

SECTION MM

THE BRAKING SYSTEM

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DESCRIPTION

The brakes on all four wheels are hydraulically operated by a foot pedal directly coupled to a master cylinder in which the hydraulic pressure of the brake operating fluid is originated. A supply tank on the master cylinder provides a reservoir. Steel pipe lines, flexible hoses, and unions interconnect the master and wheel cylinders.

The pressure generated in the master cylinder is transmitted with equal and undiminished force to all wheel cylinders simultaneously. This moves each wheel cylinder piston outwards, expanding the brake-shoes and thus producing automatic equalization and efficiency in direct proportion to the effort supplied at the pedal.

In the rear drums a single wheel cylinder operated both hydraulically and mechanically floats on the backplate and operates the brake-shoes, giving one leading shoe and one trailing shoe in each direction of rotation, and provides adequate braking in reverse.

The hand brake is mounted in the centre of the floor between the driver and passenger seats. It is of the conventional ratchet and pawl type, operating on the rear wheels only by means of cables through a relay lever located below the floor to a compensator mounted on the rear axle and transverse cables to the wheel cylinder levers.

Brake-shoes—front

Two leading shoes in each front assembly are expanded by individual, single-acting hydraulic cylinders connected by tubing and bolted to the backplate. Each shoe pivots and slides on one of the cylinders with its opposite end in contact with the piston of the cylinder diametrically opposite. Two pull-off springs are fitted, each connected from one shoe to the backplate.

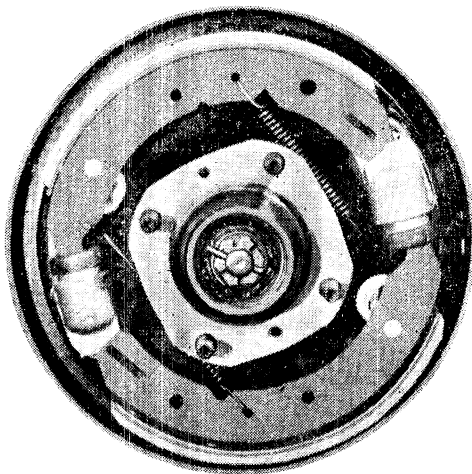


Fig. MM.1

A front brake assembly

An adjustable steady post controls the movement of each shoe without interfering with its normal braking function.

Brake-shoes—rear

Two shoes, one leading and one trailing, are expanded in each assembly by a single-acting hydraulic cylinder and piston assembly floating on the backplate.

Two springs are fitted and connected between the shoes. The shoes are not fixed but are able to slide on their abutments and centralize in the drum. At the cylinder end the leading shoe is located in a slot in the piston, while the trailing shoe rests in a slot formed in the cylinder body; at the adjuster ends they rest in slots in the adjuster links. The shoes are supported by adjustable steady posts screwed into the backplate. Inclined inner faces on the adjuster links bear on the inclined faces of the adjuster wedge, which has a finely threaded spindle and a squared end projecting through the backplate. Rotating the spindle therefore will expand the shoes or allow them to come together under the influence of the return springs.

The hand brake lever is pivoted in the cylinder body, and when operated the lever tip expands the leading shoe independently of the hydraulic piston and the pivot moves the cylinder body to apply the trailing shoe.

MAINTENANCE

Periodically check the level of the fluid in the master cylinder reservoir and maintain it about three-quarters full by the addition of **Girling Crimson Brake Fluid**. The necessity for frequent topping up is an indication of overfilling, or of a leak in the system which should be immediately traced and rectified.

Adjust the brake-shoes to compensate for wear of the linings. The need for this is shown by excessive movement of the pedal before solid resistance is felt. For brake-shoe adjustments see Section MM.1.

Adjustment of the shoes in the manner indicated also automatically adjusts the hand brake, and no separate adjustment is required.

IMPORTANT.—Always exercise extreme cleanliness when dealing with any part of the hydraulic system.

Do not handle any rubber or internal parts with greasy hands or greasy rags, and clean all parts with **Girling Brake Fluid** from clean containers; do not use a container that has been washed with trichlor-ethylene.

Examine all seals, hoses, and other parts for damage when overhauling the system and renew any damaged or unserviceable component.

