

BRAKES

SERVICE STANDARDS

Model Designation	1-08AD 1-08AF 1-08AS	2-26AD 2-26AF 2-26AS	2-33AD 2-33AF 2-33AS	3-59AD 3-59AF 3-59AS	6-71AD 6-71AF 6-71AS	8-65AD 8-65AF 8-65AS	8-71AD 8-71AF 8-71AS	8-71AD-D 8-71AF-D 8-71AS-D
Cylinder Piston Clearance	.001" to .003"	.001" to .003"	.001" to .003"	.001" to .003"	.001" to .003"	.001" to .003"	.001" to .003"	.001" to .003"
Wheel and Master	1 3/8"	1 3/8"	1 3/8"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Diameter of Wheel Cylinder	1 3/8"	1 3/8"	1 3/8"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Bore:								
Front Wheel	1 1/8"	1 1/8"	1 1/8"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Rear Wheel	1 1/8"	1 1/8"	1 1/8"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Diameter of Master Cylinder	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Bore	1 1/8"	1 1/8"	1 1/8"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Master Cylinder Piston Rod	1 1/8"	1 1/8"	1 1/8"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Free Travel	1 1/8"	1 1/8"	1 1/8"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Brake Lining to Drum	1 1/8"	1 1/8"	1 1/8"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Clearance:								
Between drum and lining-inches:	.006"	.006"	.006"	.03"	.03"	.03"	.03"	.03"
Front wheel—Heel	.006"	.006"	.006"	.03"	.03"	.03"	.03"	.03"
Toe	.012"	.012"	.012"	.03"	.03"	.03"	.03"	.03"
Rear wheel—Heel	.006"	.006"	.006"	.03"	.03"	.03"	.03"	.03"
Toe	.006"	.006"	.006"	.03"	.03"	.03"	.03"	.03"
Lining Width—Front wheel	2"	2"	2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"
Rear wheel	2"	2"	2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"
Lining Thickness:								
Front wheel	3/16"	3/16"	3/16"	1"	1"	1"	1"	1"
Rear wheel	3/16"	3/16"	3/16"	1"	1"	1"	1"	1"
Drum Diameter—Front	10"	11"	11"	14"	14"	14"	14"	14"
Rear	11"	14 1/8"	14 1/8"	14"	16"	16"	16"	16"
Brake Pedal Free Play	3/4" to 1"	3/4" to 1"	3/4" to 1"	3/4" to 1"	3/4" to 1"	3/4" to 1"	3/4" to 1"	3/4" to 1"
Brake Lining Type	Moulded	Moulded	Moulded	Moulded	Moulded	Moulded	Moulded	Moulded
Method of Installation	Rivets	Rivets	Rivets	Rivets	Rivets	Rivets	Rivets	Rivets
BRAKE—HAND								
(Transmission type only):								
Clearance between Lining and Drum	.015" to .020"	.015" to .030"	.015" to .030"	.015" to .030"	.015" to .030"	.015" to .030"	.015" to .030"	.015" to .030"
Lining—Width	2"	2"	2"	2"	2"	2"	2"	2"
Thickness	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"
Length	* 16 1/4"	* 21 1/4"	* 21 1/4"	* 21 1/4"	* 21 1/4"	* 21 1/4"	* 21 1/4"	* 21 1/4"
BRAKES BOOSTER:								
Diaphragm type								

* 3 Speed Transmission

BRAKES

MODELS 1-08A, 2-26A, 2-33A

HYDRAULIC BRAKES ARE USED ON ALL MODELS.

The two general types of hydraulic brakes used on the above models covered in this manual are: Single Piston Brakes and Double Piston Brakes.

- (a) In the single piston brakes (Figure 1) each shoe is actuated by its own individual cylinder with a single piston. One cylinder is at the top of the brake assembly and operates the front shoe, while the other cylinder is at the bottom and operates the rear shoe. Each cylinder is mounted by means of the anchor pin for the opposite shoe. That is the top cylinder which operates the front shoe is attached by the same pin that serves as an anchor for the rear shoe. The rear shoe is actuated by the bottom cylinder and pivots on the top anchor. The single piston brakes are used at the rear wheels on the 1-08A trucks.
- (b) The double piston brakes (Figure 2) have only one cylinder in each wheel. Each cylinder has two pistons which work in opposite directions. This type of brake is used at both the front and rear wheels of models 2-26A and 2-33A and on the front wheels of 1-08A. The fixed shoe type used on wheels equipped with

double piston brakes are anchored at the bottom ends and are provided with cam adjustments near the top. The rear brakes on Models 2-26A and 2-33A are self-centralising and full floating, and are provided with an adjusting bolt for each shoe.

1. REMOVAL, INSTALLATION AND MAINTENANCE (Except 2-26A, 2-33A Rear).

- (1) Removal and Installation of Brake Shoes.
 - (a) Remove wheels and brake drum.
 - (b) Remove brake shoe return springs with special pliers to avoid bending spring ends.
 - (c) Instal wheel brake cylinder clamp to prevent forcing piston out of wheel cylinder. Clamp is not used on rear brake cylinder of 1-08A.
 - (d) Remove brake shoe anchor C washers, oil washer retainer, oil washer, guide spring retainer, guide spring and brake shoes.

To assemble, reverse operation. Also see "Adjustments".

2. BRAKE SHOES (2.26 and 2-33 Rear).

- (1) Removal and installation.
 - (a) Remove wheels and brake drum.
 - (b) Instal wheel brake cylinder clamp, to prevent forcing pistons out of wheel cylinder.
 - (c) Remove brake shoe return springs.

TIGHTENING REFERENCE

PART NAME	Size (inch and number of threads per inch)	Torque (foot-pounds)
Hand brake anchor support screw	$\frac{7}{16}$ — 14	50 to 55
Brake shoe anchor bolt nut	$\frac{1}{2}$ — 18	35 to 75
	$\frac{5}{8}$ — 18	85 to 105
Rear brake support to axle housing flange bolt and nut	$\frac{3}{8}$ — 24	30 to 35
Front brake support to steering knuckle cap screw	$\frac{3}{8}$ — 24	30 to 35
Front and rear wheel cylinder to support screw	$\frac{5}{16}$ — 18	15 to 20
Wheel cylinder bleeder screw	$\frac{5}{16}$ — 24	6 to 10
	$\frac{3}{8}$ — 24	12 to 15
Brake tube nuts	$\frac{5}{16}$ (tubing)	6 to 10
	$\frac{1}{4}$ (tubing)	12 to 15
Brake hose to axle tee	—	12 to 17
Master cylinder end plug	$1\frac{1}{4}$ — 18	30 to 100
Front brake mounting bolt	$\frac{7}{16}$ — 20	50 to 55
Rear brake mounting bolt	$\frac{3}{8}$ — 24	30 to 35
Wheel cylinder bolt	$\frac{3}{8}$ — 16	18 to 22
Anchor bolt nut	$\frac{1}{2}$ — 20	55 to 75
	$\frac{9}{16}$ — 18	55 to 75
	$\frac{1}{2}$ — 18	90 to 110
	$\frac{5}{8}$ — 16	90 to 110
Brake drum to hub bolt nut	$\frac{1}{2}$ — 20	65 to 75
	$\frac{3}{4}$ — 16	175 to 200

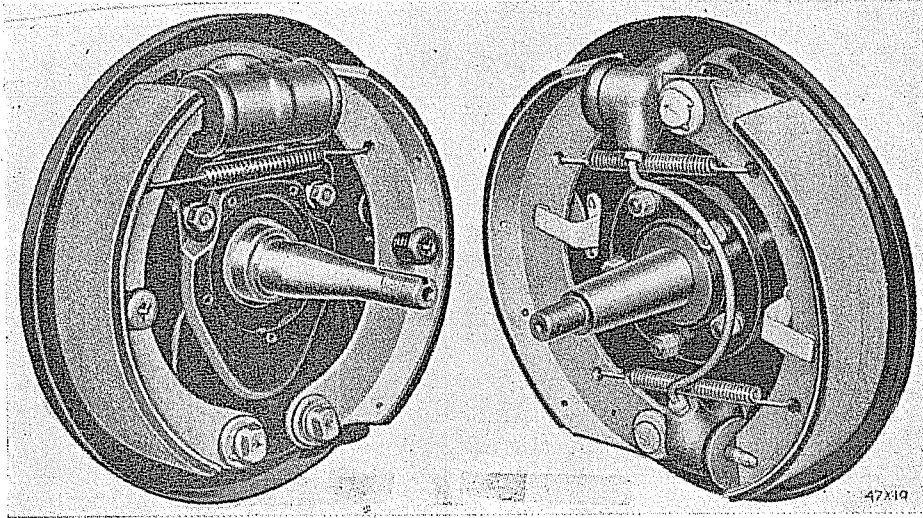


Fig. 1—Typical Front and Rear Brake Assemblies (Model 1-08A Only).
Left front brake, Left rear brake.

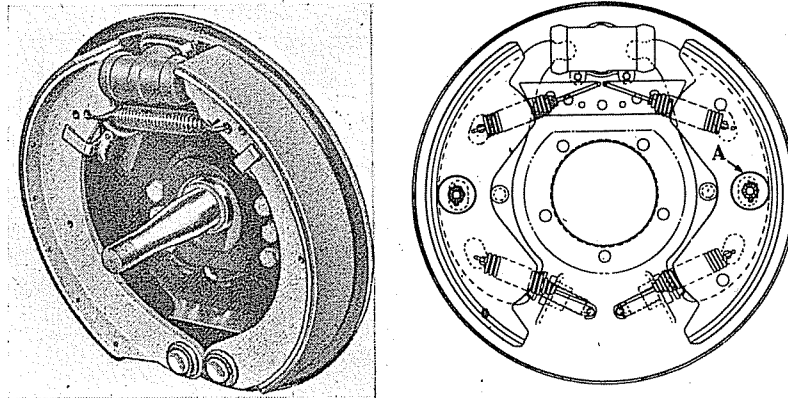


Fig. 2—Typical Front and Rear Brake Assemblies — Models 2-26A, 2-33A.
Left front brake, Left rear brake.

- (d) Remove the shoe hold down bolt, cotter pin and nut.
- (e) Remove brake shoes and levers.

To assemble, reverse operations. Also see Brake Adjustments. The correct method of installing the upper and lower pull back springs is shown in Figures 3 and 4.

3. DISASSEMBLY AND ASSEMBLY OF WHEEL BRAKE CYLINDERS.

- (a) Remove wheel and hub.
- (b) Block brake pedal at floor board to prevent downward movement of pedal.
- (c) Disconnect brake line at wheel cylinder.
- (d) Remove brake shoe return spring or springs.

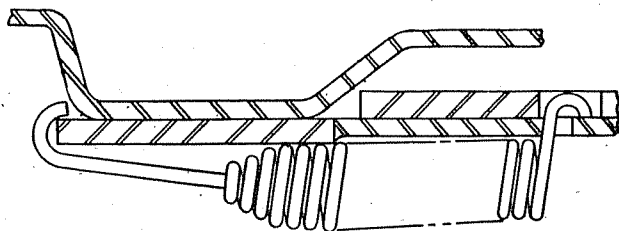


Fig. 3—Upper Pull Back Spring, Installation.

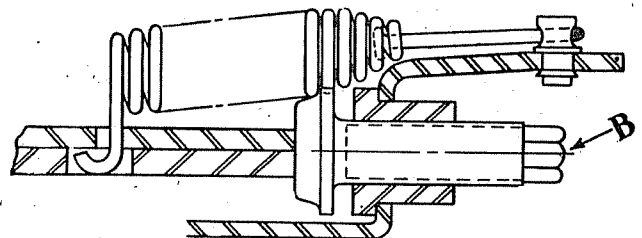


Fig. 4—Lower Pull Back Spring and Adjusting Bolt.

- (e) Pull out on toe of each brake shoe so ends pull out of brake cylinder boots.
- (f) Remove cap screws which hold cylinder body to brake support.

Remove anchor bolts on the 1-08A to remove rear wheel cylinders (Figure 5).

CAUTION.

Do not allow any brake fluid to come in contact with brake linings, either from dripping or from soiled hands.

- (g) Roll rubber boot off the end or ends of the cylinder.
- (h) Pistons, cups and internal parts can then be removed from the cylinder (Figure 6).
- (i) Assemble in the reverse order. Absolute cleanliness is necessary while assembling, as outlined under Master Cylinder.

4. DISASSEMBLY AND ASSEMBLY OF MASTER BRAKE CYLINDER (Refer Figures 7 and 8). All models.

- (1) Disconnect brake line tube at master cylinder.
- (2) Remove cotter and clevis pin which connect piston and pedal.

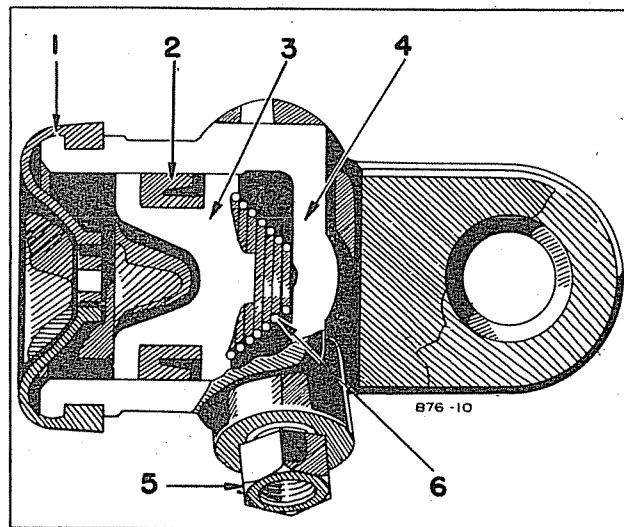
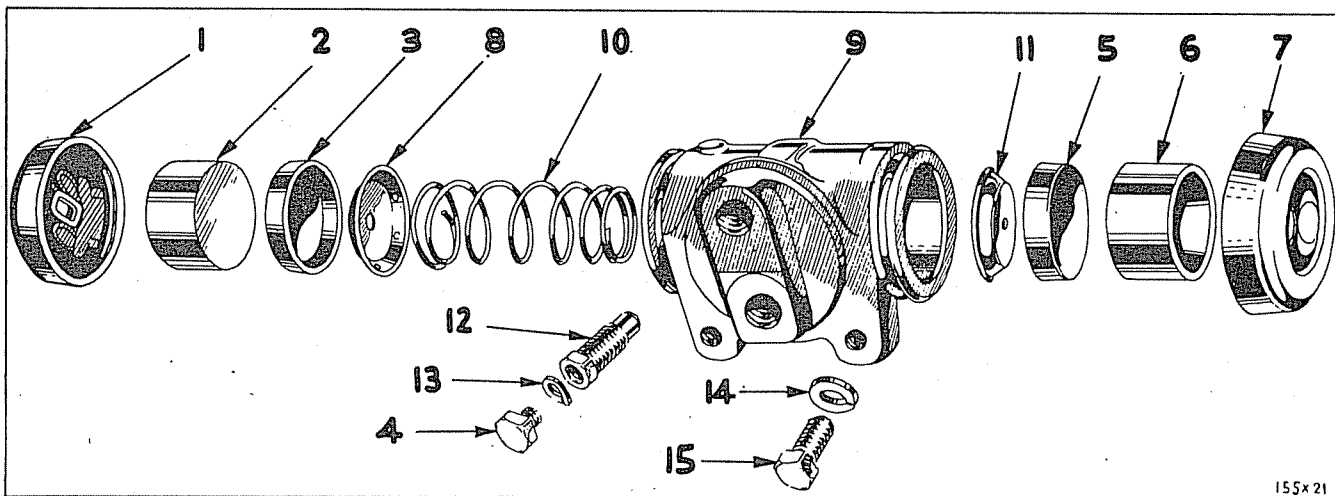
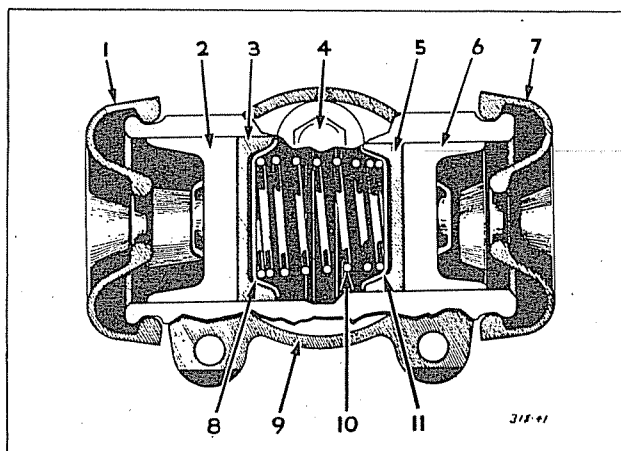


Fig. 5—Rear Wheel Brake Cylinder 1-08A Only.

