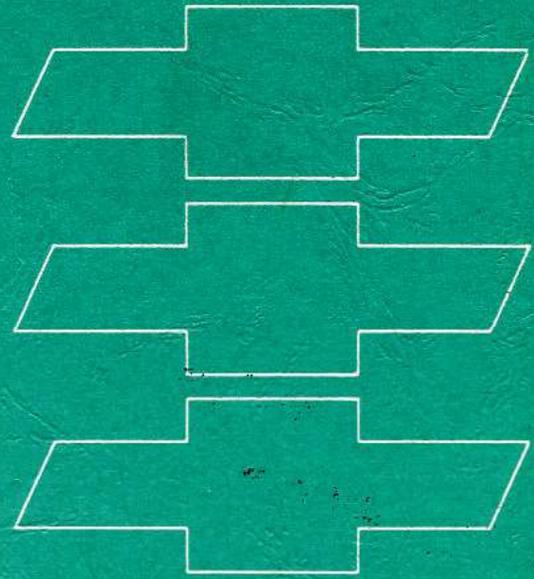
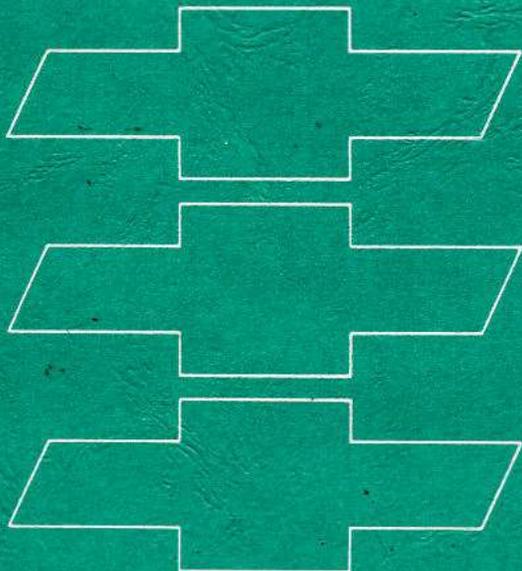


**1965**



**CORVAIR**



**CHASSIS  
SHOP  
MANUAL**

# 1965 CHEVROLET CORVAIR CHASSIS SHOP MANUAL

## FOREWORD

This manual is designed to provide complete information on the maintenance and repair of various units, except the Body, of the 1965 Chevrolet Corvair Passenger Vehicles. Service information for 1965 body items for these vehicles is contained in the 1965 Body Service Manual. For service information on the 1965 Corvair Greenbrier refer to the 1961 Corvair Shop Manual and the 1964 Corvair Shop Manual Supplement.

An effort has been made to produce a manual that will serve as a ready reference book for the experienced service man and also cover step by step procedure for the guidance of the less experienced man.

The Section Index on this page enables the user to quickly locate any desired section. At the beginning of each section, a Table of Contents gives the page number on which major subjects begin. An Index is placed at the beginning of each major subject within the section.

Summaries of Special Tools, when required, are found at the end of major sections, while Specifications covering vehicle components are presented at the rear of the manual.

This manual should be kept in a handy place for ready reference. If properly used, it will enable the technician to better serve the owners of Chevrolet Corvair vehicles.

All information, illustrations and specifications contained in this literature are based on the latest product information available at the time of publication approval. The right is reserved to make changes at any time without notice.

## CHEVROLET MOTOR DIVISION

General Motors Corporation  
DETROIT, MICHIGAN

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# SECTION 5 BRAKES

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## CORVAIR 10,000 SERIES INDEX

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## GENERAL DESCRIPTION

The self-adjusting brakes used (fig. 1) on both front and rear of all models are the Duo-Servo single anchor type which utilize the momentum of the vehicle to assist in the brake application. This self-energizing or self-actuating force is applied to both brake shoes at each wheel in both forward or reverse motion. The brake shoe facings are bonded to the shoes.

Wheel cylinders (fig. 2) are the double piston type permitting even distribution of pressure to each brake shoe. To keep out dust and moisture, both ends of each wheel cylinder are sealed with a rubber boot. The wheel cylinders have no adjustments.

The main cylinder (fig. 3) consists of a piston which receives mechanical pressure from the brake pedal and transmits it through the brake lines as hydraulic pressure to the wheel cylinders. The filler cap is accessible from inside the trunk compartment.

The parking brake lever is located to the left of the steering column. A cable type linkage, directed over pulleys and routed through the tunnel, connects this lever to an equalizer at the under body forward of the transmission.

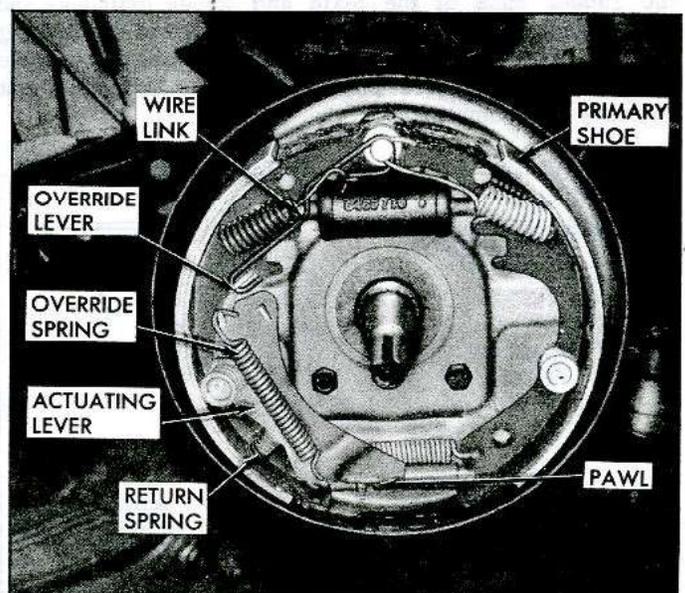
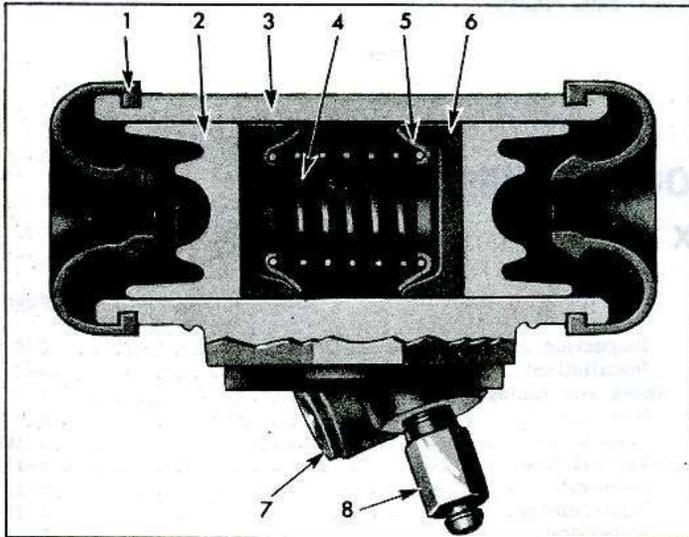


Fig. 1—Self-Adjusting Brakes

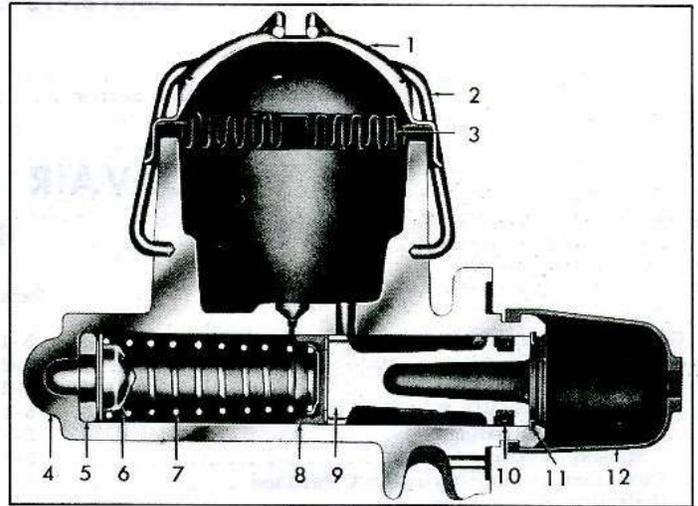
Force applied at the parking brake lever is transmitted to both right and left rear brakes by means of a single actuating cable which passes through the equalizer and is connected at each end to an actuating lever within the brake assembly.

The parking brake lever is of the single stroke ratchet type and incorporates a trigger release which is located in the lever grip. For correct adjustment procedure of service and parking brakes consult Maintenance and Adjustments in this section.



**Fig. 2—Wheel Cylinder**

- |                  |                        |
|------------------|------------------------|
| 1. Push Rod Boot | 5. Piston Cup Expander |
| 2. Piston        | 6. Piston Cup          |
| 3. Housing       | 7. Fluid Inlet         |
| 4. Spring        | 8. Bleeder Valve       |



**Fig. 3—Main Cylinder**

- |                    |                   |
|--------------------|-------------------|
| 1. Reservoir Cover | 7. Spring         |
| 2. Bail Wire       | 8. Primary Cup    |
| 3. Seal            | 9. Piston         |
| 4. Body            | 10. Secondary Cup |
| 5. Valve Seat      | 11. Lock Ring     |
| 6. Valve Assembly  | 12. Boot          |

## MAINTENANCE AND ADJUSTMENTS

In any service operation it is extremely important that absolute cleanliness be observed. Any foreign matter in the hydraulic system will tend to clog the lines, ruin the rubber cups of the main and wheel cylinders and cause inefficient operation or even failure of the braking system. Dirt or grease on a brake lining may cause that brake to grab first on brake application and fade out on heavy brake application.