Do not refill the reservoir with dirty fluid when bleeding the system; use new fluid from a sealed container.

Do not allow paraffin, petrol, or trichlor-ethylene to contact any part of the system.

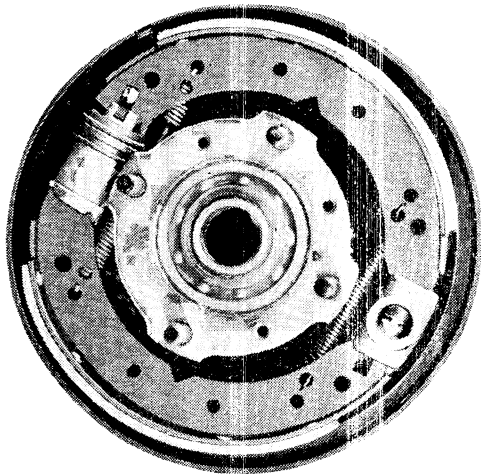


Fig. MM.2
A rear brake assembly

Section MM.1

ADJUSTING THE BRAKE-SHOES

Front

Jack up the wheel or wheels requiring adjustment.

Turn one of the squared adjuster screws on the back-plate in a clockwise direction until the drum is locked against rotation and then slacken off just enough to free the drum (two 'clicks').

Repeat the adjustment with the other shoe.

Rear

Jack up the wheel or wheels to be adjusted.

Rotate the squared adjuster screw in a clockwise direction until the drum is locked and then slacken off enough to free the drum (two 'clicks').

Section MM.2

MASTER CYLINDER

Girling-type C.V. with integral supply tank. The inner assembly consists of a push-rod, circlip, dished washer, plunger, end seal, seal, spring thimble, plunger return spring, valve spacer, spring washer, valve stem, and valve seal. A rubber dust cover protects the open end of the cylinder.

To dismantle

Disconnect the pressure pipe union from the cylinder and remove the clevis pin from the yoke.

Remove the filler cap and drain out the fluid.

Pull back the dust cover and remove the circlip; the push-rod and dished washer can then be removed.

Remove the plunger assembly complete.

Lift the thimble leaf over the shouldered end of the plunger (Fig. MM.5).

Depress the plunger return spring to allow the valve stem to slide through the elongated hole of the thimble and release the spring tension.

Remove the thimble, spring, and valve complete; detach the valve spacer, taking care of the spacer spring washer located under the valve head. Remove the seal from the valve head.

Examine all parts for wear and distortion and replace where necessary.

Use only clean Girling Brake Fluid for cleaning.

Assembly

Assembly is mainly a reversal of the dismantling procedure, but note:

Make sure that the flat side of the valve seal is correctly seated on the valve head.

Locate the spring washer with the domed side against the under side of the valve head.

The legs of the valve spacer must face towards the valve seal.

Replace the plunger return spring centrally on the spacer, insert the spring, and depress until the valve stem engages through the elongated hole of the thimble. Make sure the stem is correctly located in the centre of the thimble.

Check that the spring is still central on the spacer.

Fit the plunger seal with the flat of the seal against the face of the plunger, and the end seal so that its wiping edge will face the valve assembly.

Insert the reduced end of the plunger into the thimble until the thimble leaf engages under the shoulder of the plunger; press home the leaf (Fig. MM.5).

