SECTION J

BRAKING SYSTEM

ILLUSTRATIONS

J.1. - GENERAL DESCRIPTION

The brakes of the disc type are hydraulically operated. Pressure on the brake pedal forces fluid from the master cylinder into cylinders at the wheels, exerting pressure on pistons which actuate the brake pads. A vacuum operated servo is incorporated in the system to ensure light pedal application.

The handbrake is mechanically operated, through a cable linkage and operates on the rear brakes. It is quite independent of the hydraulic system in operation.

On vehicles designed for markets requiring dual braking systems and to comply with the laws existing in those markets, the braking system is split into two separate hydraulic units with its own master cylinder, two brakes (either front or rear). The object of the dual systems being that, in the unlikely event of a leak developing or a brake pipe splitting, at either front or rear of the car, the driver is not in a position of having no brakes and is thus able to stop in the event of a failure.

Also incorporated in the braking system is 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.

Maintenance

The combined master cylinder brake fluid reservoir is located at the rear end of the engine compartment, it being mounted on the pedal box assembly.

Check fluid level at intervals of every 3,000 miles (5,000 km.) topping-up if necessary to within $\frac{1}{2}$ in. (12 mm.) of the top, using only the specified fluid (see Section 'O').

Brake Adjustments

When properly adjusted there should be a $\frac{1}{4}$ in. (6 mm.) free movement of the brake pedal before the piston in the brake 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 brake pad wear is provided or indeed necessary, since the correct pad-to-disc relationship is maintained hydrostatically as the brakes are operated.

Brake Pads

Pads should be examined at regular intervals. Always use genuine pads on replacement.

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

a general indication of brake pads OVERDUE for replacement. Under no circumstances allow the pads to wear below 1/16 in. (1.6 mm.) thickness.

Servo Unit Air Filter

The filter element should be renewed at intervals of every 6,000 miles (10,000 km.)

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 where salt and grit (which are both corrosive), are used in the clearance of snow and ice.

Brake Seals, Hoses and Fluid

The brake manufacturers recommend that at intervals NOT EXCEEDING 40,000 miles (65,000 km.) or 3 years, whichever 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 (see Section 'O') at intervals of every 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 master 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 for bleeding is a supply of brake fluid (see Section 'O'), a rubber bleed tube and a 7/16 in. A/F spanner. A small spanner should be used as bleed screws should never be overtightened (see 'Technical Data').

Fill up the reservoir with the approved fluid direct from the can and the level should be maintained during bleeding.

Bleeding should start at the rear left-hand wheel. Unscrew the bleed nipple enough

