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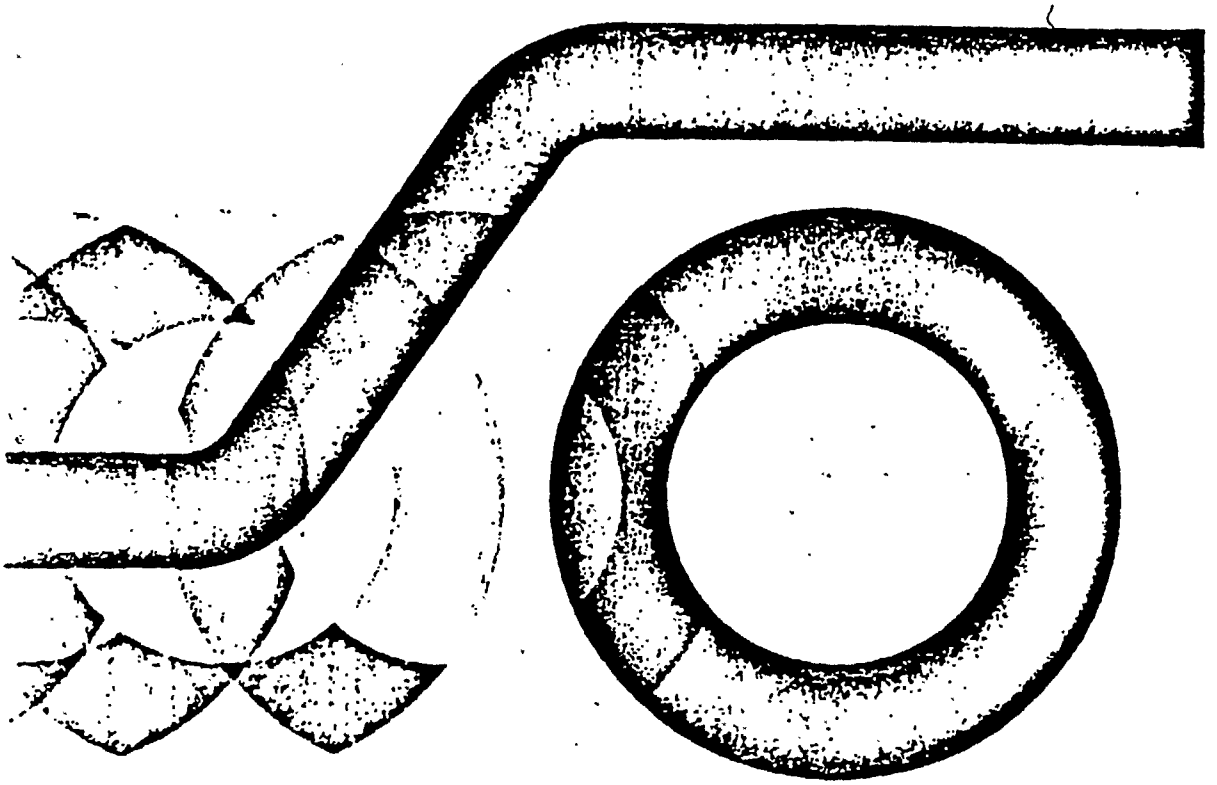

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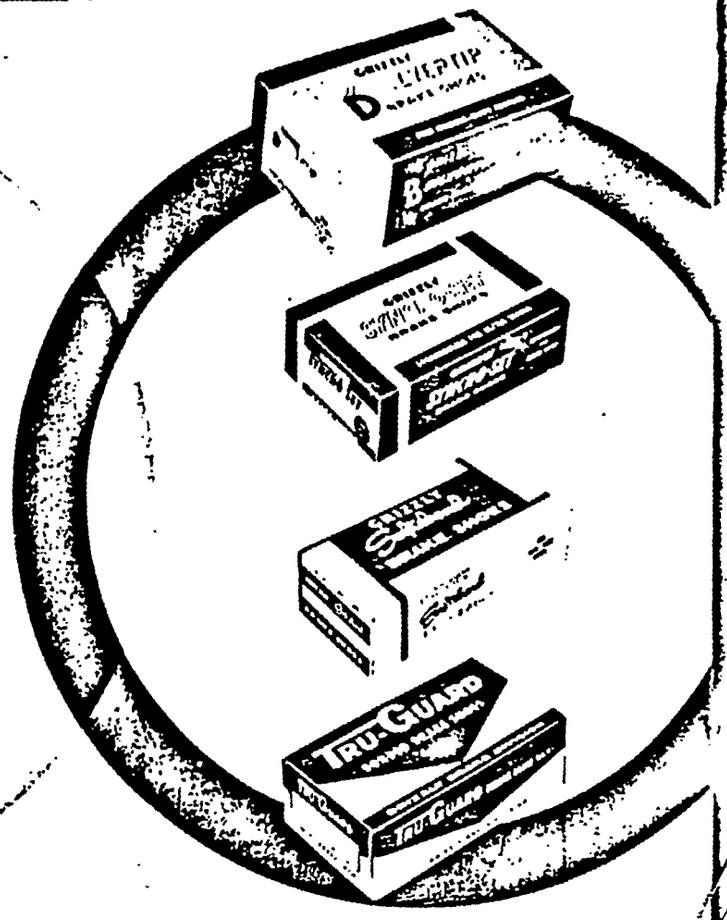

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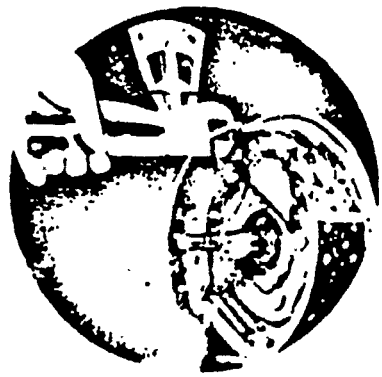

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INDEX PAGE

STANDARD BRAKES APPLICATION GUIDE - 1963

Car Make	Type of Brake	Pos.	System Desc. Page	Master Cyl. Rep. Page	Wheel Cyl. Rep. Page	Shoes		Man. Adj. Page
						Removal Page	Inst. Page	
Avanti	Caliper Disc	F.	3	20	28	14	14	14
	Bendix Non-Servo	R.	19*	20	28	102*	104*	77*
Buick	Bendix A-J	F&R	2	19	28	8	9	5
	Delco Moraine A-J	F&R	2	19	28	11	12	6
Cadillac	Bendix A-J	F&R	2	20	28	8	9	5
	Delco Moraine A-J	F&R	2	21	28	11	12	6
Chevrolet	Delco Moraine A-J	F&R	2	19	28	11	12	7
Chevy II	Delco Moraine A-J	F&R	2	19	28	11	12	7
Chrysler	Bendix A-J	F&R	2	19	28	8	9	5
Comet	Bendix A-J	F&R	2	19	28	8	9	5
Corvair	Delco Moraine A-J	F&R	2	19	28	11	12	7
Corvette	Delco Moraine A-J	F&R	2	19	28	11	12	7
Dart	Bendix A-J	F&R	2	19	28	8	9	5
Dodge	Bendix A-J	F&R	2	19	28	8	9	5
Fairlane	Bendix A-J	F&R	2	19	28	8	9	5
Falcon	Bendix A-J	F&R	2	19	28	8	9	5
Ford	Bendix A-J	F&R	2	19	28	8	9	5
Imperial	Bendix A-J	F&R	2	19	28	8	9	5
Lincoln	Bendix A-J	F&R	2	19	28	8	9	5
Mercury	Bendix A-J	F&R	2	19	28	8	9	5
Meteor	Bendix A-J	F&R	2	19	28	8	9	5
Oldsmobile (Incl. F-85)	Bendix A-J	F&R	2	19	28	8	9	5
	Delco Moraine A-J	F&R	2	19	28	11	12	7
Plymouth	Bendix A-J	F&R	2	19	28	8	9	5
Pontiac	Delco Moraine A-J	F.	2	19	28	11	12	6
	Delco Moraine A-J	R.	2	19	28	11	12	7
	Bendix A-J	F.	2	19	28	8	9	5
	Bendix A-J	R.	2	19	28	8	9	5
Rambler American	Bendix A-J	F&R	2	20	28	8	9	5
Rambler Classic 6	Wagner A-J	F&R	2	20	28	13	13	7
Rambler Ambassador	Bendix A-J	F&R	2	20	28	8	9	5
Studebaker	Wagner A-J	F&R	2	20	28	13	13	7
Tempest	Bendix A-J	F&R	2	19	28	8	9	6
	Delco Moraine A-J	F&R	2	19	28	11	12	6
Thunderbird	Bendix A-J	F&R	2	19	28	8	9	5
Valiant	Bendix A-J	F&R	2	19	28	8	9	5
Willys	Bendix Non-Servo	F&R	19*	20	28	102*	104*	77*

Abbreviations: A-J Automatic Adjusting F - Front R - Rear
NOTE: *Indicates Pages in 1962 Manual

POWER BRAKES APPLICATION GUIDE - 1963

Most generally the power brake applications used as standard, or optional equipment, on 1963 model passenger cars are identical to those listed in the 1962 Manual as standard, or optional, equipment on those cars.

New types of power brakes for 1963 are underscored in this application guide and the page reference given for such applications refer to page numbers in this Manual. The page numbers not underscored refer to page numbers in our 1962 Manual.

Car Make & Model	Unit Mfgr.	Type of Unit	Principles of Operation Page	Removal Page	Inst. Page
American Motors (all)	Bendix	Master-Vac (Tandem)	206	213	215
Buick (4400-4800 Series)	Delco Moraine	Rolling Diaphragm	216	220	222
Buick (4000-4300 Series)	Kelsey-Hayes	Bellows	26	28	28
Cadillac (all)	Bendix	Master-Vac (Tandem)	206	213	215
	Delco Moraine	Rolling Diaphragm (Tandem)	225	229	231
Chevrolet (exc. Corvette)	Bendix	Master-Vac	206	213	215
Chevrolet (incl. Corvette)	Delco Moraine	Rolling Diaphragm	216	220	222
Chevy II (all)	Bendix	Master-Vac	206	213	215
	Delco Moraine	Rolling Diaphragm	216	220	222
Chrysler (exc. C-300 J)	Bendix	Master-Vac	206	213	215
(exc. C-300 J)	Midland Ross	Hy-Lond PT	251	255	255
Chrysler C-300 J	Midland Ross	Hy-Power (Remote)	244	21	21
Dart (all)	Midland Ross	Hy-Lond PT	251	255	255
Dodge (all)	Bendix	Master-Vac	206	213	215
	Midland Ross	Hy-Lond PT	251	255	255
Fairlane (all)	Midland Ross	Hy-Lond PT	251	255	255
Ford (all)	Midland Ross	Hy-Lond PT	251	255	255
Lincoln (all)	Midland Ross	Hy-Lond PT	251	255	255
Mercury (all)	Midland Ross	Hy-Lond PT	251	255	255
Meteor (all)	Midland Ross	Hy-Lond PT	251	255	255
Oldsmobile (exc. F-85)	Bendix	Master-Vac	206	213	215
	Delco Moraine	Rolling Diaphragm	216	220	222
Oldsmobile F-85	Kelsey-Hayes	Bellows	26	28	28
Plymouth	Bendix	Master-Vac	206	213	215
	Midland Ross	Hy-Lond PT	251	255	255
Pontiac (all)	Bendix	Master-Vac	206	213	215
	Delco Moraine	Rolling Diaphragm	216	220	222
Studebaker (all)	Bendix	Master-Vac	206	213	215
Tempest	Bendix	Master-Vac	206	32	32
Thunderbird	Midland Ross	Hy-Lond PT	251	255	255
Valiant	Bendix	Master-Vac	206	213	215

1963 Applications

All 1963 models of American built passenger cars, including the Compact class are equipped with Automatic Adjusting Brakes unless exceptions are pointed out in the application index or noted in the text of this manual.

Basically and fundamentally the three popular types of Automatic Adjusting brakes are similar. The principal difference in them is the manner in which the star adjusting wheel is actuated in order to perform the automatic adjustment as lining wear occurs. Following is a detailed description by type of the 1963 Automatic Adjusting Systems:

BENDIX TYPE

The Bendix type automatic adjusting brake is a two shoe duo-servo type that uses a cable, a cable guide, adjusting lever, and adjuster spring to actuate the adjusting screw. (see fig. 1)

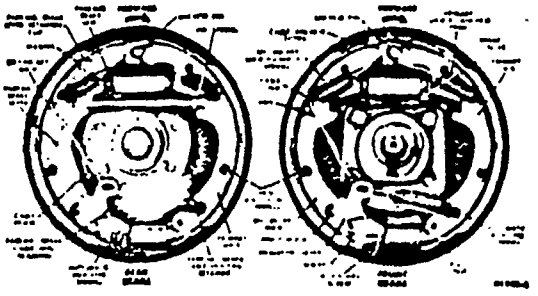

Fig. 1

The cable is hooked over the anchor pin at the top and is connected to the adjusting lever at the bottom. It is attached to the secondary brake shoe by means of the cable guide. The adjuster lever is attached to the primary brake shoe by means of the adjuster spring.

DELCO MORAINE TYPE

The Delco Moraine type of automatic brake is a two shoe duo-servo brake with a special system of rods and levers which actuate the star adjusting wheel. These consist of an actuating link, actuating pivot, override spring, actuator, actuator return spring and, adjusting screw.

A feature of this brake is the override spring and override pivot. This is a safety feature which allows the secondary shoe to be applied, when travelling in reverse, in the event the adjusting screw should become "frozen" this preventing the self-adjuster from operating. On Chevrolet applications the actuator, pivot and override spring are an assembly. (Cadillac brakes do not have the override device)

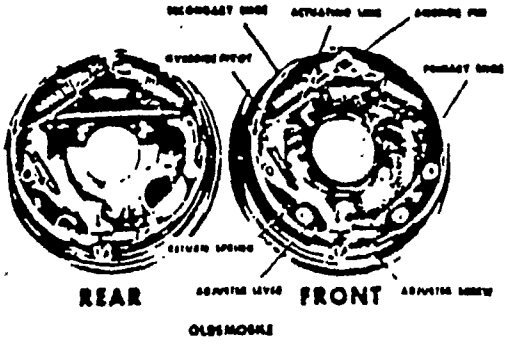

Fig. 2 Delco Duo-Servo Brakes - Automatic Adjusting.

WAGNER TYPE

The Wagner type of automatic adjusting brake is used on 1963 American Motors 10 series (6 Cyl.) cars and all Studebaker models except Avanti. It is a two shoe servo-compound type.

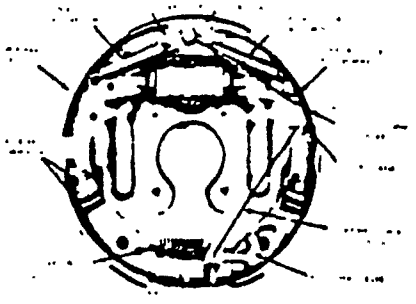

Fig. 3 Wagner - Left Front Brake Assembly.

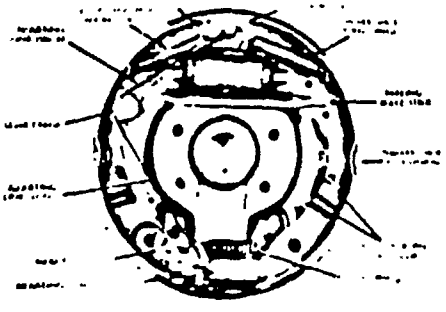

Fig. 4 Wagner - Right Rear Brake Assembly.