### HYDRAULIC BRAKE FLUID

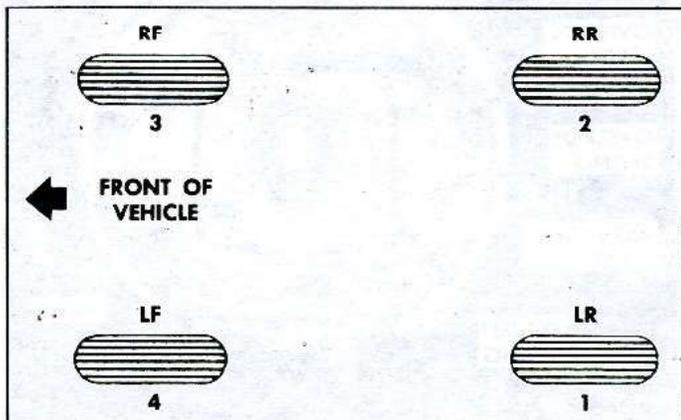
Only GM Hydraulic Brake Fluid Supreme No. 11 should be used when servicing brakes. This brake fluid is satisfactory for any climate and has all the qualities necessary for satisfactory operation, such as a high boiling point to prevent vapor lock and the ability to remain fluid at low temperatures.

In the event that improper fluid has entered the system, it will be necessary to:

1. Drain the entire system.
2. Thoroughly flush the system with clean alcohol, 188 proof, or a hydraulic system cleaning fluid, such as "Decelen."
3. Replace all rubber parts of the system including brake hoses.
4. Refill the system with GM Hydraulic Brake Fluid Supreme No. 11.

### BLEEDING HYDRAULIC SYSTEM

The hydraulic brake system must be bled whenever any line has been disconnected or air has in some way entered the system. The system must be absolutely free of air at all times. Bleeding should be done on the longest line first and the proper sequence to follow is left rear, right rear, right front and left front (fig. 4). Bleeding of brake line may be accomplished by one of two methods: either pressure or manual.



**Fig. 4—Proper Bleeding Sequence**

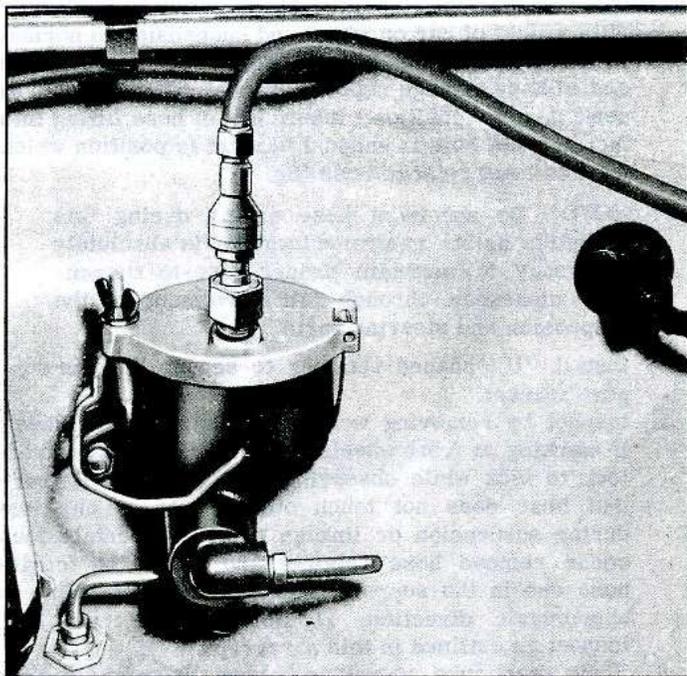


Fig. 5—Pressure Bleeding

### Pressure Bleeding

**NOTE:** Place a suitable protective cover in the luggage compartment and over exterior portion of front fender panel to prevent possible damage by brake fluid and bleeder equipment.

1. Clean all dirt from top of main cylinder, and remove main cylinder cover.
2. Install Tool J-21479 (fig. 5), connect bleeder equipment to Tool J-21479, and open release valve on bleeder equipment.

**NOTE:** Make sure brake fluid in bleeder equipment is at operating level and that the equipment is capable of exerting 30 to 50 lbs. hydraulic pressure on the brake system.

3. Position one end of bleeder hose on left rear wheel bleeder valve, and install Tool J-7647 on bleeder valve and hose.
4. Place loose end of bleeder hose in a transparent container. Pour a sufficient volume of brake fluid into container to ensure that end of bleeder hose will remain submerged.
5. Open wheel cylinder bleeder valve by turning Tool J-7647 counter-clockwise approximately  $3/4$  of a turn, and observe flow of fluid at end of bleeder hose.
6. Close bleeder valve tightly as soon as bubbles stop and brake fluid flows in a solid stream from the bleeder hose. Bleed off enough fluid to ensure that all fluid is replaced.
7. Remove Tool J-7647 and bleeder hose from wheel cylinder bleeder valve.
8. Repeat Steps 3 through 7 at the remaining wheel cylinders in the proper bleeding sequence. (See Figure 4).
9. Disconnect bleeder equipment, remove Tool J-21479, replace main cylinder cover, and remove protective cover from vehicle.

**NOTE:** The main cylinder bleeder adapter (Tool J-21479) is designed to allow filling of the reservoir to the proper level ( $1/4$ " from the reservoir rim) during the bleeding operation.—do not over-fill the reservoir.

### Manual Bleeding

1. Clean all dirt from top of main cylinder and remove filler plug.
2. Fill main cylinder reservoir.
3. Remove bleeder valve dust cover. Install Tool J-7647 on bleeder hose and position one end of hose on bleeder valve, placing other end of hose in a transparent container holding sufficient fluid to cover end of hose.
4. Open bleeder valve by turning  $3/4$  of a turn in a counter-clockwise direction. Depress foot pedal. When pedal reaches floor close bleeder valve. Return pedal to brake released position with valve closed. Repeat this operation until air bubbles no longer appear in discharging fluid.
5. Close bleeder valve tightly as soon as fluid flows in a solid stream.
6. Remove bleeder hose and Tool J-7647.
7. Repeat operations 2 thru 6 at each wheel in the proper sequence (fig. 4).

**NOTE:** Fill main cylinder reservoir to the proper level ( $1/4$ " from the reservoir rim).

### PUSH ROD TO MAIN CYLINDER CLEARANCE

Brake pedal free movement is the upward movement of the brake pedal pad, with pedal in return position, before the pedal arm contacts the pedal stop. Since the pedal stop is permanently mounted and non-adjustable, it is essential that free movement be present—too much free

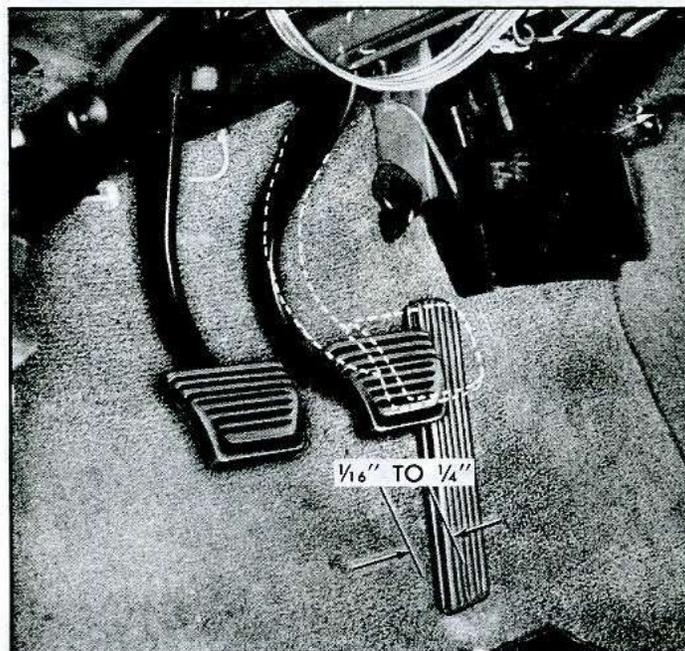


Fig. 6—Brake Pedal Free Movement

movement results in pedal rattle while insufficient movement will tend to force undue pressure on main cylinder piston, which would possibly close compensating port.

1. Loosen check nut on push rod sufficiently to allow adjustment.
2. Turn push rod in proper direction to obtain correct adjustment. Upward movement of the pedal pad before the pedal arm contacts the pedal stop must be 1/16 to 1/4 inch (fig. 6).
3. Tighten check nut against clevis, and recheck free movement.

## HYDRAULIC BRAKE LINES

### Hydraulic Brake Hose

The flexible hoses which carry the hydraulic pressure from the steel lines to the wheel cylinders are carefully designed and constructed to withstand all conditions of stress and twist which they encounter during normal vehicle usage.

The hoses require no service other than periodic inspection for damage from road hazards or other like sources. Should damage occur and replacement become necessary, the following procedure is to be followed.

#### Removal

1. Separate hose from steel line by turning double flare connector out of hose fitting.
2. Remove "U" shaped retainer from hose fitting and withdraw hose from support bracket.
3. Turn hose fitting out of wheel cylinder inlet.