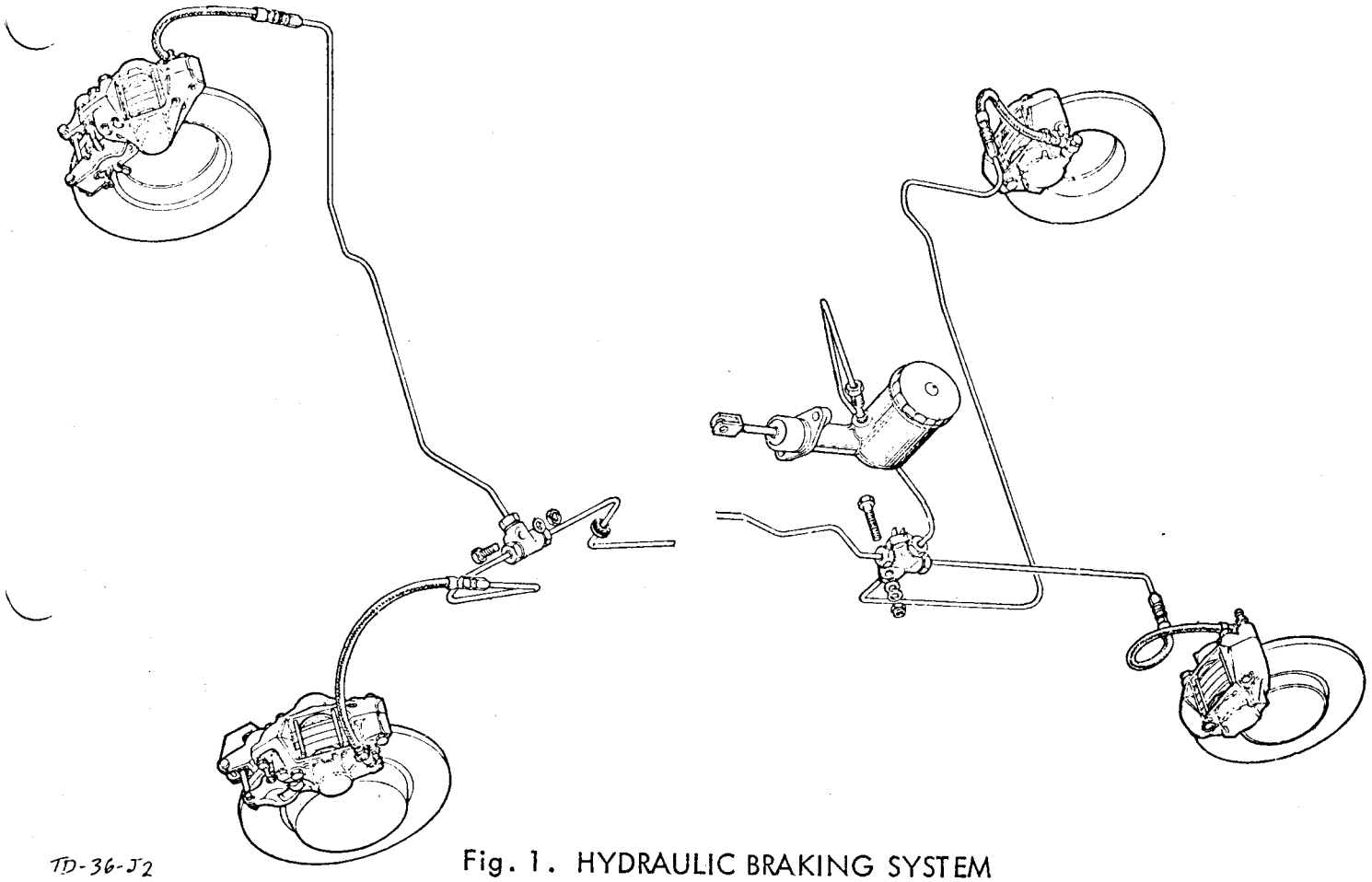

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Fig. 1. HYDRAULIC BRAKING SYSTEM