This brake uses an upper link (short), lever crank, lower link (long), and an adjusting lever to actuate the adjusting star wheel.

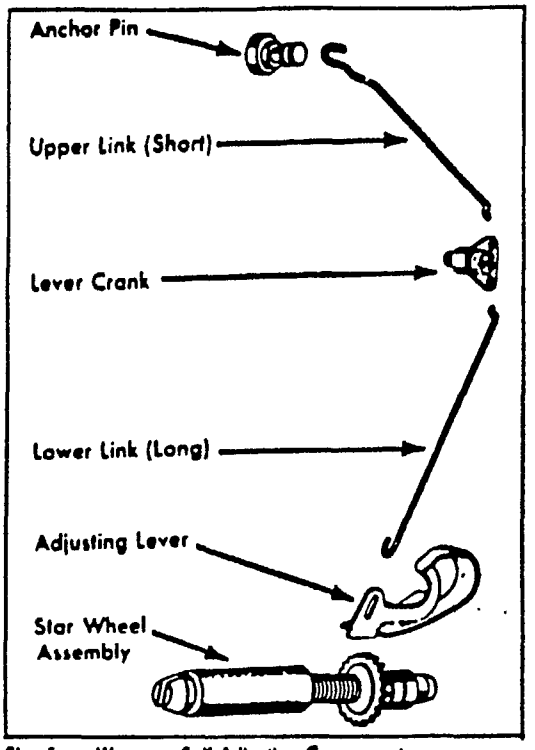

Fig. 5 Wagner - Self-Adjusting Components.

CALIPER DISC TYPE

The Caliper Disc type of automatic adjusting brake is used on the front wheel brakes of the 1963 Studebaker Avanti and is available as optional equipment on the other 1963 Studebaker models.

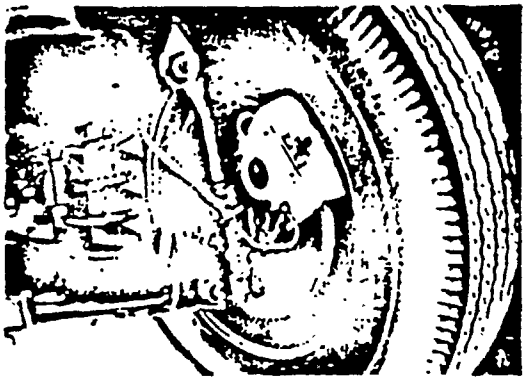

Fig 6 Caliper Disc Brake

The wheel unit is made up of a rotating disc and two rectangular friction pads, actuated by hydraulic wheel cylinders which are supported by a caliper bridge. A dust shield is provided for protecting the inner surface of the disc. The wheel provides protection for the outer surface of the disc. The rotating disc is secured to and rotates with the wheel hub. The caliper bridge is secured to an adapter bracket attached to the steering knuckle.

Each of the two wheel cylinders are secured to the caliper bridge with four cap screws and lockwashers. The friction pads clip to the pistons of the wheel cylinders and are held in position in the caliper bridge by a retainer plate and a retainer clip.

The wheel cylinder consists of a cylinder body, Piston Seal, Piston with a self-adjusting, and retracting mechanism, and a dust seal. The wheel cylinders are connected in series by a pipe assembly.

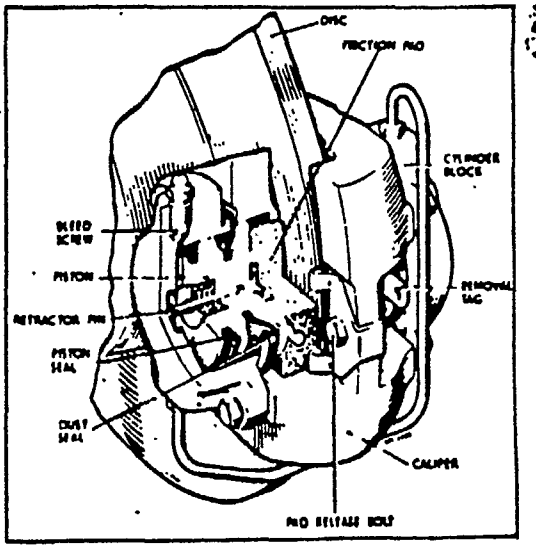

Fig. 7

PRINCIPLES OF OPERATION - CALIPER TYPE

In the released position there is no hydraulic pressure to the wheel cylinders because the master cylinder does not have a residual pressure check valve. The retracting spring holds the cylinder piston and friction pad in the released position which provides clearance between the friction pad and the rotating disc. (see fig. 8)

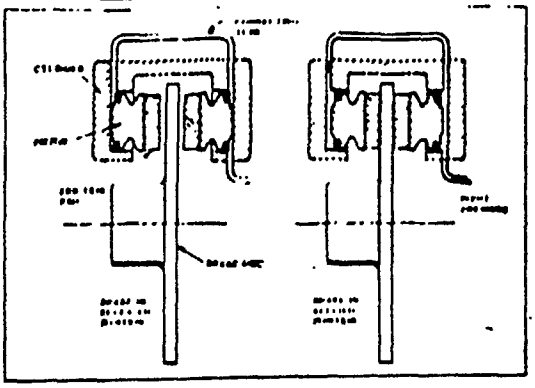

Fig. 8

As hydraulic pressure from the master cylinder applies pressure to the cylinders, the wheel cylinder piston forces the friction pads against the rotating disc applying the brakes (see fig. 9). A pressure is also set up against the retracting mechanism within the wheel cylinder piston.

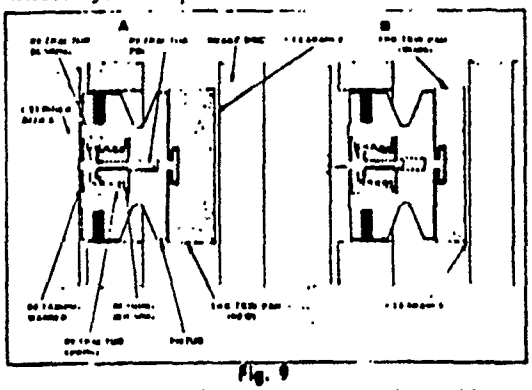

Fig. 9

As the hydraulic pressure is released from the wheel cylinders, the pressure that was applied to the retracting mechanism spring will assist in retracting the wheel cylinder piston and friction pads. The wheel cylinder pistons will force the brake fluid back to the master cylinder.

The retracting mechanism connects the wheel cylinder piston, through a spring, a spring seat, and a friction type bushing to a stationary pin that is secured to the wheel cylinder body. The bushing slides on the stationary pin by the travel of the piston to provide the automatic adjustment feature to compensate for friction pad wear.

NOTE: The rear brakes used in conjuction with the caliper disc front brakes are conventional Bendix two shoe non-servo, self centering anchor type. (See 1962 manual)

PRINCIPLES OF OPERATION - OTHER THAN CALIPER DISC TYPE

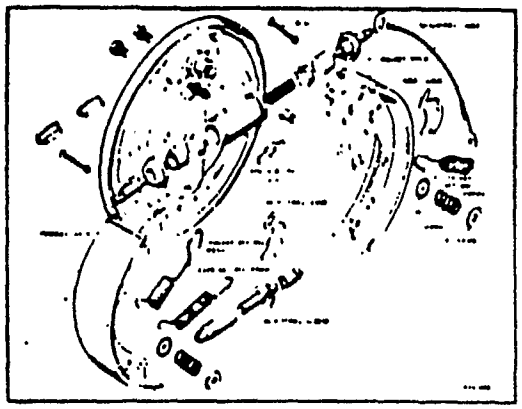

Fig. 10 Bendix Self-Adjusting - Front - Chrysler

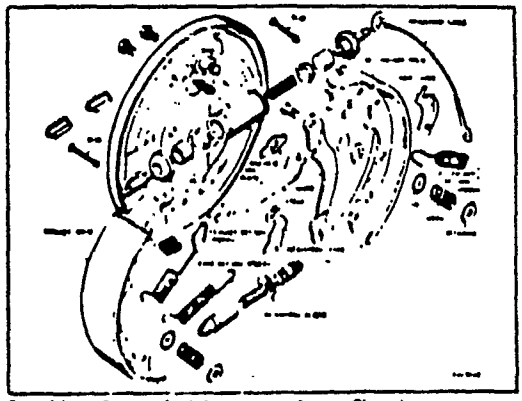

Fig. 11 Bendix Self-Adjusting - Rear - Chrysler.

The principle of the Automatic Adjusting type of brake is that when the brakes are applied while the car is travelling in a reverse direction the secondary shoe forces the upper end of the primary shoe against the brake anchor pin. The upper end of the secondary shoe is forced away from the anchor pin. The movement of the secondary shoe causes the cable to pull the adjusting lever upward and against the end of a tooth on the adjusting screw, the upward travel of the lever increases as lining wear increases. When the lever can move upward far enough, due to increase in lining wear, it passes over the end of the tooth and engages the tooth. When the brakes are released, the automatic adjuster spring pulls the lever downward causing the star wheel to turn and expand the shoes thus compensating for lining

wear. The star wheel is turned one tooth at a time as the linings progressively wear.

When the car is moving forward and the brakes are applied, the secondary shoe is against the anchor pin and the primary shoe is moved against the drum. Therefore, the adjuster does not operate. In 1963 there is one exception to the above outlined automatic adjusting principle. Chevrolet offers a special "Heavy Duty" self adjusting brake as optional equipment on the Corvette Sting Ray models. Metallic linings are standard equipment on this brake. In this brake the self adjusting device is mounted on the primary shoe and functions as the brakes are applied with the car travelling in a forward direction. Adjustment procedures, etc. are the same as for the other automatic adjustment assemblies. The front and rear brake assemblies are basically the same except that the parking brake lever, link and spring are located in the rear brakes. The anchor pins are fixed and non-adjustable.

ADJUSTMENTS:

Minor: Although these brake types are self-adjusting a manual brake adjustment is required after the brake shoes have been relined, or replaced, or when the length of the adjusting screw has been changed while performing some other service operation.

MANUAL ADJUSTMENT - BENDIX TYPE:

In order to perform a manual adjustment it is necessary to insert an ice pick, thin screw driver or other suitable tool, through the star wheel adjusting hole to hold the adjusting lever out of engagement with the adjusting screw. Alternative: Remove all wheel and drum assemblies and free up all adjustment screws.

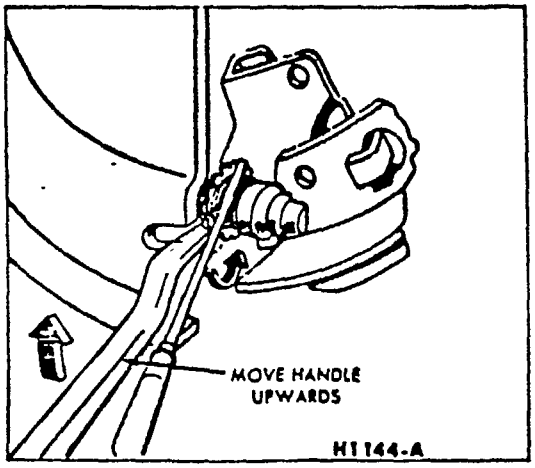

Fig. 12

1. After the shoes have been installed or the adjusting screw has been turned install the drum.

2. Remove the adjusting hole cover from the backing plate and turn the adjusting screw upward to expand the shoes. Continue until a slight drag is felt when the drum is rotated. (See fig. 13)


Fig. 13

3. Remove the drum. Hold the adjusting lever out of engagement with the adjusting screw. Back off the adjusting screw 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 adjusting screw with oil and coat with wheel bearing grease. Any deviation from this procedure may cause damage to the adjusting screw and consequent self adjuster problems.

4. Re-install the drum. Make a number of stops, while travelling in reverse. Alternate method is: with the car mounted on a hoist and some one seated in the car, have helpers vigorously spin the front wheels in a backward direction while several applications of the brake pedal are made. This balances the adjustment on all four wheels.

5. On rear brakes a step-saver, before connecting the parking brake cable, is: with the car on the hoist and some one in the driver's seat, start the motor and with the transmission lever engaged in reverse apply and release the brake pedal several times.

After this has been done, connect the parking brake cable. Be sure to check the parking brake cables for proper adjustment. Check to see that the equalizer lever operates freely.

If Chevrolet, Oldsmobile or Pontiac 1963 models are equipped with Bendix type brakes, see Delco-Moraine section for manual adjustment procedure.

MANUAL ADJUSTMENT-DELCO MORAINE TYPE

(Except Chevrolet and Oldsmobile)

1. After relining or replacing shoes, in order for the drum to slide over the shoes freely, shorten the star wheel adjusting screw until the star wheel is approximately 1/8" from the pivot nut.

2. After installing drum turn star wheel away from adjusting lever until the shoes drag heavily in drum. Then, while holding adjusting lever away from the star wheel with a small rod or a wire hook, turn star wheel back towards adjusting lever one complete turn or 30 notches.

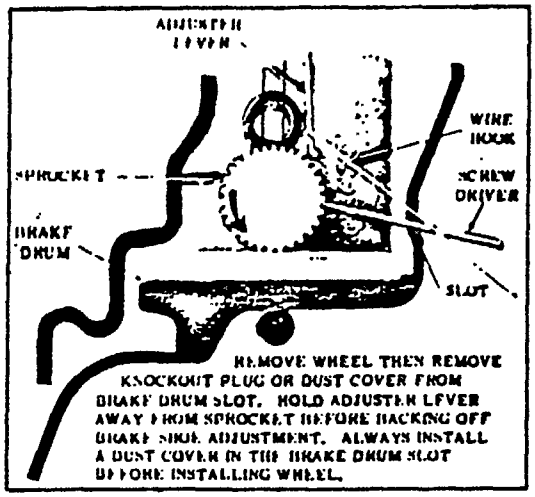

Fig. 14

NOTE: Alternate method is: with the car mounted on a hoist and some one seated in the car, have helpers vigorously spin the front wheels in a backward direction while several applications of the brake pedal are made. On rear brakes a step-saver, before connecting the parking brake cable, is: with the car on the hoist and some one in the driver's seat, start the motor and with the transmission lever engaged in reverse, apply and release the brake pedal several times. After this has been done, connect the parking brake cable.

3. Complete the adjustment by making a number of stops while the car is travelling in reverse. This will automatically adjust the shoes to uniform clearance.

NOTE: 1963 Pontiac Cars (Tempest excepted) have adjustable front anchors. Adjust as follows:

(a) Install drums. Retain rear drums with one wheel nut.

(b) Remove adjusting hole covers from front backing plates.

(c) Adjust front wheel bearings with brake shoes free.

(d) Using a feeler gauge set both ends of the secondary shoe lining to a clearance of .015" ± .005". Change clearance at anchor pin end of lining by rotating anchor pin. Change clearance at adjusting screw end of lining by shortening or lengthening adjusting screw.

(e) Adjust anchor pin and adjusting screw until there is a five to ten pound drag on a .015 feeler gauge at each end of the secondary shoe lining.

NOTE: The rear fixed anchor brakes, no feeler slot in drums, are adjusted in the same manner as outlined for conventional self adjusting brakes.

SPECIAL NOTE: 1963 Tempest

Due to the special characteristics of the Tempest rear suspension system different steps, in making the manual adjustment on the rear brakes, are necessary in order to be sure that the rear brakes do not drag under conditions of unusual loading or cornering. They are:

(a) Raise car so rear wheels hang down.

(b) Loosen parking brake cable or disconnect anchor from side of torque tube.

(c) Expand adjusting screw to produce 5 to 8 pound drag on outside of tire.

