

- 12 Hold the front and rear piston plates together and install the six piston plate capscrews. Leave the screws loose.
- 13 Insert the rubber reaction disc in the recess at the center of the front piston plate. Use care not to lose the reaction disc out of the piston before the push-rod is installed.

PISTON EXPANDER RING, FELT, AND RETAINER

(Refer to Figure 2-13.)

1. Place the assembly ring over the piston packing. Turn the piston assembly upside down and assemble the expander ring against the inside lip of the leather packing. (See Figure 2-16.)
2. Saturate the felt in vacuum cylinder oil and assemble it in the expander ring.
3. Assemble the retainer ring over the bosses on the rear piston plate making certain the retainer is anchored in all six grooves of the piston plate. Tighten securely the six capscrews in the front piston plate.

VACUUM CYLINDER, POWER PISTON, AND END PLATE

(Refer to Figure 2-12.)

1. Attach the vacuum hose to the vacuum piston and align the hose to lay flat against the piston. Apply a thin coat of vacuum cylinder oil to the bore of the vacuum cylinder.
2. Remove the assembly ring from the vacuum piston. Attach the air filter and air cleaner cover with screws. Insert the short end of the vacuum tube and plate through the gasket and attach the tube and plate in the position shown with screws.
3. Install the end plate assembly over the valve operating rod and attach the vacuum hose to the tube attached to the end plate. Before proceeding further, make certain the reaction disc is in place in the front piston plate.

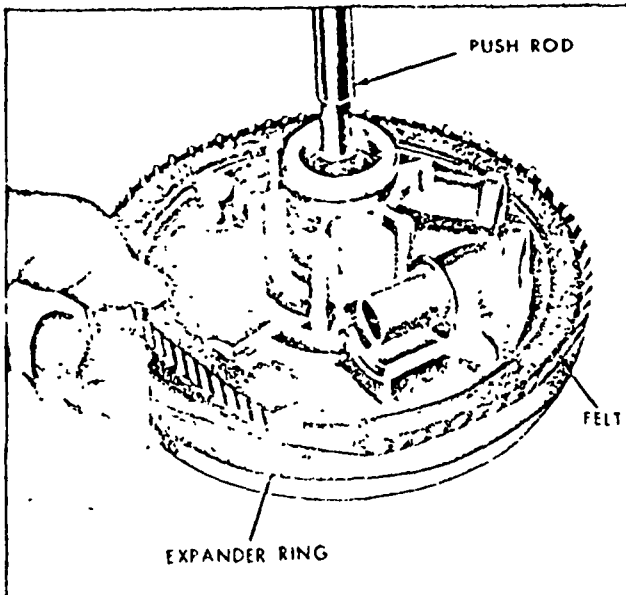


Fig 2-16 Felt and Expander Ring Installation—(9M-2411)

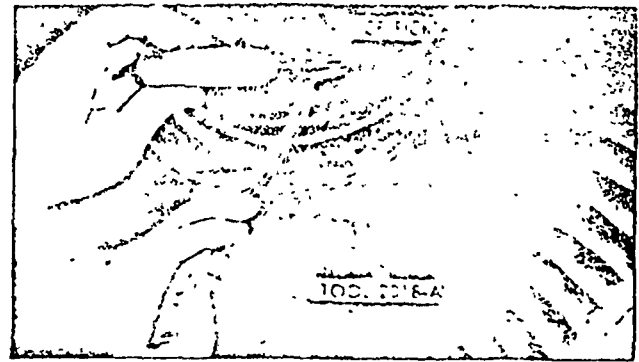


Fig. 2-17. Backing Off Brake Adjustment—(9L-2410)

4. Center the small diameter end of the piston return spring in the vacuum cylinder. Center the vacuum piston on the spring, and align the end plate to the scribe marks.
5. Compress the spring and install two attaching screws at opposite sides to hold the end plate and cylinder together. Install the balance of the screws and tighten them uniformly.
6. Dip the rubber dust guard in alcohol and assemble it over the end of the valve rod and the scalloped flange of the end plate.