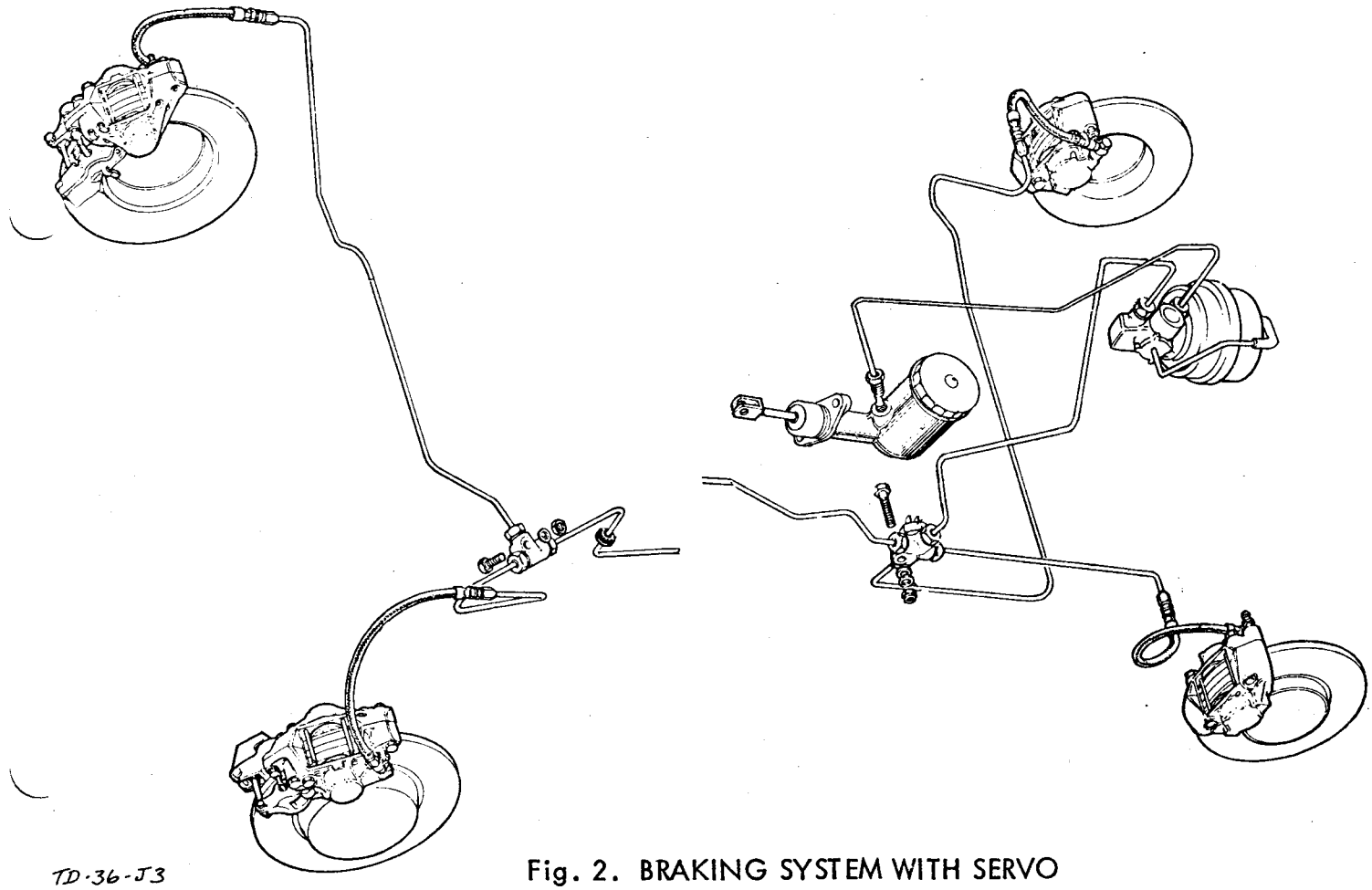

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Fig. 2. BRAKING SYSTEM WITH SERVO