(d) Insert a small rod or screw driver through the adjusting screw slot in the backing plate and hold the automatic adjusting lever away from the adjusting screw star wheel. (see fig. 14)

(e) Back off the star wheel 26 notches with shock absorbers fully extended. (Back off 30 notches if hoist supports rear suspension near ends of control arms and prevents rear wheels from hanging down.)

(f) After adjustment, drum rotation should be free from brake drag.

MANUAL ADJUSTMENT-DELCO MORAINE TYPE (Chevrolet and Oldsmobile)

Brake Drums on 1963 Chevrolet, Oldsmobile and rear drums on Pontiac models do not incorporate an inspection slot. In order to gain access to the adjusting screw star wheel in case the drum cannot be removed due to a binding condition, it is necessary to knock out the lanced area in the web of the brake drum using a chisel or similar tool.

CAUTION: After knocking out the metal, be sure to remove it from the inside of the drum and clean all particles of metal from the brake compartment. A new hole cover must be installed before re-installing the drum.

With this type of installation manual adjustment procedures are as follows:

1. With brake drum removed 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 a special Drum-to-Brake Shoe Clearance Gauge (Ammco Part No. 8650, Chevrolet Part No. J-21177) to check the diameter of the brake drum. (see fig. 15)

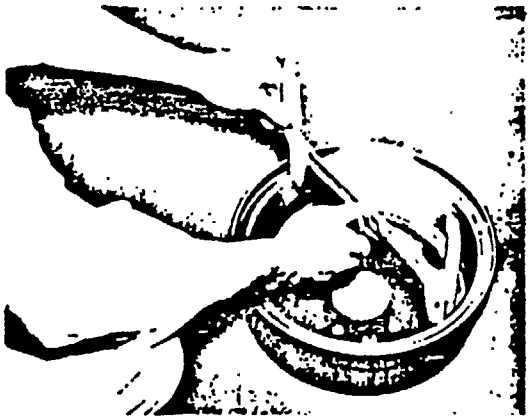

Fig. 15 Using Drum-to-Brake Shoe Clearance.

(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. (see fig. 16)

(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.

3. Install the drum and wheel.

NOTE: Make certain when installing the drums that they are installed in the same position as they were when removed with the drum locating tang in line with the locating hole in the wheel hub. (see fig. 17)

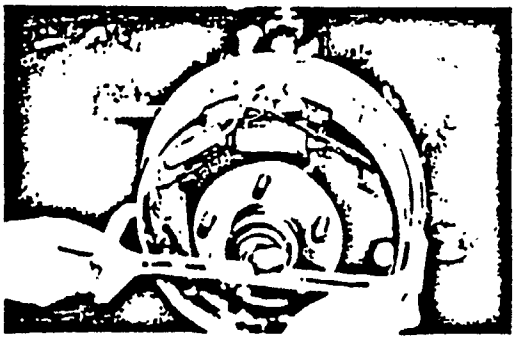

Fig. 16 Checking Brake Shoe Lining Clearance.

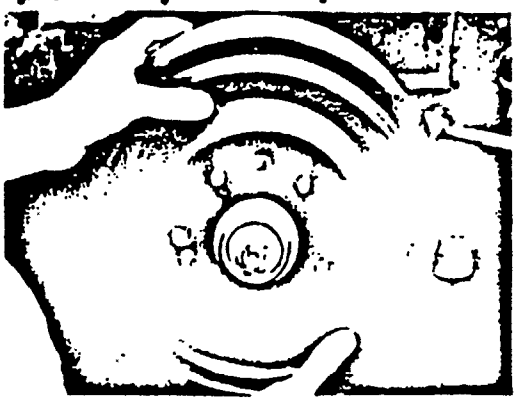

Fig. 17 Aligning Drum Tang with Wheel Hub

MANUAL ADJUSTMENT-WAGNER COMPOUND TYPE:

1. After the brake shoes have been installed in their correct positions initially adjust the star wheel assembly to a point where approximately 3/16" to 1/4" of threads are exposed between the star wheel and star wheel nut.

2. Install the drum. Remove the access slot cover and with a brake adjusting tool or screw driver rotate the star wheel until the wheel is in the locked position.

3. Back off the star wheel at least 15 to 20 notches (clicks).

NOTE: Do not insert a second tool to lift or pry the adjusting lever off the star wheel teeth on this type of brake.

4. Drive the car in reverse, or with car on hoist follow procedure outlined for Bendix and Delco Moraine making 10 to 15 brake applications to adjust all brake shoes to uniform clearance.

REMOVAL - BENDIX TYPE - FRONT DRUM

1. Raise the car so that the wheels are clear of the floor.

2. Remove the hub cap, wheel and bearing dust cap. Remove the cotter pin, nut and washer.

3. Pull the drum outward approximately two inches. Push back into original position. Remove the wheel bearing and withdraw the drum. If the drum binds on the brake shoes and will not come off insert an ice pick or narrow screw driver through the brake adjusting hole in the backing 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. Be careful not to burr, chip or damage the notches in the adjusting screw and thus cause consequent inoperation of the self adjusting mechanism.

REMOVAL - BENDIX TYPE - REAR DRUM

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

2. Remove the hub cap and wheel.

3. Remove the retaining nuts and remove the brake drum. If the drum will not come off, insert a narrow screw driver through the brake adjusting hole in the backing plate, and disengage the adjusting lever from the adjusting screw. While thus holding the adjusting lever away from the adjusting screw, back off the adjusting screw with the brake adjusting tool (fig. 12.). Back off the adjustment only if the drum cannot be removed. Be very careful not to burr, chip or damage the notches in the adjusting screw; otherwise, the self adjusting mechanism will not function properly.

BENDIX TYPE - BRAKE SHOE AND ADJUSTING SCREW REMOVAL

Before disassembling brakes study the brakes carefully. Note the relative position of each part and the color coding of springs, etc. In many cases brake parts are not interchangeable from one side of the vehicle to the other. Keep the parts of each wheel brake separated from the parts of other wheel brakes.

1. With the wheel and drum removed, install a clamp over the ends of the wheel cylinders unless the backing plate is equipped with stops or tabs. Some 1963 Model wheel cylinders are equipped with rubber boots that are recessed in grooves on the wheel cylinders. This prevents the pistons from leaving the wheel cylinder and it is not necessary to use wheel cylinder clamps on these wheel cylinders.

2. Disengage the adjusting lever from the adjusting screw by pulling outward on the adjusting lever. (see fig. 1)

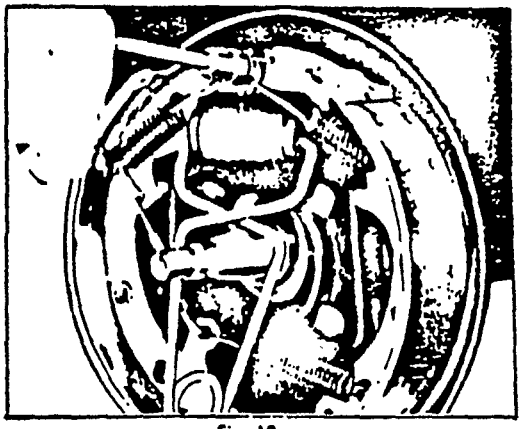

Fig. 19

3. Move the outboard side of the adjusting screw upward and back off 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 automatic adjusting spring and the automatic adjusting lever.

6. Remove the secondary shoe to anchor spring with a retracting spring tool. Using the same tool, remove the primary shoe to anchor spring and unhook the cable anchor. (fig. 19)

7. Remove the anchor pin plate (not used on all installations).

8. Remove the cable guide from the secondary shoe (see fig. 1)

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

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

11. After removing the rear brake secondary shoe, disassemble the parking brake lever from the shoe by removing the retaining clip and spring washer.

CLEANING AND INSPECTION - GENERAL

1. Wash all the parts, except the brake shoes, in a cleaning fluid and dry with compressed air.

2. Brush all dirt and dust from the backing plates and the interior of the brake drums.

3. Inspect the brake shoes for excessive lining wear or shoe damage. If linings are worn or if the shoes are damaged they must be replaced. Replace oil saturated linings. Replace linings only in axle sets. Before replacing linings check the drum diameter to determine if oversize linings must be installed.

4. Loosen wheel cylinder boot and inspect wheel cylinder for brake fluid leakage. If leak exists, remove wheel cylinder for service or replacement.

5. Disassemble the adjusting screw assembly. Clean and inspect as follows:

(a) Check thrust washer and mating surfaces for burrs or excessive wear.

(b) Inspect teeth on sprocket for wear.

(c) Remove all foreign material from adjusting screw and nut. The nut must rotate freely on threads.

6. Check the foot of the adjuster lever for wear.

7. Check the override pivot (where used) for wear or deformed parts.

8. Inspect all other brake parts and replace any that are worn or damaged.

9. Inspect the brake drums. If the drum shows indication of scoring, heat checks etc. it should be machined or "turned down." A drum that is excessively scored or shows a total indicator run out of over .007 inch should be turned down.

On cars that are equipped with tapered hub drums (American Motors, Chrysler, Studebaker) it is advisable to hold the indicator run out reading to a maximum of .004 inch. In order to properly machine tapered hub drums, assuring that they are held within correct out-of-concentric limits, a tapered hub adaptor tool (Ammco Tool No. 7325) is available. (see fig. 20) Its use will eliminate service complaints and come back's due to out-of-concentric and wobble effect leading to pulsating pedal, rear drum chatter, and other erratic braking action.

Remove only enough stock to eliminate the scores and true up the drum. In no case should the refinished diameter exceed .060 inch over-size.

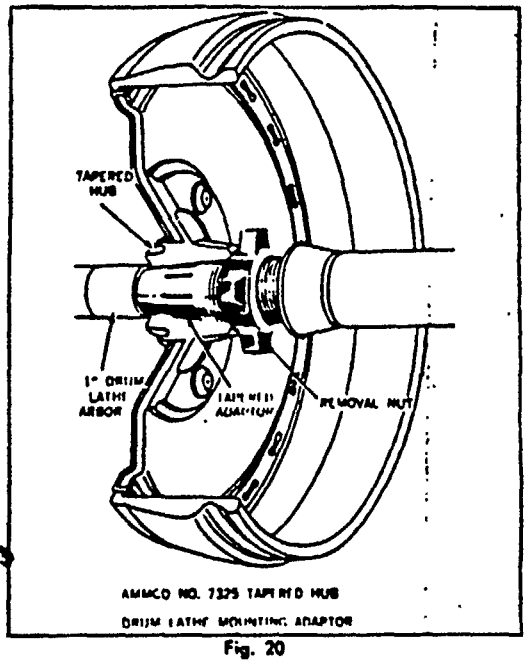

Fig. 20

INSTALLATION: BRAKE SHOES AND ADJUSTING MECHANISM - BENDIX TYPE

1. Apply a light coating of high temperature grease (Silicon base or equivalent) to all the points where the brake shoes contact the backing plate.

2. Before installing the rear brake shoes, assemble the parking brake lever to the secondary shoe and secure with the spring washer and retaining clip. On Chrysler Corporation Products be sure that the wave type washer is installed. Under the horse-shoe retaining clip outside of the parking brake lever. Apply a light coating of Silicon base grease, or equivalent at all the points where the brake shoes contact the backing plate.

3. Position the brake shoes on the backing plate and install the hold down spring pins, springs and cups. On the rear brakes install the parking brake link and spring. Connect the parking brake cable to the parking brake lever. (see fig. 1) After making manual adjustment See "Manual adjustment-Bendix Type."

4. Install the anchor pin plate on the anchor pin (where used). Install the cable anchor (eye) over the anchor pin with the crimped side toward the backing plate.

5. Install the primary shoe to anchor spring with a special retractor spring tool. (fig. 21)

6. 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. The cable must be positioned in this groove and not between the guide and the shoe web.

7. Install the secondary shoe to anchor spring with the special tool. (see fig. 21) Be sure that the cable end is not cocked or binding on the anchor pin when installed. Remove the brake cylinder clamp.

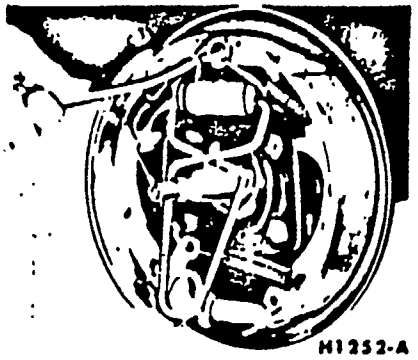

Fig. 21

8. Apply high-temperature Silicon base lubricant or equivalent 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 1/2 turn.

NOTE: Extreme caution must be taken to assure that the correct adjusting screw is assembled into each brake. Interchanging adjusting screws 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. The adjusting pivot nuts can be identified by the number of lines machined around the body of the nut. One line indicates a left hand nut; two lines indicate a right hand nut.

9. Place the adjusting socket on the screw and install the assembly between the primary and secondary shoe ends with the adjusting screw nearest the secondary shoe.

10. Hook the adjusting cable hook in the adjusting lever from the backing plate side. The adjusting levers are stamped R. or L. to indicate their installation on a right or left hand brake assembly. (see fig. 22)

11. Place the hooked end of the adjuster spring into the large hole in the primary shoe web, and connect the loop end of the spring to the adjuster lever hole.

12. 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. (see fig. 22)

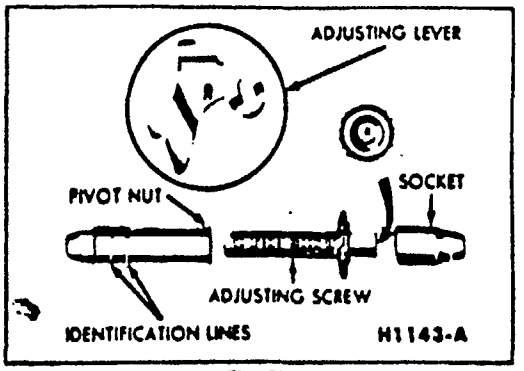

Fig. 22

13. Now 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 this check 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 3/16" (+ or - 1/32") above the center line of the screw. If the contact point is below this center-line, 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, possible damage is indicated and the cable assembly should be replaced.

Obtain a new cable and compare the length of the old cable with the new cable. Improper cable length could be the cause of trouble.

(b) 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 evidence of damage. When assembling the guide to the shoe make sure that the guide does pull away from the shoe.

(c) 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 either shows evidence of damage. The hook is sometimes damaged when a manual adjustment is made with an ice pick, or thin screwdriver, and star wheel adjusting tool.

(d) Check that the adjusting screw socket is properly seated in the notch in the shoe web. (see figs. 10 & 11)

Installation - Front Brake Drum - General

1. Install new inner wheel bearings if inspection indicates they are needed. If not replaced, repack with fresh lubricant and install with new seal. (see fig. 14)

2. Wipe most of the grease out of the hub. Install the drum assembly, outer wheel bearing, washer and retaining nut.

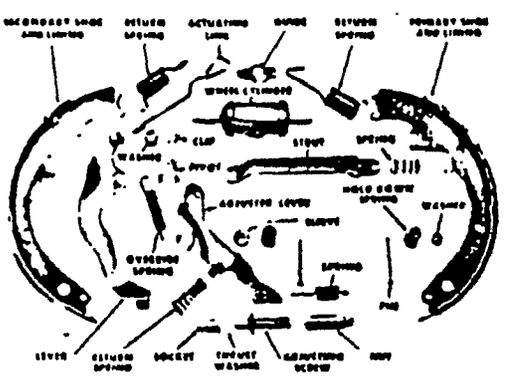

Fig. 18

3. Adjust the wheel bearings according to the individual car manufacturer's specifications.

4. Install the grease cup, wheel and hub cap. If the adjustment was backed off adjust the brakes as outlined in the "Adjustment Procedure" section.