- | | |
|-----------------|---------------------|
| 1 — Boot. | 4 — Body. |
| 2 — Piston cup. | 5 — Tube connector. |
| 3 — Piston. | 6 — Spring. |



155x 21



- | | |
|--|--|
| 1 — Boot. | 9 — Cylinder (body). |
| 2 — Piston (large) rear. | 10 — Piston cup spring. |
| 3 — Piston cup (large) rear. | 11 — Piston cup expander (service only) small—front. |
| 4 — Bleeder screw cap screw. | 12 — Bleeder screw (valve). |
| 5 — Piston cup (small) front. | 13 — Bleeder screw cap screw lock washer. |
| 6 — Piston (small) front. | 14 — Cylinder to brake support lock washer. |
| 7 — Boot. | 15 — Cylinder to brake support screw. |
| 8 — Piston cup expander (service only) large—rear. | |

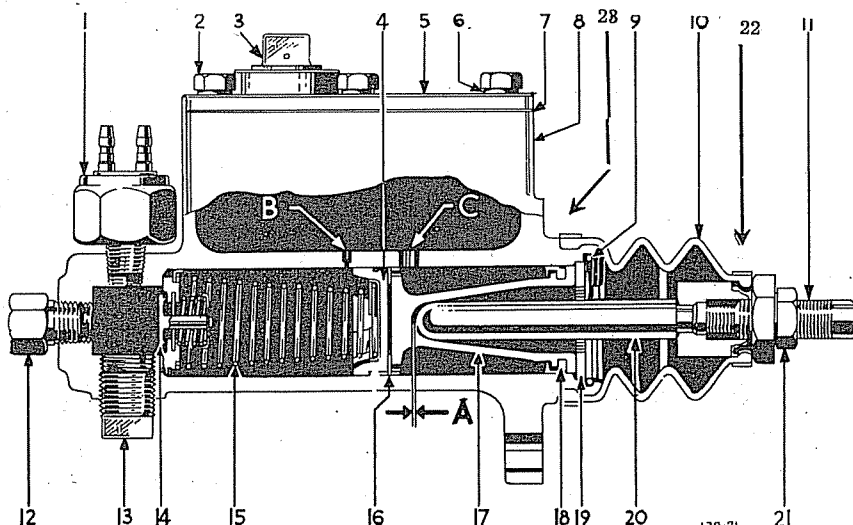
Fig. 6—Typical Wheel Brake Cylinder Except Rear Brake Cylinder 1-08A.

- (3) Remove bolts which hold master cylinder and lift out master cylinder assembly.
- (4) Remove large boot straps and roll large end of boot off master cylinder body. Piston push rod will then drop out of cylinder. If replacing a boot only, perform operation 2 and 4, and also remove small boot strap. Unless replacing a piston push rod or push rod end, do not change adjustment of the end piece. This is seldom if ever required. The factory adjustment is correct and permits the piston cup to just pass the relief Port B (Figure 7) and yet avoid covering the supply Port C when the pedal is in the released position.
- (5) Clean the outside of the cylinder assembly.
- (6) Remove reservoir filler plug and drain out all brake fluid.

Care must be taken to clean the entire cylinder body inside and outside thoroughly. Wash all parts with alcohol and dip in clean brake fluid before starting to assemble. Absolute cleanliness is essential because the slightest trace of dirt or grit may cause scratches in the cylinder and piston cup. This condition will permit the brake fluid to leak, and result in improper brake operation. The walls of the cylinder and internal parts should be coated with brake fluid before assembly. NEVER USE A MINERAL LUBRICANT FOR THIS PURPOSE.

5. INSTALLING BRAKE LININGS.

Never instal new brake linings on only one wheel. Reline both front or rear brakes at the same time using MOPAR brake linings in order to ensure even braking contact.



- 1 — Signal lamp switch.
- 2 — Cover screw.
- 3 — Filler plug.
- 4 — Piston cup.
- 5 — Cover.
- 6 — Cover screw gasket.
- 7 — Cover gasket.
- 8 — Master cylinder and supply tank body.
- 9 — Piston stop lock wire.
- 10 — Boot.
- 11 — Piston push rod end.
- 12 — Outlet connection.
- 13 — Hole plug.
- 14 — Valve assembly.
- 15 — Piston return spring.
- 16 — Piston washer.
- 17 — Piston.
- 18 — Piston secondary cup.
- 19 — Piston stop.
- 20 — Piston push rod.
- 21 — Piston push rod end lock nut.
- 22 — Strap—small.
- 23 — Strap—large.
- A — Free pedal movement.
- B — Relief port.
- C — Supply port.

Fig. 7—Brake Master Cylinder (Sectional View) Models 1-08A, 2-26A, 2-23A.

- 1 — Outlet pipe union.
- 2 — Inlet valve assembly.
- 3 — Inlet valve seat.
- 4 — Reservoir body.
- 5 — Piston return spring.
- 6 — Relief port.
- 7 — Piston cup.
- 8 — Reservoir cover.
- 9 — Reservoir cover plug.
- 10 — Port in piston.
- 11 — Master cylinder port.
- 12 — Master cylinder piston.
- 13 — Piston secondary cup.
- 14 — Boot strap (large).
- 15 — Piston stop.
- 16 — Piston stop lock wire.
- 17 — Piston push rod.
- 18 — Boot.
- 19 — Boot strap (small).
- 20 — Push rod end.
- 21 — Coupling rod.
- 22 — Coupling rod check nut.
- 23 — Yoke end.
- 24 — Piston washer.
- 25 — Master cylinder body.

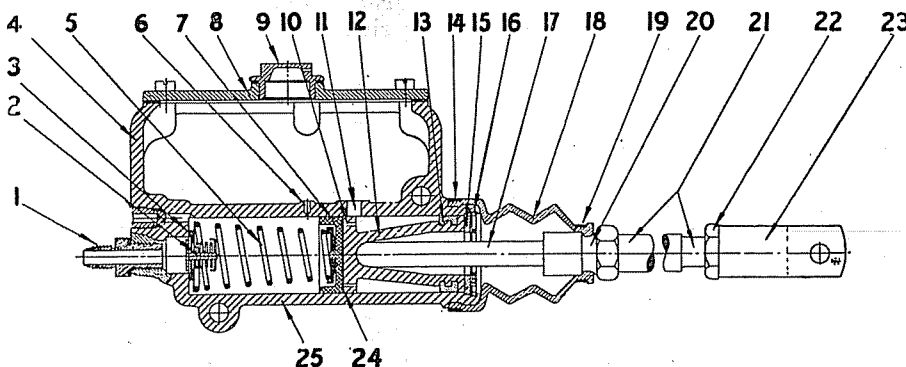


Fig. 8—Brake Master Cylinder.

Models 3-59A, 6-71A, 8-65A, 8-71A, 8-71A-D.

- (7) Remove lock ring in open end of cylinder.
- (8) Pull out piston stop washer, piston and piston cup.
- (9) Tip open end of cylinder downward and piston return spring will come out with inlet valve assembly.

- (1) Remove the old lining by punching out the rivets.

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

(2) Attach new lining in place and hold it solidly while rivetting. The brake lining stretching tool will ensure that lining is held rigidly when making this application.

The attaching rivets are countersunk to approximately two-thirds the thickness of the lining. Use rivets of the correct diameter and length.

(3) Upon completion of the lining application remove any burrs or irregular condition that may occur around the rivet holes.

CAUTION.

Never use aluminium rivets to attach brake linings to shoes.

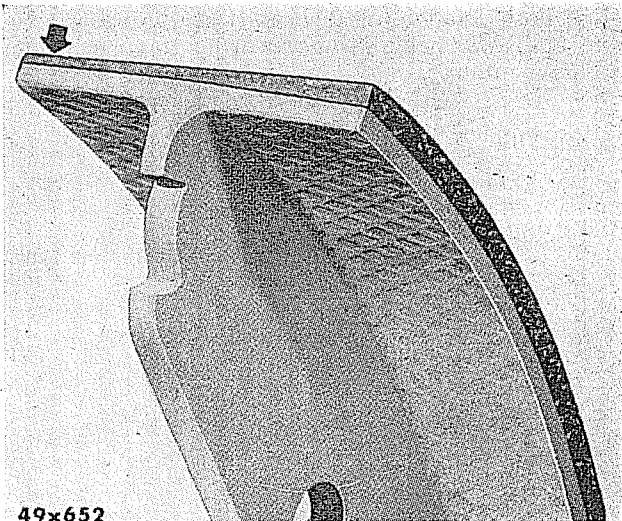


Fig. 9—Brake Lining Edge Wear.

a. ALIGNING BRAKE SHOES—

Models 1-08A, and front 2-26A, 2-33A.

Brake shoes not properly aligned are apt to cause squeaking and vibration and show a heavy edge contact. If a brake shoe is distorted and clearance between the web and face of cam pin is too much or too little, the shoe will not meet the drum squarely. One edge of the lining will have excessive

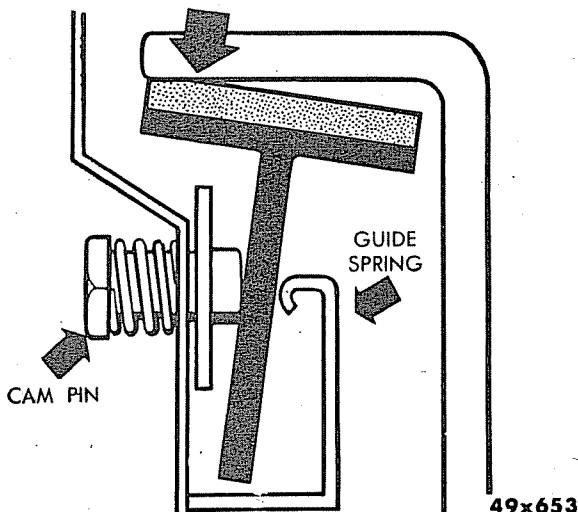


Fig. 10—Too Little Clearance Between Web and Cam Pin.

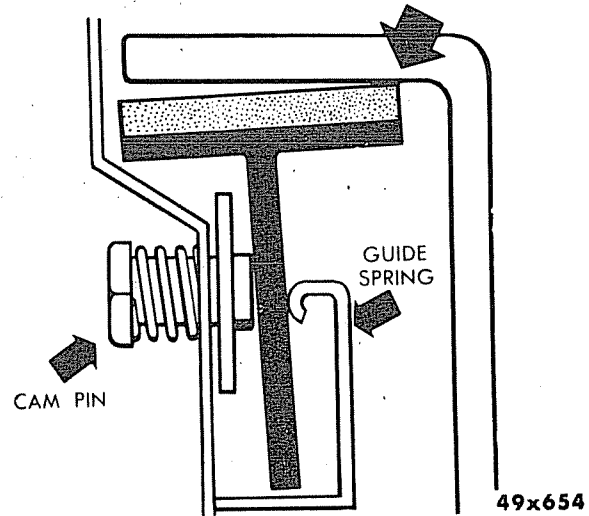


Fig. 11—Too Much Clearance Between Web and Cam Pin.

wear as shown in Figure 9. With too little clearance, the inside edge will strike the drum first and the cam pin will prevent the shoe from straightening up, as shown in Figure 10. The lining will be worn unevenly and vibration and brake noise will result.

With too much clearance, the guide springs twist the shoe and the outside edge of the lining strikes the drum first, as shown in Figure 11. This results in localized braking pressure as before. However, it will only occur momentarily. As pressure exerted by the wheel cylinder forces the lining against the drum, the shoe straightens to normal position.

Too much clearance between the cam pin and the web of shoe does not do as much harm as too little clearance, but will make it harder to obtain a good brake adjustment.

Straightening the Shoes—All Models.

If a shoe is bent or distorted, dimpling will not help it. The shoe will have to be straightened or replaced. To check for a twist in the shoe, support the anchor bolt end of the web on a surface plate,

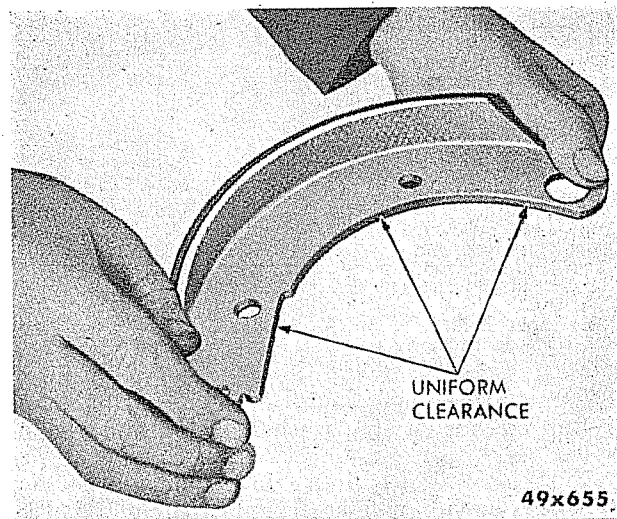


Fig. 12—Checking Shoe for Twist.

holding it flat. Test the shoe by swinging the toe end up to the plate as shown in Figure 12. If the shoe is in alignment, the web at the toe end will slide across the plate without binding. If the shoe is twisted the web will either strike the plate or ride above it. After straightening shoe reline or grind the lining flat, to make sure it fits squarely with the drum.

IMPORTANT.

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

To assemble, reverse the foregoing operation.

6. ADJUSTMENTS—

Models 1-08A, and Front Brakes 2-26A, 2-33A.

Brake shoe adjustments are divided into two classes—minor and major.

A minor brake shoe adjustment is made by moving the toes of the brake shoes. The cams for adjusting the toes of the shoes can be reached from the outside of the brake support plate (Figure 13). A major adjustment is made by moving both heel and toe of the brake shoes to centralise the shoes in relation to the drum diameter.

To make a major adjustment, the wheel and hub assemblies should be removed. The toe of the brake shoe is the end which fits into the wheel cylinder. The heel in the opposite end, attached to the anchor bolt.

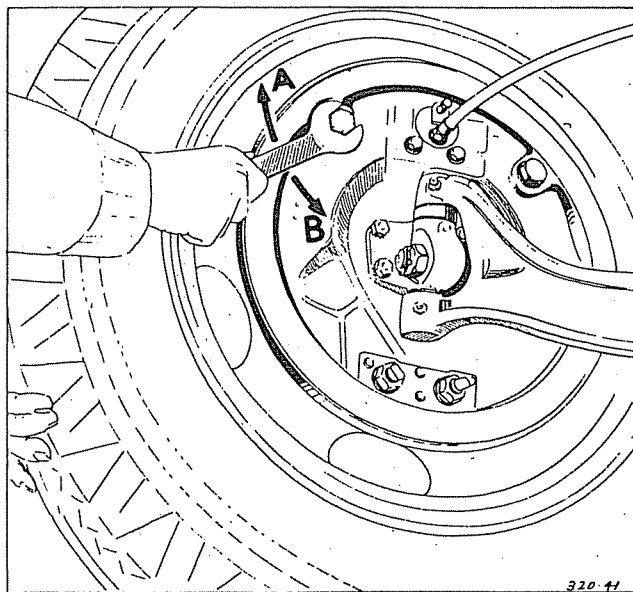


Fig. 13—Turning Brake Shoe Cams.

A—Increasing clearance. B—Decreasing clearance.

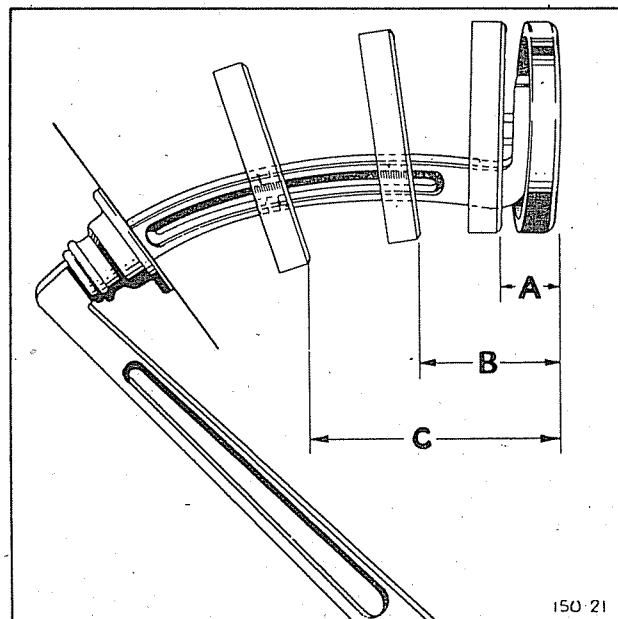


Fig. 14—Brake Pedal Free Play.

7. BRAKE PEDAL FREE PLAY (ALL MODELS).

Check total pedal travel. The total travel of the brake pedal (Figure 14) is caused by the following:

- Travel of the piston rod before touching the piston in the master cylinder.
- Travel of the piston required to cover the relief port.
- Travel of the brake shoes to contact the drum.

Pedal travel "A" is termed free play, and should be approximately $\frac{1}{8}$ inch to $\frac{1}{4}$ inch. This pedal free play may be felt readily by hand and is the movement of the pedal before the push rod touches the master cylinder piston. If necessary this adjustment can be made by changing the length of the master cylinder push rod.

Travel "B" can best be determined by looking into the master cylinder reservoir through the filler cap opening while moving the pedal slowly. After free play is taken up, fluid should be forced up through the relief port "B" (Figure 7) until the pedal has moved through an additional $\frac{3}{8}$ inch to $\frac{1}{2}$ inch approximately, making an accumulated travel of approximately $\frac{3}{4}$ to 1 inch required to close the relief port with the primary cup. If the fluid does not come up through the relief port, or if the flow stops at a pedal travel of much less than $\frac{3}{4}$ inch, the free play should be checked. If the free play is not the cause, the master cylinder should be disassembled and inspected for swollen cups, etc.

An additional pedal travel "C" of approximately 1 inch is required to move the shoes outwards against the drums. The total pedal travel to set the shoes should be approximately $1\frac{3}{4}$ inch to 2 inch with properly adjusted brakes.

Brake shoe adjustment will usually rectify excessive pedal travel.

8. MINOR BRAKE ADJUSTMENT—

Models 1-08A, and Front 2-26A, 2-33A.

- (1) Jack up truck so that one wheel can be rotated freely. While turning the wheel forwards and backwards, bring the shoe out with the top adjusting cam until a moderate drag is obtained.
- (2) Make the same adjustment to other shoes for the same wheels, as applicable to the above models.

A minor adjustment should be made when the brake drums are at room temperature.

9. MAJOR BRAKE ADJUSTMENT —

Models 1-08A, and Front 2-26A, 2-33A.

Before adjusting brake shoes to their final operating clearance, remove all traces of rough or high spots on lining. The brake shoe adjusting gauge should be used to check the concentricity of the brake lining with the drum.