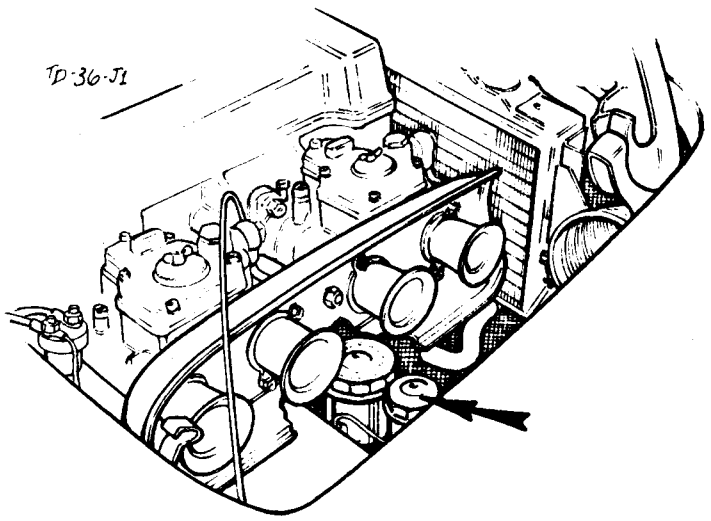

Fig. 3. BRAKE FLUID RESERVOIR

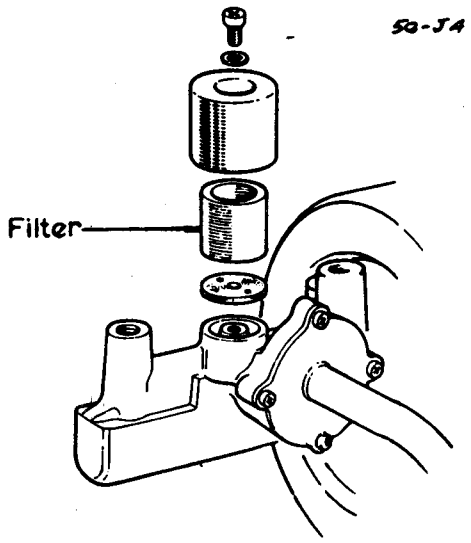

Fig. 4. SERVO FILTER

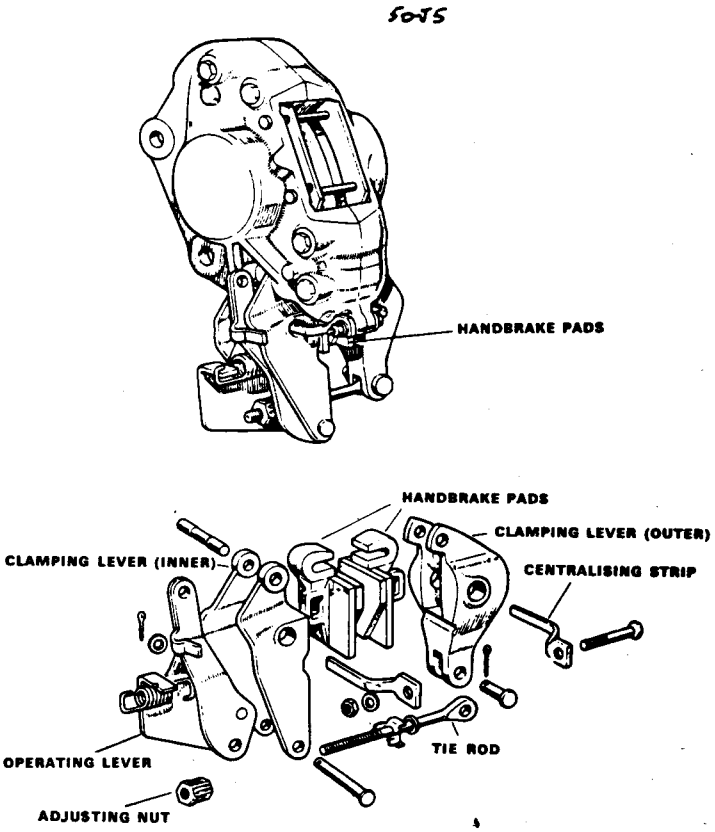

Fig. 5. HANDBRAKE CALIPER COMPONENTS

to allow the fluid to be pushed out, half a turn, and proceed to each wheel in turn from the farthest to the nearest to the master cylinder, pumping the fluid through until no more bubbles appear then closing the bleed screw on a downward stroke of the pedal.

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 unnecessary 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 finally confirm that all air has been eliminated.

A slight variation of the routine is favoured by some operators. They prefer to go round the system twice. The first time (to fill the system) each bleed screw is closed as soon as fluid is being 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 not uncommon and can be seen if looked for. Other causes not so easily seen are badly fitted pads and warped or otherwise distorted pads.

Tandem Master Cylinder

Bleed the rear brakes first, commencing with the left-hand wheel, then bleed the front brakes starting 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 plunger operates the switch and the warning lamp is on, the bleedscrew must be closed and the bleedscrew at the other end of the car opened (if bleeding the front brakes, open the bleedscrew on a rear brake and vice versa).

A steady pressure must then be applied to the pedal until the lamp goes out, when the pressure must be released immediately and the bleedscrew 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

Front

1. Remove the front wheels (see Section 'G').
2. Remove any accumulated road filth from around the brake pad 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 the 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. The shims fitted incorporate an arrow which must point in the direction of forward rotation of the wheel.
6. Refit retaining pins and secure with the retaining pin clips.
7. Operate the brake pedal several times to bring the pads into the correct adjustment. Check that the pads are free to move slightly, this indicates that the retaining pins are not fouling the pad.
8. Replace the front wheels.