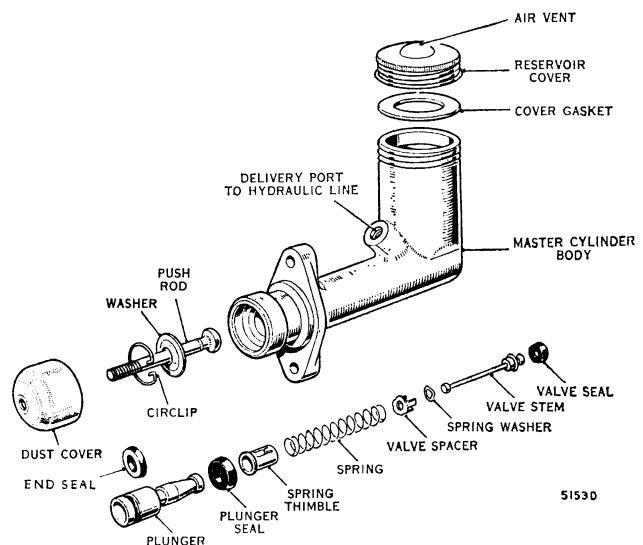


Fig. MM.3

The master cylinder components

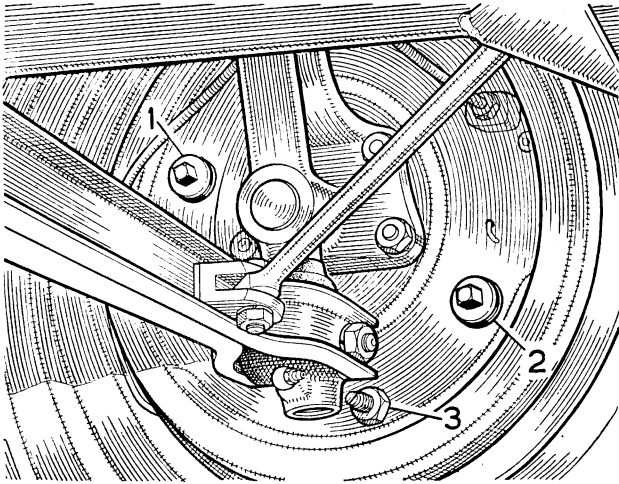


Fig. MM.4
The brakes

1 and 2. Brake-shoe adjusters. 3. Brake-shoe steady post.

Smear the assembly with Girling fluid and insert the assembly into the cylinder bore. Do not damage the plunger seal or the end seal as they are pushed into position.

Refit the push-rod, circlip, and rubber dust cover.

Section MM.3

REMOVING AND REPLACING BRAKE-SHOES

Front

Jack up and remove the wheel and brake-drum.

Lift the trailing end of a shoe from the abutment on the wheel cylinder and the leading end from the piston of the opposite cylinder; detach the spring and shoe. Repeat with the other shoe. Prevent the pistons from falling out of the cylinders by the use of rubber bands or wire.

Before refitting the shoes lightly smear the steady posts and both ends of the shoes with Girling White Brake Grease, but take care to keep all grease from the rubber parts and pistons; and from the linings.

Fit the shoes. The shorter hook of each spring must be connected to a brake-shoe. Fit the brake-drum and adjust the brakes as detailed in Section MM.1.

If replacement brake-shoes are fitted or if there is any sign of uneven wear across the surface of the linings it will be necessary to adjust the steady posts.

Slacken the locknut at the rear of the backplate and unscrew the post about three or four turns.

Apply the brakes hard and then rotate the post in a clockwise direction until it contacts the shoe web; hold the post and tighten the locknut.

MM.4

Rear

Jack up and remove the wheel and brake-drum; it may be necessary to slacken off all the adjustment in order to fit replacement shoes. Note that the lining of the leading shoe is fitted towards the trailing end, and that of the trailing shoe towards the leading end. Both springs are connected between the shoes, the lighter spring at the wheel cylinder ends.

Before fitting the shoes lightly smear the steady posts and both ends of the shoes with Girling White Brake Grease, but take care to keep all grease from the rubber parts and pistons, and from the linings.

Fit the shoes and drum and adjust as detailed in Section MM.1.

Section MM.4

REMOVING AND REPLACING A WHEEL CYLINDER

Front

Jack up and remove the wheel, drum, and shoes.

Disconnect the pipe unions from the cylinder.

Unscrew the two securing nuts and remove the cylinder(s).

When refitting, tighten the wheel cylinder nuts to a torque wrench reading of 5 to 7.5 lb. ft. (.69 to 1.03 kg. m.).

After refitting bleed the brakes.

Rear

Jack up the wheel and remove the wheel, drum, and shoes.

Disconnect the pipe from the union, the cable at the hand brake lever, and remove the rubber boot from the rear of the backplate.

With a screwdriver prise the retainer and spring plates apart and tap the retaining plate from below the neck of the wheel cylinder.