#### Installation

1. Install new copper gasket on cylinder end of hose (male end)
2. Moisten threads with brake fluid and install hose in wheel cylinder inlet.

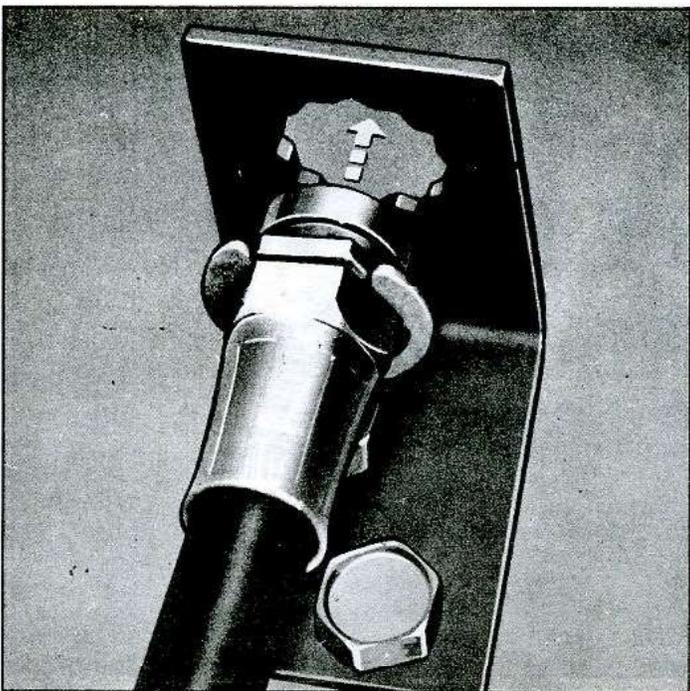


Fig. 7—Brake Line Support Bracket

3. With weight of car on wheel and suspension in normal position (front wheels straight ahead) pass female end of hose through support bracket, allowing hose to seek its own position. Insert hex of hose fitting into the 12 point hole in support bracket in position which induces least twist to hose (fig. 7).

**NOTE:** Do not twist hose unduly during this operation as its natural curvature is absolutely necessary to maintain proper hose-to-suspension clearance through full movement of the suspension and steering parts.

4. Install "U" shaped retainer to secure hose in support bracket.
5. Inspect by removing weight completely from wheel; if working at front wheels turn steering linkage from lock to lock while observing hose position. Be sure that hose does not touch other parts at any time during suspension or linkage travel. If contact does occur remove hose retainer and rotate the female hose end in the support bracket one or two points in appropriate direction, replace retainer, and reinspect as outlined in this paragraph.
6. Place steel tube connector in hose fitting and tighten securely.
7. Bleed all brakes as outlined in this section.

### Hydraulic Brake Tubing

Hydraulic brake tubing is a double layer annealed steel, copper coated and tin plated 3/16" tubing which resists corrosion and has the physical strength to stand up under the high pressures which are developed when applying the brakes. In making up hydraulic brake pipes, it is important that the proper flaring tool be used to flare the ends of the tubing for the compression couplings. Unless the tubing is properly flared, the connections will leak and the brakes will become ineffective.

**CAUTION:** When necessary to replace brake tubing, always use special metal tubing which is designed to withstand high pressure and resist corrosion. Ordinary copper tubing is not satisfactory and should not be used.

This safety steel tubing must be double-lap flared at the ends in order to produce a strong leak-proof joint.

The brake tube flaring Tool J-8051 (fig. 8) is used to form the double-lap flare.

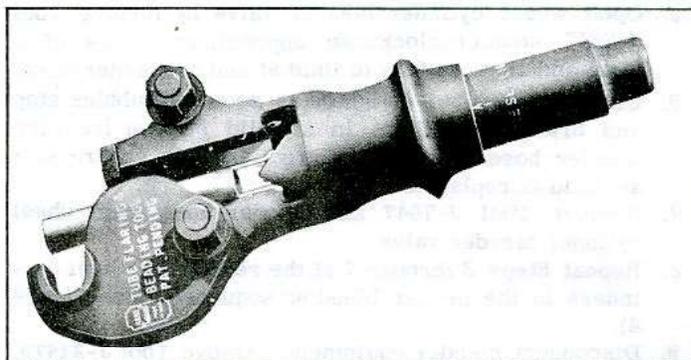


Fig. 8—Hydraulic Brake Tube Double Flaring Tool

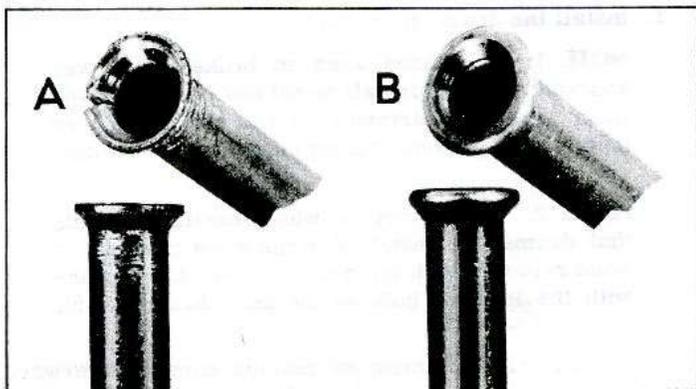


Fig. 9—Single and Double Lap Flaring

Figure 9 shows two pieces of tubing, one with single-lap flare "A" and the other with double-lap flare "B". It will be noted that the single-lap flare in "A" split the tubing while the one shown in "B" is well-formed and unbroken due to the reinforcement of the double wall.

The following procedure should be followed making up hydraulic brake pipes.

#### Double Lap Flaring

1. Clamp the tubing in the proper size die blocks with the flat ends of the blocks toward the end of the tubing to be cut off. Cut the end of the tubing flush and square. Using a mill file, dress tubing and square ends.
2. Remove the tubing from the die block and deburr the inside and outside edges.
2. Install compression couplings on tubing and dip end of tubing to be flared in hydraulic fluid. This lubrication results in better formation of the flare.
4. Place one-half of the die blocks in the tool body with the counterbored ends toward the ram guide. Now lay the tubing in the block with approximately 1/2" protruding beyond the end. Fit the other half of the block into the tool body, close the latch plate and tighten the nuts "finger-tight."
5. Select the correct size upset flare punch. One end of this punch is counterbored or hollowed out to gauge the amount of tubing necessary to form a double lap flare. Slip the punch into the tool body with the gauge end toward the die blocks. Install the ram; then tap lightly until the punch meets the die blocks and they are forced securely against the stop plate (fig. 10).
6. Using the supplied wrench, draw the latch plate nuts down tight to prevent the tube from slipping. Tightening the nuts alternately (beginning with the nut at

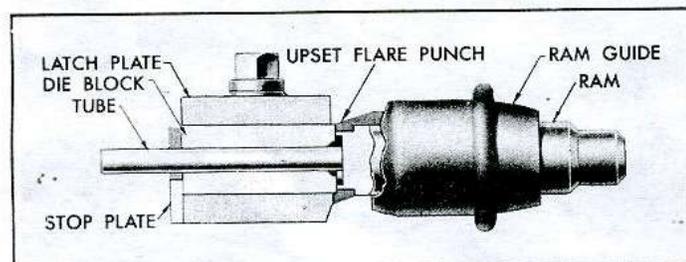


Fig. 10—Flaring Operation—Positioning Tubing

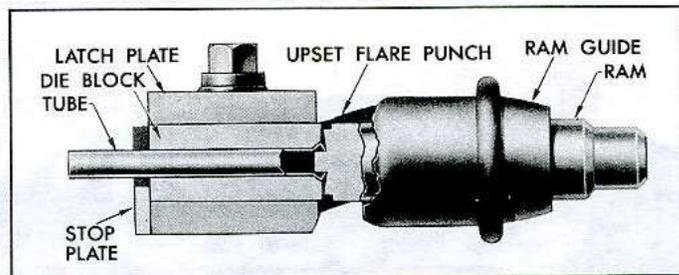


Fig. 11—Flaring Operation—First Flare

the closed hole in the plate) will prevent distortion of the plate. Remove the punch and the ram. Now reverse the punch and put it back into the tool body. Install the ram and tap it lightly until the face of the upset flare punch contacts the face of the die blocks (fig. 11). This completes the first operation. Remove the ram and the punch.

7. To complete the flare, insert the pointed finish flare punch and the ram into the tool body. Tap the ram until a good seat is formed (fig. 12).

**NOTE:** The seat should be inspected at intervals during the finishing operation to avoid over-seating.

#### SERVICE BRAKE ADJUSTMENT

Although the brakes are self-adjusting, a preliminary or initial adjustment may be necessary after the brakes have been relined or replaced, or whenever the length of the adjusting screw has been changed. The final adjustment is made by using the self-adjusting feature.

1. With brake drum off, disengage the actuator from the star wheel and rotate the star wheel by spinning or turning with a small screw driver.
2. **Recommended:**
  - a. Use special Tool J-21177, Drum-to-Brake Shoe Clearance Gauge, to check the diameter of the drum inner surface (fig. 13).