The procedure for making major brake shoe adjustment is as follows, and must be applied after relining brake shoes, when shoes have been removed for any purpose, or after replacing or resurfacing the brake drums:

- (1) Remove wheel and hub.
- (2) Remove brake shoe return springs and test spring tension by comparing with a new spring.
- (3) Inspect lining for abnormal wear, glazed braking surface and also for uniform material on opposite wheel.
- (4) Inspect brake drums for concentricity, scoring, and grease.
- (5) Instal brake shoe return springs and set cams in released position.
- (6) Check the inside diameter of the brake drum (Figure 15). Set the brake shoe gauge arbour so that finger marked DRUM is just in contact with the point of the brake drum gauge pin. Place the proper adaptor bushing on the spindle or axle shaft and slide the brake shoe gauge over the adaptor bushing.

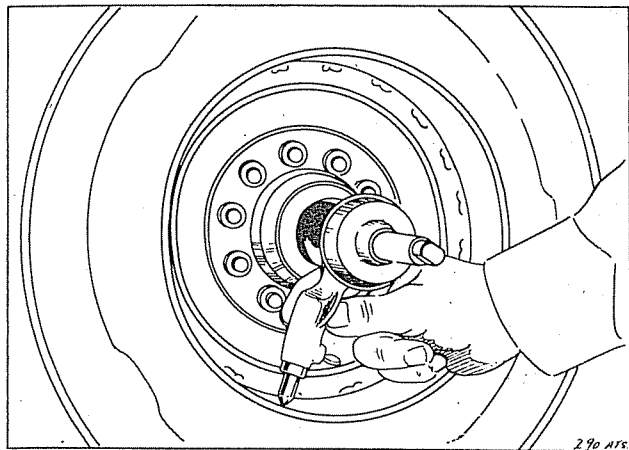


Fig. 15—Checking Brake Drum Diameter.

Tool MT-34-B.

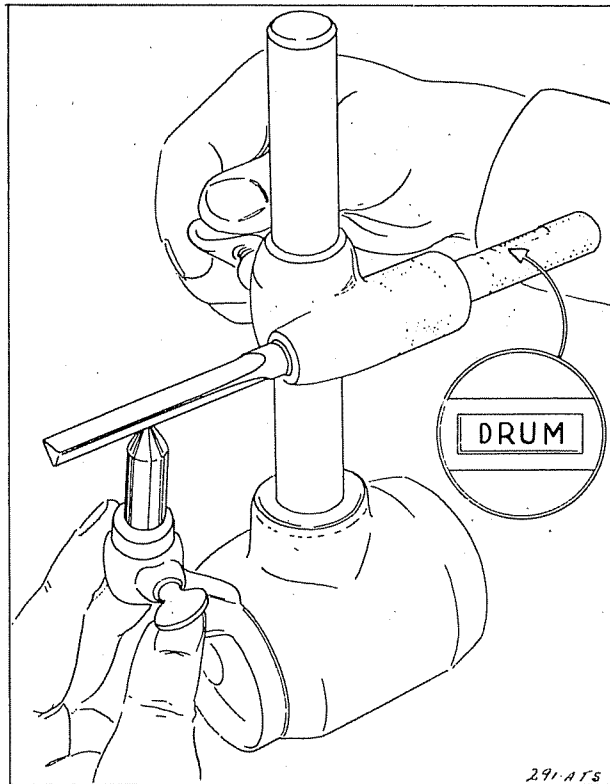


Fig. 16—Setting Brake Gauge.

Tool MT-34-B.

NOTE: After checking drum diameter, adjust brake shoe gauge to correct setting and check shoe clearance as shown in Figure 16 and 19.

- (7) Place the gauge on the point marked "Heel" and loosen the brake shoe anchor bolt nuts. An arrow or centre dot is stamped on each anchor bolt. If the marks on both anchor bolts are not pointing directly at each other, turn bolts until they are. These marks must point towards each other before starting to adjust the shoes. The anchor bolts must be turned (from that position) in the correct direction in order to decrease the clearance between the lining and the drum at the heel of the shoes.

The correct procedure is to turn the right hand anchor bolt (of the pair) counter clockwise, and the left hand anchor bolt (of the pair) clockwise, as viewed from the side where the wrench is applied (See Figure 17). When turning the anchor bolt as recommended, the heels of the brake shoes will move downwards, and outwards toward the gauge. Turn the anchor bolts until the heels of the brake shoes just contact the heel adjusting finger of the brake shoe gauge arbour.

For correct clearance refer Service Standards.

- (8) Move arbour of the gauge to the point marked "toe", Figure 18, and check the clearance between the lining and the drum at the toe of the brake shoe. Turn the toe adjusting cam until the lining at the toe of the brake shoe just contacts the gauge arbour.

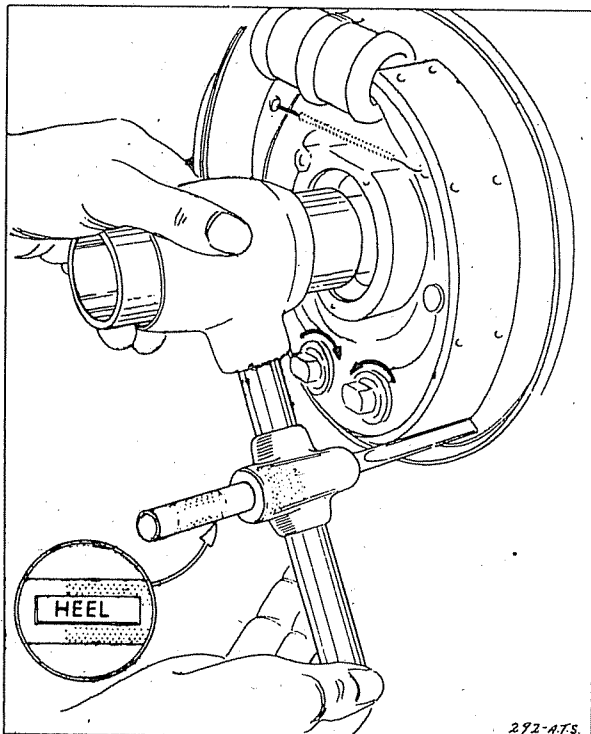


Fig. 17—Checking Brake Shoe Heel Adjustment Tool MT-34-B.

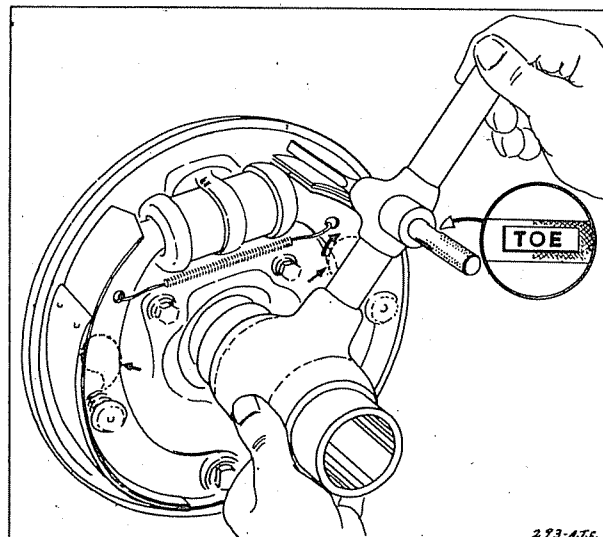


Fig. 18—Checking Brake Shoe Toe Adjustment.
Tool MT-34-B.

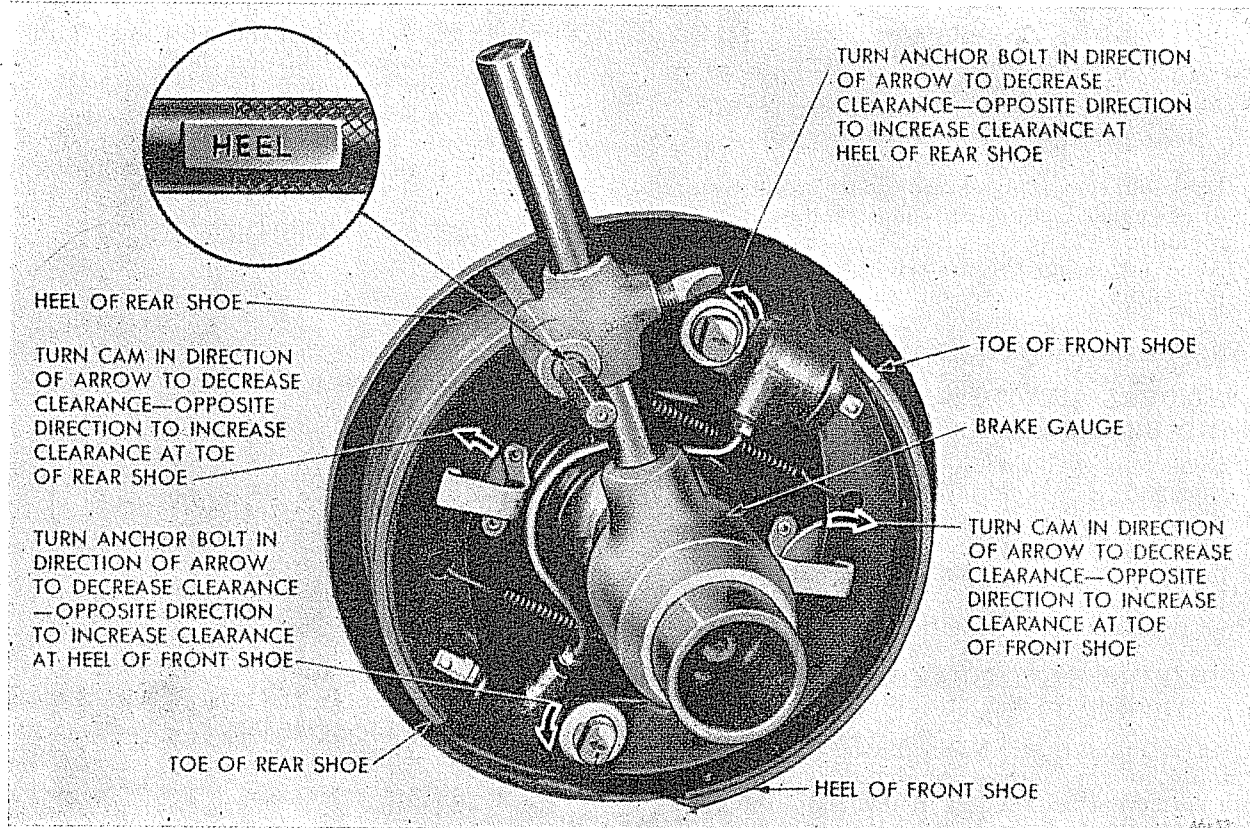


Fig. 19—Positioning Finger from “Drum” to “Heel”.

Each MoPar Part is factory engineered.

The toe of the shoe is then properly adjusted. For proper clearance between lining and drum, refer Service Standards.

- (9) Re-check the clearance (first at the heel and then at the toe) to make sure no change has occurred in either adjustment. Then, tighten the anchor bolts securely.
- (10) Instal wheel and hub assemblies.
- (11) Check, and if necessary, refill the master cylinder reservoir with brake fluid.

10. ADJUSTMENTS — REAR BRAKES— Model 2-26A, 2-33A.

- (1) After the shoes and levers have been assembled to the supports the shoe hold down bolt nut "A" Figure 20, should be adjusted to .015 inch between the face of the hold down plate washers and the brake shoe.
- (2) With the brakes cold and the drum in place, rotate the drum in both directions to be sure the brakes are free.
- (3) By means of the adjuster bolt, "B", Figure 4, found in the recess at the bottom of the brake support, adjust one shoe out tight against the drum. It should not be possible to rotate the drum in either direction of rotation.

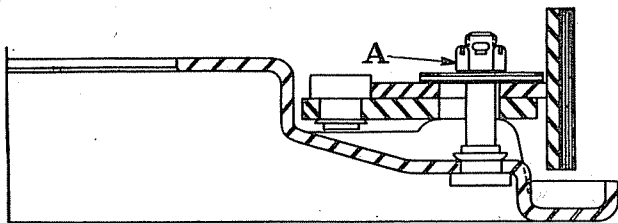


Fig. 20—Shoe Hold Down Bolt Adjustment.

- (4) Back off the adjuster until only a very slight drag caused by the shoe being adjusted remains.
- (5) After adjusting the first shoe, repeat the same procedure for the second shoe.

HAND BRAKE—MODELS 1-08A, 2-26A, 2-33A.

11. REMOVAL AND INSTALLATION OF HAND BRAKE BAND.

- (1) Remove large adjusting bolt nut (5) Figure 21.
- (2) Remove guide bolt adjusting lock nut.
- (3) Remove anchor adjusting shoe (1). Pull band assembly away from transmission and off propeller shaft after unlocking large adjusting bolt (2).

After re-assembly, adjust the band.

12. RELINING HAND BRAKE BAND (BAND REMOVED).

When relining the hand brake band, be sure to use lining of the correct grade and thickness to obtain maximum braking efficiency. The lining must first be cut to the required length (Refer Service Standards) and rivet holes drilled and counter-

bored at least one half of the thickness of the linings in both ends (to coincide with the holes in the ends of the band when the lining is snugly placed around the inside surface).

The lining should be riveted to the band at the extreme ends and then the other rivets applied, starting from each end alternately and working towards the centre until completed.

The portion of the lining next to the anchor should be cut out and the end chamfered to reduce noise and grabbing effect.

After relining the brake band, contour must conform to the shape of the drum. Excessive squeal or chatter may be eliminated by bending the toe end of the band slightly away from the drum.

13. HAND BRAKE ADJUSTMENT—EXTERNAL CONTRACTING—

MODELS 1-08A, 2-26A, 2-33A.

- (1) Set hand lever in fully released position.
- (2) Remove anchor screw lock wire and adjust screw (1, Figure 21) so lining and drum have .015 inch to .020 inch clearance on 1-08A, and .015 inch to .030 inch on models 2-26A and 2-33A.
- (3) Lock anchor adjusting screw with lock wire.
- (4) Back off large adjusting bolt nut (5) until free.
- (5) Turn guide bolt adjusting nut (4) after loosening lock nut until band and drum have .015 inch to .020 inch clearance on 1-08A and .015 inch to .030 inch on models 2-26A and 2-33A.
- (6) Lock guide bolt in place with lock nut.
- (7) Tighten large adjusting bolt nut (5) until tension on the guide bolt is just relieved at either end. Tighten lock nut.
- (8) Lubricate all frictional surfaces of brake control linkage and anchor bolts with engine oil.

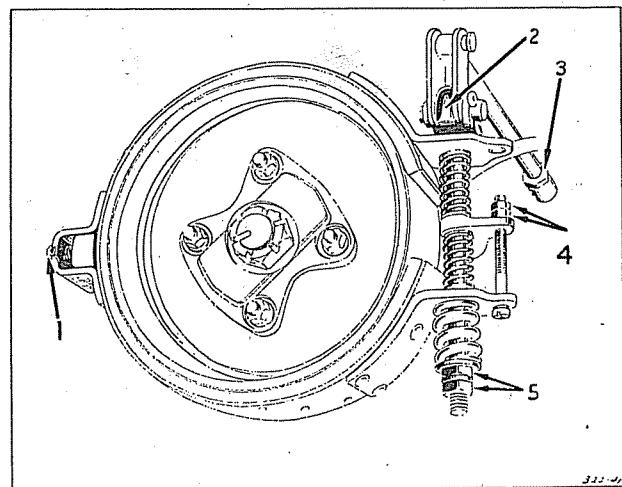


Fig. 21—Hand Brake Adjustments, 1-08A, 2-26A, 2-33A.

- | | |
|--|--------------------------------------|
| 1 — Hand brake anchor adjusting screw. | 4 — Hand brake band guide bolt nuts. |
| 2 — Hand brake adjusting bolt. | 5 — Hand brake adjusting bolt nuts. |
| 3 — Hand brake rod yoke nut. | |

Free play between the side of the anchor bracket at the centre of the band and the anchor must not be more than .005 in., otherwise band distortion may result, on brake application. This free play, if excessive, may be reduced by compressing the saddle in a vice or tapping with a hammer against a block or anvil.

FRONT BRAKES—MODEL 3-59A. FITTED WITH SINGLE WHEEL CYLINDER

14. DESCRIPTION.

The front brakes comprise two leading shoes and two trailing shoes.

The leading shoe is the shoe with the rectangular hole and the trailing shoe is that with the plain hole.

Front brakes are operated through the foot brake pedal, the pressure being transmitted to the front wheel cylinders by the principle of hydraulic equalisation from the master brake cylinder.

Adjustment for each shoe is effected by self locking snail cams.

15. ADJUSTMENTS.

Adjustment is effected by means of a self locking brake adjusting cam for each brake shoe.

- (1) Jack up front axle so that both front wheels are free to revolve.
- (2) Turn each shoe adjuster until the brake shoe lining is hard against the drum.
- (3) Back off the adjuster the least possible amount to allow the wheel to rotate freely without drag.
- (4) This operation applies to all four brake shoes.
- (5) Turn each wheel in a forward direction, and while wheel is revolving, pump the brake pedal a few times. This will centralise the forward shoe in the drum.
- (6) Re-adjust each front shoe adjuster as closely as possible, at the same time turning the wheel in a forward direction.

The rear shoe being fixed on the anchor pin does not require to be centralised by the reverse rotation of the wheel.

16. DISASSEMBLY OF FRONT BRAKE SHOES (WHEEL AND HUB REMOVED).

- (1) Remove circlip from brake shoe anchor pin.
- (2) Remove pull off spring.
- (3) Remove brake shoes from drum.

17. ASSEMBLY OF FRONT BRAKE SHOES

It is essential, when re-assembling brake shoes, to realise that the shoe with the rectangular hole which carries the rectangular washer is the leading shoe, and the shoe with the plain hole is the trailing shoe.

- (1) Thoroughly clean all moving parts and lubricate with grease, paying particular attention to the steady pin bolts and anchor pin holes, the rectangular washer and the anchor pin.

