

SECTION J

BRAKING SYSTEM

<u>Section</u>	<u>Description</u>	<u>Page</u>
J.1	GENERAL DESCRIPTION	7
J.2	BLEEDING THE SYSTEM	8
J.3	PAD REPLACEMENT	9
J. 4	SHOE REPLACEMENT	9
J.5	FRONT CALIPER	12
J.6	REAR DRUMS	12
J.7	CALIPER OVERHAUL	12
J.8	DRUM OVERHAUL	14
J.9	FRONT CALIPER MOUNTING PLATE/DUST SHIELD	14
J.10	FRONT BRAKE DISC	15
J.11	PEDAL ASSEMBLY	15
J.12	MASTER CYLINDER	16
J.13	MULTI-BRANCH UNIONS	18
J.14	SERVO UNIT	19
J.15	HANDBRAKE	20
J.16	FAULT FINDING	20

ADDITIONAL INFORMATION

J.17	SOVY DEVICE ADAPTOR	22
------	---------------------	----

ILLUSTRATIONS

<u>Fig. No.</u>	<u>Description</u>	<u>Page No.</u>
1	Components of the Braking System, Series I Vehicles Series I Vehicles (L.H.D.)	3
2	Components of the Braking System, Series II Vehicles (R.H.D.)	4
3	Components of the Braking System, Series II Vehicles (Federal, L.H.D.)	5
4	Components of the Braking System, Series II Vehicles with Servo (R.H.D.)	6
5	Rear Brake Adjustment	7
6	Front Brake Caliper	9
7	Handbrake Adjustment	10
8	Components of the Front Caliper	11
9	Components of the Rear Drum Brake	13
10	Components of the Pedal Assembly	16
11	Components of the Master Cylinder	17
12	Dismantling the Master Cylinder Piston Assembly	17
13	Brake Master Cylinder and Fluid Reservoir	18
14	Servo Unit	19

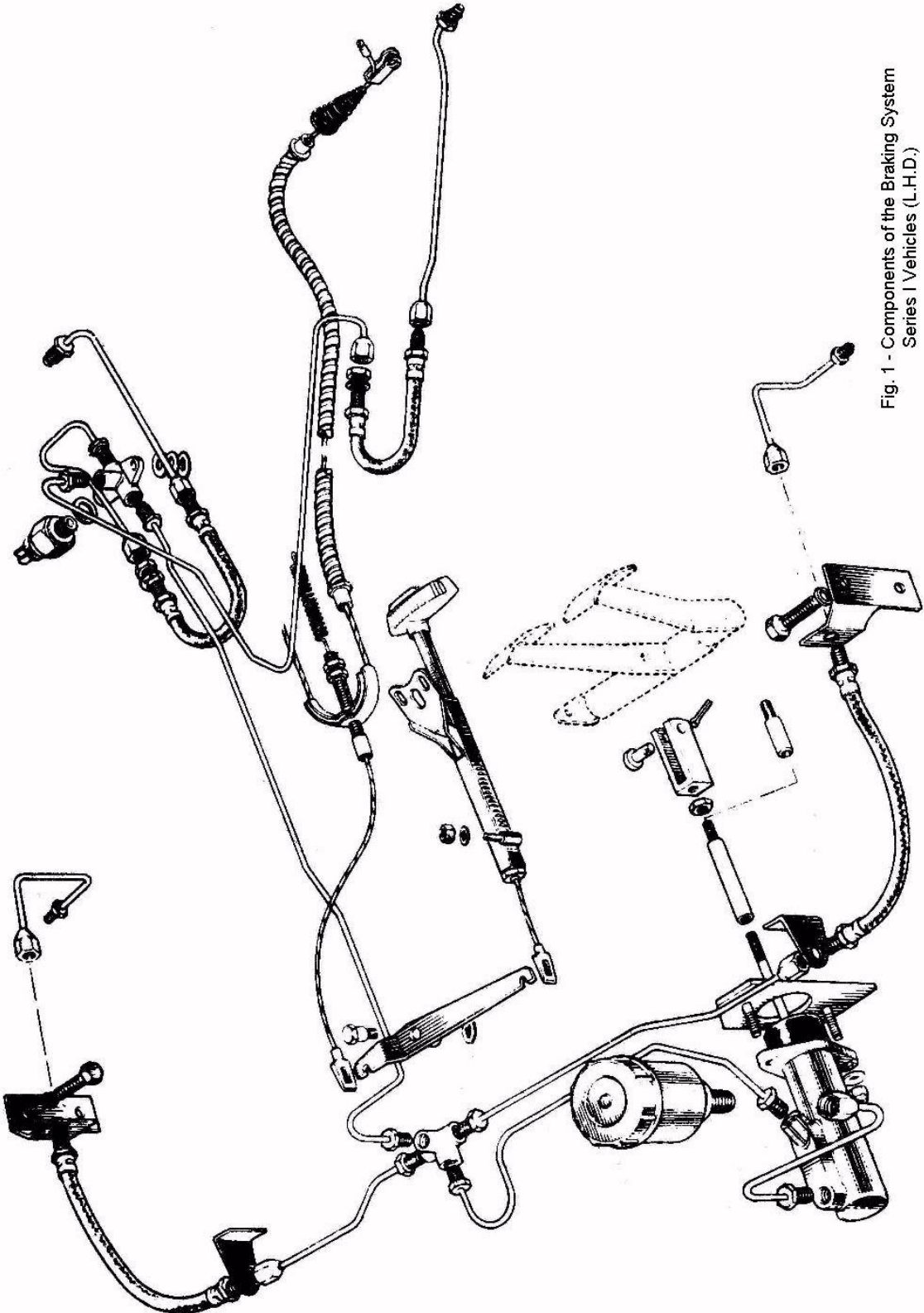


Fig. 1 - Components of the Braking System
Series I Vehicles (L.H.D.)