SPECIAL SERVICE AND REPAIR OPERATIONS

BRAKE LINING, WHEEL CYLINDER, AND DRUM

Brake Lining

REMOVAL

1. Remove the wheel from the brake drum, then remove the brake drum. Refer to the removal procedure

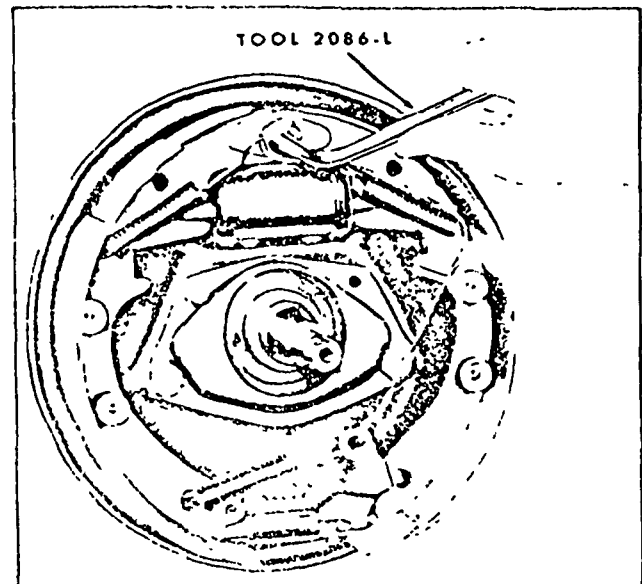


Fig 2-18. Removing Brake Shoe Retracting Spring (60L-2410)

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of the brake assemblies in this section of the manual. If it becomes necessary to back off the brake adjustment in order to remove the drums or because of dragging brakes, use an ice pick or small screwdriver to move the adjuster lever off the adjusting screw while the adjusting screw is backed off. (See Figure 2-17.)

2. **REAR BRAKE ONLY:** Move the parking brake operating lever forward and lift out the parking brake cable.
3. Contract the shoes as follows:
 - a. Disengage the adjusting lever from the adjusting screw by pulling backward on the adjusting lever.
 - b. Move the outboard side of the adjusting screw upward and back up the pivot nut as far as it will go.
4. 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.

5. Remove the primary shoe to anchor spring and spacer plate first. (See Figures 2-18 and 2-19.) Remove the secondary shoe to anchor spring and unhook the cable anchor.
6. Remove the shoe guide plate.
7. Remove the cable guide from the secondary shoe.
8. Remove the shoe hold-down springs, shoes, adjusting screws, pivot nut, and socket.

INSPECTION

Examine the brake linings for wear. If the lining face has worn to within $\frac{1}{32}$ inch or less from the rivet heads, replace the linings. Either linings or lined shoes are supplied for service. However, the installation of factory-lined shoes will give more satisfactory results. Under no circumstances replace one lining only, or one wheel set. Both front wheel sets or both rear wheel sets should