Installation - Rear Brake Drum - General

1. Place the drum over the brake assembly and into position. Install the nuts and tighten securely.

2. Install the wheel and manually adjust the brakes while the car is on the hoist or stand. With the engine running and the transmission lever in reverse apply the brake pedal several times. This will uniformly adjust the rear brakes.

REMOVAL - FRONT BRAKE SHOES & AUTOMATIC ADJUSTER - DELCO MORAINE

1. Hoist car and remove the front drum and hub assemblies. It may be necessary to back off the brake shoe adjustment before the brake drums can be removed. Insert a small screw driver or awl through backing plate slot and hold adjuster lever away from adjusting screw sprocket in order to back off the brake shoe adjustment. On Chevrolet and Oldsmobile it is necessary that a pre-punched plug be removed from the drum with a chisel, or similar tool, in order to free up the drum.

2. Remove the primary and secondary shoe return springs and the automatic adjusting actuating link.

On Chevrolet installations remove the actuator return spring. Disengage the link end from the anchor pin and then from the secondary shoe.

3. Remove the brake shoe hold down springs, pins and washers. Remove the automatic adjuster lever or actuator, pivot and override spring assembly, and the automatic adjuster return spring.

4. Spread shoes to clear wheel cylinder links, then remove the primary and secondary shoes as an assembly.

5. Remove the primary to secondary shoe spring and the automatic adjusting screw.

REMOVAL - REAR BRAKE SHOES & AUTOMATIC ADJUSTER - DELCO MORAINE

1. Hoist car and loosen check nuts at forward end of parking brake cable sufficiently to release tension from the cable, or remove parking brake equalizer nut.

2. Remove rear wheel assemblies and remove rear brake drums. It may be necessary to back off the brake shoe adjustment before the brake drums can be removed. See "1" under "Removal of Front Brake Shoes".

3. Remove the primary and the secondary shoe return springs and the automatic adjuster actuating link. On Chevrolet installations remove the actuator return spring. Disengage the link end from the anchor pin and then from the secondary shoe.

4. Spread shoes slightly and remove the parking brake lever strut and spring, then disconnect the parking brake cable from the operating lever.

5. Remove the brake shoe hold down springs, pins, and washers. Remove the automatic adjuster lever, or actuator, pivot and override spring assembly, and the lever return spring.

6. Spread shoes to clear wheel cylinder links, then remove the primary and the secondary shoes as an assembly.

7. Remove the primary to secondary shoe spring and the automatic adjusting screw.

8. Remove the parking brake lever from the secondary shoe.

9. Clean and inspect all parts as per instructions given previously in the "Cleaning and Inspection" section of this manual.

INSTALLATION - FRONT BRAKES - DELCO MORAINE

IMPORTANT: Before installing brake shoe assemblies lubricate all backing plate ledges, automatic adjusting screw threads, thrust washer mating surfaces and all other contact surfaces with a light coating of high temperature silicon lubricant or equivalent.

1. Assemble the automatic adjustment screw.

2. Attach the primary to secondary shoe spring to the shoes with the long hooked end of the spring connected to the secondary shoe. The primary to the secondary shoe spring must not contact the adjusting screw sprocket.

3. Position the automatic adjusting screw between the primary and secondary shoes with the sprocket end of the screw toward the secondary shoe and pointing toward the rear of the car.

NOTE: The right front and right rear brake adjusting screws have left hand threads. The left front and left rear brake adjusting screws have right hand threads. It is imperative that these adjusting screws do not become interchanged during removal and re-installation.

4. Position the shoe assembly on the backing plate and position the wheel cylinder links in the shoe notches.

5. Position the upper end of the automatic adjustment actuating link onto the brake shoe guide at the anchor pin.

6. Hook the automatic adjustment actuating link onto the override pivot and then position the automatic adjuster lever assembly and return spring on the secondary shoe. Fasten with the hold down spring assemblies.

7. Install the primary shoe hold down spring assemblies.

8. Install the primary and secondary brake shoe return springs.

9. Install the front hub and drum assemblies. Adjust front wheel bearings to the individual manufacturer's specification.

10. Manually adjust the brakes as outlined in the Delco Moraine "Manual Adjustment" section of this manual. This can be done before the drums are installed by using Ammco Brake Shoe Adjustment Gage No. 8650.

INSTALLATION - REAR BRAKES - DELCO MORAINE

1. Pull parking brake cables back and forth through conduits. Lubricate freely with Lithium soap grease or equivalent and return cable to normal position. Remove excess lubricant.

2. Install parking brake lever to the secondary shoe.

3. Assemble the automatic adjusting screw, nut and socket.

4. Attach the primary to secondary shoe spring to the shoes with the long hooked end of the spring connected to the secondary shoe.

5. Position the automatic adjusting screw assembly between the primary and secondary shoes with the sprocket end of the screw toward the secondary shoe and pointing toward the rear of the car. The sprocket must not contact the primary to secondary shoe spring.

NOTE: The right rear brake adjusting screw has left hand threads. The left rear brake adjusting screw has right hand threads. Make sure that they do not become interchanged during removal and re-installation.

6. Position the shoe assembly on the backing plate and position the wheel cylinder pins in the shoe notches.

7. Install the parking brake strut and spring. (see fig. 18)

8. Place the upper end of the automatic adjusting actuating link over the anchor pin.

9. Hook the actuating link onto the override pivot and then position the adjuster lever

assembly and return spring on the secondary shoe. Fasten with the hold down spring assemblies.

10. Connect the parking brake cable to the parking brake lever.

11. Install the primary shoe hold down spring assemblies.

12. Install the primary and secondary brake shoe return springs.

13. Install the drum and wheel assemblies.

14. Assemble parking brake cables to equalizer and reinstall equalizer to car. Adjust the parking brake.

15. Manually adjust the brakes by following the procedures outlined in the Delco Moraine "Manual Adjustment" section of this manual. This can be done before the drums are installed by using Ammco Brake Shoe Adjustment Gage No. 8650.

WAGNER SERVO-COMPOUND TYPE - REMOVAL - SHOES AND ADJUSTING MECHANISM

1. Remove the long link with "S" shaped end from the crank lever and adjusting lever.

2. Remove the short link with "S" shaped end from crank lever and the anchor pin.

3. Remove the lower spring, adjusting lever and adjusting screw assembly.

4. Remove anchor crank from secondary shoe. On rear shoes remove parking brake strut.

5. Remove the primary and secondary shoe return springs.

6. Remove the guide plate and anchor block. Remove the shoe hold down pin and clip.

7. Remove the shoes from the backing plate. (see fig. 3)

WAGNER SERVO-COMPOUND TYPE - INSTALLATION OF SHOES AND ADJUSTING MECHANISM (see fig. 4)

1. Place shoes on backing plate and secure with the shoe hold down pin and clip.

2. Place the adjusting lever on the secondary shoe web making sure the slot in the lever engages to full depth with the slot in the shoe web.

NOTE: The adjuster levers are painted red for right hand brakes and blue for left hand brakes.

3. Install the star wheel assembly. The star wheel must be installed over the adjusting hole in the backing plate.

4. Assemble the lower spring to the webs of the primary and secondary shoes. The Long Hook End should be secured in the small hole in the secondary shoe and should be under the shoe web. The short hook end should be secured in the small hole in the primary shoe. When installed correctly, the long hook end will not interfere with either the lever or the star wheel teeth.

5. Install the anchor block with arrow pointing in the forward direction of drum rotation (see fig. 43).

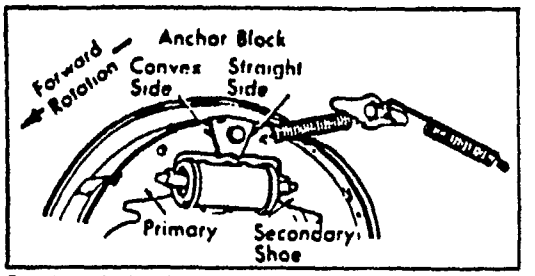

Fig. 43 Anchor Block Installation - 10 Series.

6. Place the guide plate over the anchor pin and install the shoe return springs with the long hook end flat against the guide plate.

7. Install the lever crank in the small hole in the secondary shoe web, the left crank on the left hand brakes, and the right crank on the right hand brakes. A "L" or "R" is located on the hexagon side of the crank for identification. Make certain the lever rotates freely on the hexagon head screw.

8. Assemble the short wire link with large hook by first inserting the "S" shape offset end into the lever crank hole which is closest to the hexagon head and then snap the hook end of the link in the top groove of the anchor pin.

9. Insert the long link with "S" shaped end in the crank lever. Lift the adjuster lever up enough to hook the link in the slot of the adjusting lever. The adjusting lever will then engage the star wheel teeth between 1/16" above or below the centerline of the star wheel assembly.

CALIPER DISC TYPE BRAKES

The friction pad in the Caliper disc brake is replaced when worn without removing the Caliper unit from the car.

To check pad clearance and wear remove the wheel. For clearance check, insert a feeler gauge between friction pad and the rotating disc. Ordinarily, clearance should be a minimum of .004". However, if the car was stopped by a brake application, just prior to checking the clearance, it is considered normal if the brakes tend to drag. Rotation of

the disc is a factor in causing the friction pads to move away from the disc.

When pads have worn to .200" thickness replace the friction pad and securing plate assemblies.

PAD REPLACEMENT

1. Remove the wheel and tire assembly.
2. Remove the bolt, nut and lockwasher to free the brake pad retaining clip.
3. Engage a wire hook in the hole of the inner friction pad removal tab. (No. 2 in Ill.) or grasp the tab with a pair of pliers and pull to remove the tab.

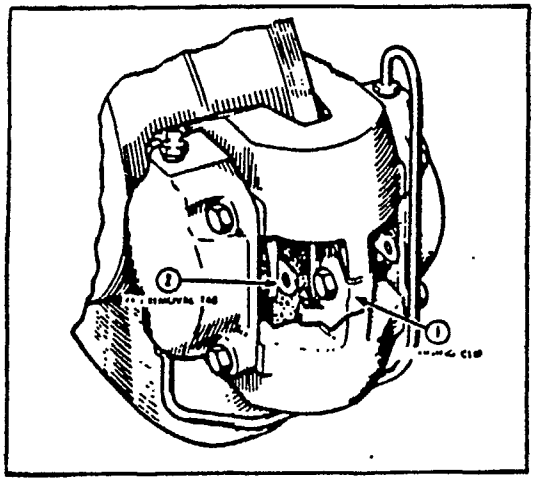

Fig. 23

4. Clean the backing plate, dust seal and surrounding area.

NOTE: A special Brake Piston Return Lever Tool (Studebaker Part #J-21172) is required to re-set the wheel cylinder pistons. This is necessary to provide clearance for inserting the new pad assembly.

5. Slide the forked end of the special tool between the rotating disc and the piston. (see fig. 24) The flat side of the tool should be towards the face of the rotating disc and the pivot stud of the tool inserted in the hole from which the retainer clip bolt was removed.
6. Attach a bleeder hose to the bleeder screw and connect to a jar semi-filled with brake fluid, then loosen the bleeder screw.
7. Using the tool pivot stud as a fulcrum, apply force on handle to slide the piston into the wheel cylinder.
8. Tighten bleeder screw.
9. Remove tool.

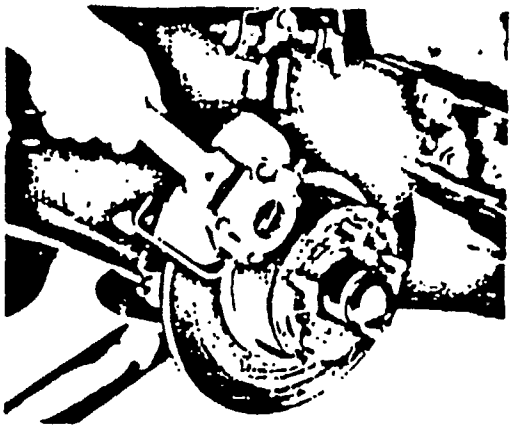

Fig. 24

10. Slide the new friction pad assembly into position with the pad securing plate engaging the protruding button of the wheel cylinder piston.
11. Repeat the preceding steps to remove and replace the opposite friction pad.
12. Replace the friction pad retainer clip and secure with bolt, lockwasher and nut.
13. Check for proper fluid level in the master cylinder reservoir and add as required. Check pedal pad; if pedal is solid it will not be necessary to bleed the brakes. If, however, the pedal is spongy; it will be necessary to bleed. Use a pressure bleeder or have someone apply light pressure on the brake pedal. Observe fluid flow from the bleeder screw and tighten the screw when flow of air bubbles stop. Maintain the pressure while tightening.
14. Replace wheel.
15. Depress brake pedal several times to properly seat the friction pads.

CALIPER UNIT - REMOVAL

1. Remove the front wheel and tire assembly.
2. Remove the hydraulic inlet pipe from the Caliper unit.
3. Remove the two capscrews and lockwashers that fasten the caliper unit to the steering knuckle adapter bracket. (fig. 25 #3).

NOTE: Shims are used between the caliper and the adapter bracket to center the caliper around the disc. Watch for the spacer shims (fig. 25 #4) and note their exact location. This procedure will save valuable installation time.

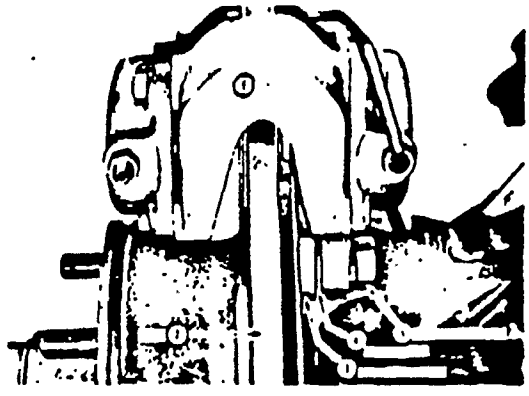

Fig. 25

DISASSEMBLY - CALIPER UNIT

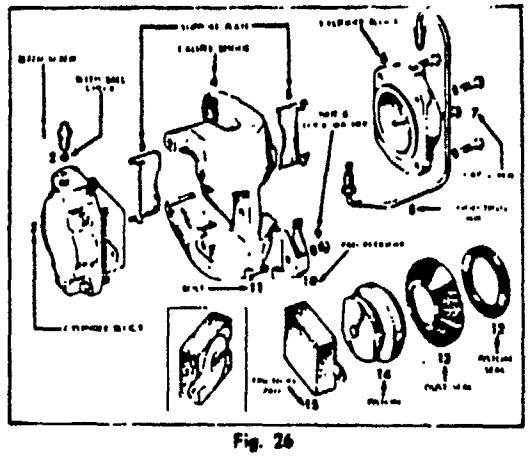

Fig. 26

The unit should be thoroughly cleaned before disassembly. Clamp the unit in a vise, securing it by the mounting boss.

1. Remove the hydraulic pipe assembly between the two wheel cylinders. Note the correct installation of the pipe before removing it.

2. Remove the nut and lockwasher (fig. 26 #9) and the bolt (fig. 26 #11) to free the friction pad retainer clip (fig. 26 #10).

3. Engage a wire hook in the hole of the friction pad removal tab and pull to remove. Remove the other friction pad (fig. 26 #15).

4. Remove the four capscrews and lockwashers (fig. 26 #7) from each wheel cylinder to free them from the Caliper Bridge (fig. 26 #4).