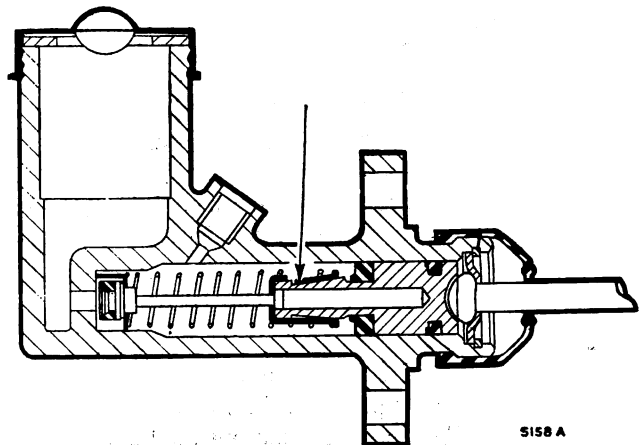


Fig. MM.5

The master cylinder. The arrow indicates the thimble leaf

Replacement in both front and rear cylinders is a reversal of the dismantling procedure.

Section MM.6

REMOVING A FLEXIBLE HOSE

Do not attempt to release a flexible hose by turning either end with a spanner; it should be removed as follows:

Unscrew the metal pipe line union nut from its connection to the hose.

Hold the hexagon on the flexible hose and remove the locknut securing the flexible hose union to the bracket.

Unscrew the flexible hose from the cylinder.

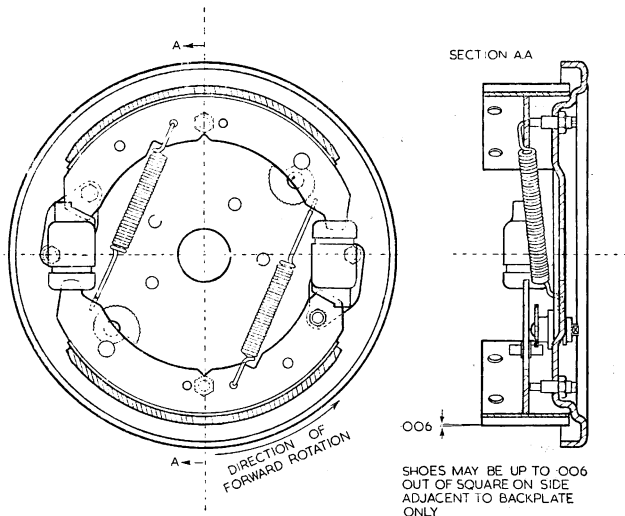


Fig. MM.6

Front brake assembly details

Withdraw the hand brake lever from between the backplate and wheel cylinder.

Remove the spring plate and distance pieces, and finally the cylinder from the backplate.

To refit, smear the backplate and cylinder with Girling White Brake Grease and mount the cylinder onto the backplate with the neck through the large slot. Replace the distance piece between the cylinder neck and the backplate with the open end away from the hand brake location; the two cranked lips must also be away from the backplate.

Replace the hand brake lever. Locate the retaining plate between the distance piece and the spring plate (open end towards the hand brake lever) and tap into position until the two cranked lips of the spring plate locate in the retaining plate.

Fit the rubber cover. Connect the pipe to the union and the cable to the hand brake lever. Replace the shoes, drum, and wheel.

Bleed and adjust the brakes.

Section MM.5

DISMANTLING AND ASSEMBLING A WHEEL CYLINDER

Front

Remove the cylinder as detailed in Section MM.4.

Remove the rubber dust cover; withdraw the piston seal, spreader, and spring; use air pressure to extract the remaining components from the cylinder.

Rear

Remove the cylinder as detailed in Section MM.4.

Remove the spring clip and rubber dust cover.

Blow out the piston and seal.