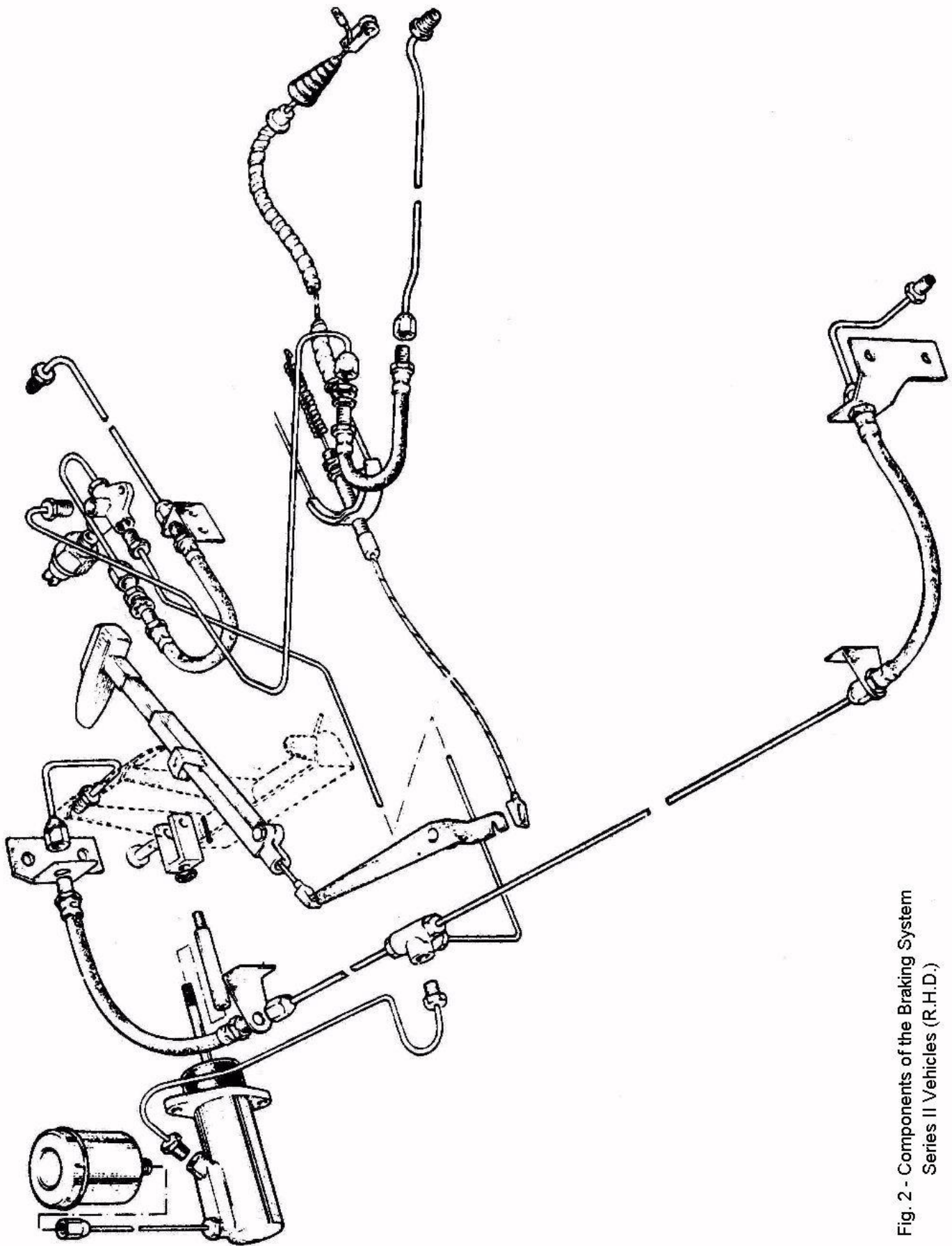


Fig. 2 - Components of the Braking System
Series II Vehicles (R.H.D.)

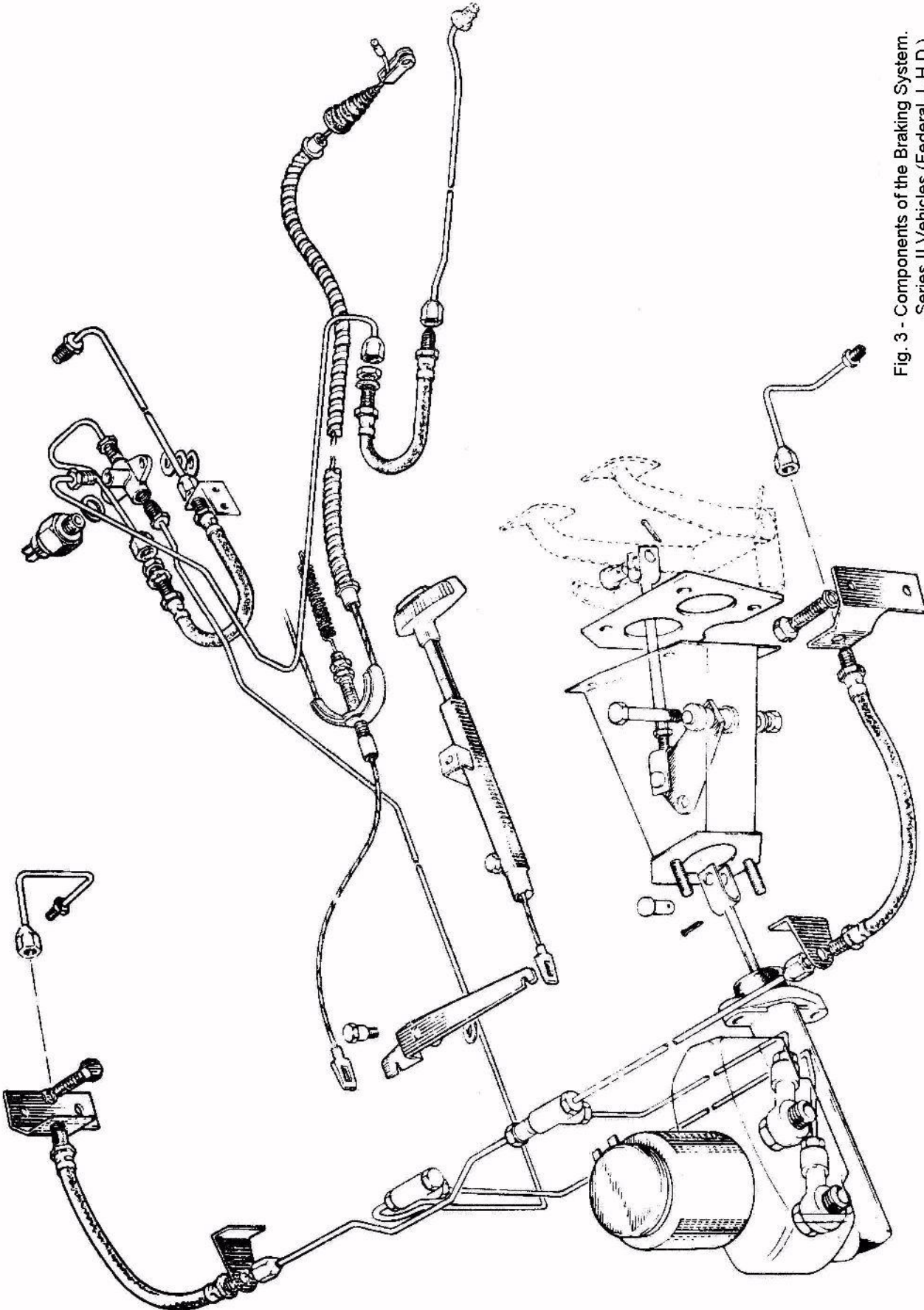


Fig. 3 - Components of the Braking System.
Series II Vehicles (Federal, L.H.D.)

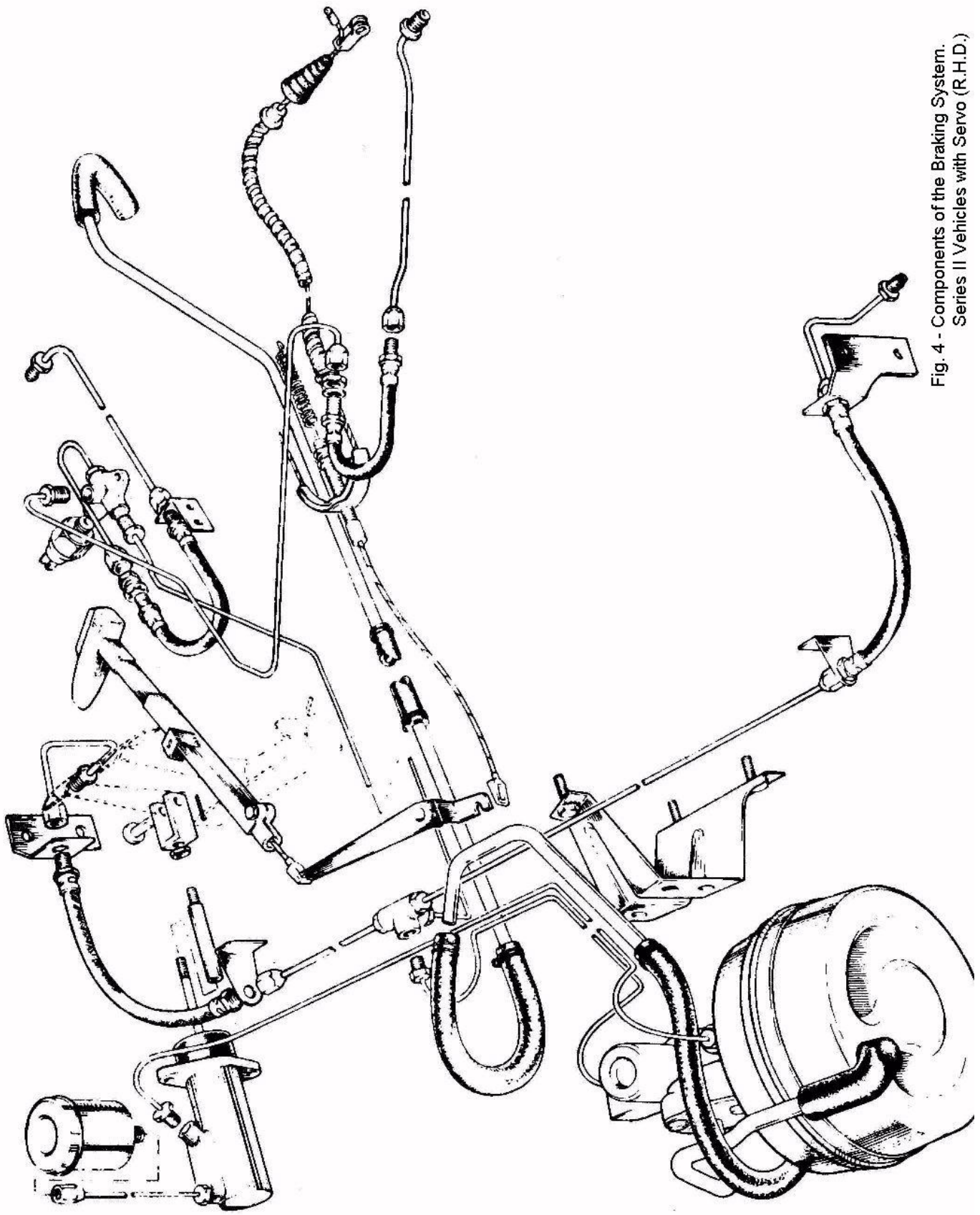


Fig. 4 - Components of the Braking System.
Series II Vehicles with Servo (R.H.D.)