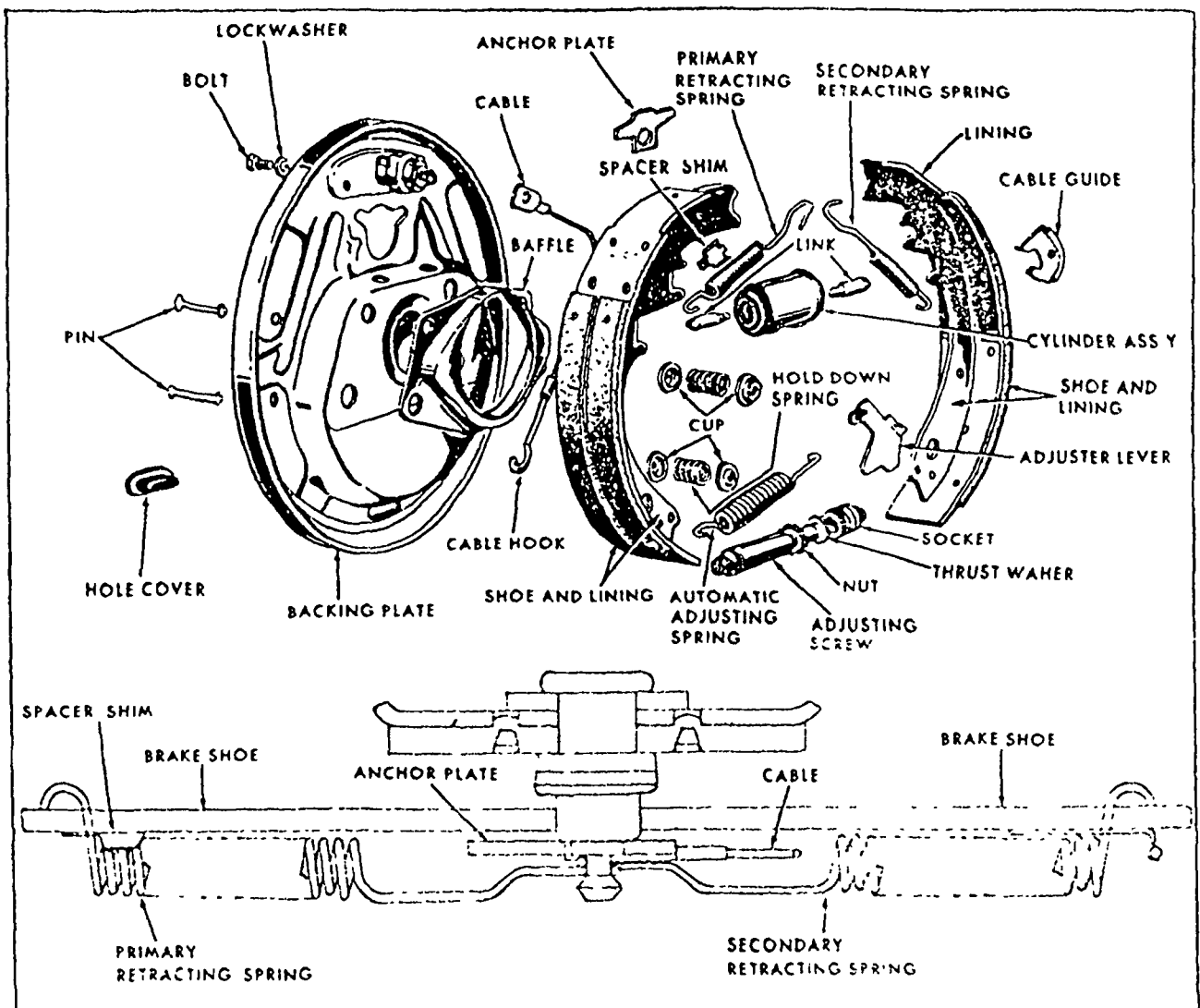


Fig 2-19 Front Wheel Brake Assembly-(61LM-2437)

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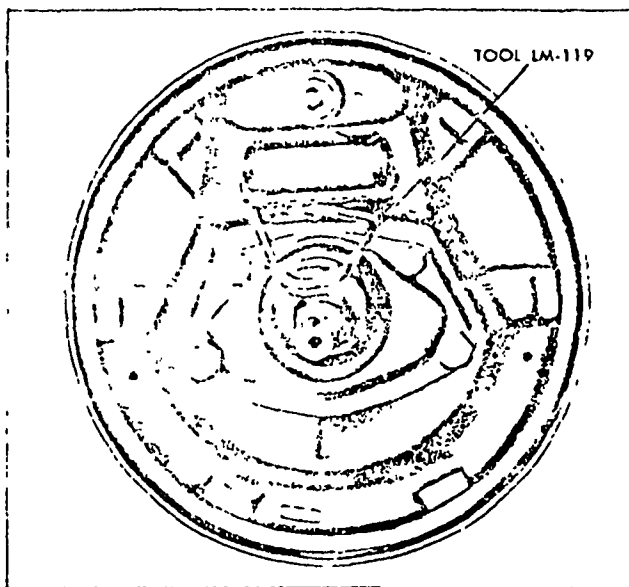


Fig. 2-20. Piston Retaining Clamp Installed—(9L-2403)

be replaced if one wheel set requires replacement. Do not turn down the linings. The lining radius is ground to specification and should not be changed.