- (2) Fit one of the large plain washers to the anchor pin and assemble the inner brake shoe. NOTE: On the near side brakes, the inner shoe is of the hooded type and the offside brake shoe is of the plain type.
- (3) Care should be taken when assembling hooded shoes to ensure that the rectangular washer is included.
- (4) Assemble the outer shoe with a second large plain washer, the spring washer, the small plain washer, and lastly the circlip.
- (5) Be sure the circlip is located in the groove in the end of the anchor pin.

NOTE: On the offside front, the spring washer is fitted between the brake shoe back plate and the inner shoe. On the near side front, the spring washer is fitted after installing the outer shoes.

- (6) Fit pull-off springs and complete the steady pin assemblies.
- (7) Push the hooded shoe up to the fullest extent of the rectangular washer and assemble the brake drum.
- (8) Turn the drum in a forward direction and apply the brake. This will centralise the hooded shoe in the drum.
- (9) Complete by adjusting brake, refer to Paragraph 15.

18. FRONT WHEEL CYLINDERS.

The front wheel cylinders are bolted on the inside of the brake shoe support plates, and the pistons are directly connected to the upper ends of the brake shoes.

The cylinders should not require any attention, but if the fluid collects inside, or is leaking past the rubber boot fitted at each end of the cylinder, this will indicate the brake fluid is leaking past the piston rubbers. If this condition arises, the wheel cylinder should be dismantled and the cause investigated.

19. FRONT BRAKES FITTED WITH DUAL WHEEL CYLINDERS.

(a) Removal and Installation.

- (1) Remove wheel and hub.
- (2) Install wheel cylinder brake clamps to prevent forcing pistons out of wheel cylinders.
- (3) Remove brake shoe return springs.
- (4) Remove brake shoes.

To assemble reverse above operations, also see "Adjustments", paragraph 20. The brake shoe steady bolt should be adjusted to ensure the lining contacts the brake drum squarely.

NOTE.— It is important that the return spring is fitted with the short length of coils on the same side as the adjuster cap.

20. ADJUSTMENTS.

- (1) Jack up truck so that one wheel will revolve freely and centralise brakes shoes by applying foot brake.

- (2) Swing back dust cover to expose access hole in the back plate and insert a lever engaging it in one of the serrations in the adjuster end cap.
- (3) Turn the end cap in a clockwise direction relative to the wheel cylinder until the brake shoe is bearing hard against the drum.
- (4) Back off sufficient notches to enable the wheel to revolve freely.
- (5) Repeat the above operation on the second wheel cylinder.
- (6) Close the dust cover.
- (7) Adjust the opposite front wheel in a similar manner.

REAR BRAKES.

21. DESCRIPTION.

The rear brake assembly consists of a back plate to which a transverse wheel cylinder with bisector and adjuster are rigidly attached in diametrically opposite position, the wheel cylinder being situated behind the back plate and the bisector at the front.

Slots are machined in the bisector tappets to provide a location for the toe of the leading shoe, and the heel of the opposite shoe, the heel of the leading screw is similarly located in one of the adjuster screws. The toe of the composite shoe contacts a face formed on the end of the other adjusting screw, and is located laterally by two side plates, which are parts of the composite shoe assembly. The shoes are retained by two pull off springs, additional support being provided by two steady pins attached to the back plate.

The brake is so designed to provide two leading shoe characteristics in the forward direction and a leading and trailing shoe in reverse. Both shoes are operated by the bisector, which is secured to the transverse wheel cylinder by set screws which pass through the back plate.

22. ADJUSTMENTS.

- (1) Jack up rear axle until both wheels are free to revolve.
- (2) Spin each wheel in a forward direction, at the same time apply the foot brake to centralise the brake shoes in the drum.
- (3) The adjuster unit is located on the back plate opposite to the wheel cylinder, and is of the double-end type.
- (4) Swing back the dust covers to expose the slots in the back plate.
- (5) Engage a lever or screw driver in the notches of the adjuster end cap and rotate away from the centre of the brake drum, that is apply an outward force to the lever until the brake shoe contacts the drum.

NOTE: The lever or screwdriver should not exceed six inches in length.

- (6) Back off the adjustment the least possible amount until the wheel is free to revolve.
- (7) Repeat this operation through the slot at the other end of the adjuster.
- (8) Adjust the opposite rear wheel in a similar manner.
- (9) Close the dust covers.

NOTE: Adjustment of both hand brakes and foot brake are accomplished in this manner. Under no circumstances should the hand brake operating rods be adjusted or altered to compensate for brake lining wear.

23. REMOVAL AND INSTALLATION OF REAR BRAKE SHOES.

- (1) Remove rear wheels and hubs.
- (2) Remove brake pull-off springs.
- (3) Brake shoes can now be lifted clear of the bisector and adjuster.

To assemble, reverse the foregoing procedure, making sure the adjuster is screwed to the off position to allow for full movement in the drum.

NOTE: Composite or dual web shoe assembly is fitted on bottom, the single web shoe to top.

Bleed brakes, pump brake pedal two or three times to centralise shoes, then adjust (See "Adjustments" Paragraph 22).

CAUTION: When assembling hub to rear axle, make sure that inner bearing and oil seal are fitted to hub, not axle. Damage may occur to oil seal if not assembled in this manner.

24. WHEEL BRAKE CYLINDER.

(Refer Figure 22).

The wheel brake cylinder is of the pusher type and incorporates handbrake lever (5) assembled between two pistons (9, 10). The unit consists of a body (6) formed with a blind bore to accommodate the pistons, the inner piston (9) is operated hydraulically and carries a rubber cup (8) backed by a filler (7) which is loaded by a spring (1).

The outer piston is operated by the handbrake lever and is recessed to admit the domed head of a fork incorporated in the bisector, the stroke of this piston is limited by a circlip (11) assembled in the bore of the body.

The adjoining faces of the pistons (9, 10) are slotted to admit the heel of the hand brake lever (5) which is pivoted on a pin (4) retained by two

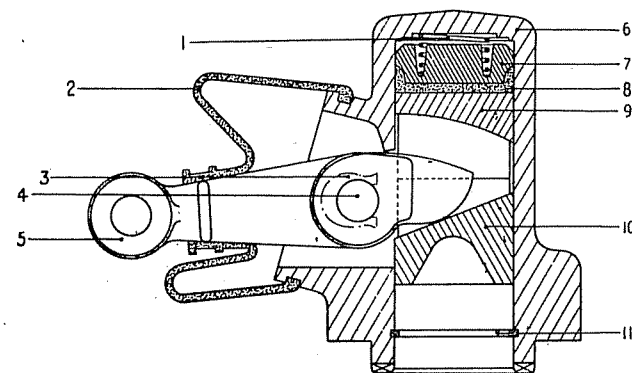


Fig. 22—Transverse Wheel Cylinder.

- | | |
|----------------------|--------------------|
| 1 — Spring. | 7 — Cup filler. |
| 2 — Rubber boot. | 8 — Rubber cup. |
| 3 — Circlip. | 9 — Inner piston. |
| 4 — Lever pin. | 10 — Outer piston. |
| 5 — Handbrake lever. | 11 — Body circlip. |
| 6 — Cylinder body. | |

circclips (3). A rubber boot (2) is fitted around the shank of the lever and the slot in the cylinder body to prevent the entry of dust and water. On the flange of the body is a spigot which locates the unit on the back plate, the spigot also projecting beyond the back plate to locate the bisector.

Four set screws pass through the clearance holes in the bisector and back plate to enter tapped holes in the wheel cylinder body.

When operated by the brake pedal, fluid pressure forces the piston (9) inwards, pushing the other piston (10), thereby applying a force to the bisector fork, the handbrake lever remaining undisturbed. When the handbrake is applied, the lever (5) operates the piston (10) without affecting the hydraulic piston.

25. DISASSEMBLY AND ASSEMBLY OF WHEEL BRAKE CYLINDER

(Refer Figure 22).

- (1) Remove circlip (3) and withdraw the pin (4).
- (2) Disengage the boot (2) from the body, remove handbrake lever (5) and ease the boot off the lever.
- (3) Remove the circlip (11) from the cylinder body and apply a LIGHT air pressure to fluid connection to expel the internal parts.
- (4) When assembling, smear the cylinder bore with clean brake fluid.
- (5) Position the spring (1) and the cup filler (7) in the base of the bore and insert rubber cup (8).

CAUTION.

Exercise care to avoid damage to the lip of the rubber cup, especially when passing the circlip groove.

- (6) Insert pistons (9, 10) with slots in alignment and fit circlip (11).
- (7) Ease the rubber boot on to the handbrake lever and insert the lever into the body, ensuring the heel is adjacent to the handbrake piston (10).
- (8) Fit the boot into the groove formed in the body.
- (9) Smear the pin (4) with lubricant, instal through body and lever and fit circlip (3).

26. THE BISECTOR (Refer Figure 23).

The purpose of the bisector is to transmit the motion of the wheel cylinder to the brake shoes. The bisector consists of a body (2) housing two opposed tappets (4, 9) which have inclined inner faces and slotted outer faces. One of the tappets (4) is retained by a set screw (3) fitted in to the body, and the other (9) by an abutment (10). This abutment is assembled within the slots in the body surrounding metal, being peened over to retain it in position. In addition to retaining and aligning the tappet, this abutment also provides a bearing for the heel of the retaining shoe. The bisector also houses an expander assembly which consists of a

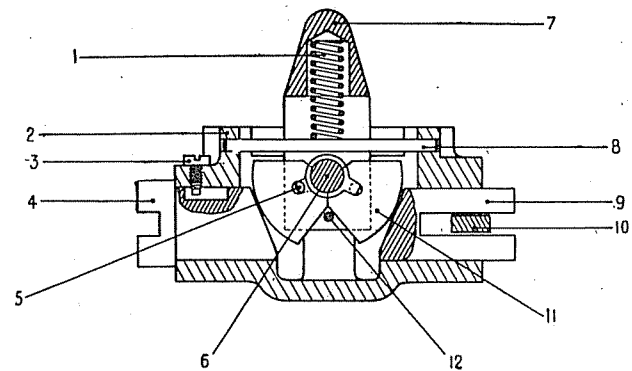


Fig. 23—The Bisector.

- | | |
|----------------------|----------------------|
| 1 — Spring. | 7 — Fork. |
| 2 — Body. | 8 — Pin. |
| 3 — Setscrew. | 9 — Tappet. |
| 4 — Tappet. | 10 — Abutment piece. |
| 5 — Sector-retainer. | 11 — Segment. |
| 6 — Pivot pin. | 12 — Stop pin. |

fork (7) carrying two segments (11) which operate the pivot pin (6). Sector retainers (5) are fitted to locate the segments, etc.

Across the extremity of the fork is a stop pin (12) which acts as a guide for the segments during assembly. The expander assembly is retained in the body by a pin (8) which also provides an abutment for the return spring (1). An inward thrust upon the domed head of the fork (7) rolls the segments between the inclined faces of the tappets, thereby forcing them outwards.

27. DISASSEMBLY AND ASSEMBLY OF BISECTOR (Refer Figure 23).

- (1) Tap out the pin (8) and withdraw the expander assembly.
- (2) Press out the pivot pin (6) and remove the segments (11) together with their retainers (5) and return spring (1).
- (3) Loosen the set screw (3) and push the tappets (4, 9) out of the body.
- (4) When assembling, coat all parts liberally with lubricant.
- (5) Insert the tappet (9) through the body until the abutment (10) engages with the slot.

CAUTION.

Note that the base of the inclined face on the tappet is towards the mounting spigot.

- (6) Insert and align the other tappet (4) and tighten the set screw, ensuring that it enters the recess in the tappet.
- (7) Place a retainer (5) on the side of each segment (11) engaging the cranked tongue with the locating hole in each segment.
- (8) Position both segments within the fork (7) so that the inner radii and the retainers are in alignment.
- (9) Fit the pivot pin (6).
- (10) Fit the return spring (1) into the head of the fork and insert the expander assembly into the body.

- (11) Compress the spring and instal pin (8). Secure pin by peening over the edges of the hole in body.

28. ADJUSTER.

The rear brake adjuster consists of a housing containing two opposed end caps which are internally threaded left and right hand respectively, to accommodate the adjuster screws. For the purpose of adjustment, the end caps are notched, access to them being through slots in the brake shoe back plate. A clicker arm under spring tension locks the end caps.

29. DISASSEMBLY AND ASSEMBLY OF ADJUSTER.

- (1) Disengage the spring and remove the clicker arm spring and retaining washer.
- (2) Withdraw the adjuster end caps from the cylinder and remove the adjusting screws.
- (3) When assembling, coat all parts with lubricant.
- (4) Thread each adjuster screw fully into its respective end cap.
- (5) Insert the adjuster assemblies with the spring and washer into the correct positions in the housing.
- (6) Align the locating faces on the adjusting screws by rotating the end caps.
- (7) Instal the clicker arm and engage the tension spring.

BRAKES.

MODELS 6-71A, 8-65A, 8-71A, 8-71A-D.

30. DESCRIPTION.

The four wheel brakes comprise Lockheed two leading shoes on the front wheels and Girling two leading shoes on the rear wheel, all being operated through the footbrake by the hydraulic equalisation from the master cylinder. On the above models the foot brake is assisted by a vacuum servo system. The vacuum power cylinder and control valve are combined in one unit, there being no external operating mechanism to require adjustment. All working parts are sealed within the unit which is mounted on support brackets to the chassis side frame.

31. REMOVAL AND INSTALLATION OF FRONT BRAKE SHOES (WHEEL AND HUB REMOVED).

- (1) Remove brake pull-off springs and lift shoes off. Shoes are full floating and self-centralising. Reverse procedure for assembling.

32. FRONT WHEEL CYLINDER.

The front wheel cylinders are bolted on the inside of the brake shoe support plates, and the pistons are directly connected to the upper ends of the brake shoes.

The cylinders should not require any attention, but if the fluid collects inside, or is leaking past the rubber boot fitted at each end of the cylinder this will indicate the brake fluid is leaking past the piston rubbers. If this condition arises, the wheel cylinder should be dismantled and the cause investigated.

33. REMOVAL AND INSTALLATION OF REAR WHEEL SHOES.

- (1) Remove wheels and hubs.
- (2) Back off all adjustments.
- (3) Prise or lift upper shoe off top of bisector, adjuster, and lower shoes. Pull back springs will now be released.

Assemble pull-off springs to shoes before assembly, then fit lower shoes into position first, then prise upper shoes into position.

34. THE ADJUSTER.

The adjuster unit (See Figure 24) consists of a housing (1), a wedge (2) having a cone at one end, on the face of which are four machined flats (4), a threaded shank and machined flats at the outer end to enable a spanner to be used for adjustment purposes. Two tappets (3), with inclined faces at the inner ends, seat against the cone and grooves at the outer ends into which the brake shoes fit. The complete unit is secured to the brake shoe support plate at a point diametrically opposite the expander by set screws which screw into tapped holes in the adjuster housing. The operation of the adjuster is as follows:

Rotation of the wedge (2) in a clockwise direction forces the cone between the inclined faces of the tappets (3), therefore opening out the brake shoes to compensate for lining wear. In the event of the adjuster being dismantled for examination, make sure that the wedge and tappets move freely.

On assembly, coat all parts liberally with special grease. In order to mount the adjuster correctly on the brake shoe support plate, fit the set screws and leave them loose, then tighten the wedge until the brake shoe linings are bearing hard

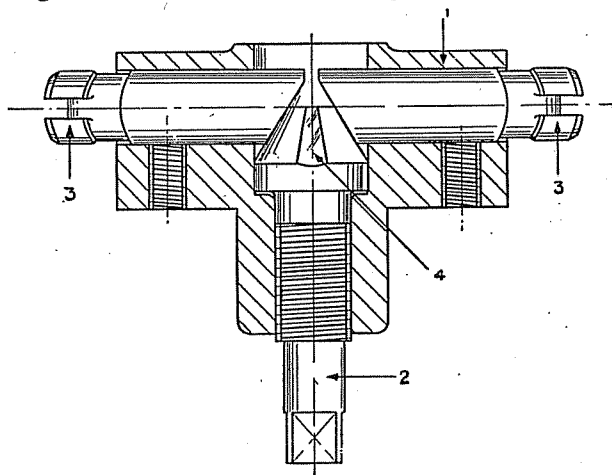


Fig. 24—Section of Adjuster.

- | | |
|----------------------|---------------|
| 1— Adjuster housing. | 3— Tappets. |
| 2— Wedge with cone. | 4— Cone flat. |

against the drum. Securely tighten the set screws and slacken the wedge sufficiently to enable the drum to be rotated freely.

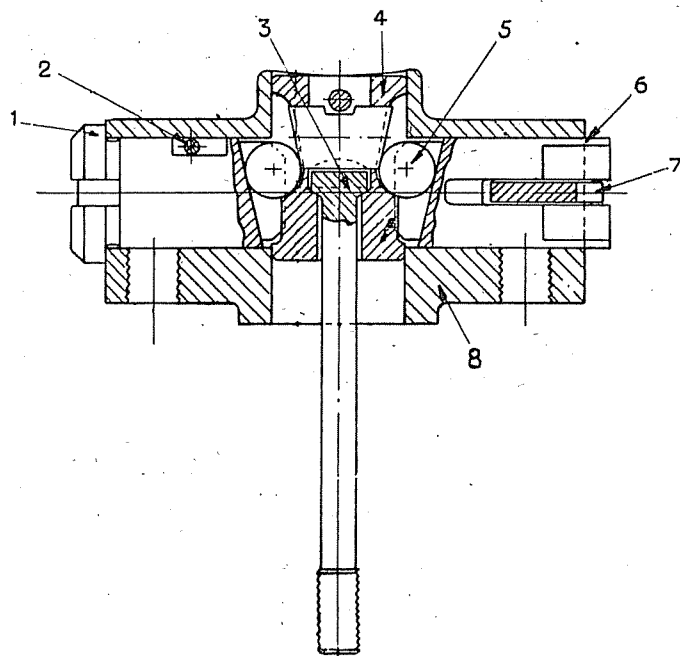


Fig. 25—Section of Expander Assembly.