J.1 - GENERAL DESCRIPTION.

Hydraulically operated brakes, discs on the front and drums on the rear are fitted to all four wheels. They are operated by means of a floor-mounted pedal situated in the drivers foot-well.

The hydraulic system may be dual line (Federal) or conventional single line.

The dual line system provides separate hydraulic circuits for the front and rear brakes: should one circuit fail the other circuit is unaffected and the car can still be stopped. Incorporated in the Federal braking system are a pressure differential warning valve and a 'brake fail' warning lamp with test switch. The lamp will glow RED if a failure occurs anywhere within the braking system, or if the test switch is operated.

The front brakes are of the trailing caliper type to minimize water entry, whilst the rear brakes are of the single leading shoe design.

An 'umbrella' type handbrake is situated under the lower edge of the facia panel to the left (L.H.D) or right (R.H.D) of the steering column, and applies the rear brakes via a cable linkage.

A vacuum operated servo is offered as optional equipment on vehicles with single circuit braking systems, and on Federal Specification vehicles as well. [1] When the engine is running, vacuum is supplied to the servo unit via a non-return valve, and both sides of the diaphragm are subjected to equal vacuum. Initial movement of the brake pedal admits atmospheric pressure to the rear face of the diaphragm resulting in a pressure difference, which causes the diaphragm to move forwards, thus brake pedal effort is considerably reduced.

Maintenance.

The master cylinder reservoir is located on the front bulkhead, and is reached by opening the front luggage compartment cover.

Check the fluid level at intervals of 5,000 km. (3,000 miles), topping up if necessary to within 12 mm (0.5 in) of the top, using only the specified fluid (see section O).

Brake adjustments.

When properly adjusted there should be 6 mm (0.25") free movement of the brake pedal before the piston in the master cylinder begins to move. When checking this setting, take care that the carpets are not fouling the pedal.

No manual adjustment to compensate for front pad wear is provided or indeed necessary, as adjustment is automatic, but the rear drums are provided with adjusting screws to ensure the correct relationship of shoes to drum.

Brake Pads and Shoes.

Pads and shoes should be examined at regular intervals.

Always use genuine replacement parts. It should be understood that a metallic hiss is apparent with disc brakes. This is normal and should not be considered as a fault. If a metallic squeal is heard this is general indication of brake pads OVERDUE for replacement. Under no circumstances allow the pads to wear below 1.6 mm (1/16") thickness, or the shoes to wear to the level of the rivet heads.

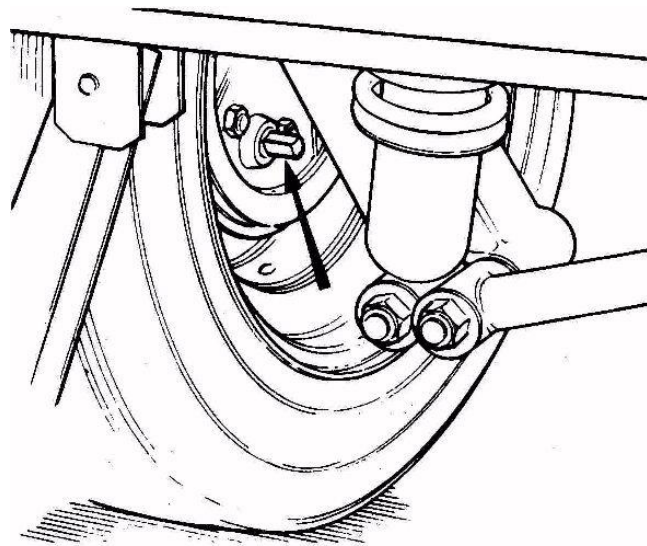


Fig. 5 - Rear Brake Adjustment.

Servo Unit Air Filter.

The filter element should be replaced every 10,000 km. (6,000 miles).

Hydraulic Pipes and Connections.

It is of vital importance that there are no leaks in the hydraulic system. Therefore, it is essential that these should be checked periodically, when the brakes are receiving normal maintenance inspection. All bundy pipes should be inspected throughout their entire length at intervals NOT EXCEEDING 6 months, i.e. before and after the winter months.

This is particularly important when salt and grit (which are both corrosive) are used in the clearance of snow or ice.

Brake Seals, Hoses and Fluid.

The brake manufacturers recommend that at intervals NOT EXCEEDING 65,000 km (40,000 miles) or 3 years, which ever is reached first, that the braking system be completely overhauled and all washers, seals and hoses renewed. Hydraulic servo units should be stripped, all old seals discarded, component parts cleaned and examined and if in good condition, the unit rebuilt with the appropriate service kit. All fluid should be drained, the system flushed with a correct cleaning fluid, then refilled with new fluid at intervals of 18 months.

J.2 - BLEEDING THE SYSTEM.

'Bleeding' is the process of removing air from the pipe line and cylinders and is necessary whenever any part of the system has been disconnected, or the level of fluid in the master cylinder reservoir has been allowed to fall so low that air has been drawn into the cylinder.

When seals are worn it is possible for air to enter the caliper cylinders without any sign of leaking fluid, and cause a 'spongy' pedal action, which is the usual indication of bubbles of air in the system.

The equipment that is necessary is a supply of brake fluid, a rubber bleed tube and a 7/16 A.F spanner. A small spanner should be used to avoid overtightening of the bleed screws.

Fill up the reservoir with the approved fluid direct from the can and maintain the level throughout the operation.

Bleeding should start at the rear left-hand wheel.

Push the rubber tube over the nipple and immerse the other end in a glass or transparent plastic container holding sufficient fluid to cover the end of the tube. Unscrew the bleed nipple enough to allow fluid to be pushed out (about half a turn) and proceed to pump fluid through by depressing the brake pedal until no more bubbles appear. Close the nipple on a downward stroke of the pedal. Repeat this operation for each nipple in turn from the farthest to the nearest to the master cylinder.

The pedal should be operated by a succession of rapid long and short strokes. The pedal is pushed down through its full stroke, followed by two or three short rapid strokes, and then allowed to fly back to the stop with the foot right off.

It is not necessary to stamp hard on the pedal but a quick, full stroke is required. If the floor mat obstructs the full stroke of the pedal it should be removed.

After all four wheels have been bled check the pedal stroke.

If there is a springy feeling to the pedal bleed again at each nipple to confirm that the system is air-free.

A slight variation of the routine is required if the system has been drained. The first time (to fill the system) each bleed screw is closed as soon as fluid is discharged regardless of the small bubbles that may be present and the second time round only a few strokes at each bleed screw are needed to finally discharge the air.

Springiness of the brake pedal can have other causes than air in the system.

Flexing of the pedal lever, of the pedal mounting or of the master cylinder mounting is possible and can be seen. Other possibilities not so readily visible are badly fitted, warped or otherwise distorted brake pads or shoes.

Tandem Master Cylinder.

Bleed the rear brakes first, commencing with the left-hand wheel, then bleed the front brakes, similarly commencing with the left-hand wheel.

Use only a light pedal action and DO NOT push the pedal through at the end of its stroke. DO NOT 'try' the pedal until the system is fully bled, as either action will cause the plunger to move and actuate the 'brake fail' warning lamp.

If during the bleeding procedure the 'brake fail' lamp is actuated, the bleed nipple must be closed and a nipple at the opposite end of the car opened.

A steady pressure must then be applied to the pedal until the lamp goes out, when the pressure must be released immediately, and the bleed nipple closed, otherwise the piston will move too far in the opposite direction and require resetting again. When the lamp goes out a 'click' will be felt on the pedal as the piston moves back.