If 24,000 miles of operation are on the brake linings or if leaks or signs of overheating are noted, it is recommended that the wheel cylinders be disassembled and inspected. The cylinder cups should be replaced upon disassembly. If the wheel cylinders do not require attention, install a Wheel Cylinder Piston Clamp, Tool LM-119, to hold the piston in place. (See Figure 2-20.)

INSTALLATION

1. Before assembly, clean the backing plate and apply high temperature lubricant COAZ-19584-A sparingly to the shoe bosses.
2. If the wheel cylinder was serviced, remove the retaining clamp and install the connecting links.
3. Position the brake shoes on the backing plate and install the four hold-down spring pins, springs and cups. On the rear brake, install the parking brake link and spring. Connect the parking brake cable.
4. Install the shoe guide plate on the anchor pin. Place the cable anchor over the anchor pin with the crimped side toward the backing plate.
5. Install the secondary shoe to anchor spring.
6. Install the primary shoe to anchor spring and the spacer plate. (Refer to Figure 2-19.) Install the cable guide on the secondary shoe web. Thread the cable around the cable guide groove. It is imperative that the cable be positioned in this groove and not between the guide and the shoe web. Be certain that the cable end is not cocked or binding on the anchor pin when installed and that all parts are flat on the anchor pin.
7. Apply door lock lubricant (with flake graphite added) to the threads and socket end of the adjusting screw.
8. Turn the adjusting screw into the adjusting pivot nut to the limit of the threads and then back off $\frac{1}{2}$ turn.
9. Install the thrust washer and adjusting socket on the screw and install this assembly between the shoe ends with the adjusting screw nearest the secondary shoe.
10. Hook the cable hook into the hole in the adjusting lever from the backing plate side.
11. Place the adjuster lever pivot hook in the large hole in the secondary shoe web. (Refer to Figure 2-19.)
12. Position the hooked end of the adjuster spring into the large hole in the primary shoe web, and install the loop end of the spring to the adjuster lever.
13. After installation, the action of the adjuster can be checked 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, which will turn the adjusting screw one tooth ($\frac{1}{20}$ revolution).
14. 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 $\frac{1}{4}$ 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 $11\frac{1}{8}$ inch (plus or minus $\frac{1}{4}$ inch).
- 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. Repair the hook or 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.

cover from the backing plate. Turn the adjusting screw upward from the backing plate side to expand the shoes. Use Adjustment Tool 2018-A. Expand the shoes until a slight drag is felt during drum rotation. Remove the drum and while holding the adjusting lever away from the adjusting screw, back off the adjusting screw $\frac{1}{4}$ of a turn.

15. Install the brake drum.
16. If the brake cylinder was serviced, bleed the cylinder (See "Hydraulic System Bleeding", which follows in this section.)
17. Install the wheel and tire assembly. Torque the wheel nuts to 75-85 lbs. ft.
18. Install the hub cap.
19. Lower the car to the floor. Drive the car in reverse, and apply the brakes five or six times while the car is moving rearward. This action will operate the adjusters if additional brake shoe expansion is required to bring the brakes into proper adjustment.

The "Diagnosis and Test Procedures" area at the end of this section contains a "Brake System Service Check List" which should be reviewed to insure the relining and repair operations have been done correctly.

Front Wheel Cylinder

REMOVAL

(See Figure 2-21.)

1. Disconnect the hydraulic hose from the tubing at the frame.
2. Remove the capscrews which secure the cylinder to the backing plate. Remove the cylinder with the hydraulic line attached. Remove the hydraulic line.
3. Remove the boots, pistons, cups and spring from the cylinder.

CLEANING AND INSPECTION

1. Place all parts, except the cylinder casting, in alcohol. Clean the cylinder walls with alcohol.
2. Examine the cylinder bore. A scored bore may be

honed providing the diameter is not increased more than 0.005 inch beyond the original diameter of 1 $\frac{1}{16}$ inch. Replace worn or damaged parts with the repair kit.