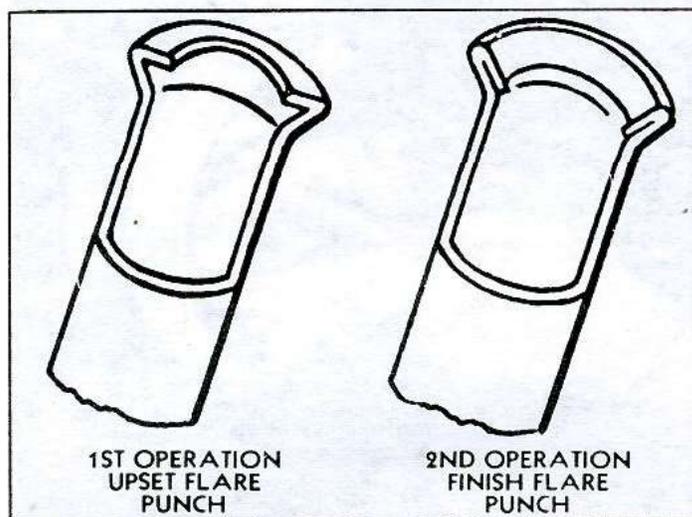


Fig. 12—Flaring Operation—First and Second Flare

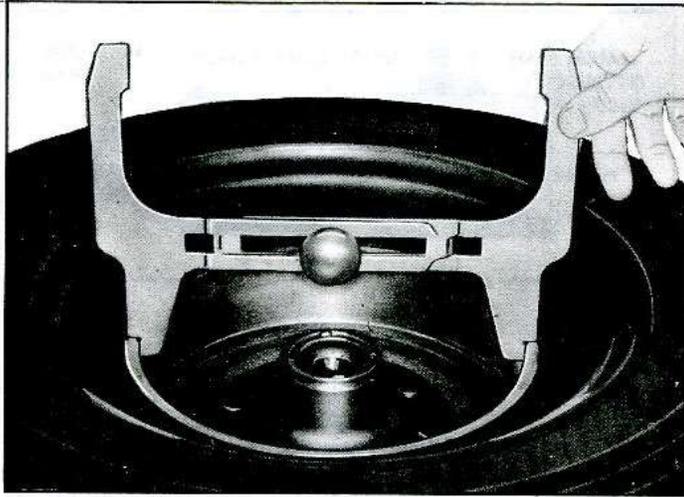


Fig. 13—Using Drum-to-Brake Shoe Clearance Gauge

- b. Turn the tool to the opposite side and fit over the brake shoes by turning the star wheel until the gauge just slides over the linings (fig. 14).
- c. Rotate the gauge around the brake shoe lining surface to assure proper clearance.

**Alternate:**

- a. Using the brake drum as an adjustment fixture, turn the star wheel until the drum slides over the brake shoes with a slight drag.
- b. Turn the star wheel 1-1/4 turns to retract the shoes. This will allow sufficient lining-to-drum clearance so final adjustment may be made as described in Step 4.

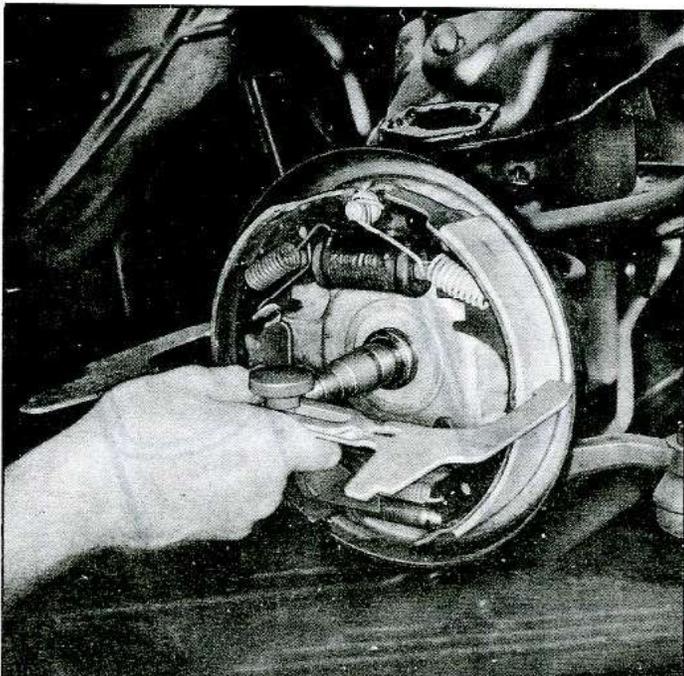


Fig. 14—Checking Brake Shoe Lining Clearance

3. Install the drum and wheel.

**NOTE: 1:** If lanced area in brake drum was knocked out, be sure all metal has been removed from brake compartment. Install new hole cover in drum to prevent contamination of the brakes.

**NOTE: 2:** Make certain when installing drums that drums are installed in the same position as when removed with the drum locating tang in line with the locating hole in the axle shaft (fig. 15).

4. Make final adjustment by making numerous forward and reverse stops, applying brakes with a firm pedal effort until a satisfactory brake pedal height results.

**NOTE:** Frequent usage of an automatic transmission forward range to halt reverse vehicle motion may prevent the automatic adjusters from functioning, thereby inducing low pedal heights.

**PARKING BRAKE**

The service brake must be properly adjusted first as a base for the parking brake adjustment.

**Adjustment**

1. Jack up both rear wheels.
2. Pull parking brake lever up 1 notch from fully released position.
3. Loosen the forward check nut on the equalizer and tighten the rear one until a heavy drag is felt when rear wheels are rotated.
4. Tighten check nuts securely.
5. Fully release parking brake and rotate rear wheels; no drag should be present.



Fig. 15—Aligning Drum Tang with Wheel Hub

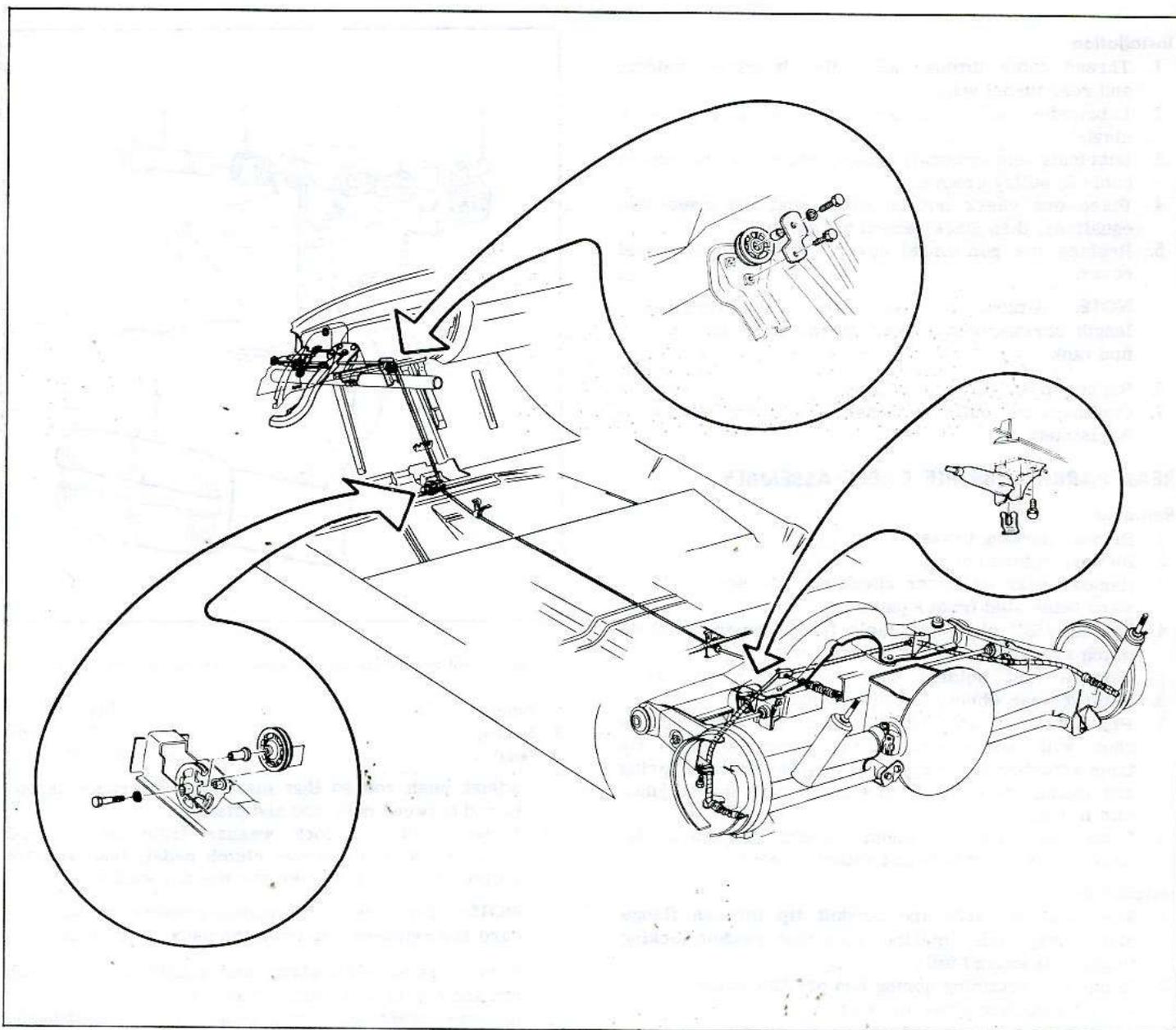


Fig. 16—Parking Brake System

**Inspection**

If complete release of the parking brake is not obtained when release handle is pulled, or if application effort is high, check parking brake lever assembly for free operation. If operation is sticky or a bind is experienced, correct as follows:

1. Clean and lubricate brake cables and pulleys.

**NOTE:** These pulleys must be lubricated, as outlined in Section 2, every 12,000 miles.

2. Inspect brake lever assembly for straightness and alignment (replace if necessary).
3. Clean and lubricate parking brake lever assembly, which must operate freely.
4. Check condition and installation of return spring.