J.3 - PAD REPLACEMENT.

1. Jack up the front of the car and remove the road wheels.
2. Remove any accumulated road filth from around the brake pads in the calipers.
3. Pull out the pad retaining pin clips, withdraw the retaining pins and remove the brake pads and shims.
4. To enable new pads to be fitted push the pistons into their bores. This action will cause fluid to be returned to the master cylinder, which, if it has recently been topped up, may overflow. To avoid this, examine the fluid level and, if necessary, remove a quantity of fluid.
5. Fit new brake pads and shims, ensuring that both are correctly fitted and that the pads are of the correct type. The shims fitted incorporate an arrow, which must point in the direction of forward rotation of the wheel.
6. Refit the retaining pins and secure with the retaining pin clips.
7. Operate the brake pedal several times to bring the pads into their working positions. Check that the pads are free to move slightly; this indicates that the retaining pins are not fouling the pads.
8. Replace the front wheels.

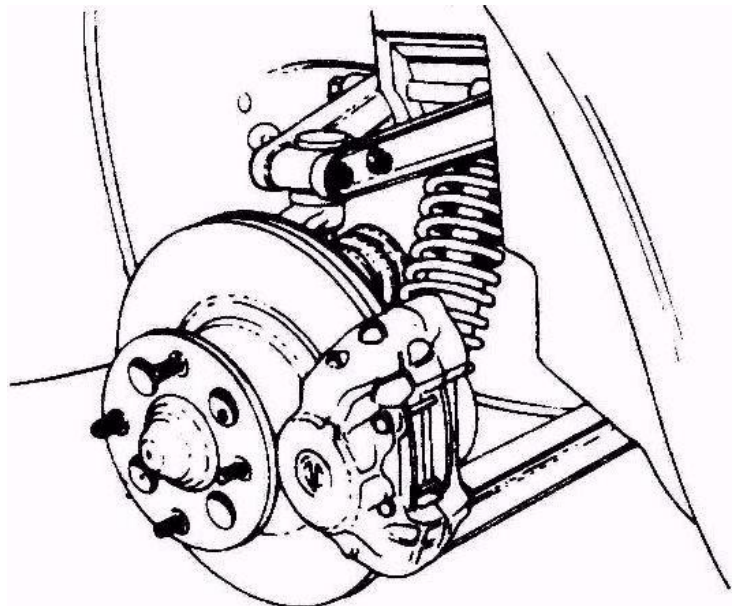


Fig. 6 - Front Brake Caliper.

J.4 - SHOE REPLACEMENT.

1. Jack up the rear of the car and remove the road wheels.
2. Ensure that the handbrake is released. In some cases it may be found necessary to slacken off the shoe adjusting screws to eliminate all resistance. If, having done this, difficulty is still experienced in removing the drum, a few taps with a raw-hide or plastic-faced mallet should help.

3. Having noted the positions of the shoes and which perforations are used to locate the retracting springs, remove the shoe holding down springs by turning the top washer through 90° and pulling off the washer and spring.
4. Disengage each shoe from its location slot in the wheel cylinder and the fixed pivot and remove the shoes. Remove the retracting springs.
5. Re-assemble the retracting springs between two new shoes of the correct type, ensuring that the springs are in the correct relation to the hub and that the shoes are in the right attitude.
6. Lightly smear brake grease on all pivot points and the brake-shoe support pads.
7. Snap the shoes into position, ensuring that the handbrake link is correctly positioned.
8. Replace the shoe holding down springs and retain them by turning the top washers through 90°.
9. Replace the brake drums and screw in the brake adjusting screws until the drum is locked, then slacken until a running tolerance is attained.
10. Replace the drum retaining screws, the road wheels and wheel nuts and lower the car. Fully tighten the wheel nuts and replace the hub cap.

NOTE: The new shoes should 'bed in' fairly quickly until they take on the general contours of the drums, and lose their rough surface.

The rear brakes will, therefore, need to be re-adjusted fairly soon after replacing the shoes.

Handbrake.

The handbrake consists of a combined cable and mechanical linkage system operated by an 'umbrella' type control situated under the fascia panel and operating on the rear brakes drums. Very little maintenance is required apart from occasional greasing of pivot points and lubricating of the cables. The handbrake also gives indication of need to adjust the rear brakes, apart from excessive travel of the brake pedal. It will be noticed that the ratchet will have to be extended much further to ensure safe parking.

Excessive movement of the handbrake control will automatically be eliminated with adjustment of the rear brake shoes. In the unlikely event of it not doing so, due to gradual stretching of the cables, there is a further adjustment situated inside the central chassis backbone.

To reach it, pull up the central armrest (clipped front and rear).

Take out the foam plastic dust seal and so reveal the oval access hole. The handbrake adjustment will be visible underneath the front gear change shaft. With the rear brakes correctly adjusted, slacken off the locknut on the cable connection and take up the slack with the second nut until the handbrake is fully effective when pulled out about 40 mm (1.5 in.)

Check that when the handbrake 'umbrella' is fully released it completely frees the brake shoes

Tighten the locknut. Replace the dust seal and armrest.

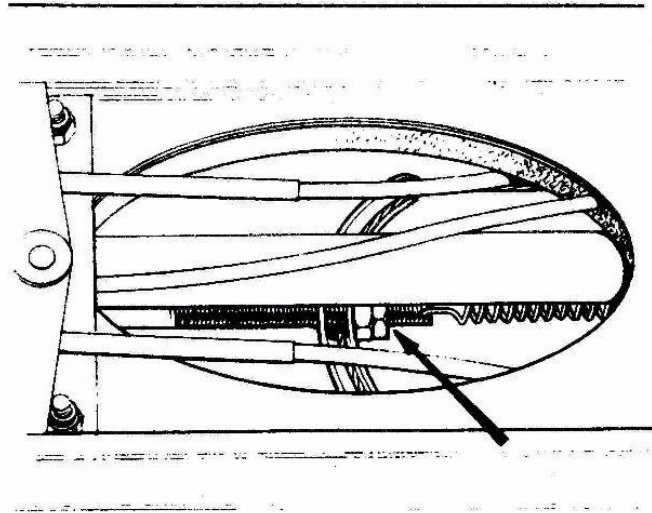


Fig. 7 - Handbrake Adjustment.