CAUTION. Clean hands with soap and water, not cleaning fluid or kerosene, before handling replacement parts.

3. Clean the hose; then, wipe the threads and sealing surface clean in order to obtain a leak-proof connection.

INSTALLATION

1. Install the hose on the cylinder. Lubricate the wheel cylinder walls and cups with brake fluid.
2. Install the spring, cups, pistons, and boots in the cylinder housing.
3. Install the Piston Retaining Clamp, Tool 1M-119 (Refer to Figure 2-20.)
4. Attach the cylinder to the backing plate. Torque the capscrews to 11-19 lbs. ft.
5. Connect the hydraulic hose to the hydraulic line at the underbody.

Rear Wheel Cylinder

REMOVAL

(Refer to Figure 2-21.)

1. Disconnect the hydraulic line at the wheel cylinder. Do not pull the metal line away from the cylinder. Pulling the line out of the cylinder connection will bend the metal line and make installation difficult. The line will separate from the cylinder when the cylinder is removed from the backing plate.
2. Remove the two capscrews securing the hydraulic wheel cylinder to the backing plate. Remove the cylinder.

CLEANING AND INSPECTION

For inspection and repair, follow Step 3 of "Removal" through Step 3 of the "Installation" inclusive, under "Front Wheel Cylinder". The original diameter of the rear wheel cylinder is 1 $\frac{1}{16}$ inch.

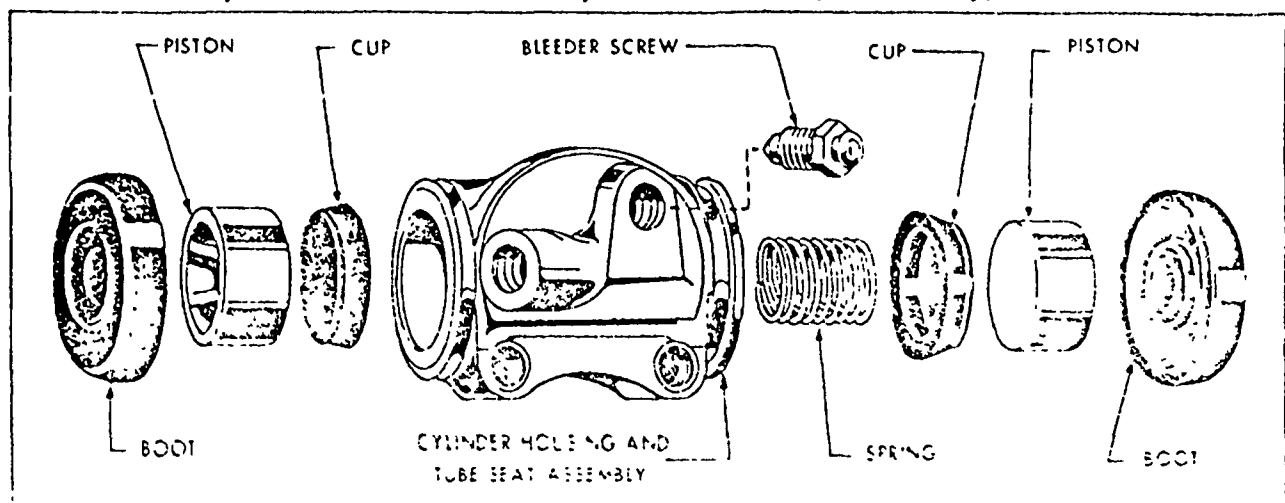


Fig. 2-21 Wheel Cylinder Assembly—18L-2006

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INSTALLATION

- 1 Wipe the end of the hydraulic line to remove any foreign matter. Place the hydraulic cylinder in position. Enter the tubing into the cylinder and start connecting the nut.
2. Secure the hydraulic cylinder to the brake backing plate with two cap screws and complete the tightening of the tubing nut. Torque the cap screws to 11-19 lbs. ft.