**SERVICE OPERATIONS****FORWARD PARKING BRAKE CABLE****Removal**

**NOTE:** Remove positive cable from battery to eliminate possibility of creating short circuits under dash.

1. Release parking brake.

2. Remove equalizer check nuts and separate cable stud from equalizer.
3. Remove underbody tunnel cover.
4. Remove toe pan tunnel cover.
5. Remove cable pulley from upper toe board bracket.
6. Remove cable ball from hand lever clevis and withdraw cable from car.

**Installation**

1. Thread cable through all pulley brackets, guides, and rear tunnel wall.
2. Lubricate cable ball and position in hand lever clevis.
3. Lubricate and reinstall pulley, carefully positioning cable in pulley groove.
4. Place one check nut on cable stud and insert into equalizer, then place second nut on stud.
5. Replace toe pan tunnel cover and underbody tunnel cover.

**NOTE:** Attach toe pan cover with original length screws only; longer screws may puncture fuel tank.

6. Replace positive battery cable.
7. Continue as outlined under Parking Brake--Adjustment.

**REAR PARKING BRAKE CABLE ASSEMBLY****Removal**

1. Release parking brake.
2. Remove return spring.
3. Remove rear equalizer check nut and separate forward cable stud from equalizer.
4. Extract "U" clips and cable from support brackets which are bolted to rear crossmember.
5. Remove bolt holding cable clip to control arm.
6. Remove rear wheels and brake drums.
7. Pry actuating lever from behind secondary brake shoe with screw driver, then separate cable tip from actuating lever by compressing retaining spring and lifting cable tip up and out of "U" shaped junction in lever.
8. Compress expanded conduit locking fingers at the flange plate entry hole and withdraw cable.

**Installation**

1. Pass end of cable and conduit tip through flange plate entry hole, making sure that conduit locking fingers all expand fully.
2. Compress retaining spring and position cable in "U" shaped actuating lever junction.
3. Replace brake drum and wheel.
4. Position cable clip to control arm and secure with attaching bolt.
5. Pass die cast conduit tip through support bracket and secure with "U" clip.
6. Position rubber boot over conduit tip, carefully indexing bead of boot in groove provided in tip casting.
7. Place equalizer on cable and insert forward cable stud. Install check nut and return spring.

**NOTE:** To perform its intended function, equalizer must be free to slide on rear cable. Lubricate with chassis grease on assembly and every 5,000 miles thereafter.

8. Proceed as outlined under Parking Brake--Adjustment.

**BRAKE PEDAL****Removal**

1. Remove pedal stop and stop light switch from pedal support bracket, also remove clutch pull back spring.
2. Loosen check nut on main cylinder push rod, and

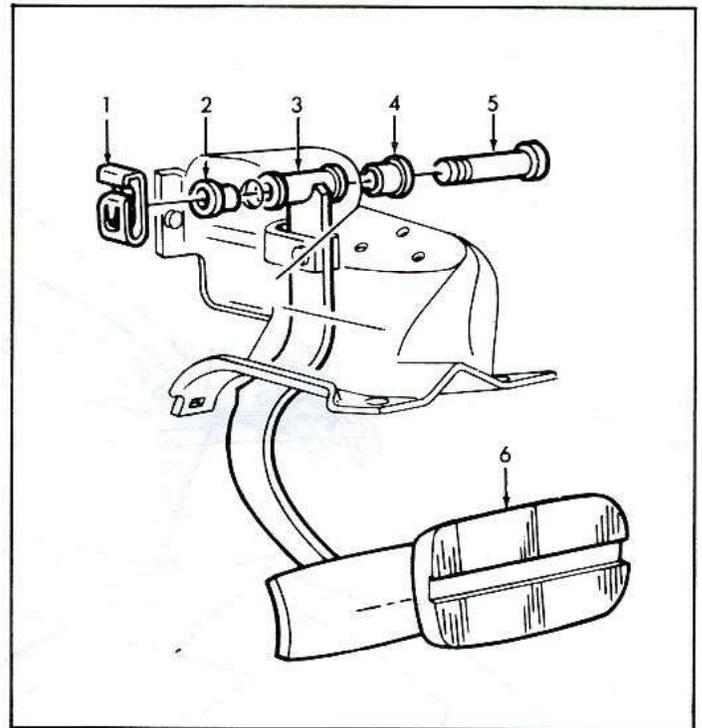


Fig. 17—Brake Pedal and Attachments—w/Automatic Trans.

- |                   |                      |
|-------------------|----------------------|
| 1. Retaining Clip | 4. Bushing           |
| 2. Bushing        | 5. Pedal Pivot Shaft |
| 3. Pedal          | 6. Pedal Pad         |

adjust push rod so that maximum clearance is obtained between push rod and piston.

3. Remove nut and lock washer from clutch pedal cross shaft and remove clutch pedal, then remove support bolt, lock washer and special washer.

**NOTE:** On Powerglide models remove and discard the retainer clip from the pedal pivot shaft.

4. Remove pedal pivot shaft, and withdraw pedal, push rod and clevis from support and rubber boot.
5. Remove clevis, push rod, pedal pad and shaft bushings from pedal assembly. Also remove bushing from support.

**Inspection**

1. Clean all metal parts with a nontoxic cleaning solvent.
2. Wipe the nylon bushings clean with a clean cloth.

**CAUTION:** Nylon bushings should not be treated with cleansing agent of any nature.

3. Inspect pivot pin and nylon bushings for wear and damage--replace parts as required.

**Installation**

1. Apply a light coating of Lubriplate to inside diameter of nylon bushings and install bushings to pedal bore and support.
2. Position push rod and clevis to pedal arm, and install clevis pin and retainer.

**CAUTION:** Install clevis pin from right side of pedal arm, for proper operating clearances and retention.

3. Apply rubber lube to push rod surface. Position complete pedal assembly to support and insert push rod through rubber boot. Install clutch pedal cross shaft from right side so that shaft goes through support assembly, pedal and bushings. Secure by installing support bolt with lock washer and special washer.

**NOTE:** On Powerglide models install pedal pivot pin from left side so that pin goes through support assembly and pedal bushings. Hold head of pivot pin securely against support, and install a new push-on type retainer. There should be no end play in pin after retainer is installed. (Install retainer so that flush side is snug against support.)

4. Install clutch pedal secure with lock washer and nut and torque to 30-35 ft. lbs.
5. Install pedal stop and stop light switch, and adjust brake pedal free play (see "Push Rod to Main Cylinder Clearance"). Also install clutch pull back spring.

## SHOES AND LININGS

**NOTE:** If brake drums are worn severely, it may be necessary to retract the adjusting screw. To gain access to the adjusting screw star wheel, knock out the lanced area in the web of the brake drum using a chisel or similar tool. Release the actuator from the star wheel by lifting with a small screw driver and back off the star wheel with a second screw driver (press down on handle to retract shoes).

**CAUTION:** After knocking out the metal, be sure to remove it from the inside of the drum and clean all metal from the brake compartment. A new hole cover must be installed when drum is reinstalled.

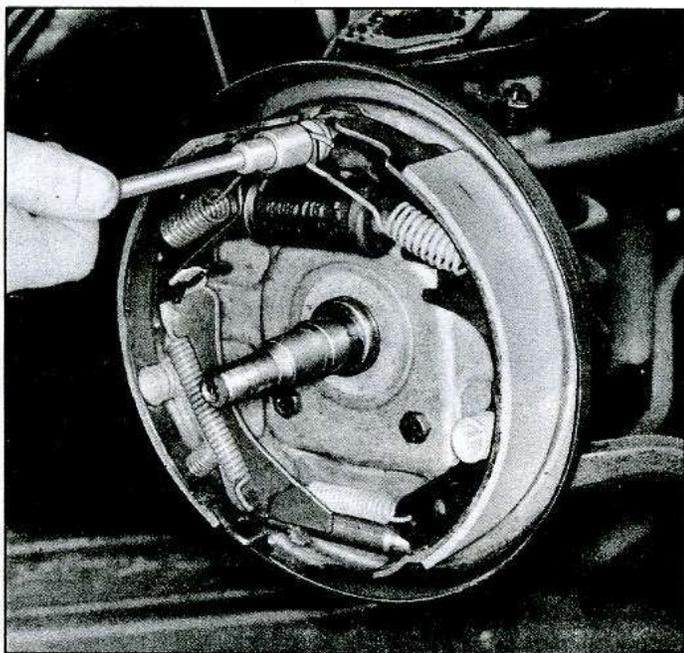


Fig. 18—Unhooking Pull Back Springs

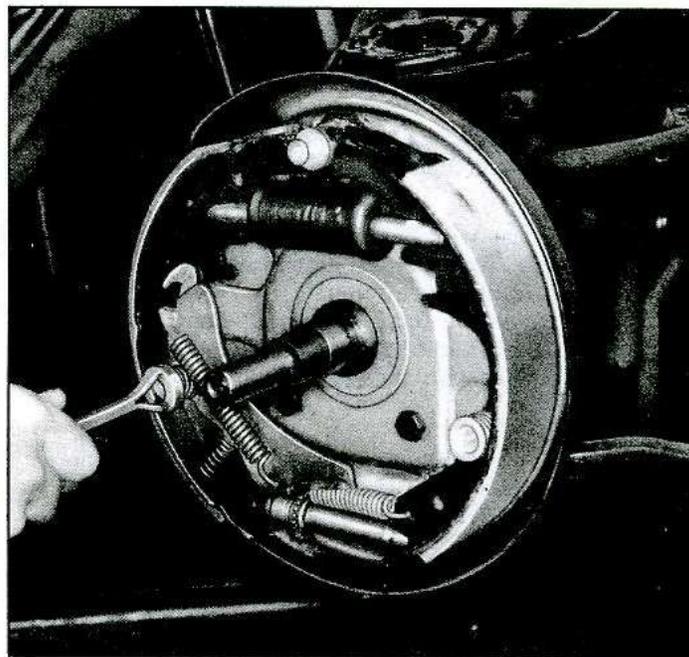


Fig. 19—Removing Hold Down Springs and Pins

## Removal

1. Raise the vehicle and place on stand jacks.
2. Loosen check nuts at forward end of parking brake cable sufficiently to remove all tension from brake cable.
3. Remove brake drum.