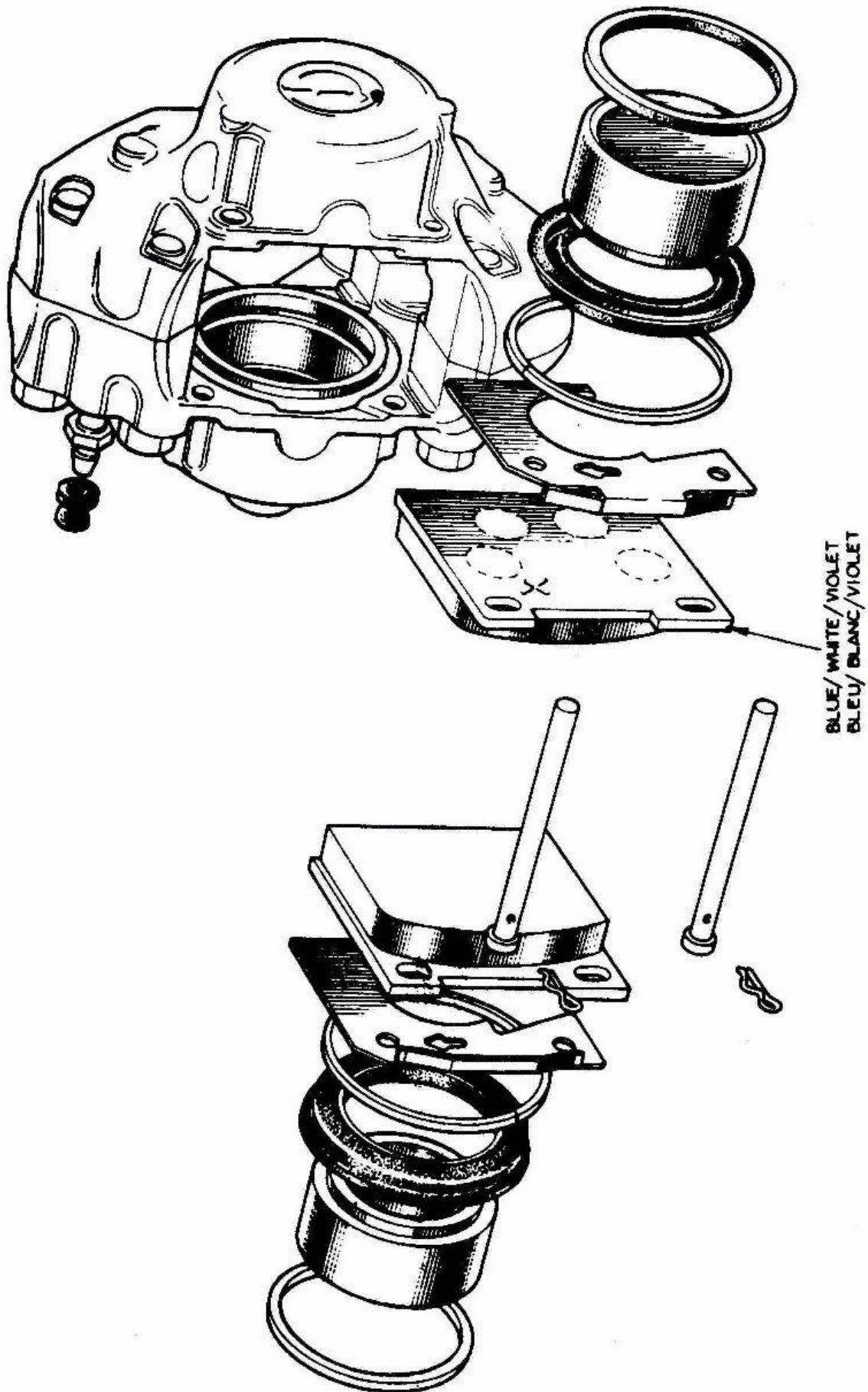


Fig. 8 - Components of the Front Caliper.

J.5 - FRONT CALIPER

To remove:

1. Raise the front of the car and remove the road wheel.
2. Remove the brake pads (section J.3). If it is intended to overhaul the caliper assembly, depress the brake pedal to bring the pistons into contact with the discs, thus facilitating the removal of the pistons.
3. Remove the flexible hose from the caliper and plug or clamp the hose to avoid unnecessary leakage of brake fluid or the possible ingress of foreign matter.
4. From the inner face of the caliper unscrew the two mounting bolts and remove the caliper.

To replace:

1. Replace the caliper and secure it with the two bolts, tightened to the torque setting given in the Technical Data Section.
2. Unplug (or unclamp) the flexible hose and connect the hose to the caliper.
3. Push the pistons into their bores sufficient to allow replacement of the brake pads and shims.
4. Replace the front wheel.
5. Bleed the braking system (section J.2). It should be necessary to bleed only that brake which has been removed and replaced. However, in the case of air having infiltrated the system, section J.2 will have to be followed in its entirety.

J.6 - REAR DRUMS.

To remove:

1. Remove the wheel trim and bend up the lock tab on the hub nut. Slacken the hub nut.
2. Raise the rear of the car and remove the road wheel.
3. Remove the brake drum and shoes (see section J.4).
4. Remove the split pin and clevis pin attaching the handbrake cable clevis to the handbrake link.
5. Detach the bundy tubing from the wheel cylinder and plug the end of the tube to prevent unnecessary loss of fluid and the possible ingress of foreign matter.
6. Remove the hub retaining nut and using an extractor pull off the hub.
7. Undo the four backplate retaining bolts and remove the backplate.

To replace.

Replacement is a reversal of the procedure outlined above. For torque settings see Technical Data Section. Bleed the system (see Section J.3).

J.7 - CALIPER OVERHAUL.

To remove.

Remove the caliper (see section J.5).

To dismantle.

1. Remove the outer sealing ring securing the dust cover and pull off the cover.
2. Remove the piston and extract the inner sealing ring.

Inspection and Cleaning.

1. Wash the pistons and piston bores in commercial alcohol, methylated spirit or brake fluid. DO NOT use a mineral-based fluid such as petrol, paraffin or carbon tetrachloride, etc.

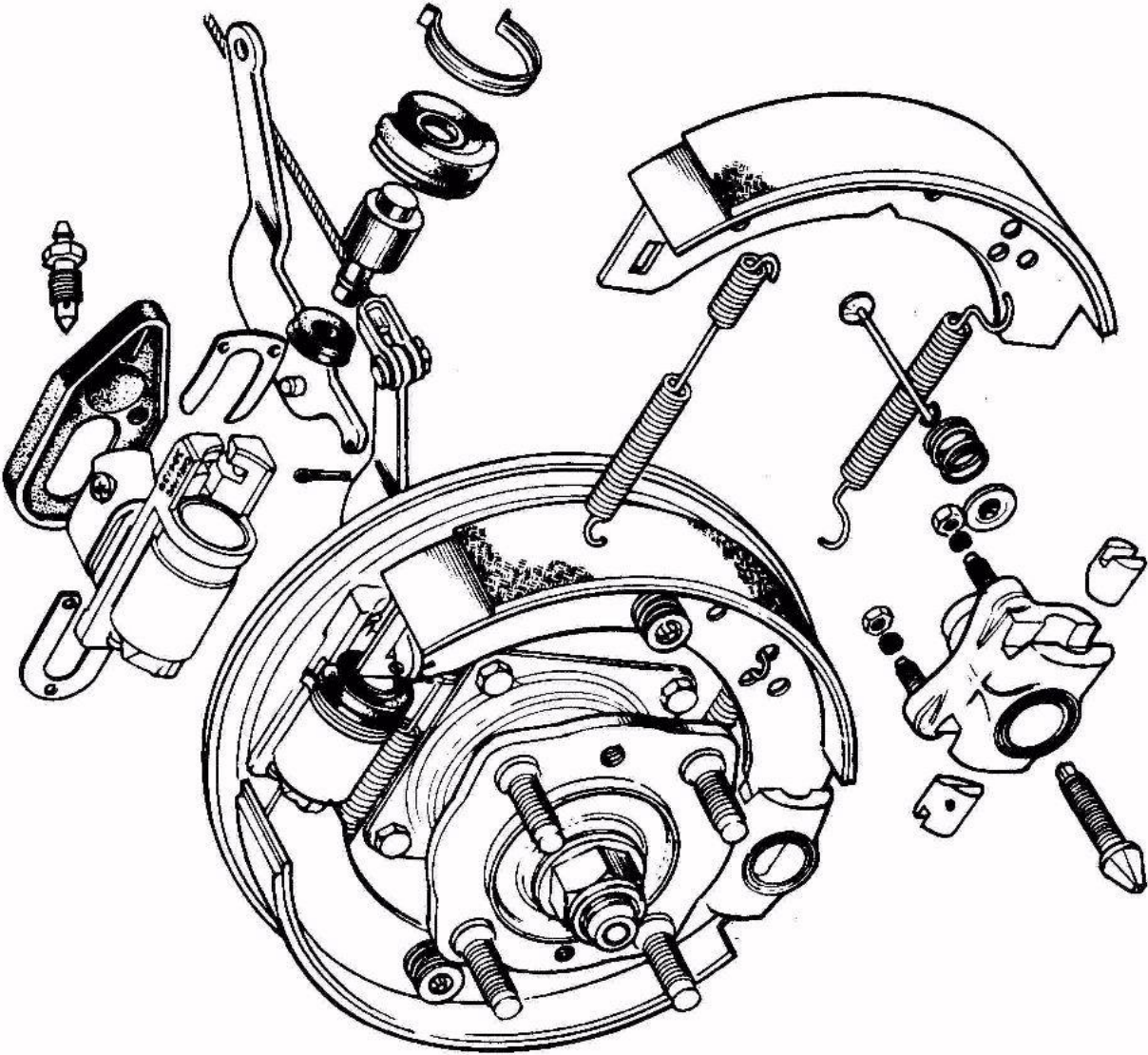


Fig. 9 - Components of the Rear Drum Brake.

2. Ensure that the pistons and their bores are free from score marks.
If not, replace with new pistons and calipers as necessary.

To reassemble.

1. Renew the inner sealing ring and replace the piston.
2. Replace the dust cover and outer sealing ring.

To replace.

1. Refit the caliper (see section J.5).
2. Bleed the system (see section J.2).

J.8 - DRUM OVERHAUL.

To remove.