- | | |
|--------------------------------|-------------------------------------|
| 1—First shoe tappet. | 5—Roller. |
| 2—First shoe tappet split pin. | 6—Second shoe tappet. |
| 3—Draw link. | 7—Second shoe tappet contact plate. |
| 4—Expander. | 8—Expander housing. |

35. THE EXPANDER.

The expander unit (See Figure 25) to which is attached the hydraulic cylinder and handbrake connector mechanism, is secured to the brake shoe support plate by means of studs and nuts which must be kept securely tightened. When the brake is applied, the draw link (3) is pulled outwards and moves between the rollers (5), which in turn force the tappets outwards. The brake shoes, being located in the slotted ends of the tappets, are forced apart until the linings are in contact with the brake drum.

In the event of the assembly being dismantled, it should be noted that removal of the split pin (2) enables the first shoe tappet (1) to be removed while the contact plate (7) is a driving fit in the housing slots, and must be removed before the second shoe tappet (6) can be withdrawn. When the expander is dismantled, tappets, draw link and rollers should be carefully checked to ensure that they slide freely.

During initial assembly, the expander is packed with special grease in order to ensure free operation for a considerable period. Therefore, during re-assembly the parts should be liberally coated with this grease.

36. ADJUSTING REAR WHEEL BRAKES— MODELS 6-71A, 8-65A, 8-71A, 8-71A-D.

The adjuster is the only point on each rear wheel brake at which adjustment can be made to compensate for lining wear. The stem of the wedge (2) See Figure 24, protrudes through the brake shoe support plate and the end is machined square to enable a spanner to be used for adjustment purposes.

- (1) Jack up rear axle until wheel revolves freely.
- (2) Turn the wedge on each rear wheel in a clockwise direction as far as possible, using a spanner of normal length without undue force.
- (3) In this position the tappets (3) Figure 24, will be seating on the cone between the flats.
- (4) Turn the wedge in an anti-clockwise direction until a "click" is heard which will indicate the tappets have come under the influence of the brake shoe pull off springs and dropped on to the nearest flats.
- (5) Turn the wheels and if they do not rotate freely without drag, turn the wedge until a further "click" is heard.

It requires approximately $\frac{1}{4}$ of a turn of the wedge for the tappets to drop from one flat to another.

CAUTION.

Always make sure that the tappets are seating on the cone flats, this will be indicated by a very slight backlash on the wedge stem.

Separate adjustment for the handbrake is not necessary, and all adjustments are affected by the adjuster wedges.

When the rear wheel brakes are adjusted correctly, both hand and foot brakes are in order.

37. HAND BRAKE LINKAGE — MODELS 3-59A, 6-71A, 8-65A, 8-71A-D.

The handbrake operates the same shoes on the rear wheels as the foot brake, the hand brake lever is connected to a double acting bell crank or compensator fixed to the axle casing, the compensator being in turn connected by rods to the draw link in each transverse wheel cylinder.

UNDER NO CIRCUMSTANCES MUST THE HAND BRAKE OPERATING ROD BE ADJUSTED OR ALTERED IN AN ENDEAVOUR TO ADJUST HAND BRAKE.

If the hand brake linkage at any time is dismantled, care must be taken to see that the compensator is correctly set when re-assembling and is perfectly free, and that the swinging barrel is hanging vertically. The two short rods are connected so that the clevis pins are positioned $\frac{3}{8}$ on either side of an imaginary line drawn parallel to the centre line of the chassis, and passing through the compensator swivel (Figure 28). The rod from the hand brake lever to the compensator should be connected last with the brake lever in the off position, and the rear wheel brake adjuster wedges

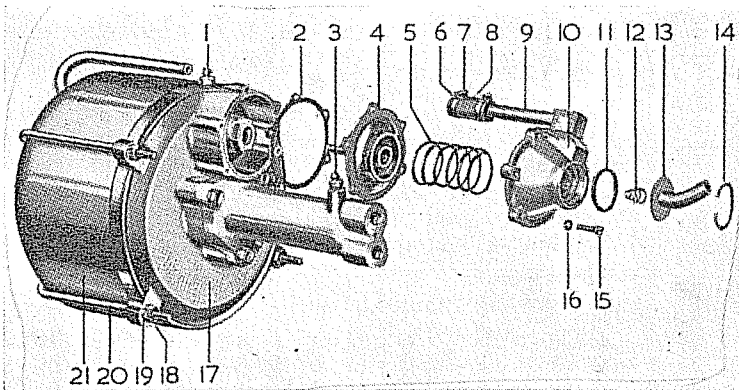


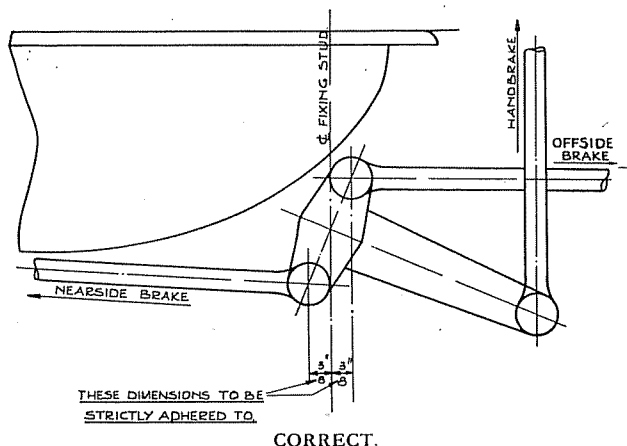
Fig. 26— Lockheed Hydrovac Servo Braking Unit.

tightened so that the brake shoe linings are bearing hard on the drums. There must be no end play in the linkage and the clevis pins should be inserted without straining the rods.

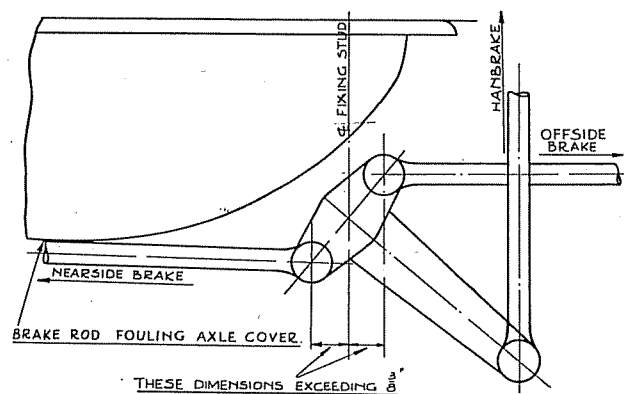
After the clevis pins have been fitted, replace the split pins and slacken the adjuster wedges one or more "clicks" (Refer Paragraph 36) until the linings are just free of the drums.

38. ADJUSTMENT OF FRONT WHEEL BRAKES. MODELS 6-71A, 8-65A, 8-71A, 8-71A-D.

- (1) Jack up one wheel until free to revolve and centralise brake shoes by applying foot brake.
 - (2) Swing the dust cover away to expose one hole in the back plate and insert a cranked lever, engaging it in one of the serrations in the adjuster end cap.
- NOTE: The lever for turning the adjuster should not exceed 6 in. in length.
- (3) Turn the end cap in a clockwise direction relative to the wheel cylinder until the brake shoe is bearing hard against the drum.
 - (4) Back off adjustment sufficient notches to enable the wheel to revolve freely.
 - (5) Repeat the above operations on the second wheel cylinder.
 - (6) Adjust the opposite front wheel cylinder in a similar manner.



CORRECT.



INCORRECT.

FIG. 28—Hand Brake Compensator Layout, Showing Correct and Incorrect Setting.

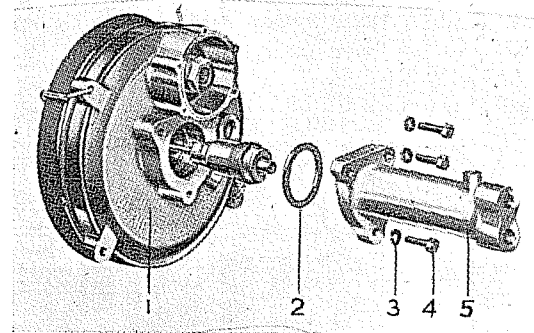


Fig. 27.

39. ASSEMBLY AND DISASSEMBLY VACUUM SERVO UNIT— MODELS 6-71A, 8-65A, 8-71A, 8-71A-D.

- (1) Place unit upon suitable wooden blocks in a vertical position. Care should be taken not to exert strain on pipe during dismantling.
 - (2) Loosen the screws (6) Figure 26, in the clips (7) and slide the connecting hose (8) along the air pipe (9).
 - (3) Remove bleeder screws (1) and (3) and take out plug and gasket in the vacuum cylinder shell.
 - (4) Remove five bolts (15) and spring washers (16) and remove end cover (10). Collect spring (5) and remove diaphragm (4) and gasket (2).
 - (5) Take out circlip (14), withdraw disc and pipe (13), sealing ring (11) and valve spring (12).
 - (6) Mark a line across the vacuum cylinder shell (21) and the end cover (17) to facilitate re-assembly.
- Remove nuts (18), spring washers (19) and remove clamp bolts (20) and pull shell off end cover.
- (7) Compress the return spring by pressing down on the end cover (1).
- Refer Figure 27 and instal hook clamps, Figure 32.
- (8) Remove three screws (4) and spring washers (3) and remove slave cylinder (5) from the end cover (1).

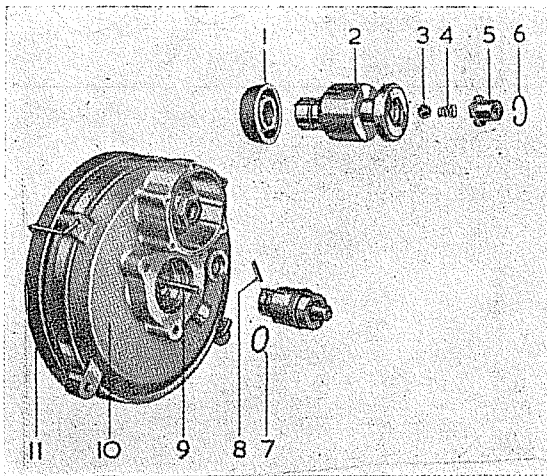


Fig. 29.

- (9) Remove rubber sealing ring (2).
- (10) Remove the slave cylinder (2) Figure 29, off the piston rod (9) by removing circlip (7) and driving out pin (8).
- (11) Remove circlip (6) and spring retainer (5) spring (4) and ball (3).
- (12) Carefully remove piston cup (1).
- (13) Remove the hooked clamps and withdraw the vacuum piston assembly (11) from the end cover (10) and collect the return spring.
- (14) Place the vacuum cylinder end cover (2) Figure 30, on the fixture, illustrated in Figure 33. Secure the fixture in a vice.

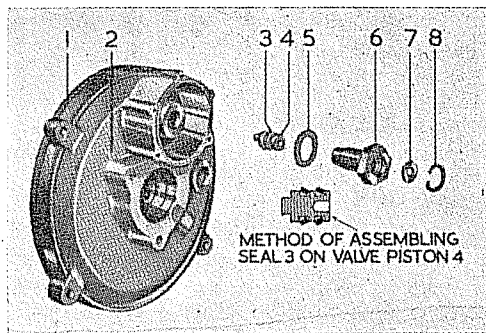


Fig. 30.

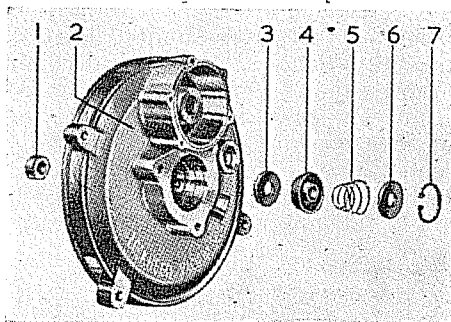


Fig. 31.

- (15) Remove the circlip (8) and stop washer (7).
- (16) Unscrew the valve piston body (6) and remove gasket (5).
- (17) Push out the valve piston (4) and remove seals (3).
- (18) Remove seal (1) from end cover (2).
- (19) Remove circlip (7) Figure 31, from the end cover (2) and withdraw stop washer (6) spring (5) cup (4) and washer (3).
- (20) Remove the end cover from the holding fixture, place upon two wooden blocks and drive out the oil seal (1) with a soft drift.
- (21) To assemble, reverse the foregoing procedure.

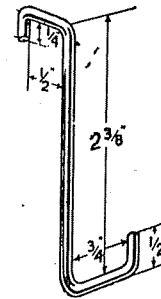


Fig. 32.

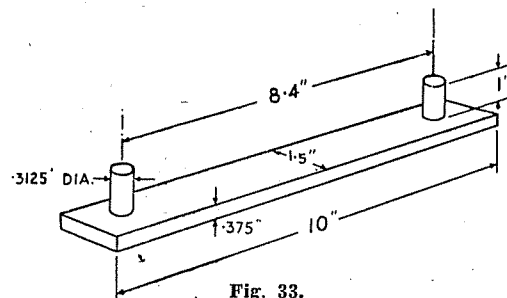


Fig. 33.

IMPORTANT.

The metal parts of the unit may be cleaned in solvent. **DO NOT HANDLE PARTS WITH DIRTY HANDS.** All rubber parts must be renewed and must **NOT** on any account be contaminated with solvent.

Before assembly, soak all parts including rubbers in clean brake fluid. After cleaning, dry off with clean fluffless cloth.

Rubber parts must be dipped in brake fluid and assembled wet. If the bore of the vacuum cylinder shell is corroded, it may be polished with fine emery cloth or steel wool, a badly pitted or scored cylinder must be replaced.

40. BLEEDING THE BRAKE LINES (ALL MODELS).

Air in the braking system seriously impairs braking efficiency, resulting in soft, spongy pedal action. The air therefore must be removed by bleeding the lines. Bleeding the lines is not considered a routine maintenance operation, and should only be necessary when some part of the braking system has been disconnected or replaced.

If frequent bleeding is found necessary, this would indicate worn rubber cups in the cylinder, and this will be apparent by a fluid leak at the cylinder or cylinders affected.

NOTE: On models 6-71A, 8-65A, 8-71A and 8-71A-D, it is necessary to bleed the units incorporating the vacuum servo system in the following order:

- (1) Master Cylinder.
- (2) Vacuum Servo System Control Valve.
- (3) Vacuum Servo System Slave Cylinder.

Operations 1, 2 and 3 above should be completed before commencing to bleed the brake line system.

- (1) To bleed the brake lines, first clean off all dirt on and around master cylinder, and filler plug to prevent dirt dropping into the reservoir.
- (2) Remove filler cap and see that reservoir is at least half full of fluid.

NOTE: This level should be maintained throughout the operation to prevent air being drawn into the system at this point.

- (3) Commencing at the near side rear wheel, attach a rubber hose to the wheel cylinder bleeder nipple and allow the free end of the hose to be submerged in a clean glass jar partially filled with brake fluid.

- (4) Unscrew the bleeder screw $\frac{3}{4}$ to 1 turn.
- (5) The actual bleeding operation is carried out by pressing the brake pedal through half the limit of its travel, allowing it to return without assistance. Repeat this operation with a slight pause between each depression of the pedal.

- (6) An assistant should observe the flow of liquid into the glass container and when bubbles cease to appear, depress the brake pedal and securely tighten the bleeder screw.

- (7) Repeat the operation of the remaining wheel cylinders in the following order:

Offside rear, Near side front, Offside front, making sure the fluid in master cylinder reservoir is replenished to the required level.

NOTE: The twin wheel cylinders on models 3-59A, 6-71A, 8-65A, 8-71A and 8-71A-D are both bled from the nipple situated at the lower wheel cylinder.

On the rear brakes of the 1-08A, bleed the lower cylinder first.

CAUTION.

Do not allow any brake fluid or grease to come in contact with the brake linings. When all air is expelled from the system, the bleeder valve should be closed tightly before taking the bleeder hose out of the fluid.

When any part of the braking system is disconnected, it is necessary to bleed the brake lines at all four wheel cylinders.

- (8) After bleeding brake lines, ensure that the master cylinder reservoir is filled to the correct level, that is, half an inch below the bottom of the filler plug.
- (9) Brake fluid bled from the system should be discarded.

41. BLEEDING THE VACUUM SERVO SYSTEM.

Bleeding must be carried out with the engine off and without vacuum in the system.

- (1) Fill the supply tank with brake fluid, and maintain at least one quarter full throughout the operation, otherwise air will be drawn in, necessitating a fresh start.
- (2) Attach a rubber hose to the bleeder screw (1) Figure 26 and allow the free end to be submerged in fluid contained in a clean glass jar.
- (3) Open the bleeder screw one complete turn, and depress the brake pedal slowly, allowing it to return unassisted. Repeat this pumping action with a slight pause between each operation, watch the flow of fluid in the jar, and when air bubbles cease to appear, hold the pedal down firmly and securely tighten the bleeder screw.
- (4) Repeat the operation with the other bleeder screw (3), Figure 26.
- (5) Finally bleed the wheel cylinders.

42. MAINTENANCE.

BRAKE SHOE RETURN SPRINGS.

Brake shoe return springs should be inspected for tension every time brakes are serviced. Weak or broken springs should be replaced and both front and rear return springs should be uniform in tension.

BRAKE SHOE ALIGNMENT.

Maximum braking effect can be obtained only if the entire length and width of the lining contacts the surface of the drum. This alignment can be upset by a sprung brake support, bent shoe or anchor bolt, which does not protrude at right angles to the surface of the support.

An examination of the lining will indicate whether or not the shoe is out of alignment and the affected parts should be straightened or replaced.

BRAKE LINING.

Grease or oil on brake lining destroys its effectiveness, and results in hard pedal pressure, grabbing, unequal braking and excessive noise.

Cleaning an oil-soaked lining with gasoline or other grease solvent will only give temporary relief at best. A complete relining is recommended when possible after eliminating the grease leaks and repacking the bearings. MOPAR linings, available from the Chrysler Australia Limited Parts Division, Distributors and Dealers, is practically impervious to the absorption of water. A certain amount of moisture, however, may get between the lining and the drum when washing the truck with a pressure spray. Temporary difficulty afterwards may be experienced with the brakes until this factor is removed by a few applications of the brakes.