**NOTE:** Since boots are recessed in grooves on wheel cylinders to prevent pistons from leaving cylinders, it is not necessary to install wheel cylinder clamps when brake shoes are removed; however, brake pedal must not be depressed while drums are removed.

4. Unhook brake shoe pull back springs from anchor pin and link end, using Tool J-8049 (fig. 18).
5. Remove the actuator return spring.
6. Disengage the link end from the anchor pin and then from the secondary shoe.
7. Remove hold-down pins and springs using a pair of needle nose pliers (fig. 19).
8. Remove the actuator assembly.

**NOTE:** The actuator, pivot and override spring are on assembly. It is not recommended that they be disassembled for service purpose, unless they are broken. It is much easier to assemble and disassemble the brakes by leaving them intact.

9. Separate the brake shoes by removing adjusting screw and spring.
10. Remove parking brake lever from secondary brake shoe (rear only).
11. Clean dirt out of brake drum using care to avoid getting dirt into front wheel bearings. Inspect drums for roughness, scoring or out-of-round. Replace or recondition drums as necessary.
12. Inspect wheel bearings and oil seal and replace any necessary parts.
13. Carefully pull lower edges of wheel cylinder boots

away from cylinders and note whether interior is wet with brake fluid. Excessive fluid at this point indicates leakage past piston cups requiring overhaul of wheel cylinder.

**NOTE:** A slight amount of fluid is nearly always present and acts as lubricant for the piston.

14. If working at rear wheels, inspect backing plate for grease leakage past axle shaft seals. Install new seals if necessary.
15. Check all brake flange plate attaching bolts to make sure they are tight. Clean all rust and dirt from shoe contact faces on flange plate, using fine emery cloth.

#### Instr tion

**CAUTION:** Make certain to install recommended shoe and lining assemblies, otherwise serious fade or permanent failure may occur.

1. Inspect new linings and make certain there are no nicks or burrs on bonding material on shoe edge where contact is made with brake flange plate or on any of the contact surfaces.

**NOTE:** Keep hands clean while handling brake shoes. Do not permit oil or grease to come in contact with linings.

2. If working on rear brakes, lubricate parking brake cable.
3. On rear brakes only, lubricate fulcrum end of parking brake lever and the bolt with brake lube, then attach lever to secondary shoe with bolt, spring washer, lock washer and nut. Make sure that lever moves freely.
4. Before installation, make certain the adjusting screw is clean and lubricated properly.

**NOTE:** Loose adjustment may occur from an adjusting screw that is not properly operating. If the lubrication in the adjusting screw assembly is contaminated or destroyed, the adjusting screw should be thoroughly cleaned and lubricated.

5. Connect brake shoes together with adjusting screw spring, then place adjusting screw, socket and nut in position.

**CAUTION:** Make sure the proper adjusting screw is used (screw stamped "L" for left side of vehicle and "R" for right side of vehicle). The star wheel should only be installed with the star wheel nearest to the secondary shoe and the adjusting screw spring inserted properly to prevent interference with the star wheel.

6. Secure the primary brake shoe (short lining--faces forward) first with the hold-down pin and spring using a pair of needle nose pliers. Engage shoes with the wheel cylinder connecting links.
7. Secure the actuator assembly, override spring and return spring on the secondary shoe.
8. Install and secure the actuator assembly and secondary brake shoe with the hold-down pin and spring using a pair of needle nose pliers.
9. Install guide plate over anchor pin.
10. Install the wire link.

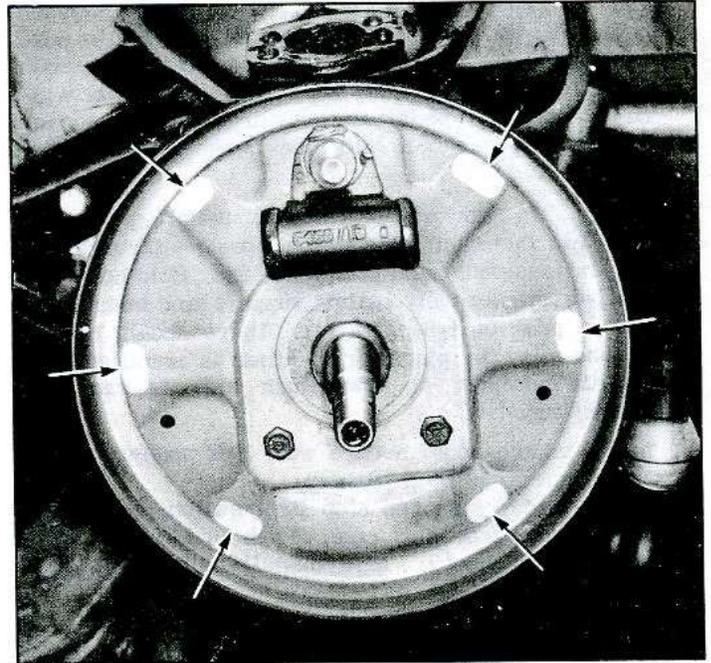


Fig. 20—Backing Plate Contact Surfaces

**NOTE:** Do not hook the wire link over the anchor pin stud with the regular spring hook tool. This may damage the cylinder boot seals. Place the wire link over the anchor pin stud first, and then fasten to the actuator assembly by holding the adjuster assembly in the full down position.

11. On rear brakes connect to parking brake lever and install strut between lever and primary shoe as installation is made.
12. If old brake pull back (return) springs are nicked,

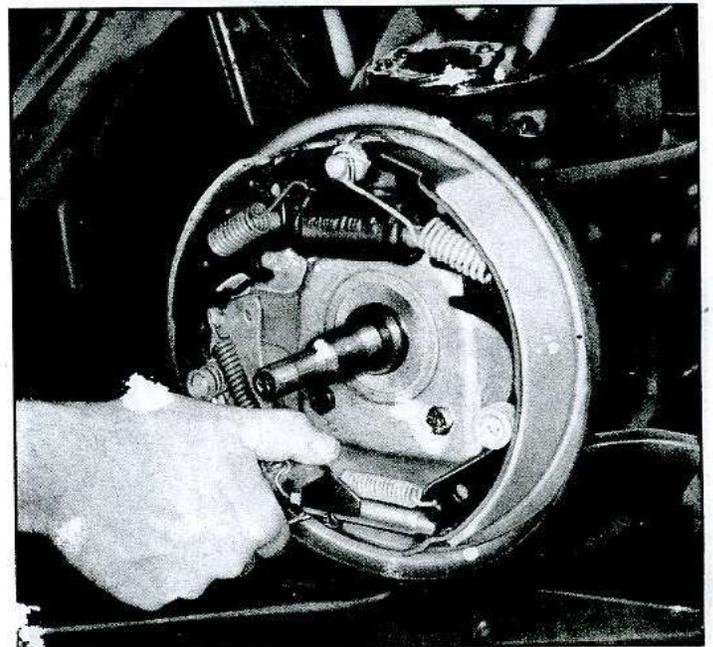


Fig. 21—Checking Operation of the Actuating Lever

distorted, or if strength is doubtful, install new springs.

13. Hook springs in shoes using Tool J-8049 by installing the primary spring from the shoe over the anchor pin and then spring from secondary shoe over the wire link end.
14. Pry shoes away from backing plate and lubricate shoe contact surfaces with a thin coating of brake lubs (fig. 20).

**CAUTION:** Be careful to keep lubricant off facings.

15. After completing installation, make certain the actuator lever functions easily by hand operating the self-adjusting feature (fig. 21).
16. Follow the above procedure for all brakes.
17. Adjust the service brakes as outlined below, then adjust the parking brake.

## MAIN CYLINDER

### Removal

1. Provide suitable protective cover for luggage compartment and exterior portion of front fender panel.
2. Disconnect hydraulic line from outlet end of cylinder and tee.
3. Remove the two retaining nuts and lock washers from the cylinder mounting studs, and remove the cylinder, gasket, and rubber boot from the vehicle.

### Disassembly

1. Remove boot from main cylinder.
2. Place main cylinder in a vise so that the lock ring (fig. 22) can be removed from the small groove in the I.D. of bore.