1. Remove the brake drum and shoes (see Section J.4).
2. Check the condition of the slave cylinder.

Inspection and Cleaning.

1. Prise off the dust seal retaining clip and remove the dust seal. Ease out the piston and inner seal.
2. Wash the cylinder and piston in commercial alcohol, methylated spirits or brake fluid. DO NOT use a mineral based fluid such as petrol, paraffin or carbon tetrachloride.
3. Ensure that the cylinder and piston are free from score marks. If they are perfect, renew the inner seal, the piston, renew the dust seal and replace the dust seal retaining clip.
4. Bleed the system (See J.2).

Replacing a wheel Cylinder.

1. Remove the brake drum and shoes (See Section J.4).
2. Remove the split pin and clevis pin attaching the handbrake cable to the handbrake link.
3. Detach the bundy tubing (See Section J.5)
4. Prise the rubber boot on the rear of the wheel cylinder away from the back plate and remove it. Pull off the two 'U' shaped retainers securing the cylinder to the brake plate.
5. Remove the wheel cylinder and handbrake link.
6. Assemble the handbrake link with the new wheel cylinder. Clean and lightly grease the wheel cylinder aperture in the back plate, and place the cylinder assembly in the aperture.
7. Secure the wheel cylinder with the 'U' shaped spring retainer and the 'U' shaped flat retainer.
8. Note that the spring retainer is fitted from the handbrake link end of the cylinder. Replace the rubber boot and check that the cylinder is free to slide in the backplate.
9. Connect the brake bundy tubing to the wheel cylinder, and using a new split pin, secure the clevis pin through the handbrake cable clevis and the handbrake link.
10. Replace the brake shoes (See Section J.4).
11. Replace the drum and road wheel.
12. Bleed the system (See Section J.3).

J.9 - FRONT CALIPER MOUNTING PLATE/DUST SHIELD.

To remove.

1. Raise the front of the car and remove the road wheel.
2. Remove the caliper (See Section J.5).

2. Remove the hub (See section G).
3. Remove the bolts securing the caliper mounting plate and dust shield to the vertical link. Note that the two lower bolts also retain the steering arm.

To replace:

Replacement is a direct reversal of the procedure outlined above.
For torque settings see Technical Data.

J.10 - FRONT BRAKE DISC.

To remove.

1. Raise the front of the car and remove the road wheel.
2. Remove the front hub (See Section G).
3. From the rear of the hub remove the four bolts which retain the disc.

To replace.

1. Clean the mating faces of both the hub and the disc. These must be scrupulously clean if disc run-out is to be avoided.
2. Insert the bolts through the disc and into the hub and tighten them to the torque loading given in Technical Data.
3. Replace the disc and hub assembly (See Section G).
4. Using a magnetic based dial gauge mounted on the front upper wishbone, check the disc run-out, which must be within the dimension given in Technical Data. Should a reading in-excess of this figure be recorded, the cause of the excessive run-out, i.e. distorted disc, dirt between mating surfaces of disc and hub, or mal-adjusted hub bearings, etc; must be eliminated.

J.11 - PEDAL ASSEMBLY.

Two designs of pedal assembly have been fitted to the Europa since its inception the second type being introduced with the Series 2 car.

To remove.

1. Disconnect the master cylinder push rod from the brake pedal by removing the split pin and withdrawing the clevis pin.
2. Similarly disconnect the clutch cable.
3. (Series 1) From underneath the car remove the two Nyloc nuts and penny washers retaining the outer end of the pedal assembly, and from inside, remove the bracket and pull the pedal assembly from the funnel mounted spigot.
4. (Series 2) From underneath the car, remove the four bolts and washers retaining the pedal assembly mounting bracket. Remove the pedal assembly.

To replace.

Replacement is a direct reversal of the procedure outlined above.
First check that the assembly is lubricated sufficiently to ensure complete freedom of movement.

Note: The clevis pin securing the brake master cylinder push rod to the pedal must have its head facing the accelerator pedal. The split pin (.125 in. x .875 in.; 3.17 mm x 22.22 mm) must have its legs bent back around the clevis pin.

J.12 - MASTER CYLINDER.

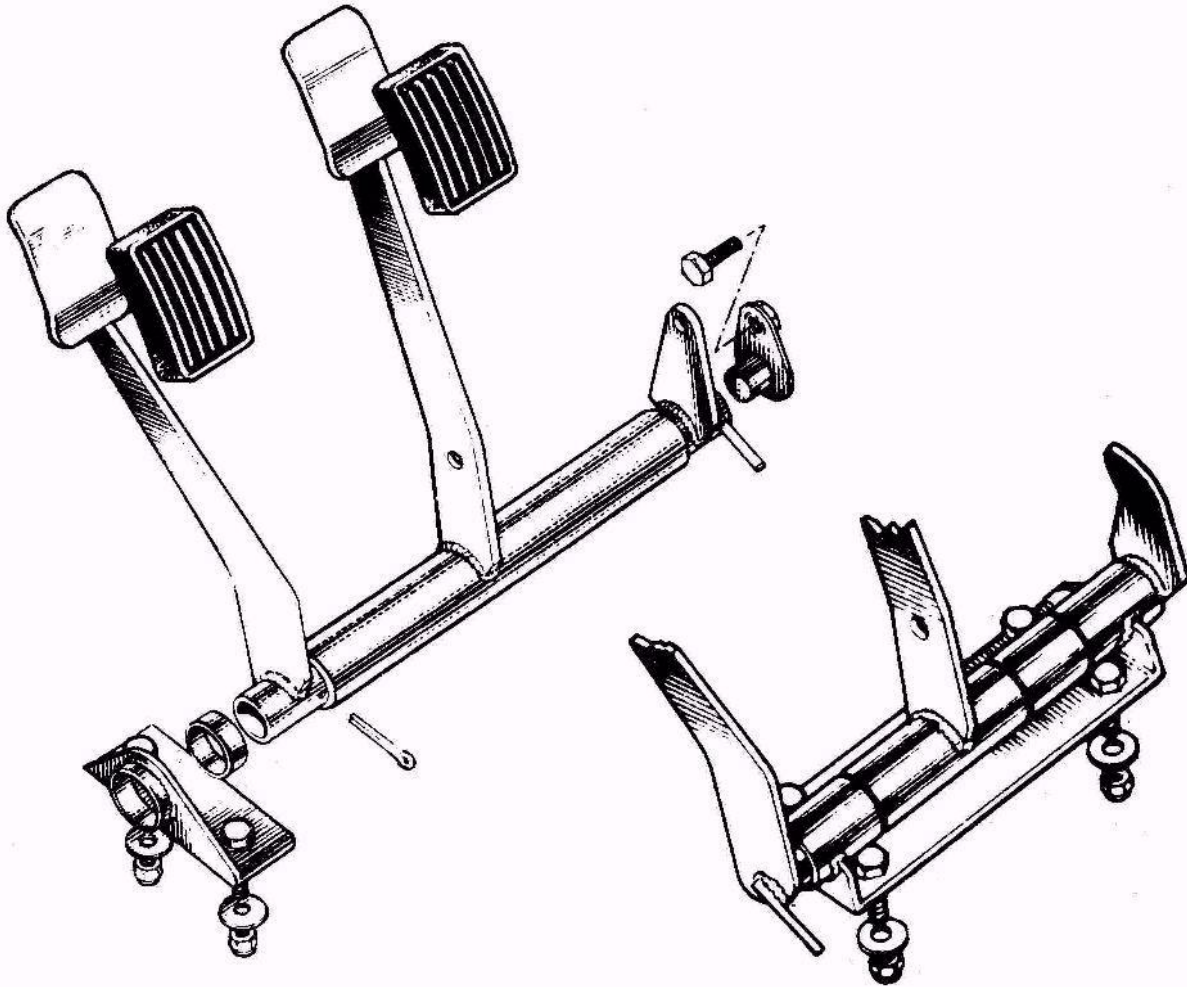


Fig. 10 - Components of the Pedal Assembly.

To remove.

1. Remove the nine self-tapping screws and the two access panels from the front luggage compartment.
2. From inside the car, remove the split pin and clevis pin retaining the master cylinder push rod to the brake pedal.
3. Pull back the front carpet and remove the two self tapping screws retaining the push rod seal cover. Pull the seal cover and seal over the push rod clevis.
4. With a suitable container conveniently positioned, disconnect the reservoir to cylinder brake pipe at the master cylinder and drain off the fluid. Ensure that no fluid comes into contact with the cars paintwork as the fluid is highly corrosive.
5. Disconnect the brake pipe from the outlet part of the master cylinder and seal the pipe against the ingress of foreign matter.
6. Undo the two Nyloc nuts retaining the master cylinder and pull the cylinder forward, off the two studs and away from the front chassis cross member.