Brake Drum

Examine the brake drum for the following wear conditions.

- a. **SCORED SURFACE.** Visually check and grind, if necessary. The inside diameter of the drum must not exceed 11.122 inches. To remove more material would seriously affect the strength of the drum. If it is necessary to turn down one drum to 11.122 inches, turn down either both front or both rear and use the oversize linings in axle sets. Do not shim linings.
- b. **OUT-OF-ROUND.** If erratic brake action is noted when brakes are road tested, check for an out-of-round drum condition. Use an arbor and dial indicator gauge or equivalent for making the check. There are various commercial devices available for restoring drum roundness, most of which are equipped with necessary gauges. A variation of more than 0.007 inch from round warrants attention.

HYDRAULIC SYSTEM BLEEDING

When any part of the hydraulic system has been open to the atmosphere or disconnected for repair or replacement, air may get into the lines and cause lack of brake application or spongy pedal action. Bleed the hydraulic system after it has been properly connected to be sure that all air is expelled from the brake cylinders and lines.

The hydraulic system can be bled manually or with pressure bleeding equipment. However, pressure bleeding equipment is preferred.

Manual Bleeding

1. Fill the brake master cylinder with brake fluid.
2. Position a $\frac{3}{8}$ inch box wrench on the wheel bleeder fitting. Install a bleed tube on the fitting. Submerge the end of the bleeder tube in a clean glass jar partially filled with fluid. Start at the right rear brake bleed fitting.
3. Open the bleeder valve approximately $\frac{3}{4}$ turn.
4. Depress the brake pedal slowly and close the bleeder valve, then, allow the pedal to return to the normal position. Repeat this pumping action until all evidence of air bubbles has ceased, and the fluid entering the glass jar is clear. During this bleeding process, the master cylinder reservoir must be kept at least half full of brake fluid.

5. Repeat the bleeding procedure at each wheel cylinder. Proceed from the left rear to the right front, to the left front.
6. When the bleeding operation is complete, check the fluid level in the master cylinder. Fill to within $\frac{1}{4}$ inch from the top of the reservoir.

Pressure Bleeding

1. Connect the pressure bleeder tank to the master cylinder, replacing the master cylinder cap with the special adapter cap, Tool 2162.
2. Open the valve in the pressure tank supply line. Start at the right rear brake bleed fitting.
3. Position a $\frac{3}{8}$ inch box end wrench on the wheel bleeder fitting. Install the bleed tube on the fitting. Submerge the end of the bleeder tube in a clean glass jar partially filled with fluid.
4. Open the wheel cylinder bleeder valve approximately $\frac{3}{4}$ turn.
5. Allow the hydraulic fluid to bleed into a glass jar until all air bubbles have disappeared and the fluid is clear.
6. Close the bleeder valve.
7. Repeat the procedures at each wheel cylinder, proceeding to left rear, right front, then left front.
8. When the bleeding is complete, check the fluid level in the master cylinder reservoir. Fill to within $\frac{1}{4}$ inch from the top of the reservoir.

ADJUSTMENTS**PARKING BRAKE**

Check the parking brake cables when the brakes are fully released. If the cables are loose, adjust them as follows:

1. Fully release the parking brake pedal.
2. Raise the car.
3. Loosen the parking brake cable at the equalizer lever.
4. Depress the parking brake pedal $1\frac{3}{4}$ inches from its normal released position.
5. Adjust the cable until a slight drag is felt when turning the rear wheels.
6. Tighten the locknut on the equalizer rod.
7. Release the parking brake and check to make sure that the brake shoes return to the fully released position.
8. Depress the parking brake pedal two inches. Under normal conditions, this will satisfactorily hold the vehicle.

SERVICE BRAKE

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. After adjusting, check the parking brake adjustment.

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nents to restore efficiency and performance that has been lost due to wear, corrosion, deterioration, or maladjustments. It is seldom advisable to attempt an improvement in brake performance by correction of one or two items only.