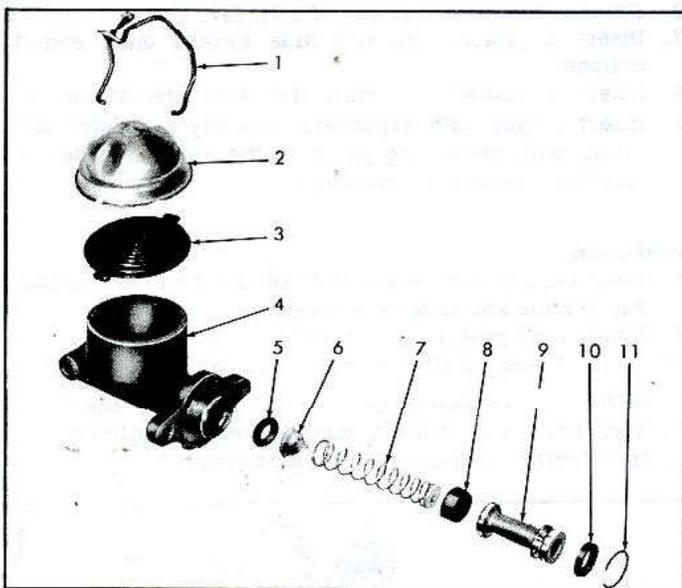


Fig. 22—Brake Main Cylinder

- |                    |                   |
|--------------------|-------------------|
| 1. Bail Wire       | 7. Spring         |
| 2. Reservoir Cover | 8. Primary Cup    |
| 3. Seal            | 9. Piston         |
| 4. Body            | 10. Secondary Cup |
| 5. Valve Seat      | 11. Lock Ring     |
| 6. Valve Assembly  |                   |

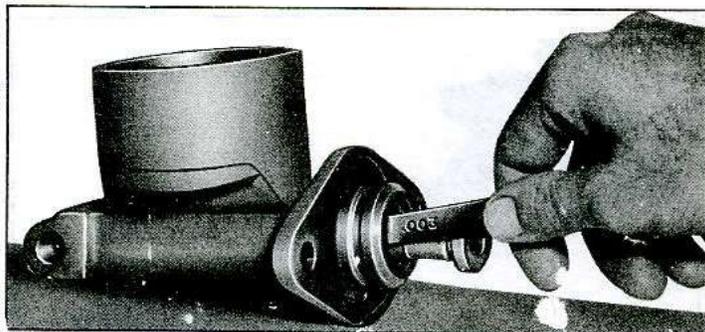


Fig. 23—Checking Main Cylinder Piston Fit

3. Remove lock ring, main cylinder piston assembly, primary cup, spring and valve assembly and valve seat from cylinder bore.
4. Pry ball wire off cover with screw driver or similar tool and remove cover and seal.

### Inspection

1. Wash all parts in clean alcohol. Make sure that compensating and bypass ports in main cylinder body and bypass holes in piston are clean and open.

**NOTE:** Before washing parts, hands must be clean. Do not wash hands in gasoline or oil before cleaning parts. Use soap and water to clean hands.

2. Inspect cylinder bore for corrosion, pits and foreign matter.
3. Inspect primary and secondary cups, check valve and valve seat for damage and swelling. Swelling of rubber parts is due to the use of improper brake fluid or washing parts in gasoline or kerosene.
4. Check piston fit in cylinder bore (fig. 23). The clearance between piston and wall of cylinder should be 0.001-0.005 inch.

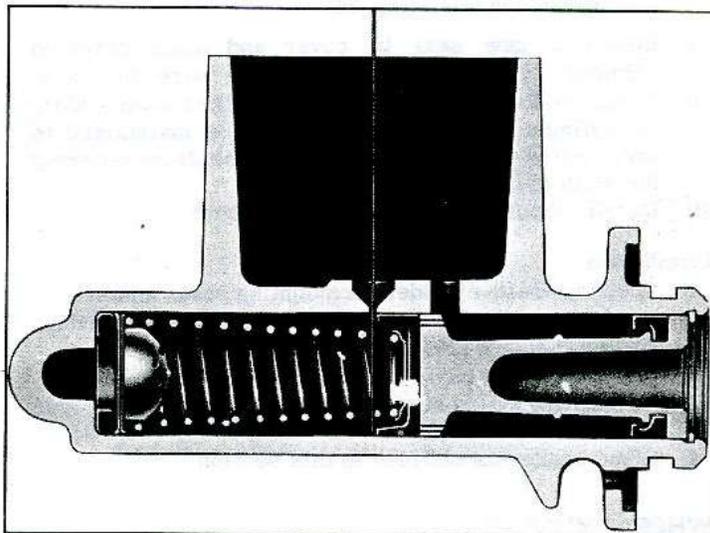


Fig. 24—Checking Compensating Port Clearance

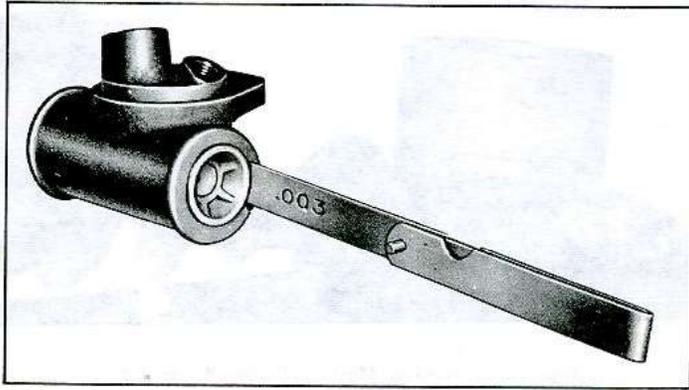


Fig. 25—Checking Wheel Cylinder Piston Fit

### Assembly

Whenever a hydraulic brake main cylinder is overhauled, care must be taken to reassemble the check valve correctly. Improper assembly of the check valve seat will result in its distortion. When the check valve seat is distorted, there will be no check valve action and there will be a loss of brake pedal travel, also, the pedal will have to be depressed or pumped one or more times before actual car braking occurs.

1. Install valve seat in cylinder bore so that flat portion of seat rests against end of cylinder bore.
2. Position valve and spring assembly into bore.
3. Dip primary cup into clean brake fluid and install into main cylinder with the flat side toward push rod end. Make sure cup seats over end of spring.
4. Assemble the secondary seal in the groove on the piston so that the lip faces toward the end of the piston that contains the bypass holes.
5. Dip piston in clean brake fluid and place piston in cylinder bore.
6. Install piston stop ring.
7. Check clearance between the edge of the primary cup and the center of compensating port.

**NOTE:** This check is made easily by using a wire and inserting it through the reservoir and into piston chamber (fig. 24).

8. Install a new seal in cover and place cover on cylinder. Secure by snapping bail wire in place.
9. Install rubber boot, making certain boot seals tightly on cylinder body. This seal must be maintained to keep water and other foreign matter from entering the main cylinder.
10. Install mounting gasket to main cylinder.

### Installation

1. Position main cylinder on mounting studs and secure to dash wall. Make sure push rod goes through rubber boot and into piston.
2. Connect brake line to main cylinder.
3. Check, and if necessary, adjust brake pedal free play.
4. Bleed brakes as outlined in this section.

## WHEEL CYLINDER

### Removal

1. Raise vehicle and place on jack stand.

2. Remove wheel and tire assembly, back off brake adjustment (only if necessary) and remove drum.
3. Disconnect brake system hydraulic line from cylinder.
4. Remove brake shoe pull back springs.
5. Remove two cap screws that hold wheel cylinder to flange plate, disengage wheel cylinder push rods from brake shoes, and remove wheel cylinder.

### Disassembly

1. Remove the cylinder boots.
2. Remove the pistons, rubber cups and spring.
3. Wash all parts in clean alcohol.

**NOTE:** Before washing parts, hands must be clean. Do not wash hands in gasoline or fuel oil before cleaning parts. Use soap and water to clean hands.

### Inspection

1. Inspect cylinder bore for smoothness. A scored or damaged cylinder must be replaced.
2. Check rubber cups for damage or swelling. Replace the cups when necessary. Improper brake fluid will cause the cups to swell as much as 40 per cent.
3. Check fit of the piston in the cylinder bore, using a feeler gauge (fig. 25). This clearance should be from .002"-.004". If clearance exceeds .004", replace cylinder.

### Assembly (Fig. 26)

1. Moisten cylinder bore, pistons and rubber cups with brake fluid before assembly.
2. Place a boot over one end of cylinder.
3. Insert a piston with flat side toward open end of cylinder.
4. Insert a rubber cup with flat side against piston.
5. Insert spring with expanders securely connected and follow with remaining parts in the reverse order of foregoing assembly procedure.

### Installation

1. Position wheel cylinder to brake flange plate, install cap screws and tighten securely.
2. Replace all push rods and pull back springs.
3. Connect hose or line to wheel cylinder.

**NOTE:** If replacing front wheel cylinder, connect hose and inspect installation as outlined in "Hydraulic Brake Hose Replacement."

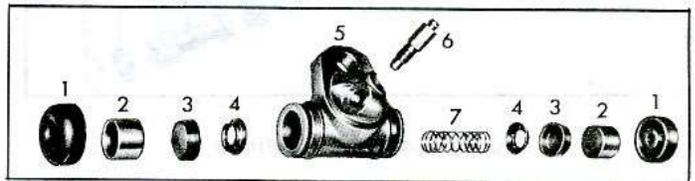


Fig. 26—Wheel Cylinder

- |                        |                  |
|------------------------|------------------|
| 1. Push Rod Boot       | 5. Housing       |
| 2. Piston              | 6. Bleeder Valve |
| 3. Piston Cup          | 7. Spring        |
| 4. Piston Cup Expander |                  |

4. Install drum and wheel.
5. Bleed brakes as specified in this section.

## BRAKE DRUMS

Front brake drums are the demountable type; that is, they can be removed without removing the hub. Rear brake drums are demountable and may be removed without removing the axle shaft.