BRAKE FLUID.

IT IS RECOMMENDED THAT ONLY ISO BRAKE FLUID BE USED IN HYDRAULIC BRAKING SYSTEM.

SERVICE DIAGNOSIS

Conditions — Possible Causes — Remedies

43. SPONGY OR RUBBERY PEDAL.

Possible Causes.

- (a) Air in system.
- (b) Swollen rubber parts due to use of improper fluid.
- (c) Improper shoe adjustment.
- (d) Improper height of guide pin or cam.

Remedies.

- (a) Bleed brake system.
- (b) Replace rubber parts as required.
Drain system, flush and refill with Iso Brake Fluid.
- (c) Adjust brakes.
- (d) Refer to Aligning Brake Shoes.

44. CHATTERING BRAKES.

Possible Causes.

- (a) Improper adjustment of brake shoes.
- (b) Loose front wheel bearings.
- (c) Hard spots on brake drum.
- (d) Out-of-round brake drum.

Remedies.

- (a) Adjust brakes.
- (b) Inspect bearings for possible damage. Replace as required and adjust.
- (c) Check lining for excessive wear and instal new drum.
- (d) Check lining for spotty wear. Replace if necessary and instal new drum.

45. NO PEDAL RESERVE.

Possible Causes.

- (a) Normal wear of lining.
- (b) Hydraulic brake fluid level low.
- (c) Defective cylinders.
- (d) Improper push rod adjustment.
- (e) Deteriorated hoses.

Remedies.

- (a) Adjust brakes.
- (b) Check brake system for leaks and correct as necessary. Refill master cylinder and bleed lines if needed.
- (c) Remove cylinders and recondition.
- (d) Adjust pedal free play.
- (e) Replace deteriorated hoses and bleed the system.

46. LOSS OF PRESSURE.

Possible Causes.

- (a) Leak in primary cup of master cylinder.
- (b) Leak in wheel cylinder (internal).
- (c) External leak in lines.
- (d) Leak at stop light switch.

Remedies.

- (a) Remove master cylinder and recondition.
- (b) Remove leaking cylinder and recondition.
- (c) Check lines and connections for fractures or fatigue. Replace defective parts. Bleed lines.
- (d) Replace defective stop light switch and bleed lines.

47. HARD PEDAL.

Possible Causes.

- (a) Improper lining.
- (b) Restriction in by-pass port of master cylinder.
- (c) Improper shoe adjustment.

Remedies.

- (a) Replace lining with new MOPAR brake lining.
- (b) Remove master cylinder. Clean or recondition as necessary.
- (c) Adjust brakes.

48. PUMPING OF PEDAL NECESSARY.

Possible Causes.

- (a) Worn linings.
- (b) Improper brake adjustment.
- (c) Worn wheel cylinders or cups.

Remedies.

- (a) Replace with new MOPAR Brake Lining.
- (b) Adjust brakes.
- (c) Recondition worn wheel cylinders as required.

49. BINDING BRAKE PEDAL.

Possible Causes.

- (a) Bent piston push rod.
- (b) Worn, tight or rusted pedal shaft.
- (c) Loose master cylinder mounting bolts.

Remedies.

- (a) Replace bent push rod. Reset brake pedal free play.
- (b) Free up pedal on pedal shaft. Check pedal bushing for excessive wear. Replace if necessary.
- (c) Tighten master cylinder mounting bolts as required.

50. BRAKE PEDAL FAILS TO RETURN.

Possible Causes.

- (a) Weak pedal return spring.
- (b) Bent piston push rod.
- (c) Loose master cylinder mounting bolts.
- (d) Rubber draft pad binding.

Remedies.

- (a) Check pedal return spring for tension and replace as necessary.

- (b) Replace bent push rod. Reset brake pedal free play.
- (c) Tighten master cylinder mounting bolts as required.

51. POOR BRAKES.**Possible Causes.**

- (a) Water soaked lining.
- (b) Improper linings (not factory approved).
- (c) Glazed linings.
- (d) Improper shoe adjustment.
- (e) Improper pedal adjustment.

Remedies.

- (a) Dry brake lining by applying brakes while driving.
- (b) Replace with MOPAR Brake Lining.
- (c) Replace with MOPAR Brake Lining and adjust brakes.
- (d) Adjust brakes.
- (e) Adjust pedal free play.

52. GRABBING BRAKES.**Possible Causes.**

- (a) Linings soaked with grease, oil or brake fluid.
- (b) Charred linings.
- (c) Scored or cracked drums.
- (d) Improper lining.
- (e) Improper shoe adjustment.
- (f) Hard spots on drums.

Remedies.

- (a) Check for oil, brake fluid or grease leaks and replace seals as needed. Replace lining with MOPAR Brake Lining.
- (b) Replace with MOPAR Brake Lining.
- (c) Replace cracked drums. Reface scored drums, being careful not to cut over .030 inch of stock. If drums will not clean up at .030 inch, replace as required.
- (d) Replace with MOPAR Brake Lining.
- (e) Adjust brakes.
- (f) Replace drums.

53. SIDE PULL.**Possible Causes.**

- (a) Linings soaked with grease, brake fluid or oil.
- (b) Improper shoe adjustment.
- (c) Loose anchor pins.
- (d) Clogged or crimped wheel line.
- (e) Excessive wear in drum.
- (f) Different makes of lining.
- (g) Tyres not properly inflated.
- (h) Charred linings.
- (i) Scored drums.
- (j) Water or mud in brakes.
- (k) Weak chassis springs.

Remedies.

- (a) Replace with MOPAR Brake Lining. Check for oil or grease leaks and replace seals as necessary.

- (b) Adjust brakes.
- (c) Tighten anchor bolts (pins). Inspect lining for possible excessive wear or damage. Adjust brakes.
- (d) Replace crimped wheel line. If line is clogged, clear with air pressure. Bleed lines.
- (e) Reface scored drums. Be careful not to cut more than .030 inch of stock. If drum will not clean up at .030 inch replace drum. Check lining for excessive wear and replace if necessary.
- (f) Replace with MOPAR Brake Lining.
- (g) Refer to Service Standards section for proper tyre pressure.
- (h) Replace with MOPAR Brake Lining.
- (i) Reface scored drum. Be careful not to cut over .030 inch of stock from drum. If the drum will not clean up at .030 inch, replace drum. Check lining for excessive wear and if necessary, replace.
- (j) Remove drums and clean brake assemblies. Check for possible scoring and replace parts as required. Lubricate all moving parts.
- (k) Check height of front and rear springs.

54. SQUEALING BRAKES.**Possible Causes.**

- (a) Incorrect lining.
- (b) Distorted brake drum.
- (c) Bent brake support plate.
- (d) Sprung or bent brake shoes.
- (e) Foreign material embedded in lining.
- (f) Dirt in brake drum.
- (g) Shoes scraping on support plate.
- (h) Loose anchor bolts.
- (i) Brake shoe cocked by campost.

Remedies.

- (a) Replace with MOPAR Brake Lining.
- (b) Replace distorted brake drum.
- (c) Replace bent support plate.
- (d) Check shoes for alignment. If shoes are out of alignment and condition cannot be corrected, replace shoes.
- (e) Remove foreign material embedded in lining. If lining or drum is heavily scored, replace lining and reface drum.
- (f) Remove drum and clean thoroughly. Check drum and lining for possible scoring. Recondition drum and replace lining if necessary.
- (g) Check shoes for alignment. If shoes are out of alignment and condition cannot be corrected, replace shoes.
- (h) Tighten anchor bolts (pins). Inspect lining for possible excessive wear and replace if necessary. Adjust brakes.
- (i) Remove drums. Then, insert rubber insulating washer around campost, between shoe web and adjusting cam. If necessary, groove the lining.

55. OVERHEATING BRAKES.**Possible Causes.**

- (a) Dragging brakes.
- (b) High spots on drums.
- (c) Improper adjustment.
- (d) Defective master cylinder.
- (e) Dirt or grime on drums.
- (f) Incorrect push rod clearance.

Remedies.

- (a) Adjust brakes. Also see Paragraph 52 for additional possible causes.
- (b) Check diameter of drum. If refacing of drum does not correct this condition, replace drum.
- (c) Adjust brakes.
- (d) Check master cylinder for dirt, rust, or corrosion in back of piston. This may prevent piston from making a full return. Also check for swollen primary cup. If necessary, recondition master cylinder.
- (e) Clean brake drums and lining. Check for possible scoring.
- (f) Adjust pedal push rod clearance.

56. FADING BRAKES.**Possible Causes.**

- (a) Improper lining.
- (b) Poor lining contact.

Remedies.

- (a) Replace with MOPAR Brake Lining.
- (b) Adjust brakes.

57. DRAGGING BRAKE.**Possible Causes.**

- (a) Improper brake adjustment.
- (b) Distorted cylinder cups.
- (c) Brake shoe seized on anchor bolt.
- (d) Weak brake shoe return spring.
- (e) Anchor bolts loose or improperly installed.
- (f) Sprung brake shoes.
- (g) Loose wheel bearing.
- (h) Obstruction in brake line.
- (i) Warped brake drum.

Remedies.

- (a) Adjust brakes.
- (b) Replace rubber cylinder cups, drain and flush system. Refill system with Iso Brake Fluid. Bleed lines.
- (c) Free up brake shoe and lubricate anchor bolt with lubricant.

- (d) Check brake shoe return spring and replace if spring is weak.
- (e) Tighten loose anchor bolts.
- (f) Check shoes for alignment.
- (g) Adjust front wheel bearings.
- (h) Disconnect brake lines and clear with air pressure. Refill system with Iso Brake Fluid. Bleed lines.
- (i) Replace warped drum. Check lining for excessive wear, and replace as required.

58. WHEEL LOCKS.**Possible Causes.**

- (a) Oily fluid on linings.
- (b) Torn brake lining.
- (c) Loose lining.
- (d) Loose or improperly installed anchor bolts.

Remedies.

- (a) Replace with MOPAR Brake Lining. Clean drum thoroughly, inspect for possible grease or brake fluid leaks. Replace parts as necessary.
- (b) Replace with MOPAR Brake Lining. Check shoes for possible distortion.
- (c) Replace with MOPAR Brake Lining.
- (d) Tighten loose anchor bolts. Maintain proper clearance between lining and drum.

59. ALL BRAKES DRAG.**Possible Causes.**

- (a) Improper adjustment.
- (b) Improperly adjusted push rod and/or brake pedal stop screw.
- (c) Swollen cylinder cups.
- (d) Restricted port in master cylinder.
- (e) No free pedal travel.
- (f) Lining too thick.
- (g) Weak brake shoe return springs.

Remedies.

- (a) Adjust brakes.
- (b) Adjust brake pedal free play.
- (c) Replace cylinder cups, drain and flush brake system. Refill with Iso Brake Fluid. Bleed lines.
- (d) Remove master cylinder. Clean and recondition if necessary.
- (e) Adjust push rod setting until free pedal travel is obtained.
- (f) Check lining thickness. Refer to Service Standards for proper lining thickness.
- (g) Check tension of brake shoe return springs. If springs are weak, replace as necessary.

CLUTCH

SERVICE STANDARDS

Model Designation	1-08AD 1-08AF 1-08AS	2-26AD 2-26AF 2-26AS	2-33AD 2-33AF 2-33AS	3-59AD 3-59AF 3-59AS	6-71AD 6-71AF 6-71AS	8-65AD 8-65AF 8-65AS	8-71AD 8-71AF 8-71AS	8-71AD-D 8-71AF-D 8-71AS-D
Pedal Free Play	1"	1"	1"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Clutch Disc Facings, Outside Diameter	10"	10"	10"	11"	11"	11"	11"	12"
Thickness — Front125	.125	.125	.125	.125	.125	.125	.125
Rear125	.125	.125	.125	.125	.125	.125	.125
Spring Pressures — Spring Compressed to 1 1/4 inch ...	160 to 170 lbs.	160 to 170 lbs.	160 to 170 lbs.	135 to 145 lbs.	135 to 145 lbs.	135 to 145 lbs.	135 to 145 lbs.	135 to 145 lbs.

TIGHTENING REFERENCE

Part Name	Torque (Foot Pounds)
Housing to cylinder block cap screw.....	30 to 35
Clutch to flywheel bolt.....	15 to 20
Clutch cover to flywheel cap screw.....	30 to 35
Transmission to clutch housing screw	45 to 50

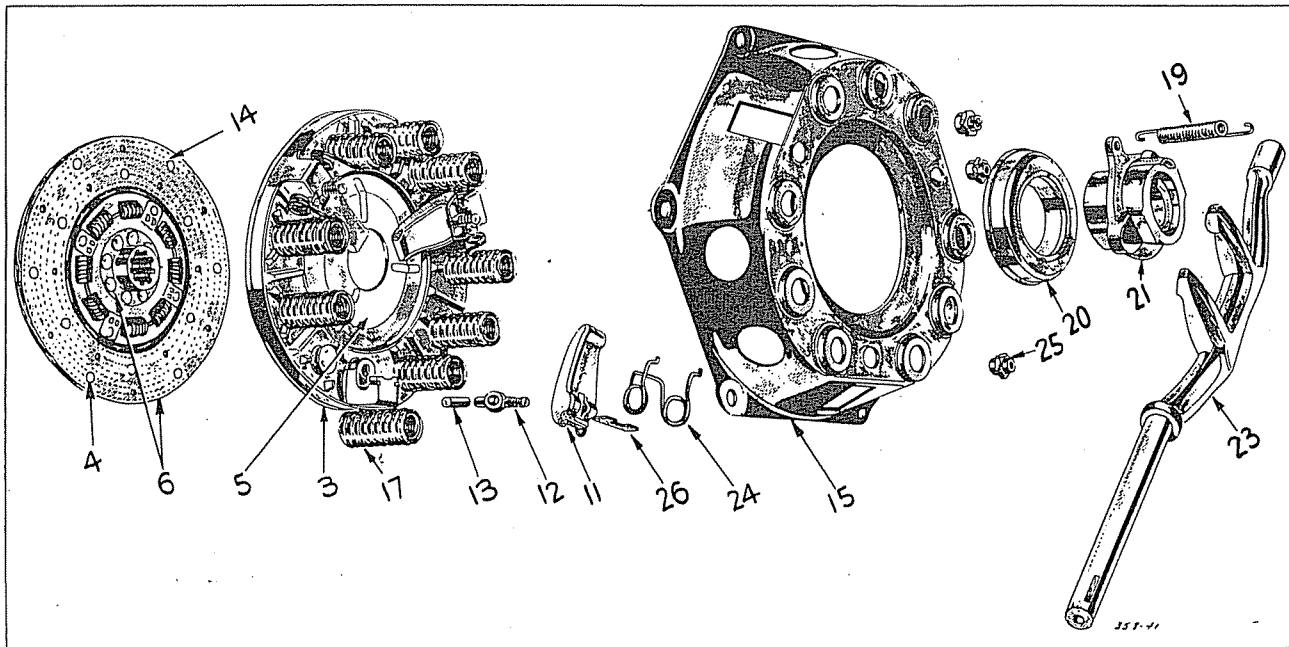


Fig. 1.—Clutch typical of all models except 8-71A-D.

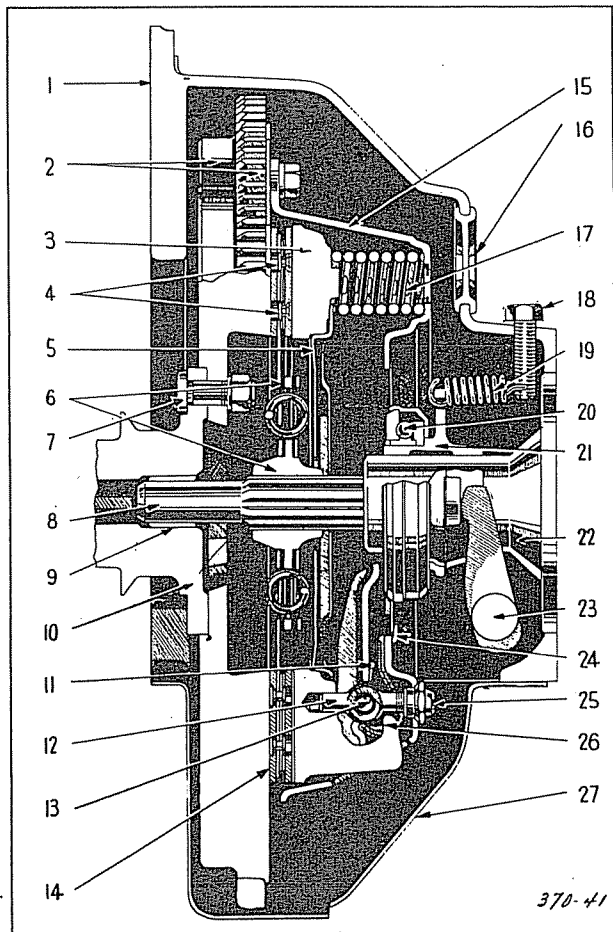


Fig. 2—Clutch Except 8-71A-D.

Clutch Assembly.

Fig. No.	DESCRIPTION
1.	Housing.
2.	Engine flywheel and ring gear.
3.	Pressure plate.
4.	Clutch lining rivets.
5.	Pressure plate baffle.
6.	Disc assembly.
7.	Engine flywheel bolt.
8.	Engine clutch shaft.
9.	Clutch shaft pilot bush.
10.	Engine crankshaft.
11.	Release lever.
12.	Release lever eye bolt.
13.	Release lever pin.
14.	Clutch lining.
15.	Cover.
16.	Housing hole plug.
17.	Pressure spring.
18.	Release bearing pull-back springscrew.
19.	Release bearing pull-back spring.
20.	Release bearing.
21.	Release bearing sleeve.
22.	Clutch shaft pinion bearing retainer.
23.	Release fork.
24.	Release lever spring.
25.	Release lever eye bolt nut.
26.	Release lever strut.
27.	Housing pan.