5. Remove the outer lip of the dust seal (fig. 26 #13) from its groove in the cylinder body.

6. Use a hydraulic hand pump or air pressure to remove the outside cylinder piston from the cylinder body. Hold a container under the assembly to catch the brake fluid as the piston is removed.

7. Remove the bleeder screw (fig. 26 #1) and bleeder screw ball check (fig. 26 #2) from the outside cylinder body and insert the removed bleeder screw and ball in one of the hydraulic openings of the inside wheel cylinder. Then use hydraulic hand pump or air pressure to remove the piston from the inside wheel cylinder.

8. Pull the piston seal (fig. 26 #12) from the groove in the piston (fig. 26 #14) and discard the seal. Pull the dust seal and stretch it over the small end of the piston assembly. Discard the dust seal.

CLEANING AND INSPECTION - CALIPER UNIT

Clean all metal parts with Bendix Metal-Clene or an equivalent solvent.

Check cylinder bore for damage or excessive wear. Replace the piston and cylinder assembly if excessively damaged or worn.

ASSEMBLY - CALIPER UNIT

1. Apply a film of clean brake fluid on a new dust seal and stretch the seal to position it into the groove of the piston assembly. The cup side of seal should face the piston side of the assembly.

2. Roll the outer edge of dust seal toward the flange on the piston to provide better access to the groove for the piston seal.

3. Apply a film of clean brake fluid on the piston seal, then stretch the seal to position it into the groove of the piston.

4. Repeat above steps to assemble the seals to the other piston assembly.

5. Coat the inner surface of one of the cylinder bodies with brake fluid.

6. Place the cylinder body, opening up, on the bed of the arbor press.

7. Position the piston assembly, small end down, aligning the retractor pin into the hole in the piston and the edge of the piston seal aligned with the edge of the cylinder bore.

8. Carefully apply slow even pressure with the arbor press. Be sure the piston seal is not damaged. Press the assembly to the bottom of the bore.

9. Repeat the operation for the other wheel cylinder.

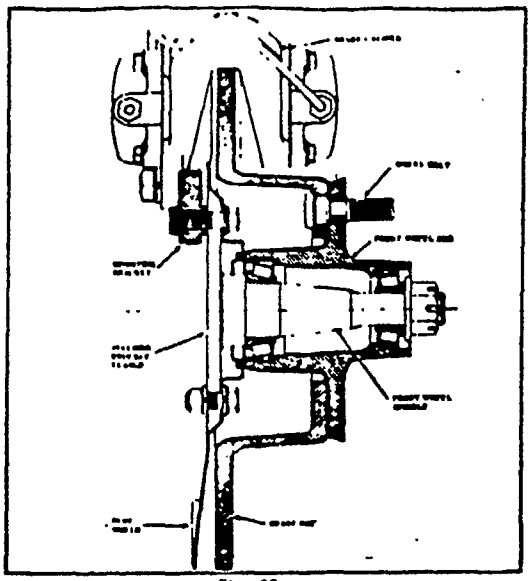

Fig. 29

REMOVAL

1. Remove the front wheel and tire assembly.
2. Remove the caliper assembly retaining capscrews. Be sure to keep the shim packs used between the caliper and caliper mounting bracket separated to facilitate installation.
3. Lift the Caliper assembly from the disc (it is not necessary to disconnect the brake line) and tie it up out of the way.
4. Remove the grease retainer cap.
5. Remove the bearing adjusting nut, washer and outer cone and roller assembly and pull the hub and disc assembly off the steering knuckle.

INSTALLATION

1. Lubricate the inner hub bearing and make certain the inner grease seal is in good condition.
2. Install the hub and disc assembly on the steering knuckle.
3. Lubricate and install the outer bearing cone and roller assembly, the washers and the adjusting nut.
4. Tighten the adjusting nut until there is no end play. Back off the nut to the first slot in the nut that aligns with the hole in the steering knuckle spindle. Install the cotter pin.
5. Install the grease retainer cap.
6. Position the caliper assembly on the disc. Place the proper shim pack between the caliper and the caliper mounting bracket and install the upper cap screw. Place the flexible hose bracket on the lower capscrew and with the shim pack between the caliper and caliper mounting bracket install the lower capscrew.
7. Check the caliper alignment with the disc as outlined under "Installation of Caliper Unit."
8. Install the wheel and tire assembly.

MASTER CYLINDERS

Master cylinders used on 1963 model cars are of two general types. The closed end type and the tandem or dual safety type (dual reservoir) (see figs. 30 & 31)

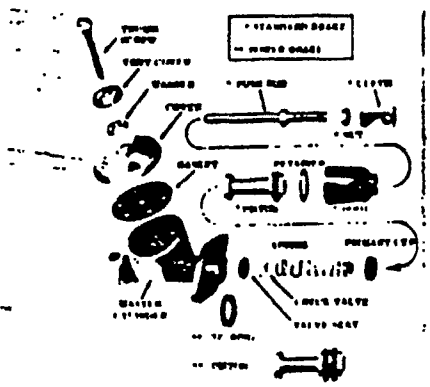

Fig. 30

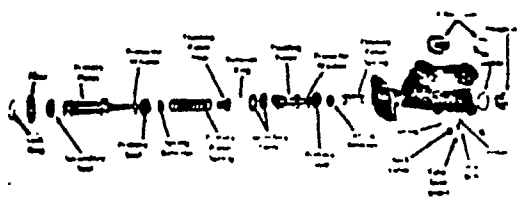

Fig. 31

The master cylinders used on cars not equipped with power brakes are usually identical in operation and construction to the master cylinders used with power brakes with the exception of the secondary piston, push rod, and front seal.

In the Dual-Safety (Tandem) type Master Cylinder, failure in one part of brake system does not result in failure of the entire hydraulic brake system. Failure in the front brake system will leave the rear brake system still operative or failure in the rear brake system will still leave the front brake system operative.

A double hydraulic cylinder with two outlets, two residual check valves, two fluid reservoirs and two hydraulic pistons, a primary and a secondary, are operated in tandem by a single hydraulic push rod. The primary outlet is connected to the front brakes with the secondary outlet connected to the rear brakes. With the Master cylinder fluid reservoirs filled and the front and rear brake systems bled, there is a solid column of fluid on the forward side of both the primary and secondary pistons.

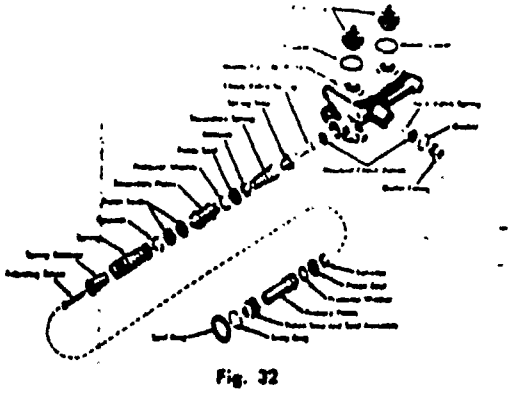

Fig. 32

Upon application of the brakes, through movement of the brake pedal fluid is displaced by the pistons into the wheel cylinders to activate both front and rear brakes. Upon release of the brakes, fluid returns from the rear wheel cylinders through the secondary residual check valve to the secondary portion of the master cylinder bore. Fluid also returns from the front wheel cylinders through the primary residual check valve to the primary portion of the master cylinder bore. The dual system differs from the single system in operation, in that when hydraulic failure occurs in either the front brake system or the rear brake system, fluid under pressure continues to be displaced by the primary piston into the front brake system as in the conventional type Master Cylinder. Likewise, if failure occurs in the front brake system the rear brakes are still operative. There are two different types of dual systems, as well as single systems, used in 1963 - The Bendix Type and Delco Moraine type.

NOTE: The Master Cylinders used on 1963 Studebaker cars equipped with the Caliper Disc Brakes and on 1963 Chrysler Model C-300J equipped with Remote Power Brakes (See Power Brake section) do not incorporate residual check valves.

Do not assemble residual check valves in these particular master cylinders when repairing them.

MASTER CYLINDER REMOVAL - GENERAL

In most cases the standard brake master cylinder can be removed from the fire wall without disconnecting the push rod and clevis. On most cars equipped with power brakes the master cylinder can be removed, and serviced without removing the vacuum cylinder from the car. Be sure that the area around the master cylinder is clean before attempting removal.

1. Disconnect the rubber boot from the rear end of the master cylinder.

2. Disconnect the hydraulic line at the master cylinder. Plug or tape the end of the line to prevent the entrance of dirt. Disconnect the stop switch wires from the stop switch (where the stop light switch is located in the body of the master cylinder).

3. Remove the bolts that secure the master cylinder to the dash panel and lift the cylinder out and away from the push rod. Remove the rubber boot from the push rod.

MASTER CYLINDER INSTALLATION - GENERAL

1. With the rubber boot on the cylinder, guide the master cylinder over the end of the push rod, and position the cylinder against the dash panel.

2. Install and torque the mounting bolts to 20-28 foot pounds.

(a) In the case of a power brake master cylinder install a new master cylinder to vacuum cylinder "O" ring on flange of master cylinder. Lubricate "O" ring with a light film of clean brake fluid. The master cylinder attaching nuts should be tightened 15 to 20 foot pounds torque in this instance.

3. Connect the brake line to the master cylinder.

4. Connect the wires to the stop light switch and the rubber boot to the master cylinder.

5. Fill the master cylinder with an approved brake fluid and bleed the hydraulic system in line with the following instructions:

BLEEDING THE SYSTEM - GENERAL

When any part of the hydraulic brake system has been disconnected for repair or replacement, air may get into the lines and cause a 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.

Use only Heavy Duty Brake Fluid that meets the SAE 70R3 specification.

PRESSURE BLEEDING

Use an approved type pressure bleeder and follow the particular equipment manufacturer's instructions.

MANUAL BLEEDING

Bleed the longest lines first. The proper sequence is left rear, right rear, right front and left front. Keep the master cylinder filled with new brake fluid during the bleeding operation.

1. Attach a bleeder hose to the bleeder screw of the wheel cylinder that is located farthest from the master cylinder.

2. Place the loose end of the bleeder hose in a transparent container that is partially filled with brake fluid sufficient to keep the end of the hose completely submerged.

3. Turn wheel cylinder bleeder screw counter clockwise approximately 3/4 of a turn. Slowly depress the brake pedal until it reaches the end of its travel. Close the bleeder screw and allow the brake pedal to return slowly to the fully released position. Repeat this operation until brake fluid flows in a solid stream from the end of the bleeder hose with no indication of air bubbles. Always bleed off sufficient brake fluid to ensure that all fluid in that particular line has been replaced.

4. Close wheel cylinder screw tightly as soon as fresh brake fluid flows in a solid stream from the bleeder hose.

5. Remove the bleeder hose from the wheel cylinder bleeder screw.

6. Refill the Master Cylinder reservoir and repeat steps 1 through 5 at the remaining wheel cylinders in the proper bleeding sequences.

7. Refill master cylinder reservoir to the proper level.

CAUTION: Never reuse brake fluid that was withdrawn from the system during the bleeding operation.

MASTER CYLINDERS - DISASSEMBLY (TYPICAL) CLOSED END TYPE

Figures 30 and 33A (as follow) are of typical Master Cylinders of the closed end type used on 1963 models. Though the physical contours, shape, and size of filler caps may vary the operating principles are identical and the functional parts are of a similarity.

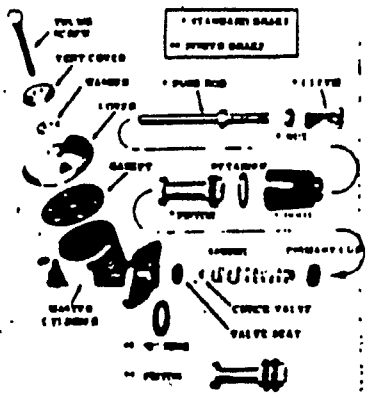

Fig. 30

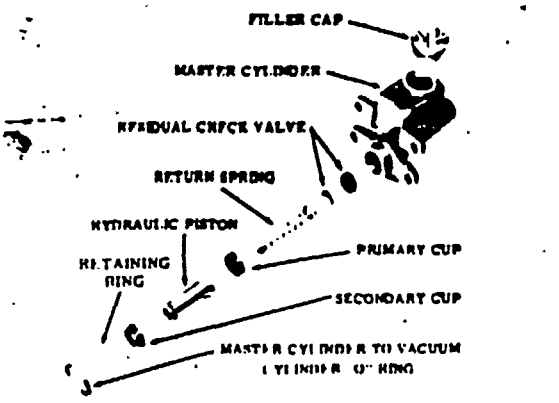

Fig. 33A

1. Brush off the worst of the external dirt before disassembling. It is a good idea to place the parts in a pan in the order of disassembly. This contributes to ease of inspection and reassembly.

2. Remove boot from Master Cylinder (Standard Brake). Remove the filler cap and gasket. Pour out any brake fluid that may remain in the cylinder or reservoir.

3. Remove the piston retaining ring from the bore of the master cylinder and remove the piston.

4. Remove the primary cup, spring and check valve from the bore of master cylinder.

5. On Delco Moraine Master Cylinders remove the rubber valve seat washer from cylinder bore with a wire hook.

6. On Power Brake Master Cylinders remove the Master Cylinder to vacuum cylinder "O" ring.

DISASSEMBLY - TANDEM SAFETY TYPE MASTER CYLINDERS

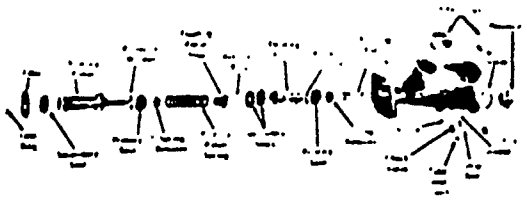

Fig. 31

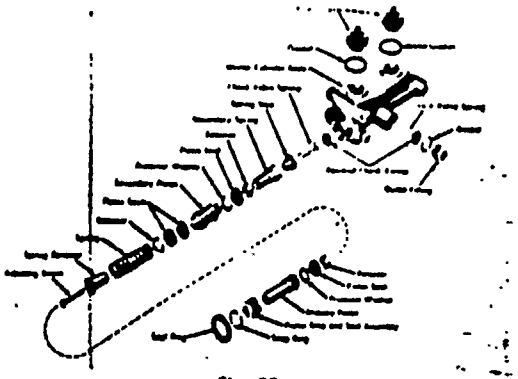

Fig. 32

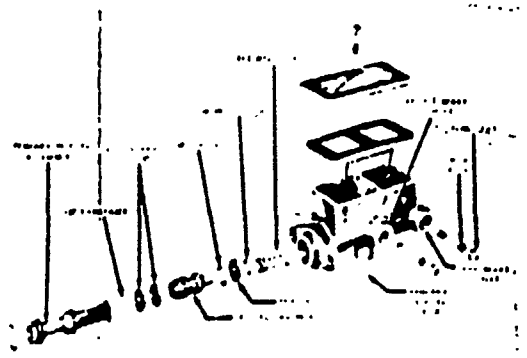

Fig. 33 Bendix Type - Master Cylinder Components.

The above illustrations show the types of Tandem Master Cylinders used on 1963 Models.

To disassemble the Bendix type as installed on Cadillac proceed as follows:

1. Remove the filler caps from the Master Cylinder assembly. Pour out any brake fluid that may remain in the reservoirs or bore.

2. Remove the hydraulic fitting and the residual check valve from the rear outlet of the Master Cylinder (fig. 31-32). Remove gasket from fitting and discard.