To Overhaul.

1. Remove the rubber boot and the circlip and withdraw the piston.
2. Withdraw the piston and valve assembly from the cylinder.

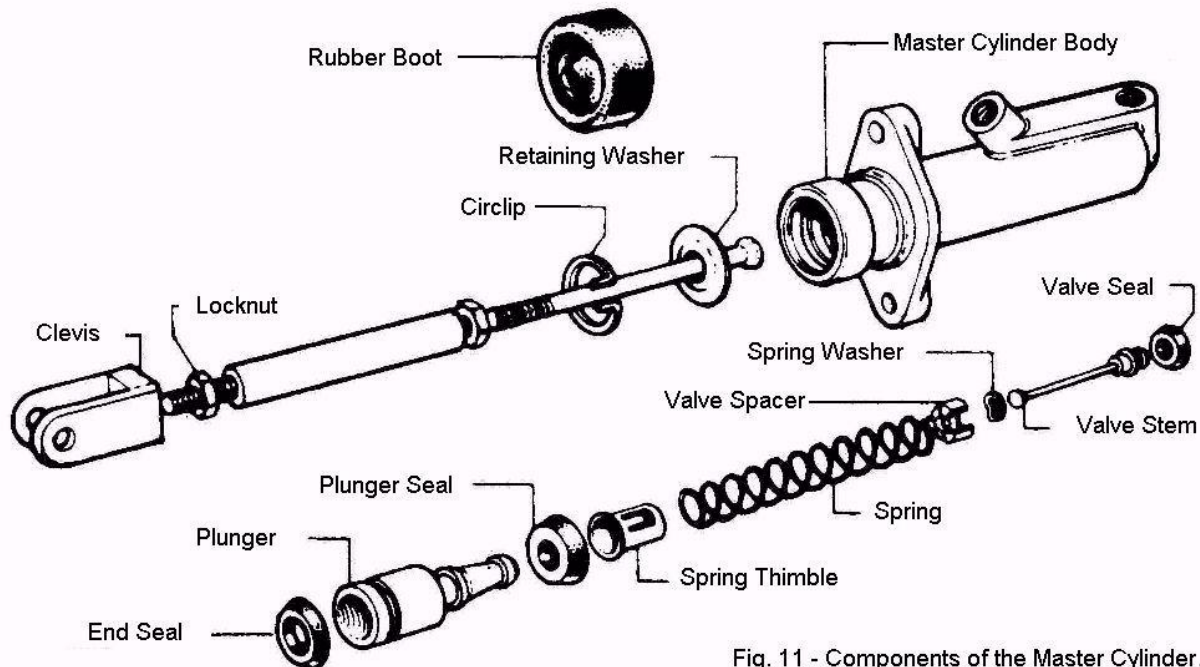


Fig. 11 - Components of the Master Cylinder.

3. The piston is held in the spring thimble by a leaf, which engages under a shoulder on the front of the piston. Carefully lift this leaf and remove the piston.
4. Compress the spring and move the retainer to one side, which will release the end of the valve stem from the retainer.
5. Slide the valve spacer and shim off the valve stem.
6. Remove the rubber valve seal and the piston seal if necessary.
7. Wash all parts in methylated spirit, commercial alcohol or approved brake fluid. DO NOT use mineral based fluids such as petrol, paraffin or carbon Tetrochloride.
8. Inspect the piston and cylinder for score marks and the rubber seals for signs of damage to the sealing lips. Renew any parts that appear unsuitable for further service. It is recommended that the seals be renewed as a matter of course. If there are signs of scoring a new master cylinder assembly is necessary.
9. Fit the piston seal to the piston with the sealing lip towards the spigot end and the valve seal to the valve stem with the lip towards the front of the valve.
10. Replace the shim washer on the valve stem together with the seal spacer so that the legs of the spacer are towards the valve seal. Ensure that the shim is fitted concentrically on the rear shoulder of the valve stem so that its convex face abuts the shoulder flange.

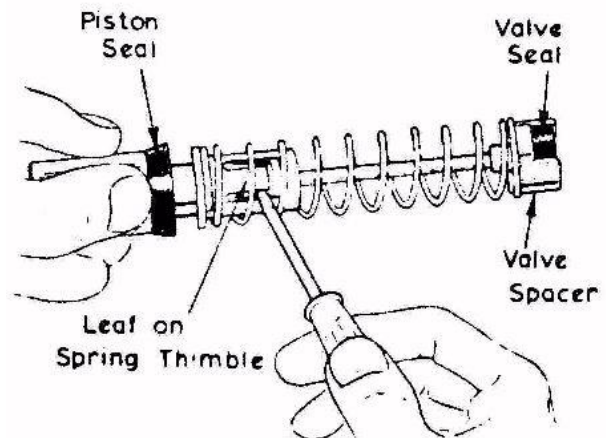


Fig. 12 - Dismantling the Master Cylinder Piston Assembly.

11. Fit the return spring. Compress the spring and engage the boss on the valve stem in its recess in the spring retainer.
12. Insert the spigot end of the piston into the spring thimble and secure by pressing down the leaf so that it locates against the shoulder of the piston.
13. Replace the piston assembly in the cylinder, refit the pushrod with its retaining circlip and replace the rubber boot.

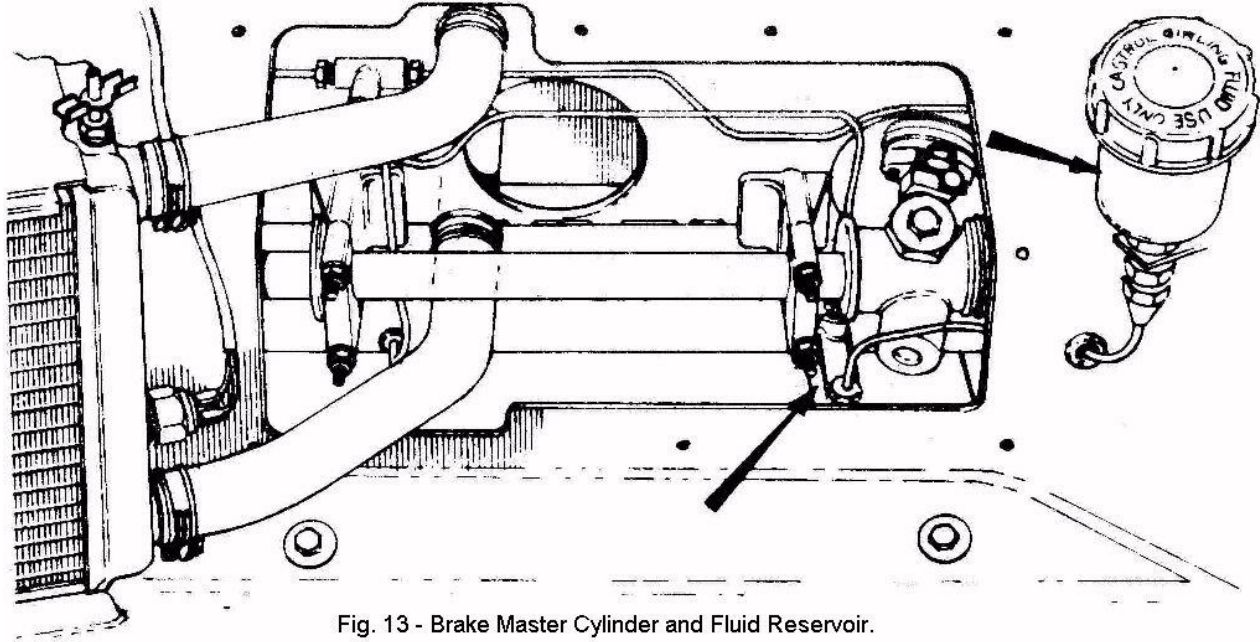


Fig. 13 - Brake Master Cylinder and Fluid Reservoir.

To Replace.

Replacement is a reversal of the removal procedure.

Finally refill the master cylinder reservoir and bleed the system (See Section J.2).

J.13 - MULTI BRANCH UNIONS.