CLUTCH

1. REMOVAL, INSTALLATION AND MAINTENANCE.

- (1) Remove transmission (see transmission section).
- (2) Remove clutch housing pan.
- (3) Remove clutch throw out bearing.
- (4) Mark clutch cover and flywheel (Figure 3). This will ensure the clutch being refitted to the flywheel in its original position to maintain balance.
- (5) Remove floor boards.
- (6) Disconnect the clutch release fork bracket at the clutch housing.
- (7) Remove the clutch release fork flange cap with the pedal and bushing out of the clutch housing far enough to provide clearance for the clutch assembly to pass the cross shaft clutch release fork.

2. INSTALLATION OF CLUTCH DISC.

Instal the clutch disc (reversing the procedure above) and observe the following precautions:

- (1) Coat the main drive pinion pilot bushing in the end of the crankshaft and insert half teaspoon in the reservoir at the back of the pilot bushing with short fibre wheel bearing grease medium. (See Figure 4).
- (2) Clean the surfaces of the flywheel and pressure plate thoroughly, making certain that no oil or grease remains on these parts.

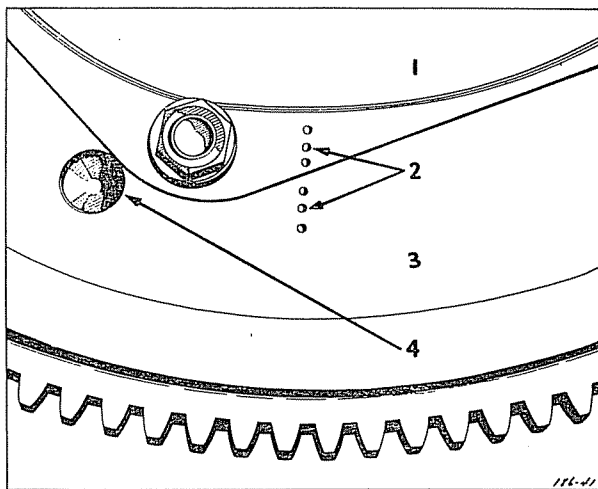


Fig. 3—Punch Marks on Clutch Cover and Flywheel.

- 1—Clutch cover
- 2—Punch marks
- 3—Engine flywheel
- 4—Balance drilling in engine flywheel

- (3) Hold the clutch cover plate and disc in place and insert the aligning tool through the hub of the driving disc and into the drive pinion pilot bushing in the crankshaft. (Figure 5.) If a clutch disc aligning arbour is not available, the clutch shaft should be removed from gear box and used as a substitute.
- (4) Bolt the clutch cover plate loosely to the flywheel and make sure the marks on the cover and flywheel are in alignment.
- (5) The clutch cover bolts should then be tightened a few turns in rotation until they are tight. Instal the transmission, guiding into place with the pilot studs.

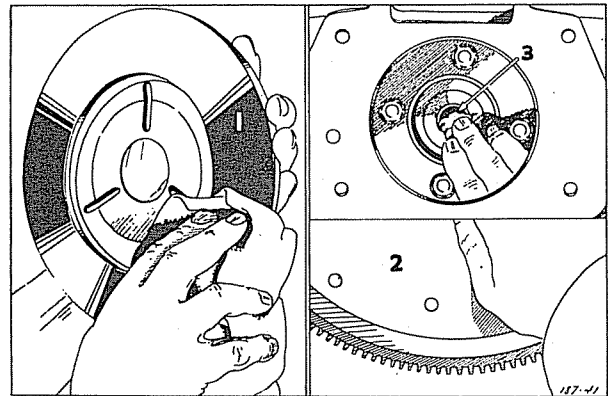


Fig. 4—Lubricating Pilot Bushing.

- 1—Clutch pressure plate. 2—Flywheel. 3—Pilot bushing.

3. DISASSEMBLY AND ASSEMBLY OF CLUTCH COVER AND PRESSURE PLATE.

The clutch cover should be removed as described in Paragraph 1, then proceed as follows:

- (1) Mark the cover and pressure plate with a prick punch so that the parts are assembled in their original position to maintain balance.
- (2) Mount the clutch assembly in the clutch fixture (Figure 7).
- (3) Instal the three legged spider over the centre screw so that it rests directly against the top of the clutch cover.
- (4) Instal the plain thrust washer and the hexagonal compression nut, compress the springs by turning down the compression nut (Figure 7).
- (5) With the spring under compression, remove the screws, washers and shims, and the clutch release lever pad. Slowly release the spring pressure by unscrewing the compression nut.
- (6) The cover may then be lifted off. All parts will be available for inspection.

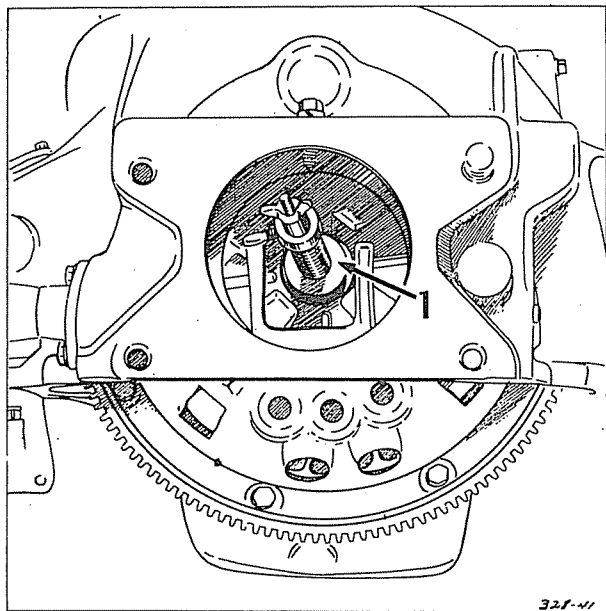


Fig. 5.—Clutch Disc Aligning Arbor Tool C-360.

- (7) Remove the clutch release levers from the pressure plate housing.

Assemble the clutch cover and pressure plate by reversing the foregoing operations, and observe the following precautions:

- (1) It is important that the clutch release lever springs and the pressure plate springs are correctly located.
- (2) Match up the prick punch marks when assembling, so that the cover and pressure plate will be assembled in the same position in relation to each other.

To remove the release levers on all models except 8-71A-D, proceed as follows:

Grasp the lever and eye bolt between the thumb and fingers as shown in Figure 6, so that the slot side of the lever and upper end of the eye bolt are as close together as possible. Be sure to keep the eye bolt pin seated in its socket in the lever. The strut (1) Figure 6, can then be lifted over the ridge on the end of the lever, making it possible to lift the lever and eye bolt off the pressure plate. It is advisable to replace parts which are worn.

4. TO ADJUST RELEASE LEVERS.

Correct operation of the clutch is dependent upon accurate adjustment of the release levers. This adjustment cannot be made correctly by setting the levers parallel to the face of the release bearing with the clutch assembled to the flywheel. The most accurate method is to adjust the levers in a special adjusting fixture, see Figure 7.

- (1) Mount the clutch cover and pressure plate assembly on the fixture with the release levers over the feeler gauges in the base of the fixture.
- (2) Place the proper spacer on the centre screw of the fixture, after selecting it according to the diameter of the clutch plate.

Clutch Size	Spacer Number
10 inch	17
11 inch	* 20 and 21
12 inch	* 17 and 21

* Place both spacers on centre screw.

- (3) Install the compression plate on the centre screw. Make sure that it rests directly against the clutch release fingers. This plate can be reversed for proper clearance, depending on the size of the clutch.
- (4) Install the self aligning washer, plain thrust washer and the compression nut.
- (5) Tighten the compression nut until the clutch is fully compressed.
- (6) On the 10 and 11 inch clutches install the clutch housing clamps over the bolt holes and tighten securely.
- (7) Adjust the 10 inch clutch release levers until each of the three feeler gauges have the same drag or feel (while being pushed in and out). Tighten the nuts to decrease the drag and loosen nuts to increase drag.
- (8) Recheck the release lever adjustment to make sure each one is adjusted properly.

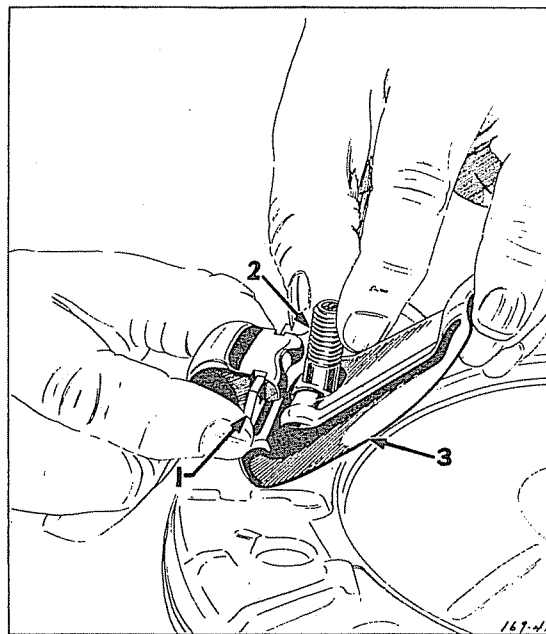


Fig. 6—Removing Strut.

1 — Release lever strut. 2 — Eye bolt. 3 — Release lever.

On 11 inch clutches having four release levers, locate two of the levers over two of the three feeler gauges. Adjustment is made as outlined in the foregoing instructions. The clutch should then be rotated 180 degrees on the base of the fixture, so that the other two release levers can be placed over two of the feeler gauges. Adjust these levers so they show the same slight drag as the first two release levers.

When removing the clutch cover assembly from the fixture, loosen the housing clamps first, and then remove the compression nut to avoid throwing unequal strain on the release levers. This is important.

On the 12 inch clutch, the feeler gauges are used as described in step 8. However, it is necessary to hold the clutch housing on the fixture with 8 cap screws. Tapped holes are provided in the base of the fixture for this purpose.

5. ALIGNMENT OF CLUTCH HOUSING.

Replacement of clutch housing or re-installing the original clutch housing (if removed for any reason) must be correctly aligned when installed. Out of round of the bore must not exceed .005 inches total indicator reading. To correctly align clutch housing, proceed as follows:

- (1) Inspect the housing face where it contacts the rear of the engine block for particles of dirt and burrs, remove burrs with a file then clean both surfaces.
- (2) Start the two dowel pins in the block from the

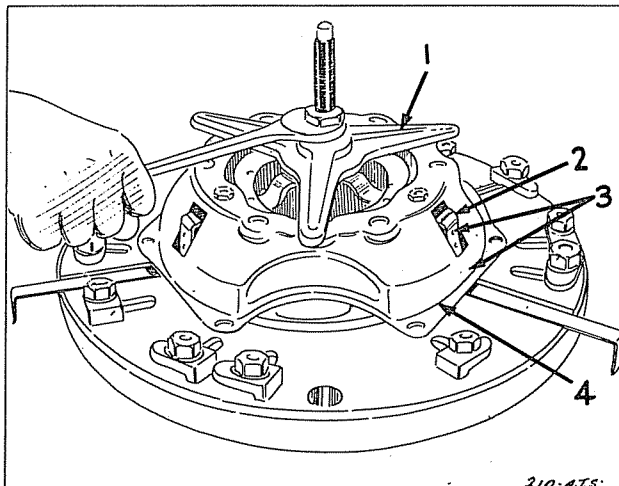


Fig. 7—Clutch Cover and Pressure Plate Assembly in Fixture C-585-B.

- 1 — Fixture (Tool C 585-B).
- 2 — Clutch Pressure Plate.
- 3 — Punch marks on pressure plate and cover.
- 4 — Clutch cover.

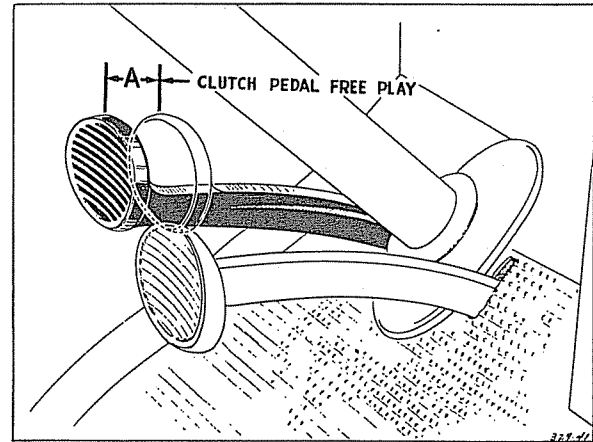


Fig. 8—Clutch Pedal Free Play.

front end so they protrude beyond the machine face of the engine block, and instal the clutch housing.

Instal clutch housing to block cap screws making them just snug enough so that the housing can be shifted if necessary by tapping with a mallet.

Note.—Failure to align clutch housing may result in hard shifting of transmission and possibility of gear disengagement.

- (3) Instal the fixture to the flywheel attaching bolts (Figure 9). Rotate the crankshaft and check the inside diameter of the housing bore, it should not vary more than .005 inch in one complete revolution of the crankshaft. If alignment is necessary, remove the dowel pins and tap the housing until it is within the specified tolerance. After obtaining correct alignment, tighten the housing cap screws.

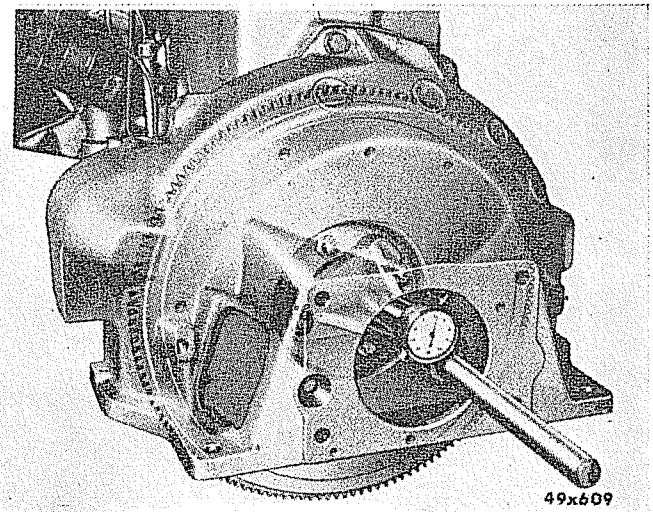


Fig. 9—Method of Attaching Fixture C-870 (Flywheel Type Housing)

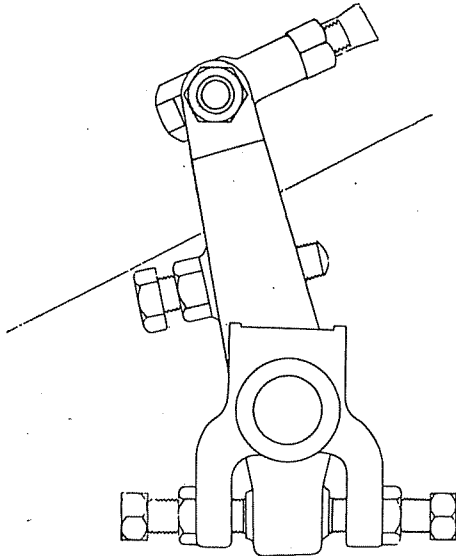


Fig. 10.—Clutch Pedal Adjusting Mechanism.

- (4) Change the position of the dial indicator and check the rear face. This tolerance must be within .002 inch. Assuming that all dirt and burrs were removed as described in step (1), this tolerance no doubt will be within the specified limits.

If alignment of the housing was necessary, as described in step (3), the dowel pin holes will have to be reamed and oversize dowel pins fitted.

6. CLUTCH—Model 8-71A-D. (Figure 11).

The clutch fitted to the above model is of the single dry plate type. Friction linings are rivetted

to the drive plate which is solid and does not incorporate centre tension springs. The pressure plate housing is bolted direct to the pressure plate housing and encases nine coil springs which ensure adequate and evenly distributed pressure between the driving and driven members.

The clutch release lever operating mechanism is located on the outside of the pressure plate housing and is visible through the inspection hole provided in the clutch housing.

The clutch release bearing is a carbon block type and therefore must not be lubricated. If grease or oil is allowed to contact the face of the carbon thrust bearing, a partial seizure may occur between the thrust bearing and the release lever thrust plate, when the clutch pedal is depressed, resulting in rapid wear on all parts of the clutch release operating mechanism.

ADJUSTMENTS.

7. ADJUSTING CLUTCH PEDAL FREE

MOVEMENT—Refer Figures 8 and 10.

- (1) Loosen pedal adjusting screw lock nuts.
- (2) Turn clutch pedal adjusting screws until pedal has 1 inch free movement on models 1-08A, 2-26A, and 2-33A, and 1- $\frac{1}{4}$ inch on models 3-59A, 6-71A, 8-65A, 8-71A and 8-71A-D.

Free movement of the clutch pedal (Figure 8) is necessary to compensate for wear of clutch facing and to avoid slippage.

This free movement ensures proper clearance between clutch release bearing and clutch release lever.