3. Remove the retaining ring from groove in the bore of the Master Cylinder.

4. Remove primary piston and stop assembly, secondary piston and stop assembly, secondary spring, spring stop, secondary check valve spring, and check valve from the Master Cylinder housing (see fig. 34 and 33)

5. Remove brass piston stop and seal assembly from primary piston (see fig. 34) and discard. Piston stop is serviced as a unit and should not be disassembled.

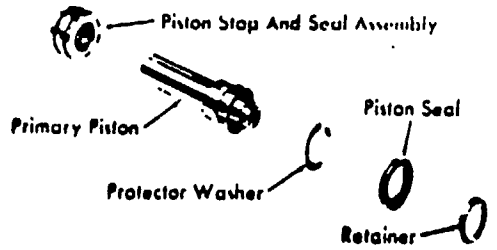

Fig. 34 Bendix Primary Piston Disassembled.

6. Remove retainer, piston seal, and protector washer from primary piston.

7. Remove retainer, piston seal and protector washer from forward end of secondary piston assembly. (see fig. 35)

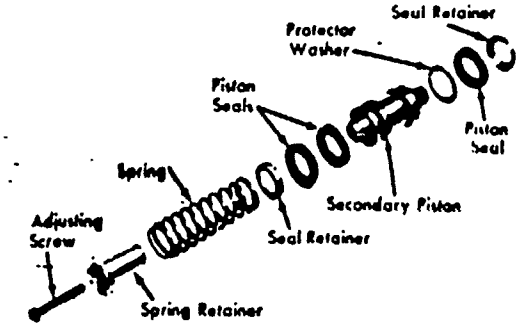

Fig. 35 Bendix Secondary Piston Disassembled.

8. Remove spring adjusting screw, spring retainer, and spring from secondary piston.

9. Remove seal retainer and two piston seals from secondary piston.

DISASSEMBLY - BENDIX TYPE - AMERICAN MOTORS AND STUDEBAKER APPLICATION

The Bendix Tandem Type Master Cylinder as used on 1963 American Motors and Studebaker cars not equipped with power brake units is identical in construction and operation to

the master cylinder used with Power Brakes with the exception of the primary and secondary piston push rod, and front seal.

To disassemble this type proceed as follows:

1. Remove the filler cap and drain out all fluid.
2. Remove the stop light switch and the primary piston stop, located in the stop light switch outlet hole.
3. Remove the snap ring from the piston bore.
4. Remove the primary and secondary piston assemblies. Air pressure applied in the piston stop hole will help facilitate the removal of the secondary piston assembly.
5. Remove the tube seats by using self-tapping screws (supplied in Manufacturers repair kits.) Screw the self-tapping screws into the tube seats and place two screw driver tips under the screw head and force the screw upward as shown in fig. 36

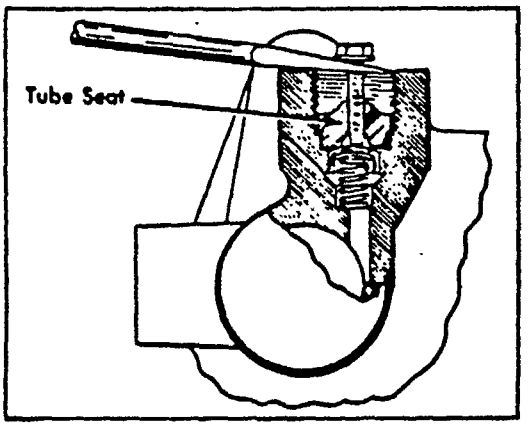

Fig. 36 Removing Tube Seats.

6. Remove the residual check valves from under the front and rear fluid outlet tube seats.
7. Remove the expander in the rear secondary cup, secondary cups, return spring, cup protector, primary cup and washer from the secondary piston.

DISASSEMBLY - DELCO MORAINE TYPE

1. Remove filter from groove on O.D. of open end of Master Cylinder. (see fig. 31) Remove floating piston stop bolt and gasket from boss between outlet holes on side of master cylinder.
2. Remove head nut and gasket from master cylinder housing and remove floating piston spring and retainer.
3. Remove retaining ring from open end of master cylinder and remove primary piston assembly.
4. Push floating piston out of unthreaded rear end of master cylinder bore.
5. Remove filler caps from fluid reservoirs and pour out any fluid remaining in the reservoirs or the Master Cylinder bore.
6. Place master cylinder housing in vise with the outlet holes up. This facilitates the removal of the tube seat inserts from the outlets.
7. Install a spare brake line tube nut in outlet hole (fig. 37). Place a flat washer on 1" #8-32 screw and thread screw into threaded hole in tube seat insert. If threads in tube seat are damaged, run a #8-32 tap into the hole to clean up the threads.

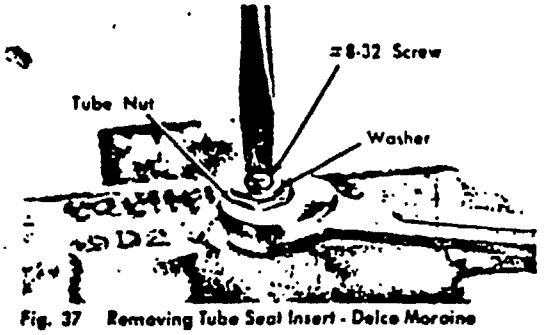

Fig. 37 Removing Tube Seat Insert - Delco Moraine

8. Pull the insert by holding the screw from turning while turning tube nut out of outlet hole. Remove both inserts in this manner and discard.
9. From cavity beneath each tube insert, remove rubber check valve and check valve spring. (see fig. 37)
10. Remove primary seal, protector washer and secondary seals from the floating piston.
11. Compress primary piston spring, attached to primary piston, remove small retainer ring from groove in end of piston and remove piston spring and floating piston stop.
12. Remove spring retainer, primary seal, protector washer and secondary seal from primary piston.

MASTER CYLINDERS - CLEANING AND INSPECTION

Thoroughly clean all parts with alcohol except those that obviously need replacing. It may be necessary to clean the bodies or

some metal parts with mineral base solvents, alkaline cleaners, degreasing fluids etc., however, they should be given a final wash in alcohol to remove all traces of the mineral oil solvent from the parts. After cleaning all parts inspect them as follows:-

1. Body

(a) Check body for soundness, no cracks, bad threads, sandholes, etc.

(b) Check bore for finish (must be glass smooth). It must be free from deposits, pits or scores.

(c) Check that bypass vent hole is open (.015 to .025 diameter). Check for burrs around bypass venthole.

2. Internal rubber parts

Check for wear, tears, scuffing, softening, hardening, gumminess, etc. This inspection is made to determine any contributing causes for failure such as undersize pistons, scored bore, dirt, overheating, bad fluid, etc.

New internal rubber parts should be installed when re-assembling the master cylinder.

3. Pistons

Inspect the pistons for corrosion, scoring, plugged compensating holes, bad cup groove surfaces, size, etc. Most pistons will be corroded on stem but this may not affect operation. Check the clearance between piston and the cylinder bore. This should be .003" to .006".

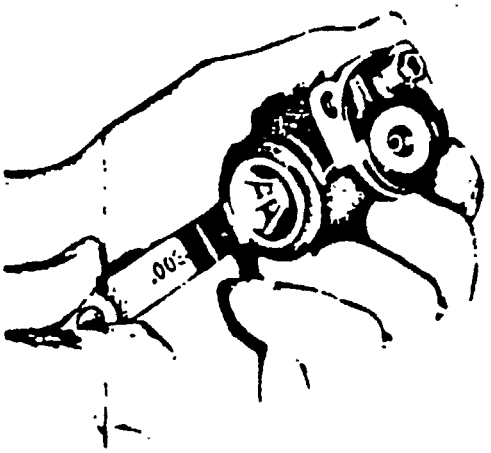

Fig. 38 Check Wheel Cylinder Clearance.

4. Springs

Check springs for corrosion, cracks, distortion, etc.

5. Check Valves and Seats.

As with internal rubber parts, the check valves and rubber seats should be replaced when the master cylinder is re-assembled.

6. Rubber Boot

Check rubber boot for cracks, cuts, hardening, holes, softening, etc. turn inside out and inspect.

7. Filler Cap

Check to see that vent holes are open and baffle is in place. Check gasket.

NOTE: If any of the internal rubber parts in the master cylinder are deteriorated or swollen this is evidence that the brake fluid in the system is contaminated and that all the internal rubber parts in the system will have to be replaced.

MASTER CYLINDER ASSEMBLY - (TYPICAL CLOSED END TYPE)

1. Lubricate the Master Cylinder bore and all rubber parts with clean fresh brake fluid.

2. Install residual check valve rubber washer against the shoulder inside the master cylinder bore (see figs. 30 & 39)

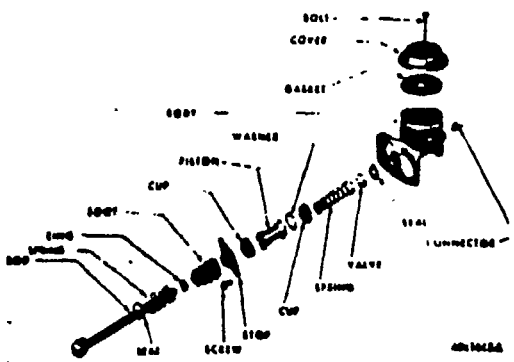

Fig. 39 Master Cylinder Assembly - Chrysler.

3. Install large end of spring of residual check valve and then install the assembly, check valve end first, into the bore.

4. Install the primary cup over the end of the spring (concave side toward the spring).

5. Install the piston into the bore and while compressing the spring, install the retaining ring.

6. Install the boot over lip of master cylinder housing (Standard Brakes).

7. On Power Brakes install the master cylinder to vacuum cylinder "O" - ring on the flange of the master cylinder.

MASTER CYLINDER ASSEMBLY - TANDEM SAFETY TYPE - BENDIX (fig. 32-35)

A. Cadillac Installations

1. Lubricate the master cylinder bore and all rubber parts with clean fresh brake fluid.

2. Dip two secondary piston seals in brake fluid and install seals on spring end of secondary piston with seals back-to-back (Fig. 8-18). Install retainer on outer seal.

3. Stand Piston on end opposite seals and install spring and spring retainer.

4. Install spring adjusting screw in bottom of spring retainer and start screw into piston body by exerting enough pressure on screw driver to compress spring and engage threads.

5. Tighten spring adjusting screw until measurement from end of spring retainer to surface against which protector washer seats is 3-35/64" as shown in fig. 40. To measure this distance accurately, place piston on a flat surface with spring retainer down, and using a steel scale graduated into sixty-fourths of an inch, measure upward from end of the retainer.

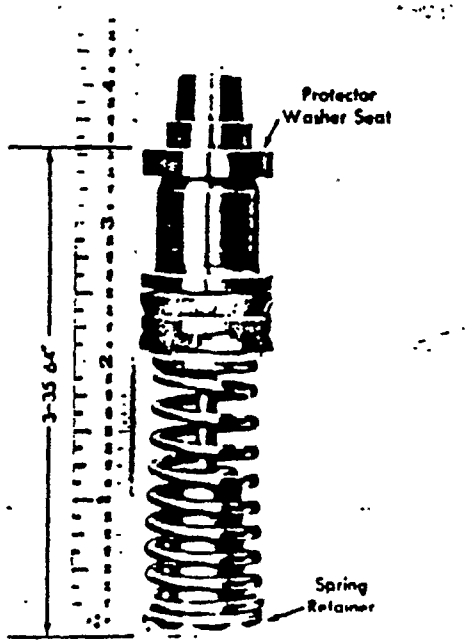

Fig. 40 Secondary Piston Spring Adjustment

NOTE: If screw is turned in too far, piston will cover master cylinder inlet port, resulting in excessive brake pedal travel before brakes apply. If screw is not turned in far enough, piston will cover by-pass hole in master cylinder, and pressure build-up will cause brake drag.

6. Install protector washer, seal, and retainer on end of secondary piston.

7. Coat inside bore of master cylinder with brake fluid and dip secondary piston and seals in brake fluid.

8. Stack secondary piston assembly, secondary spring with small diameter end of spring next to piston, and spring stop. (see fig. 32)

9. Insert check valve spring in recessed end of check valve and place these parts on spring stop. Carefully guide this group of parts into master cylinders.

10. Dip primary piston and piston stop and seal assembly in brake fluid and install new piston stop and seal assembly over end of primary piston with undercut end of stop toward primary seal end of piston.

11. Install protector washer, piston seal, and retainer on primary piston with lip of seal toward retainer.

12. Dip entire assembly in brake fluid and guide into position in cylinder bore. Install snap ring in ring groove.

CAUTION: Undercut on brass piston stop and seal assembly should not be visible.

13. Dip residual check valve in brake fluid. Insert spring in recessed end of check valve and install valve and spring in rear outlet of master cylinder.

14. Place new gasket on outlet fitting and install fitting in master cylinder.

15. Install filler caps in master cylinder.

B. American Motors and Studebaker Installations (see fig. 33)

1. Install the primary cup washer, primary cup, cup protector and return spring on the secondary piston.

2. In the double groove end of the secondary piston, install the piston cups back-to-back (lip of cups away from each other). Install the cup expander in the lip groove of the end cup.

3. Coat the cylinder bore and the piston assemblies with clean brake fluid before installing in the cylinder.

4. Install the secondary piston assembly first and then the primary piston. Secure with the snap ring.

5. Install the primary piston stop and stop light switch.

6. Install the residual check valve springs in the fluid outlet holes, placing the valve over

the spring so the flat side of the valve will be against the tube seats.

7. Install the tube seats, flat side toward the check valve and press in with tube nuts or the master cylinder brake pipe tube nuts.

MASTER CYLINDER ASSEMBLY - TANDEM SAFETY TYPE - DELCO MORAINE (fig. 31-36)

1. Lubricate the master cylinder bore and all rubber parts with clean fresh brake fluid.

2. Place master cylinder in vise with outlet holes up and install check valve springs in outlet holes so that they seat in depression in bottom of holes.

3. Install new rubber check valves over springs being careful not to displace springs from their seats. When check valve is properly seated, end of valve will be even with machined top of outlet boss.

4. Position new brass tube inserts in outlet holes. Thread spare brake line tube nut into each outlet hole and turn nuts down until inserts are seated. Remove tube nuts and check both outlet holes for burrs.

5. Install new secondary seals in grooves in counterbored end of floating piston. Face the lip of the seal nearest the counterbore toward the counterbore. The seal in the second groove should have the lip facing the end of piston that contains the small compensating holes.

6. Install new protector washer and primary seal over end of floating piston opposite secondary seals. Protector washer seats against flange of piston that has the small compensating holes and flat side of seal seats against washer.

7. Install primary piston, secondary seal in groove on push rod end of primary piston. Lip of seal must face toward small compensating holes in opposite end of piston.

8. Install protector washer and primary seal on end of master cylinder piston opposite secondary seal. Protector washer seats against flange on piston that contains compensating holes and flat side of seal seats against washer.

9. Install spring retainer on one end of primary piston spring and floating piston stop on other end.

10. Install primary piston spring on primary piston with spring retainer seated inside lips of primary seal.

11. Compress piston spring until floating piston stop clears small groove in end of piston. Install small retaining ring in this groove and release spring.

12. Coat master cylinder bore and primary and secondary seals on floating piston with clean brake fluid.

13. Insert floating piston, primary seal first, into unthreaded rear end of master cylinder bore. Push piston forward until end of piston is even with beginning of threads for headnut.

14. Install floating piston stop bolt and new gasket in side of master cylinder housing and push floating piston rearward until it contacts stop bolt. Tighten stop bolt to 10 foot-pounds torque.