A lanced "knock out" area (fig. 27) is provided in the web of the brake drum for servicing purposes in the event retracting of the brake shoes is required in order to remove the drum.

**NOTE:** If brake drums are worn severely, it may be necessary to retract the adjusting screw. To gain access to the adjusting screw star wheel, knock out the lanced area in the web of the brake drum using a chisel or similar tool. Release the actuator from the star wheel by lifting with a small screw driver and back off the star wheel with the second screw driver (press down on the handle to retract shoes).

**CAUTION:** After knocking out the metal, be sure to remove it from the inside of the drum and clean all metal from the brake compartment. A new hole cover must be installed when drum is reinstalled.

### Removal

1. Raise vehicle and place on jack stand.
2. Remove wheel and tire assembly, back off brake adjustment and remove drum.

### Inspecting and Reconditioning

Whenever brake drums are removed they should be thoroughly cleaned and inspected for cracks, scores, deep grooves, and out-of-round. Any of these conditions must be corrected since they can impair the efficiency of brake operation and also can cause premature failure of other parts.

Smooth up any slight scores by polishing with fine emery cloth. Heavy or extensive scoring will cause excessive brake lining wear and it will probably be necessary to rebore in order to true up the braking surface.

An out-of-round drum makes accurate brake shoe adjustment impossible and is likely to cause excessive wear of other parts of brake mechanism due to its eccentric action.

A drum that is more than .008" out-of-round on the diameter is unfit for service and should be rebored. Out-of-round, as well as taper and wear can be accurately measured with an inside micrometer fitted with proper extension rods.

If drum is to be rebored for use with standard size brake facings which are worn very little, only enough metal should be removed to obtain a true smooth braking surface.

If drum has to be rebored more than .020" over the standard diameter, it should be rebored to .060" diameter oversize and the brake facing should be replaced with .030" oversize facings.

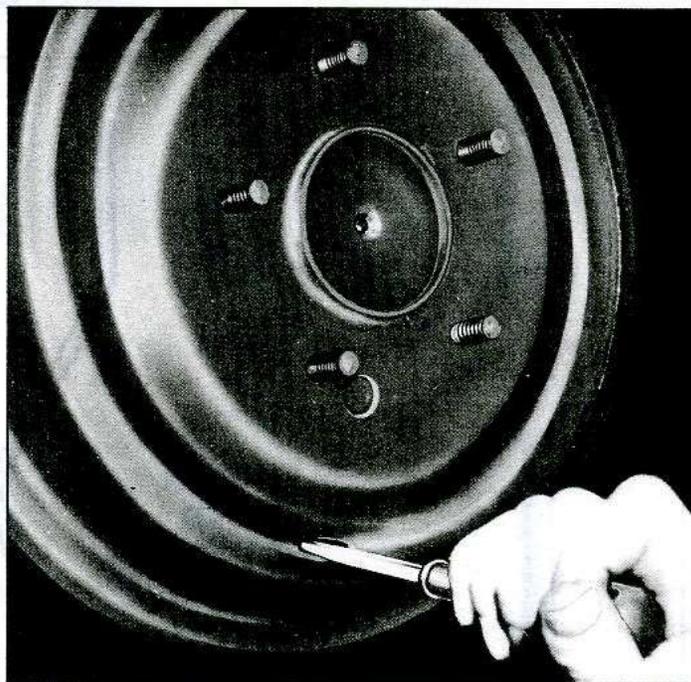


Fig. 27—Brake Drum Access Hole

A brake drum must not be rebored more than .060" over the maximum standard diameter, since removal of more metal will effect dissipation of heat and may cause distortion of drum. Chevrolet brake facing is not furnished larger than .030" oversize and this will not work efficiently in drums bored more than .060" oversize.

Brake drums may be finished either by turning or grinding. Best brake performance is obtained by turning drums with a very fine feed. To insure maximum lining life, the refinished braking surface must be smooth and free from chatter or tool marks, and run-out must not exceed .005" total indicator reading.

### Cleaning

New brake drums in parts stock are given a light coating of rust proofing oil to prevent the formation of rust on the critical braking surfaces during the time that the drums are in storage.

This rust proofing oil must be carefully removed before the drum is placed in service to prevent any of this oil from getting on the brake shoe facings, which might cause an extreme brake grab condition.

It is recommended that a suitable volatile, nontoxic, greaseless type solvent be used to clean the oil from the braking surface of the new brake drums before they are placed in service to insure the cleanest possible surface.

Gasoline or kerosene should not be used as there is danger that a portion of the diluted oily substance may be left on the braking surface that may later cause difficulty.

### Installation

1. Make brake adjustment as outlined in this section.
2. Install brake drum, aligning tang with wheel hub (fig. 15).
3. Install wheel and tire assembly.
4. Make final brake adjustment as outlined in this section and check brake operation.

## SPECIAL TOOLS

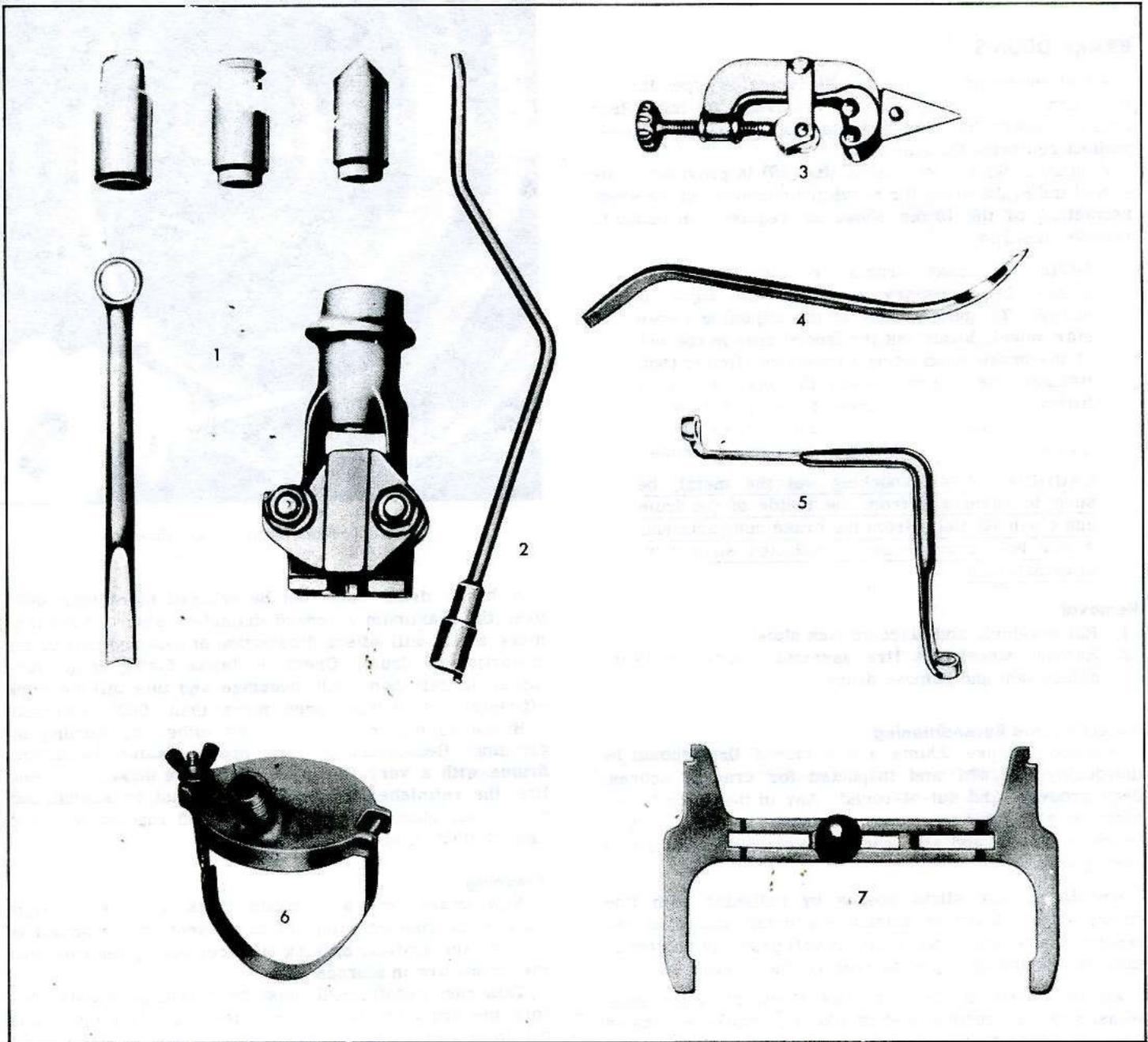


Fig. 28—Special Tools

1. J-8051 Brake Tool Flaring Tool  
 2. J-8049 Brake Spring Remover  
 and Installer

3. J-8113 Brake Tube Cutter  
 4. J-9485 Brake Adjusting Tool  
 5. J-21472 Brake Bleeder Wrench

6. J-21479 Pressure Bleeder Adapter  
 7. J-21177 Drum-to-Brake Shoe  
 Clearance Gauge

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