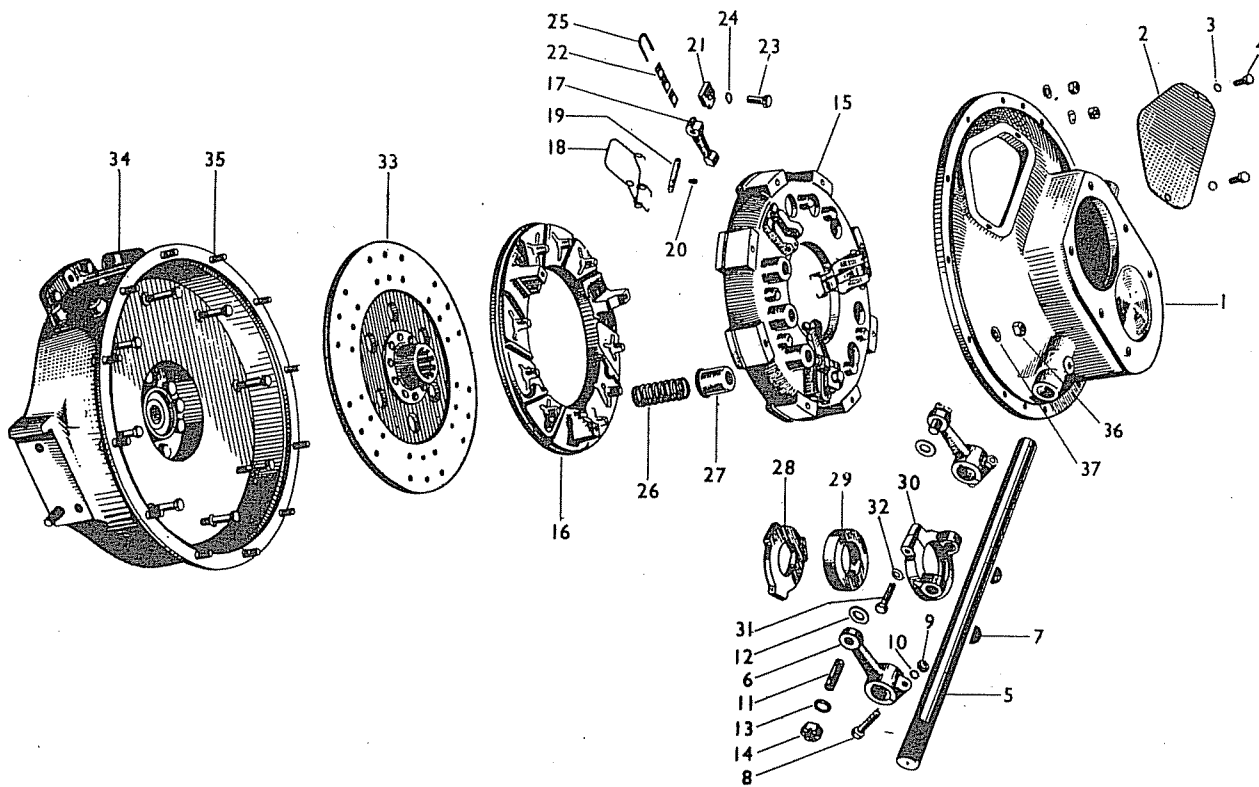


Fig. 11—Typical View of Clutch, as fitted to 8-71 A-D.

Fig. No. DESCRIPTION.

- 1. Clutch Housing.
- 2. Clutch Inspection Cover.
- 3. Clutch Inspection Cover Screw Washer
- 4. Clutch Inspection Cover Screw
- 5. Clutch Withdrawal Shaft.
- 6. Clutch Withdrawal Arm.
- 7. Clutch Withdrawal Arm Key.
- 8. Clutch Withdrawal Arm Clamp Screw.
- 9. Clutch Withdrawal Arm Clamp Screw Nut.
- 10. Clutch Withdrawal Arm Clamp Screw Washer.
- 11. Clutch Withdrawal Arm Pin
- 12. Clutch Withdrawal Arm Pin Distance Washer.
- 13. Clutch Withdrawal Arm Pin Washer.
- 14. Clutch Withdrawal Arm Pin Nut
- 15. Clutch Pressure Plate Housing
- 16. Clutch Pressure Plate
- 17. Clutch Release Lever
- 18. Clutch Release Lever Spring
- 19. Clutch Release Lever Pin

Fig. No. DESCRIPTION.

- 20. Clutch Release Lever Pin Allen Screw
- 21. Clutch Release Lever Pad
- 22. Clutch Release Lever Pad Shim
- 23. Clutch Release Pad Screw
- 24. Clutch Release Lever Pad Screw Washer
- 25. Clutch Pressure Adjustment "U" Clip
- 26. Clutch Pressure Spring
- 27. Clutch Pressure Spring Cup.
- 28. Clutch Release Lever Bearing Plate.
- 29. Clutch Release Bearing
- 30. Clutch Release Bearing Assembly Cup
- 31. Clutch Release Bearing Cup Clamp Screw
- 32. Clutch Release Bearing Cup Clamp Screw Washer
- 33. Clutch Assembly Plate (with Linings)
- 34. Flywheel Housing
- 35. Clutch Bell Housing Stud
- 36. Clutch Bell Housing Stud Nut
- 37. Clutch Bell Housing Stud Washer

SERVICE DIAGNOSIS

Conditions — Possible Causes — Remedies

8. CHATTERING CLUTCH.

Possible Causes.

- a. Improper lever adjustment.
- b. Oil or grease on facings.
- c. Loose universal joint flange.
- d. Worn splines on transmission shaft.
- e. Binding pressure plate.
- f. Binding release levers.
- g. Binding disc hub.
- h. Glazed facings.
- i. Unequal contact of pressure plate.
- j. Bent clutch disc.
- k. Uneven spring pressures.
- l. Improper alignment of transmission.
- m. Loose facings.
- n. Scored pressure plate.

Remedies.

- a. Re-adjust clutch.
- b. Check for oil leaks at rear main bearing and at transmission pinion shaft bearing. Correct leaks if necessary. Then, replace disc assembly and clean clutch parts thoroughly.
- c. Check universal joint flange and tighten to recommended torque.
- d. Replace worn transmission drive pinion (clutch shaft). Instal new disc assembly and adjust clutch.
- e. Check pressure plate for binding where lug protrudes through cover. Coat contact surfaces with a thin coat of LUBRIPLATE. Replace worn parts as required.
- f. Free up binding release levers. Check for worn or damaged threads on eyebolts, adjusting nuts, or where binding (which retards free back and forth movement) seems to occur. Check strut for wear on contact edges and, if necessary, replace.
- g. Replace disc assembly and adjust clutch.
- h. Replace disc assembly after checking pressure plate, flywheel or driving plate for possible scoring. If parts are badly scored or worn, replace them.

- i. Check clearances of release levers, disc for thickness and pressure plate for parallel position against flywheel or driving plate.
- j. Replace disc assembly if it is distorted or bent. Examine pressure plate for excessive wear or scoring. Replace if necessary.
- k. Check springs for tension.
- l. Check clutch housing alignment. Misalignment of transmission and clutch housing may be caused by chips, dirt, or burrs. Check to determine cause, and correct.
- m. Replace disc assembly. Examine pressure plate and flywheel, or driving plate, for possible scoring and excessive wear. Replace as required.
- n. If pressure plate shows signs of scoring, excessive wear, or heat checking, or if pressure plate is warped more than .005 inch, replace plate.

9. GRABBING CLUTCH.

Possible Causes.

- a. Improper lever adjustment.
- b. Oil or grease on facings.
- c. Worn pressure plate, flywheel or drive plate.
- d. Clutch disc hub sticking on pinion (clutch) shaft.
- e. Worn or binding release levers.
- f. Worn or glazed facings.
- g. Broken or weak pressure springs.
- h. Sticking clutch pedal.
- i. Dragging brakes.
- j. Incorrect disc facings.
- k. Improper alignment of transmission.
- l. Engine loose in frame.

Remedies.

- a. Adjust clutch.
- b. Replace disc assembly. Check for oil leak at rear main bearing. Replace the oil seal, if necessary.
- c. A flywheel, pressure plate that shows signs of excessive wear, heat checking or scoring, must be replaced.

- d. Free up disc hub. Check pinion shaft for excessive wear or burrs. Check disc assembly for distortion and replace if necessary.
 - e. If the tips of release levers are badly worn, replace the levers. This is also an indication of a sticking release bearing. Replace eyebolts or adjusting nuts which have worn or damaged threads. If binding (which retards free back and forth movement) occurs, correct the condition. Check contact edges of struts for wear and replace as necessary.
 - f. Replace disc assembly. Check pressure plate for excessive wear or scoring. Replace parts as required.
 - g. Replace broken or weak springs.
 - h. Free up sticking pedal. Check for worn or misaligned parts. Replace or align parts as necessary.
 - i. Refer to Brakes Section in this manual and correct condition.
 - j. Replace disc assembly. Use Factory Engineered and Inspected clutch disc assembly. Adjust clutch.
 - k. Check clutch housing alignment. Misalignment of transmission and clutch housing may be caused by chips, dirt or burrs. Check to determine cause and correct.
 - l. Check engine mounting for loose bolts. Tighten as required.
- b. Replace disc assembly. Check pressure plate, flywheel, or clutch driving plate for possible scoring, heat checking or excessive wear. Test pressure springs for tension. Replace parts as needed.
 - c. Examine disc assembly for excessive wear or a glazed surface. Check pressure plate for possible scoring or distortion. Test springs for tension. Replace parts as required. Adjust clutch.
 - d. Replace disc assembly. Check for oil leak at rear main bearing. If necessary to replace oil seal, refer to Engine Section in this manual.
 - e. Replace warped or distorted disc assembly, after examining pressure plate for possible damage. Test pressure springs for tension.
 - f. A pressure plate that is badly scored, heat checked or warped more than .005 inch, must be replaced. Test springs for tension and install new disc assembly.
 - g. Free up release levers where binding is present (which retards free back and forth movement). Examine contact surfaces of struts for excessive wear and replace as needed. Lubricate all moving parts with LUBRIPLATE. Check disc and pressure plate for scoring or heat checking. Test pressure springs for tension. Replace parts as required.
 - h. Examine pressure plate for possible scoring or heat checking. Test pressure springs for tension.
 - i. Examine disc assembly and pressure plate for excessive wear and possible scoring. Test pressure springs for tension and replace damaged parts as required. Adjust pedal travel.

10. SLIPPING CLUTCH.

Possible Causes.

- a. Weak or broken pressure springs.
- b. Worn facings.
- c. Improper clutch adjustments.
- d. Oil or grease on facings.
- e. Warped disc assembly.
- f. Warped or scored pressure plate.
- g. Binding release levers.
- h. Binding clutch pedal.
- i. Insufficient free pedal travel.

Remedies.

- a. Replace weak or broken springs.

Note.—It is advisable to replace pressure springs when clutch is dismantled after considerable service, or if there has been a great amount of slippage due to excessive heat which may have caused the springs to lose their initial tension.

11. DRAGGING CLUTCH.

Possible Causes.

- a. Oil or grease on facings.
- b. Incorrect lever adjustment.
- c. Incorrect pedal adjustment.
- d. Dust or dirt in clutch.
- e. Worn or broken facings.
- f. Bent clutch disc.
- g. Disc hub binding on pinion shaft.
- h. Binding pilot bushing.
- i. Sticking release bearing sleeve.
- j. Warped pressure plate.
- k. Improper alignment of transmission.
- l. Clutch facings too thick.

Remedies.

- a. Replace disc assembly. Check for oil leak at rear main bearing. If necessary to replace oil seal, refer to Engine Section in this manual.
- b. Re-adjust levers after checking for possible damage.
- c. Re-adjust pedal.
- d. Disassemble clutch and clean thoroughly. Examine all parts for excessive wear or scoring. Replace worn or scored parts as required. At re-assembly, coat all moving parts with a thin coat of LUBRIPLATE.
- e. Replace disc assembly. Inspect pressure plate for excessive wear or scoring. Test pressure springs for tension.
- f. Replace bent disc assembly after checking to determine cause of distortion. Replace worn or scored parts.
- g. Free up disc assembly. Check pinion shaft (clutch shaft) for burrs or gummed splines. Replace parts as required.
- h. Replace pinion shaft (clutch shaft) pilot bushing.
- i. Free up sticking sleeve and examine mating surfaces for scoring or rough spots. Replace parts as required.
- j. A pressure plate that is warped more than .005 inch must be replaced. Install new disc assembly. Adjust clutch.
- k. Check clutch housing misalignment. Misalignment of transmission and clutch may be caused by chips, dirt, or burrs. Determine cause of condition and correct.
- l. Clutch facings of more than recommended thickness should be replaced. When replacing the disc assembly, always use Factory Engineered and Inspected Parts.

12. RATTLING CLUTCH.**Possible Causes.**

- a. A weak or broken release lever anti-rattle spring.
- b. Damaged pressure plate.
- c. Broken pull back spring.
- d. Worn splines on pinion shaft (clutch shaft) or disc hub.
- e. Worn release bearing.
- f. Dry or worn pilot bushing.
- g. Unequal contact of release levers.
- h. Excessive backlash in transmission or propellor shaft.

- i. Worn drive pinion bearing.
- j. Pedal free play improperly adjusted.
- k. Warped disc assembly.
- l. Misaligned clutch housing.

Remedies.

- a. Replace weak or broken anti-rattle spring.
- b. Examine damaged pressure plate to determine cause of fatigue. Replace plate and adjust clutch.
- c. Replace broken pull back spring.
- d. Replace pinion shaft (clutch shaft) and/or, disc assembly.
- e. Replace worn release bearing. Examine the tips of release levers for excessive wear. Replace levers if necessary.
- f. Replace pilot bushing.
- g. Re-adjust release levers.
- h. Correct excessive backlash in transmission or propellor shaft. Refer to Transmission Section or Propellor Shaft and Universal Joint Section in the manual.
- i. Replace worn drive pinion bearing after checking bearing retainer for cracks or excessive wear. Examine pilot bushing and replace as necessary.
- j. Adjust pedal free play.
- k. Replace disc assembly. Check pressure plate for excessive wear and replace if required.
- l. Check alignment of clutch housing. Correct as necessary.

13. SQUEAKING CLUTCH.**Possible Causes.**

- a. Lack of lubrication in release sleeve.
- b. Worn release sleeve.
- c. Dry pilot bushing.
- d. Pilot bushing turning in crankshaft.
- e. Worn drive pinion bearing.
- f. Improper alignment of transmission.

Remedies.

- a. Lubricate release sleeve with LUBRIPLATE.
- b. Check sleeve land for interference at oilite part of release bearing. Replace sleeve if necessary.
- c. Replace pilot bushing.

- d. Replace pilot bushing.
- e. Replace worn drive pinion bearing after checking bearing retainer for cracks and excessive wear. Examine pilot bushing and replace if necessary.
- f. Check clutch housing alignment. Misalignment of transmission and clutch housing may be caused by chips, dirt, buckled gasket or burrs. Check to determine cause and correct.

14. WHIRRING CLUTCH.

Possible Causes.

- a. Insufficient free pedal travel.
- b. Improper alignment of transmission.

Remedies.

- a. Adjust pedal travel.
- b. Check clutch housing alignment. Misalignment of transmission and clutch housing may be caused by chips, dirt, or burrs. Check to determine cause and correct.

15. GRINDING CLUTCH.

Possible Causes.

- a. Dry release bearing.
- b. Worn or dry pilot bushing.
- c. Worn pinion shaft (clutch shaft) bearing.

Remedies.

- a. Replace dry release bearing. (Release bearings are pre-lubricated at the factory at assembly and should require no further lubrication). Examine tips of release levers for excessive wear and replace if necessary.
- b. Replace worn or dry pilot bushings.
- c. Replace worn drive pinion (clutch shaft) bearing after checking bearing retainer for cracks or excessive wear. Examine pilot bushing and replace if necessary.

16. VIBRATING CLUTCH.

Possible Causes.

- a. Improper balance of assembly.
- b. Improper fitting of pressure plate.
- c. Pressure spring off centre.
- d. Improper clutch alignment.
- e. Worn transmission shaft rear bearing.

- f. Worn universal joints.
- g. Loose hand brake drum.
- h. Loose flywheel.

Remedies.

- a. Replace disc assembly and pressure plate.
- b. Check clutch cover for distortion which would interfere with correct operation of pressure plate. Check clutch cover assembly mounting bolts for looseness and tighten if necessary.
- c. Check springs for alignment on bosses and test for tension.
- d. Replace disc assembly and align. Readjust clutch.
- e. Replace worn transmission mainshaft rear bearing. Refer to Transmission section.
- f. Replace worn universal joints.
- g. Tighten loose hand brake drum bolts as required.
- h. Tighten flywheel nuts to specified torque. Check for runout.

17. HEAVY CLUTCH PEDAL.

Possible Causes.

- a. Improper adjustment of overcentre spring.
- b. Dry or scored linkage parts.
- c. Sticking release bearing sleeve.
- d. Improper clutch pedal shaft.
- e. Dry or scored pedal hub.
- f. Pedal interference with floorboard or mat.
- g. Bad eyebolts or driving lugs.
- h. Rough or dry pivot ball, or fork pivots.

Remedies.

- a. Adjust overcentre spring.
- b. Lubricate all clutch linkage parts and replace scored parts as required. Refer to Lubrication Section in this manual.
- c. Check release bearing sleeve for excessive wear, burrs or roughness on mating surfaces. Replace if necessary.
- d. Refer to Parts Book for correct shaft. Check lever position before installing.
- e. Replace bushing in pedal hub and lubricate as outlined in Lubrication Section in this manual.
- f. Check pedal for interference and correct as necessary.

- g. Replace badly worn eyebolts and pressure plate. Check disc assembly and renew if required.
- h. Lubricate all points of movement on pivot fork. Check pivot ball for roughness or excessive wear. Replace if necessary.

18. SPINNING CLUTCH.

Clutch spinning is frequently confused with clutch dragging. A clutch disc which releases perfectly will naturally spin under its own weight and momentum, immediately after being released, if the transmission gears are in the neutral position.

Gear clash, when shifting from neutral to first speed, or to reverse, is usually caused by the clutch spinning and can be overcome only by releasing the clutch, allowing the disc to stop spinning, and then, shifting the gears.

Possible Causes.

- a. Dry or worn bushings.
- b. Misaligned clutch housing.
- c. Bent, or distorted disc.
- d. Warped pressure plate.
- e. Excessive free pedal play.

Remedies.

- a. Replace bushings.
- b. Check clutch housing alignment. Align if necessary.
- c. Replace disc assembly. Check pressure plate for possible damage.
- d. Replace pressure plate if warped or distorted.
- e. Re-adjust free pedal play.