15. Place spring retainer on end of floating piston spring and insert spring into threaded end of master cylinder bore with retainer seated inside lips of floating piston primary seal.

16. Install new copper gasket on head nut and assemble headnut into master cylinder, taking care to seat floating piston spring in counterbore of headnut. Tighten to 105 foot pounds torque.

17. Coat primary and secondary seals on primary piston with clean brake fluid and insert piston, spring end first, into master cylinder bore. Install retaining ring into groove in master cylinder bore.

18. Install new filter element in groove on O.D. of master cylinder. Install reservoir filler caps.

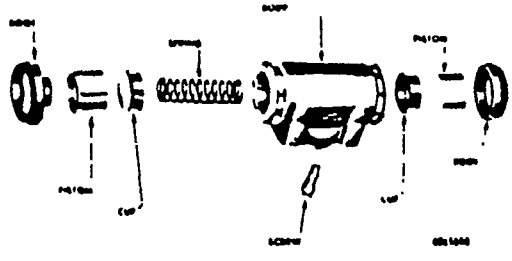

Fig. 41 Wheel Cylinder Disassembled - Typical

WHEEL CYLINDERS

Basically the wheel cylinders used on 1963 applications are of the same construction and operating principles as those used on 1962 models. On all applications the wheel cylinders used with the standard brakes are the same as those used with power brakes.

On the 1963 Ford Fairlane and Mercury Meteor applications the front wheel cylinders have been redesigned with a fixed baffle built into the cylinder between the two rubber piston cups. This is the same design as used on

1962 and 1963 Ford Falcon and Mercury Comet applications. Because of this baffle the cylinder cannot be honed; therefore, if inspection indicates the need for honing, the cylinder will have to be replaced. If honing is not necessary, all parts except the baffle can be replaced without removing the cylinder.

The front cylinder pistons, in these applications, are provided with a rubber seal around the center of the pistons. Whenever a piston is removed from the front cylinder be sure to replace this seal.

REMOVAL AND INSTALLATION OF WHEEL CYLINDERS (TYPICAL)

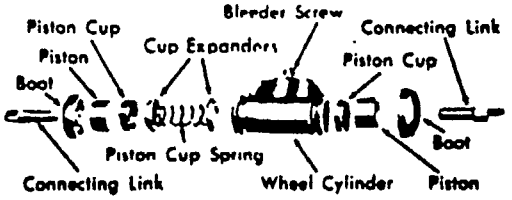

Fig. 42 Wheel Cylinder Disassembled - Cup Expander Type.

REMOVAL

1. With the car in a raised position remove the drums. Back off the adjustment of the automatic adjusting device, if necessary, to remove the drums.

2. Place clamps over the ends of the cylinders on cars whose backing plates are not equipped with wheel cylinder stops (tabs). Some 1963 wheel cylinders are equipped with boots recessed in grooves on the wheel cylinder housing to prevent the pistons from leaving the wheel cylinder. It is not necessary to install clamps on the wheel cylinders.

3. Remove the brake shoe assemblies following the procedures given previously for that particular type of brake.

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

At the rear cylinders, unscrew the pipe fitting that connects the tube to the cylinder.

On cars equipped with power brakes be sure that there is no vacuum in the system before disconnecting the hydraulic lines. Depress and release the brake pedal several times to expel any trace of vacuum from the system.

5. On the front brake cylinders, remove the capscrews and washers that retain the cylinders and washers to the anchor pin and backing plate.

6. On the rear brake cylinders, remove the brake cylinder retaining bolts and lock washers and remove the cylinders from the backing plates. Remove the clamps, if used, from all cylinders.

INSTALLATION FRONT WHEEL CYLINDERS

1. Position the cylinder on the anchor pin against the backing plate. Install washer and cylinder retaining nut on the anchor pin and torque to specification.

2. Install a new copper gasket over the hose fitting. Screw the hose assembly into the fitting. Engage the opposite end of the hose to the bracket on the frame, install the horse-shoe-type retaining clip and connect the brake tube to the hose with the pipe fitting nut. Torque to 10-15 foot pounds.

INSTALLATION - REAR WHEEL CYLINDERS

1. Insert the cylinder into the opening in the backing plate and install the retaining cap screws and lock washers.

2. Connect the brake line tube to the cylinder by tightening the pipe fitting to the cylinder. Torque to 10-15 foot pounds.

DISASSEMBLY - WHEEL CYLINDERS

1. Remove all external dirt.

2. Remove the links and the rubber boots from the ends of the wheel cylinder.

3. Remove the pistons, cups and return spring from the cylinder bore.

4. Remove the bleeder screw from the cylinder. (see fig. 42)

INSPECTION - WHEEL CYLINDERS.

1. Wash all usable parts in clean denatured alcohol and dry with compressed air.

2. Check all internal parts for damage or wear. If any of the internal parts require replacing it is good service practice to replace them all.

3. Check the cylinder bore finish (should be glass smooth) and for freedom of deposits, pits or scores.

4. Check rubber cups for wear, tears, scuffing, softening, hardening, gumminess, size, etc. This inspection may be used to

locate contributing causes for failure such as undersized pistons, score, bore dirt, bad fluid, etc.

5. Check the pistons for corrosion, scoring, size, etc. Clearance between pistons and cylinder bore should be .003" to .006".

6. Check rubber boots for hardening, softening, cracks, cuts and holes. Turn boot inside out and inspect. (see fig. 38)

7. Check the spring for distortion and cracks.

8. Bleeder Valve. Inspect the dirt in passage and damaged cone seat.

ASSEMBLY - WHEEL CYLINDERS

1. Dip all internal parts in heavy duty brake fluid sufficient to thoroughly coat them with the fluid. Coat the wheel cylinder cups and inside of the bore with Tru-Torque lubricant or equivalent. (fig. 42)

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

3. Install piston cup in one end of cylinder with lip toward center, and install piston with flat side toward cup. (see fig. 41)

4. Place rubber boot over end of wheel cylinder.

5. Install spring and expander assembly.

6. Install other piston cup, lip toward center. Install piston, flat side toward cup.

7. Install remaining rubber boot over end of cylinder.

POWER BRAKES

KELSEY HAYES BELLOWS TYPE POWER BRAKE

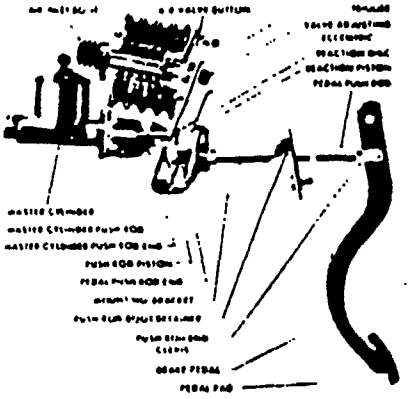

Fig. 44 Kelsey Hayes Bellows Type.

The Power unit of the Kelsey Hayes Bellows Type of Power Brake consists of the air-vacuum bellows, mounting bracket, power lever assembly, actuating lever assembly, the pedal push rod, and the master cylinder.

PRINCIPLES OF OPERATION

The power unit consists of an air-vacuum bellows which contracts and expands as the air pressure in it is varied by the introduction of atmosphere or vacuum.

One end of the assembly is attached to the mounting bracket, and the other end is connected to the power lever assembly.

The valves which control the air pressure in the bellows are located in the valve housing, and are controlled by the movement of the actuating lever through the brake pedal. When the bellows contracts, it draws the power lever toward the master cylinder and gives a proportional assist to the operator as he depresses the brake pedal. This movement is transmitted to the master cylinder through the push rod and the brake applying action which result is the same as in any standard hydraulic brake system.

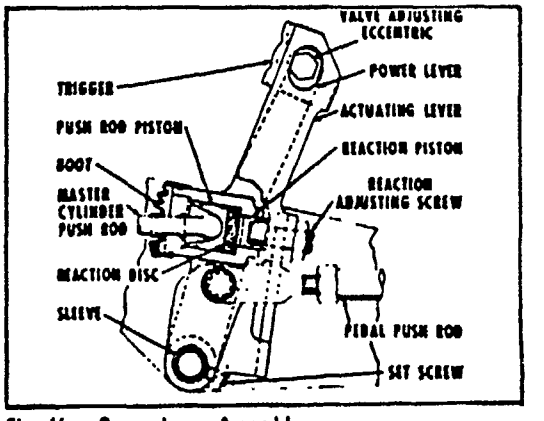

Fig. 46 Power Lever Assembly.

This illustration shows the construction of the power lever assembly and actuating lever assembly which pivots in the mounting bracket. The power lever is connected to the valve housing of the power unit through the shank of the valve adjusting eccentric bolt. It is also connected to the master cylinder push rod through the reaction disc and push rod piston. The actuating lever is controlled by the movement of the brake pedal through

the pedal push rod and carries the valve actuating bracket or "trigger". It is also connected to the reaction disc through the reaction piston and the reaction adjusting screw.

Refer to fig. 44 and note the relative positions of the valve assembly and the brake pedal, and particularly the air valve button and the trigger. The trigger is part of the actuating lever, and its movement, transmitted through the air valve button, controls the operation of the valves. The details of this operation are shown in figures 47, 48 and 49.

RELEASED POSITION

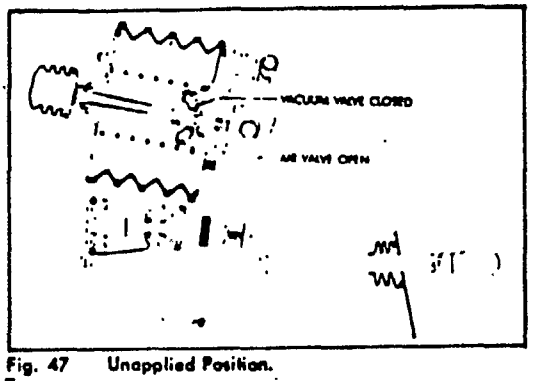

Fig. 47 Unapplied Position.

In the released position, the bellows of the power unit is fully extended and is filled with atmosphere which has entered it through the air filter and the open air valve. The vacuum valve is closed, sealing the bellows off from the vacuum supply. However, as can be observed, vacuum is being applied at all times right up to the vacuum valve; so that any opening of the vacuum valve will begin an evacuation of the air out of the bellows.

APPLIED POSITION

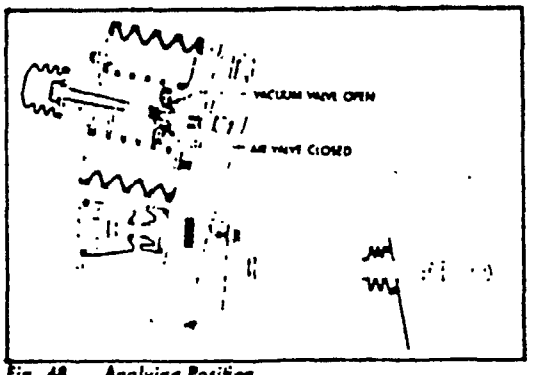

Fig. 48 Applying Position.

In the illustration (figure 48) the actuating lever is moving in an "applying" direction and its trigger is applying pressure to the air valve button. The air valve, which at "release" was held open by the air valve spring, has now closed. Continued movement has opened the vacuum valve which, by its spring, has been held in closed position. This permits vacuum to be applied to the bellows, evacuating a controlled amount of air from it (the amount of evacuation depends on the amount of pedal effort) and causing it to contract.

In this way, because it is mechanically connected to the power lever, it moves the power lever which, with the actuating lever, moves the push rod into the master cylinder, thereby applying the brakes.

As fluid pressure increases in the master cylinder, a reaction force is transmitted through the push rod to the reaction disc and reaction piston to apply a pressure on the actuating lever through the reaction adjusting screw. This reaction force moves the "trigger" away from the air valve button to close off the vacuum port. The reaction force is proportional to the fluid pressure in the hydraulic system and balances the force exerted on the actuating lever, providing the driver with brake "feel".

HOLDING POSITION

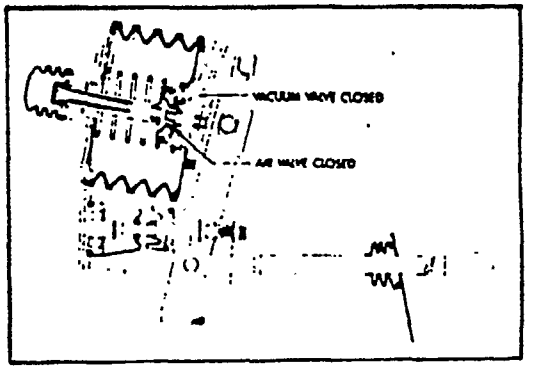

Fig. 49 Holding Position.

When pedal pressure is held (at any stage of brake application or release), both the air and vacuum valves immediately close and the unit becomes poised. The operator is imposing only a "holding" pressure on the pedal. The air and vacuum valves are responding by also remaining in a "holding" position - both are closed. Thus, a status quo is maintained in the bellows.

While the preceding reduction of air pressure is maintained, no further evacuation can occur. The power unit holds the brake system at the same degree of application as the operators pressure on the pedal. The fluid pressure applied by the master cylinder continues, as at all other times, to be proportional to the foot pressure applied by the operator.

When the brakes are in the fully applied position and the power unit is delivering its maximum assist, any additional pedal pressure applied by the operator results in a still greater increase of pressure delivered to the master cylinder, through the combination of the actuating lever and power lever acting as one through the eccentric, fully compressing the rubber collar.

The full assist of the power unit is maintained during this increase. When the foot pressure of the operator is released, the unit correspondingly releases its pressure on the brake system. Here, with the trigger moving away from the air valve button, the vacuum valve is closed by spring tension while, in the same movement, the air valve is opened. Atmosphere is thereby permitted to enter the bellows, causing it to expand. At any point during release, as well as during application, the operator may assume a "holding" position, and the unit will immediately become poised. On complete release, of course, the entry of atmosphere allows the return spring to expand the bellows to its full length and again assume an unapplied position.

REMOVAL - BUICK 4000-4300 SERIES

1. Remove the stop light switch wires.
2. Disconnect hydraulic line. Plug or tape line to prevent dirt from entering the hydraulic system.
3. Disconnect the vacuum hoses from the top of the bellows unit.
4. Disconnect the air supply hose from the unit.
5. Disconnect the pedal push rod from the brake pedal.
6. Remove the nuts which attach the mounting bracket to the cowl and the self-tapping screw holding the tab to the frame rail.

REMOVAL - OLDSMOBILE F-85

1. Remove mounting bolts.
2. Disconnect vacuum hose.
3. Scribe eccentric bolt location, remove bolt, wave washer and bushing. (see fig. 50)

NOTE: If necessary to service the pedal assembly it can be removed at this time.

1. Disconnect and remove the stop lamp switch.
2. Remove pedal pivot bolt.
3. Remove pedal assembly.

Fig. 50 Bellows Removal.

INSTALLATION - BUICK 4000-4300 SERIES

1. Replace the nuts which attach the mounting bracket to the cowl. Torque to 25 foot pounds. Install the self-tapping screw holding the tab to the frame rail.
2. Connect the pedal push rod to the brake pedal.
3. Connect the vacuum hose to the top of the bellows unit.
4. Connect air supply hose to the unit.
5. Connect hydraulic unit.
6. Install stop light switch wires.
7. Bleed hydraulic system.

INSTALLATION - OLDSMOBILE F-85

1. Secure bellows assembly to pedal assembly by installing the eccentric bolt, bushing and wave washer. Be sure eccentric bolt is aligned with scribe marks made at time of removal.
2. Connect vacuum hose.
3. Install mounting bolts and torque to 3 to 6 foot pounds.
4. Bleed hydraulic system.