During normal brake operation, changes in various component parts take place gradually, thereby reducing their efficiency below recommended specifications. Lasting brake efficiency and performance is assured by following definite and thorough testing, inspection and, repair procedures. The following "Brake System Service Check List" items should be reviewed prior to, during, and after servicing of the brake system. This will insure that all repair work has been performed correctly and completely, thus reducing service complaints upon completion of a specific repair operation.

Brake System Disassembly

1. In order to avoid damage to wheel bearing grease seals, always remove the front wheels from the drums before the drums are removed from the spindle. The spindle should be wiped free of grease. Damaged seals can allow some of the wheel bearing grease to escape onto the brake drum, resulting in brake pull and grab.
2. Check the condition of the brake shoes, retracting springs, and drum for signs of overheating. If the shoes have a slight blue coloring, indicating overheating, replacement of the retracting and hold down springs is strongly recommended. Overheated springs lose their pull and could cause the new lining to wear prematurely, if they are not replaced.
3. If the car has 24,000 or more miles of operation on the brake linings or signs of overheating are present when relining brakes, the wheel cylinders should be disassembled and inspected for wear and entrance of dirt into the cylinder. The cylinder cups should be replaced, thus avoiding future problems.

Brake Shoe or Lining Replacement

1. Factory lined shoes give better results than shoe linings rivet mounted at the dealership. However, if rivet relined shoes are to be used, be sure all the rivets are secure. Do not "turn down" the linings of factory lined shoes. The lining radius is ground to specification at the factory and should not be changed.
2. Lining replacements (primary and secondary) should always be made in axle sets to prevent brake pull. Oversize linings should always be used when the drums have been "turned" oversize.

Brake Drums

1. Brake drums should be "turned" only if the braking surface has been damaged or if the out-of-round indication exceeds 0.007 inch. Use care in handling drums. Dropping a drum on an edge can produce an out-of-round condition. There is no real

advantage in taking a drum from a drum if the brake surface is within specifications and is not damaged, or the out-of-round indication does not exceed 0.007 inch.

2. If the drums do require "turning", do not exceed a drum diameter of 11.122 inch. Always turn both front or both rear drums to the same diameter if any one drum requires turning. Make sure the surface of the drums is good.

Assembly of Brakes

1. When installing the brake shoes always place the parts on the anchor pin in the following order. (Refer to Figure 2-19).
First - Brake shoes
Second - Shoe guide plate
Third - Adjuster cable eye, with the crimped side toward the backing plate
Fourth - Secondary shoe retracting spring.
Fifth - Primary shoe retracting spring
Failure to place the parts on the anchor pin in the above order can result in incorrect operation of the self-adjuster due to interference of the adjuster cable with the secondary shoe retracting spring.
2. The front wheel brake shoe retracting springs are 114 lb springs and are colored red. The rear brake shoe retracting springs are 7.1 lb springs and are colored purple. Be sure the springs are in the correct location to avoid unequal braking.
3. High temperature lubricant COAZ-19584-A, or a flake graphite lubricant should be applied sparingly to the backing plate ledges at the points of shoe contact. This permits the shoes to move easily.
4. Lock lubricant, with flake graphite added, should be used to lubricate the adjuster screw. The thrust washer should also be lubricated with this mixture.
5. Test the self-adjuster action by pulling the cable (between the cable guide and the adjusting lever) toward the secondary shoe web far enough to lift the liner past a tooth on the adjusting screw wheel. The lever should snap into position behind the next tooth. Release of the cable should cause the adjuster spring to return the lever to its original position which will turn the adjusting screw one tooth (1/20 of a revolution).
6. To adjust the brakes after installing the shoes.
a. Install the drum, then, remove the adjusting hole cover from the backing plate.
b. Turn the adjusting screw upward from the backing plate side to expand the shoes. Use Adjustment Tool 2018-A. Expand the shoes until a slight drag is felt during drum rotation.
c. Remove the drum, and while holding the adjusting lever off the adjusting screw, back off the adjusting screw 3/4 of a turn.

CAUTION. Failure to use the above adjustment procedure can damage the adjusting screw resulting in self-adjuster problems.

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