To remove.

1. Disconnect the brake pipes from the respective unions, plug the ends of the brake pipes, particularly the pipe from the master cylinder to avoid unnecessary wastage of fluid or the possible ingress of foreign matter.
2. Remove the nut and bolt securing the union to the chassis.

To replace.

1. Replace and secure the union to its location, tightening the nuts to the torque loading given in Technical Data.
2. Remove the pipe-plugs and replace the brake pipes in the union, tightening to the correct torque loading (See Technical Data).
3. Ensure that the complete brake pipe system is at no point fouling any other part of the vehicle.
4. Bleed the system (See Section J.2).

J.14 - SERVO UNIT.

The vacuum servo unit, when fitted is situated in the left hand side of the lower front luggage compartment.

Servicing.

The air filter should be changed every 10,000 km. (6,000 miles).

Testing the Servo Unit.

It is assumed that any faults connected with the hydraulic system such as contamination, air in the system, fluid leaks etc; have all been diagnosed and eliminated.

1. Start the engine and as the brake is applied it should be possible to hear the 'hiss' of the air inlet and, with a hand on the centre of the front shell, feel the movement of the unit working. With the brakes held on, there should be no 'hiss' from the air inlet. Any unsatisfactory result of the above test could be caused by lack of vacuum, a faulty non-return valve or a fault within the unit. Rectify as required.
2. Run the engine for half a minute, switch off, leave for two minutes, apply the brake and the servo unit should function as in '1'. An unsatisfactory result of the above test indicates leaking gaskets, air valve or rubber grommet. To test for a leaking air valve, run the engine and place a finger over the air inlet, if the suction is only slight the air valve is satisfactory and the leak is elsewhere.
3. Run the engine and apply the brake hard and hold it down for 10 to 20 seconds. There should be no perceptible creep of the pedal. If pedal creep is evident, it indicates leaks or scored bores in the hydraulic components. If the pedal pushes back, the hydraulic connections may have been wrongly connected or there is a fault in the unit. Causes of any unsatisfactory results of this test can only be found by a process of elimination. Check for leaks. If no leak of hydraulic fluid is evident, clamp each hose successively and repeat the test each time. Finally, plug the master cylinder outlet and test. If creeping of the pedal is evident when the hoses are clamped, and the pedal is solid when the master cylinder outlet is plugged, the servo unit is faulty.

To remove.

Remove the hydraulic and vacuum pipes from the unit and detach the unit from its mounting bracket by undoing the setscrews.

To replace.

1. Replacement is a direct reversal of the procedure outlined above.
2. Bleed the system (See Section J.2).

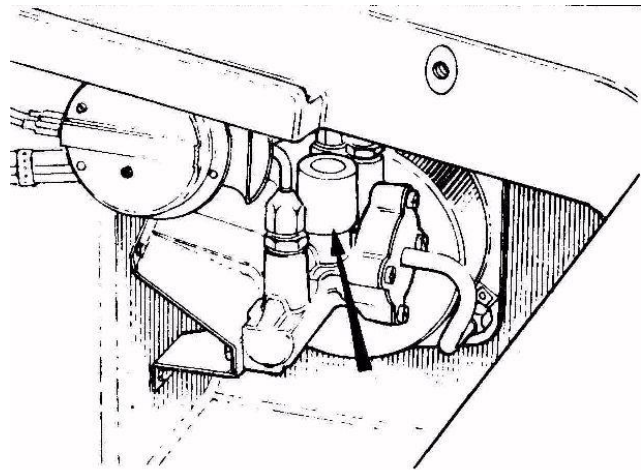


Fig. 14 - Servo Unit.

J.15 - HANDBRAKE.

The handbrake control is mounted under the facia on the driver's side, and is of the 'umbrella' type. To operate the handbrake, pull the handle out.

The ratchet will be heard to engage, and when the handle is out as far as it will go, it will lock in position until released.

To release the handbrake, pull on the handle to release the tension on the ratchet, push in the white serrated button on the top of the handle and release the handbrake.

To remove.

1. Remove the two bolts retaining the handbrake control and detach the handbrake ratchet tube from the chassis-mounted handbrake lever.

2. With the handbrake mechanism disconnected at the rear wheels, the intermediate cable may be disconnected from the opposite end of the chassis mounted handbrake lever. The lever may be reached by removing the large rubber plug from the floor of the upper front luggage compartment.

3. Detach the spring from the end of the intermediate cable and remove the lock nuts. Thread the intermediate cable through the horseshoe, and remove the 'horseshoe' from the looped cable.

Pull the cable through the slit in the rear of the chassis.

To replace.

Replacement is a direct reversal of the procedure outlined above.

When tightening the lower ratchet tube mounting bolt care must be taken to avoid crushing the ratchet tube.

For adjustment, see Section J.4.

J.16 - FAULT FINDING

FAULT	CAUSE	ACTION
Fade	Incorrect pads. Distorted pads. Overloaded vehicle. Excessive braking. Old hydraulic fluid.	Replace the pads, decrease the vehicle load or renew hydraulic fluid as necessary.
Spongy Pedal	Air in system. Pads or shoes distorted. Weak master cylinder mounting.	Bleed system. Check master cylinder mounting and pads.
Long Pedal Travel.	Disc drum-out pushing pads back. Distorted damping shims. Misplaced dust covers.	Check that disc run-out is not excessive. Replace as necessary.
Brakes binding.	Brakes or handbrake maladjusted. No clearance at master cylinder pushrod. Seals swollen, Seized pistons. Shoe return springs weak or broken. Servo faulty.	Check the brake adjustment and handbrake linkage. Check for clearance at the master cylinder Seized pistons or weak shoe springs. Repair or replace parts as necessary. Fit new dampers.

FAULT	CAUSE	ACTION
Hard Pedal - Poor braking.	Incorrect linings, glazed linings. Linings wet, greasy or not bedded correctly. Servo unit inoperative. Seized caliper pistons. Worn dampers causing wheel hop.	Replace the shoes, or if glazed scuff the surface with coarse sand paper. Check calipers for damage and repair where necessary. Fit new dampers.
Brakes pulling.	Seized pistons. Variations in linings. Unsuitable tyres or pressures. Worn dampers. Loose brakes. Greasy linings. Faulty drums, suspension or steering.	Check tyres and pressures. Check for seized pistons, greasy linings or loose brakes. Check suspension, steering and drums. Repair or replace as necessary. Fit new dampers.
Fall in fluid level.	Worn disc pads. External leak. Leak in servo unit.	Check the pads for wear. Check for fluid leaks. Fit new servo.
Brake squeal, Pad rattle.	Worn retaining pins. Worn discs. No pad damping shims or springs. Worn shoes.	Renew the retaining pins or discs. Fit damping shims or springs. Replace shoes.
Uneven or excessive pad wear.	Discs corroded (by salt). Discs badly scored.	Check the discs corrosion or scoring and replace if necessary.
Slow action of servo unit.	Blocked filters or restricted air inlet. Faulty vacuum hose or connections.	Change filter. Tighten vacuum connections. Replace vacuum hose.
Lack of assistance on heavy braking. Servo operating only when engine is running. Poor slow running of engine.	Air leaks in servo, low vacuum. Air leaks in gasket, non return valve, diaphragm or air valve, Vacuum hoses or faulty non return valve.	Check for vacuum leaks. Tighten connections. Replace vacuum hose or non-return valve. Fit new servo.
Pedal pushes back.	Hydraulic inlet and outlet pipes incorrectly connected. Major fault in servo.	Reconnect pipes. Fit new servo.

ADDITIONAL INFORMATIONJ.17 - SOVY DEVICE ADAPTOR

Commencing at Chassis No. 2090, a new Sovy device adaptor (Part No. 065 J 0104) has been fitted, in production to solve the problem of fluid leakage. Note that these adaptors are only fitted to cars having the Sovy device.

When fitting to cars prior to this chassis number, simply remove the existing adaptor and fit the new alloy adaptor. Check the fluid level after fitting.

If, after fitting the new adaptor, fluid seepage still occurs, it is recommended that a very small amount of 'Hylomar SQ 32M' be applied to the threads at the top of the master cylinder. Leave a narrow band clear at the top to ensure that sealing compound does not enter the master cylinder, thus contaminating the hydraulic fluid.

Editors Notes:

[1] Page 7 - Revised to indicate brake servo optional for both systems. [SV]