ADJUSTMENTS

A. VALVE OPERATION

Valve adjustment must be made without master cylinder installed.

1. Clamp unit assembly in vise or mount on car.
2. Be sure that master cylinder push rod is removed, so that cut-in of the unit can be checked without interference.
3. Be sure that vacuum supply hose is attached to power unit, then apply vacuum.

NOTE: If a shut-off valve is used in the vacuum line, the unit should never be applied with the shut-off valve closed; an application against a closed or blocked vacuum line may expand the bellows, causing dislocation of the bellows support plate.

4. Turn the valve adjusting eccentric until the unit chatters when the pedal is depressed in a sharp and rapid applying movement. Then turn the eccentric until the chatter disappears. Do not turn the eccentric more than necessary or the unit cut-in will be excessively high. (see fig. 51)

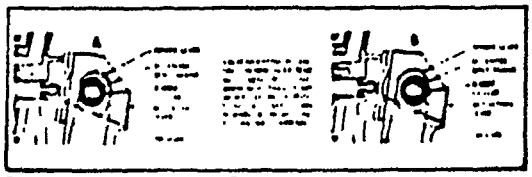

Fig. 51 Valve Adjusting Eccentric.

5. After completing the valve adjusting eccentric adjustment, tighten the eccentric nut to 180-220 inch pounds torque. Then check the adjustment again, after the nut is tightened.

NOTE: If turning the eccentric from one extreme position to the other does not stop the chatter, it will be necessary to check the trigger alignment as shown in figure 53.

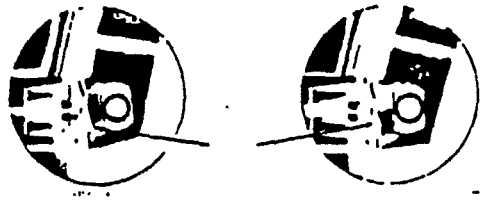

Fig. 52 Eccentric Extreme Positions.

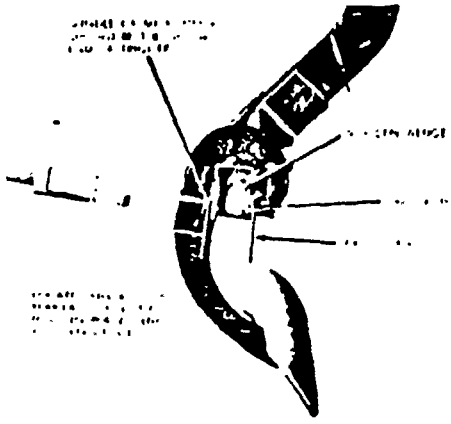

Fig. 53 Checking Trigger Alignment.

B. PUSH ROD ADJUSTMENT

This adjustment is necessary if any of the master cylinder parts, power lever parts, or the push rod itself has been changed.

1. With the master cylinder removed from the unit, locate the master cylinder push rod in the push rod piston. Push on the rod to seat the reaction disc in the power lever, then hold the rod in with a light pressure.

2. Adjust the rod length to the .096/.116 dimension. (see fig. 54)

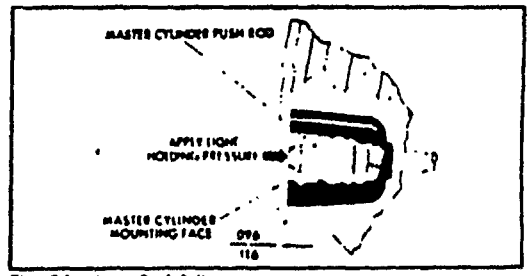

Fig. 54 Push Rod Adjustment.

3. Tighten lock nut and recheck the adjustment.

4. With the boot installed on the master cylinder, attach the master cylinder to the mounting brackets, using 25 foot pounds torque on the nuts. Care must be taken when installing the master cylinder boot to be sure it does not wrinkle and that the reaction piston stays properly located in the power lever.

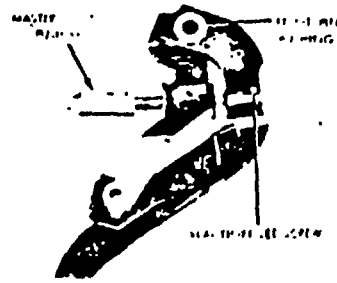

Fig. 55 Adjusting Push Rod.

C. MASTER CYLINDER

1. Remove the master cylinder filler cap and check the master cylinder at the compensator port for bubbles or spurt on application of the unit, which indicates that the push rod is properly adjusted. Check fluid level. Add fluid to correct level if needed and reinstall master cylinder filler cap.

D. REACTION ADJUSTING SCREW

This adjustment must be made only if the adjustment has been changed or the actuating lever or reaction piston has been replaced.

1. Recommended Method.

(a) Disconnect the hydraulic line to the master cylinder. Connect a gauge to the master cylinder.

(b) Apply a 30 pound load perpendicular to the pedal pad. (see fig. 57) The hydraulic gauge reading should be 340 to 350 PSI. Adjust the reaction adjusting screw to obtain this, with the final adjustment being made by turning the screw in. Tighten the adjusting screw lock nut and recheck the setting.

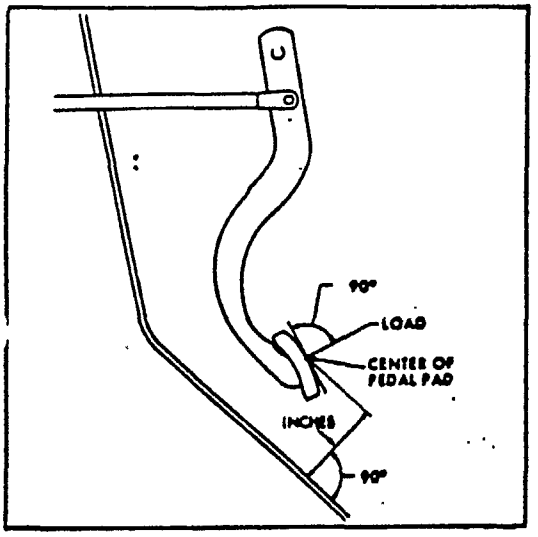

Fig. 56 Pedal Heighth.

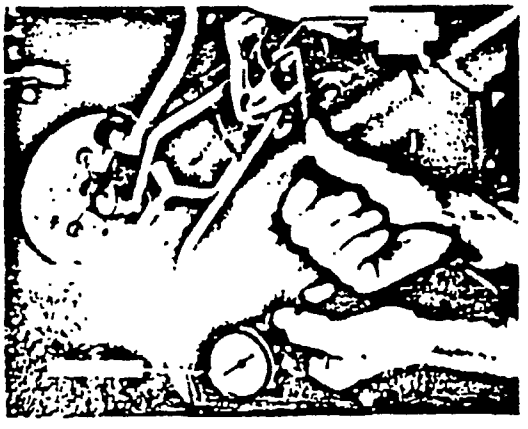

Fig. 57 Adjusting Reaction.

2. Alternate Method.

If guages are not available, a setting can be made as follows:

(a) With the unit completely assembled, and the valve adjusting eccentric adjusted, turn the reaction adjusting screw in until the rear of the reaction piston skirt is flush with the back face of the power lever.

NOTE: A light rearward pressure on the master cylinder push rod will maintain contact between the reaction adjusting screw and the reaction piston.

(b) Back off the screw 1-2/3 turns and lock in place with the jam nut (see fig. 58).

(c) After installation of the unit in the vehicle and completion of all other adjustments, apply a load of 70 pounds or more at the pedal. The rear of the reaction piston skirt should then be flush or exposed not more than .010 inch.

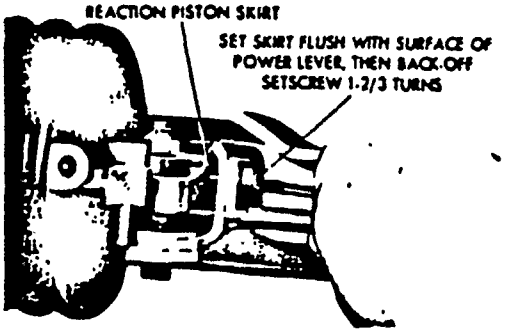

Fig. 58 Reaction Screw Adjustment.

E. PEDAL HEIGHTH ADJUSTMENT

The pedal push rod is adjustable in the clevis at the unit end. It should be adjusted to provide a pedal heighth of approximately 4-1/4 inches (fig. 56) or until the end of the push rod should just touch the master cylinder piston.

MIDLAND ROSS HY-POWER - REMOTE MOUNTED

The Midland Ross Remote Power Brake introduced in 1963 (Chrysler Model C-300J) is generally the same as the Midland Hy-Power unit used on some 1962 installations. It consists of a control valve, a vacuum suspended booster and a slave cylinder assembly, mounted on brackets under the left front fender, just back of the headlamp housing (see fig. 59).

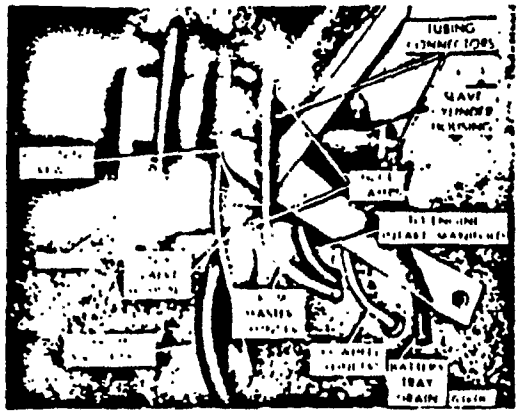

Fig. 59 Remote Control Booster Assembly.

It breathes through an air filter assembly mounted inside of the left front fender side shield just under the battery tray. A strap integral with the filter housing serves as a mounting bracket (fig. 60). All in-line check valve is used in the vacuum line. The residual check valve is contained in the slave cylinder assembly, rather than in the master cylinder as it is in most other brake systems.

CAUTION: When servicing the master cylinder on this installation do not install a residual check valve or the booster will not permit the brakes to release fully.

For an explanation of the operating principles of this power unit. See Page 244 of the 1962 Manual.

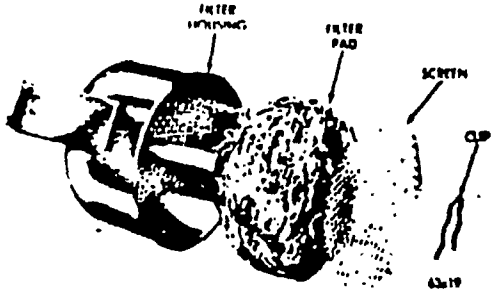

Fig. 60 Air Filter Assembly.

REMOVAL

1. Remove the hose clamps that secure the air hose and the vacuum hose to the control valve housing and to the booster.

2. Disconnect the master cylinder line and wheel cylinder line at the tubing connectors on the slave cylinder housing.

3. Remove the two retaining screws that secure the slave cylinder housing to the mounting bracket, and remove the power brake assembly from the vehicle.

4. Remove the filter retaining nut and bolt and remove the filter assembly from the inner side of the fender side shield.

INSTALLATION

1. Position the power brake assembly on the mounting bracket and install the two retaining screws with a flat washer next to the bracket and then a lockwasher.

2. Connect the air hose to the breather cap and the vacuum hose to the booster exhaust.

3. Connect the tube from the wheel cylinders to the fitting in the slave cylinder end cap.

4. Connect the tube from the master cylinder to the slave cylinder. Bleed the brakes.

BENDIX MASTER-VAC - SMALL SIZE

A smaller version of the Bendix Master-Vac power brake is offered as optional equipment on the 1963 Tempest. The differences between the small size and the standard size Master-Vac are:

1. The small unit is 6-1/2 inches in diameter compared to the 9 inch diameter of the standard size.

2. The small unit is mounted to brackets rather than directly to the cowl.

3. The small unit has an O-ring in place of a secondary cup seal at the hydraulic piston in the master cylinder.

4. The small unit rear housing seal held in place with a retaining spring.

5. The small unit air filter is of one piece foam design.

6. The small unit has a bleed fitting attached to the master cylinder. Since it is located at the highest point in the system it may be possible to bleed the system from this point if the hydraulic line is carefully removed and replaced at the master cylinder so that a minimum amount of fluid is lost.

PRINCIPLES OF OPERATION

The principles of operation of the small size Master-Vac are identical to those of the standard size unit. For a detailed description of these operating principles see page 206 of the 1962 manual. Removal and installation instructions on the small Master-Vac are as follows:

REMOVAL

1. Disconnect stop light switch wires.
2. Remove cotter pin from clevis pin, then remove clevis pin from brake pedal arm and clevis from vacuum push rod.
3. Disconnect vacuum hose from vacuum cylinder assembly. Cover openings to prevent entry of dirt, etc.
4. Disconnect hydraulic brake line from end of master cylinder. Cover opening in master cylinder and brake line to prevent entry of dirt, etc.
5. Remove nut and washer securing bracket on fender apron to power brake assembly.
6. After brake assembly is removed from bracket, replace nut and washer on brake assembly.
7. Remove four nuts and washers holding brake assembly and bracket to cowl and remove brake assembly.
8. Clean exterior of power brake assembly and drain reservoir of hydraulic fluid.

INSTALLATION

1. Place power brake unit in position and install four attaching nuts. Tighten nuts to 15-25 pounds foot torque.
2. Remove outboard nut and washer from master cylinder and insert stud into bracket on fender apron. Install nut and washer and tighten to 15-20 pounds foot torque.
3. Assemble clevis and locking nut to vacuum push rod and attach to brake pedal assembly with clevis pin. Secure assembly with cotter pin.
4. Adjust pedal heighth to provide 3-1/16" to 3-5/16" clearance from floor mat to bottom of pedal pad. Tighten clevis lock nut to 60-120 pounds inch torque.
5. Adjust stop light switch if necessary to provide 3/16" plunger extension from body. Attach wire.
6. Attach vacuum line.
7. Attach hydraulic line.
8. Bleed brakes as necessary and fill fluid reservoir to 1/2 inch from top of filler hole.

NOTE: If hydraulic line was carefully removed and replaced with a minimum amount of fluid lost from line it may only be necessary to bleed system at bleed fitting on end of master cylinder.

SPECIAL NOTE: The following instructions apply to the Disassembly and Assembly of the Master Cylinder used with the small Master-Vac power brake.

DISASSEMBLY

1. Remove snap ring from groove in bore at rear of master cylinder.

CAUTION: Ring is under high tension. Use eye protection to prevent possible injury.

2. Remove piston assembly, primary cup, piston return spring assembly and residual pressure check valve.
3. Do not further disassemble the piston assembly, return spring assembly or the check valve assembly unless it is necessary to replace damaged parts.
4. If necessary, the O-ring seal may be removed from the piston with an ice pick or thin blade screw driver.
5. Remove filler cap and bleed fitting.

ASSEMBLY

1. Clamp master cylinder in vise with front end slightly below horizontal.
2. If O-ring seal has been removed, dip ring in brake fluid and assemble over end of piston.
3. Dip piston assembly, primary cup, piston return spring, and residual check valve in fresh clean brake fluid. Stack parts on piston in proper order and assemble in bore of master cylinder.
4. Compress piston far enough to insert snap ring in groove. Make certain snap ring is firmly seated in groove.
5. Install bleed fitting.
6. Fill reservoir with brake fluid and operate piston by hand until no more bubbles arise in reservoir. If this is done carefully and properly, bleeding brakes on car may not be necessary.
7. Replace filler cap.
8. Remove master cylinder assembly from vise.