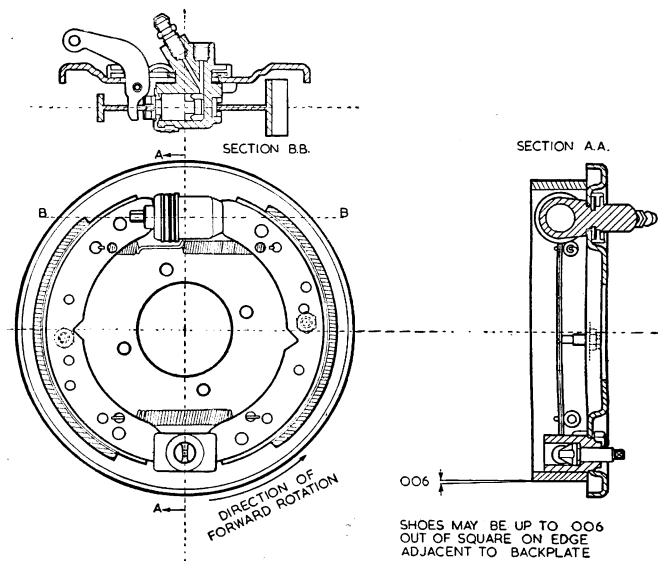


Fig. MM.7

Rear brake assembly details

Open the bleeder screw one full turn.

Depress the brake pedal slowly, and allow it to return without assistance. Repeat this pumping action with a slight pause before each depression of the pedal.

Watch the flow of fluid into the glass jar, and when air bubbles cease to appear hold the pedal firmly against the floorboards while the bleeder screw is securely tightened.

Tighten the bleeder screws to a torque wrench reading of 5 to 7.5 lb. ft. (.69 to 1.03 kg. m.).

Repeat the operation on each wheel.

After bleeding top up the master cylinder to its correct level.

NOTE.—Clean fluid bled from the system must be allowed to stand until it is clear of air bubbles before it is used again. Dirty fluid should be discarded.

Section MM.8

HAND BRAKE

The hand brake operates the rear brake-shoes through cables, an intermediate lever beneath the car, and a compensator on the rear axle. Do not attempt to adjust the brakes by interfering with the cables.

Slackness in the hand brake mechanism may be removed as follows:

- (1) Adjust the brake-shoes as detailed in Section MM.1.
- (2) Turn the brass nut on the front end of the rear longitudinal cable at the intermediate lever in a clockwise direction until the hand brake is hard on when the lever is pulled up three or four notches.
- (3) Check that the drums are free to rotate when the hand brake is off.

Section MM.9

BRAKING IRREGULARITIES AND THEIR CAUSES

Pedal travel excessive (requires pumping)

- (1) Brake-shoes require adjusting.
- (2) Leak at one or more joints.
- (3) Master cylinder cup worn.

Pedal feels springy

- (1) System requires bleeding.
- (2) Linings not bedded in.
- (3) Master cylinder fixing loose.
- (4) Master cylinder cup worn.

Brakes inefficient

- (1) Shoes not correctly adjusted.
- (2) Linings not bedded in.
- (3) Linings greasy.
- (4) Linings wrong quality.
- (5) Drums badly scored.
- (6) Linings badly worn.
- (7) Wrongly fitted cup fillers.

Brakes grab

- (1) Shoes require adjusting.
- (2) Drums distorted.
- (3) Greasy linings.
- (4) Broken or loose road spring.
- (5) Scored drums.
- (6) Worn suspension linkage.

Brakes drag

- (1) Shoes incorrectly adjusted.
- (2) Shoe springs weak or broken.
- (3) Pedal spring weak or broken.
- (4) Hand brake mechanism seized.
- (5) Wheel cylinder piston seized.
- (6) Blocked pipe line.
- (7) Filler cap vent hole choked.

Brakes remain on

- (1) Shoes over-adjusted.
- (2) Hand brake over-adjusted.
- (3) No free movement on pedal.
- (4) Compressor port in master cylinder covered by swollen rubber cap, or incorrect adjustment of push-rod.
- (5) Swollen wheel cylinder cups.
- (6) Choked flexible hose.

Unbalanced braking

- (1) Greasy linings.
- (2) Distorted drums.
- (3) Tyres unevenly inflated.
- (4) Brake-plate loose on the axle.
- (5) Worn steering connections.
- (6) Worn suspension linkage.
- (7) Different types or grades of lining fitted.

SPECIAL TOOLS

18G546. Brake Adjusting Wrench

This small wrench is designed to facilitate turning the squared adjusters of the front and rear brakes.

