, INSPECTION, AND REPAIR

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

2. Check the ports and vents in the master cylinder to make sure that all are open and free of foreign matter.

3. A leaf-type valve is riveted to the front end of the piston in a master cylinder used with the standard brake system (Fig. 18). If this valve is loose or has moved so that the piston ports are open, replace the piston.

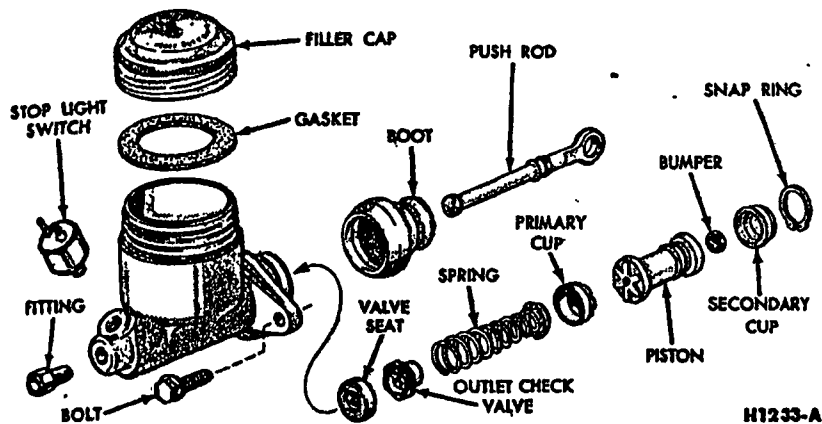


FIG. 18—Master Cylinder with Standard Brake System

When inspecting a master cylinder used with a booster, check the ports in the piston to make sure that they are open and free of foreign material (Fig. 19).

4. Inspect the cylinder walls for scores or rust, and recondition them if necessary. Hone the cylinder walls no more than necessary (0.003 inch maximum). Oversize pistons and cups are not available for excessively honed cylinders.

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

ASSEMBLY

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

2. Install the brake line fitting and the stop light switch on the cyl-

inder and tighten them securely.

3. When assembling a master cylinder used with the standard brake system, install the valve seat, check valve, spring, cup, and piston assembly in the cylinder bore (Fig. 18).

When assembling a master cylinder used with a booster, install the O-ring on the piston. Install the spring and check valve assembly, cup, and piston in the cylinder bore (Fig. 19).

4. Install the snap ring in the back of the bore (Fig. 20).

DISASSEMBLY OF BOOSTER REMOVAL OF EXTERNAL PARTS

1. Remove the two attaching nuts and lockwashers, and separate the master cylinder from the booster body.

2. Remove the filter cover and

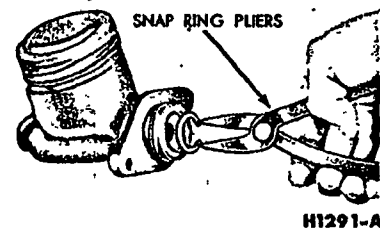


FIG. 20—Removing Snap Ring from Master Cylinder

hub and the air filter from the booster body (Fig. 6, Part 2-1).

3. Remove the vacuum manifold and check valve assembly and the rubber grommet from the booster body (Fig. 6, Part 2-1).

4. Disconnect the valve operating rod from the lever assembly by removing the retainer clip and connecting pin (Fig. 6, Part 2-1).

5. Disconnect the lever assembly from the end plate brackets by removing the retainer clip and pivot pin.

6. Remove the retaining nuts, and disassemble the brackets from the end plate.

7. Remove the rubber boot from the valve operating rod.

SEPARATION OF MAJOR COMPONENTS

1. Remove the large C-ring that retains the rear seal adapter assembly to the booster end plate (Fig. 6, Part 2-1).

2. Scribe a line across the booster body and end plate to facilitate proper alignment at reassembly. Remove the booster body-to-end plate retaining screws, tap the outside of the end plate with a fibre hammer, and separate the end plate from the booster body, leaving the rear seal and adapter assembly on the control valve hub.

3. Push the bellows assembly into the vacuum chamber (Fig. 21), and separate the bellows, control valve, and diaphragm assembly from the booster body.

4. Remove the outer O-ring from the rear seal adapter assembly (Fig. 6, Part 2-1).

DISASSEMBLY OF BELLOWS, PUSH ROD AND VALVE ASSEMBLY FROM DIAPHRAGM

1. Remove the large bellows retaining ring, bellows, bellows retainer and support ring from the diaphragm and valve assembly (Fig. 22).

2. Remove the retainer and support ring from the bellows (Fig. 6, Part 2-1).

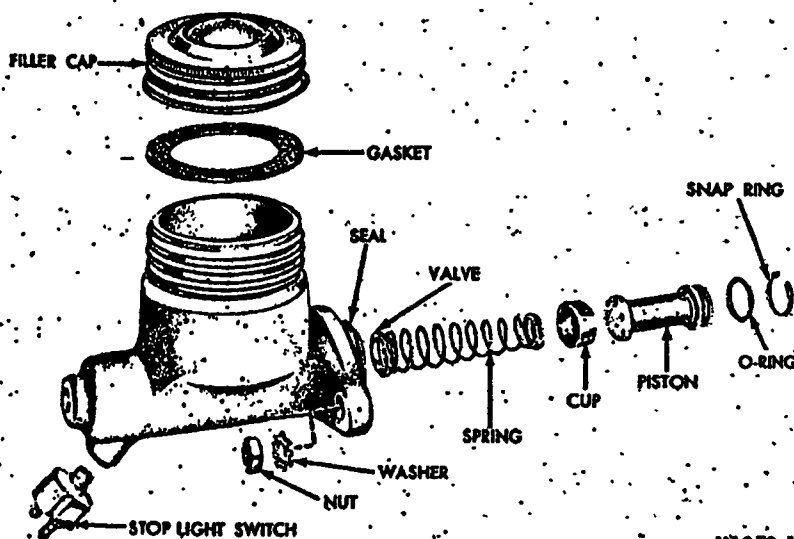


FIG. 19—Master Cylinder with Booster