Rear

1. Pad replacement for the rear brakes is carried out in a similar fashion to the front pads replacement.
2. It should be noted (for identification purposes) that the retaining pins do not pass through the pad plates, nor are shims fitted.

Handbrake

1. Remove the rear wheels (see Section 'G').
2. Release the nut and remove the bush and bolt securing the handbrake actuating rod to the operating lever on the caliper. Do not misplace the bush.
3. Unscrew and remove completely the operating lever adjusting nut from its tie-rod.
4. Release the nut and remove the bolt securing the centralising straps.
5. Swing the clamping levers away from the disc to give as much working clearance as possible, then unhook the worn pads from the pivot pins.
6. Before replacing the pads, which is a direct reversal of the removal procedure, apply a liberal quantity of Girling Brake Grease to all pivot points. Renew centralising straps if necessary.

7. After refitting pads, adjust by means of the adjuster nut to give a maximum clearance of .003 in. (.076 mm.) at each side of the disc.

J.4. - FRONT CALIPERS

To Remove

1. Remove the front wheel (see Section 'G').
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 disc, thus facilitating the removal of pistons.
3. Remove the fluid pipe from its union on the caliper and fit a plug to avoid unnecessary wastage of fluid, or the possible ingress of foreign matter.
4. From the inner face of the caliper, release the two mounting bolts and remove caliper from the car.

To Replace

1. Replace the caliper and secure to its mounting plate with the two bolts, tightening them to the torque loading given in 'Technical Data'.
2. Remove the plug and replace the fluid pipe to its union on the caliper.
3. Push the pistons sufficiently into their bores to allow the pads to be replaced together with their shims.
4. Replace the front wheel.
5. Bleed the braking system (Section 'J.2').

J.5. - REAR CALIPERS

To Remove

1. Remove the rear wheel (see Section 'G').
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 disc, thus facilitating the removal of the pistons.
3. Disconnect the handbrake actuating rod from the operating lever on the caliper.
4. From Chassis No. 50/1333 it will be necessary to remove the upper dirt shield, this being secured by 4 No.10 self-locking UNF nuts.
5. Remove the fluid pipe from its union on the caliper and fit a plug to avoid unnecessary wastage of fluid, or the possible ingress of foreign matter.
6. From the outer face of the caliper, remove the locking wire securing the mounting bolts, release bolts and remove caliper from the car.

To Replace

1. Replace the caliper and secure to its mounting on the wheel bearing housing with the two bolts, tightening them to the torque loading given in 'Technical Data'. Wire lock the bolts after tightening, ensuring that the wire will not allow the bolts to release themselves.
2. Remove the plug and replace the fluid pipe to its union on the caliper.
3. If removed, replace the upper dirt shield using new nuts for its retention.
4. Push the pistons sufficiently into their bores to allow the pads to be replaced.
5. Replace the handbrake actuating rod to the operating lever on the caliper.
6. Replace the rear wheel.
7. Bleed the braking system (Section 'J.2').

J.6. - CALIPER OVERHAUL

To Remove

1. Remove the caliper (Section 'J.4' or 'J.5').

NOTE: The calipers are made in two paired halves which are bolted together. Under NO CIRCUMSTANCES MUST the two halves be separated.

To Dismantle - Front

1. Remove the outer sealing ring securing the dust cover and pull off cover.
2. Remove the piston and withdraw the inner sealing ring.
3. Repeat these operations for the other cylinder.

To Dismantle - Rear

1. Pull the dust cover from its location.
2. Remove the piston and withdraw the inner sealing ring.
3. Repeat these operations for the other cylinder.

Inspection and Cleaning

1. Wash the pistons and piston bores in commercial alcohol, methylated spirit or brake fluid (see Section 'O'). Do NOT use a mineral-based fluid such as petrol, paraffin or carbon tetrachloride, etc.
2. Ensure that the pistons and their bores are free from score marks. If not, replace with new pistons and calipers as necessary.

To Re-assemble - Front

1. Replace the inner sealing ring, followed by the piston (crown end first).
2. Replace the dust cover and outer sealing ring.
3. Repeat these operations for the other cylinder.

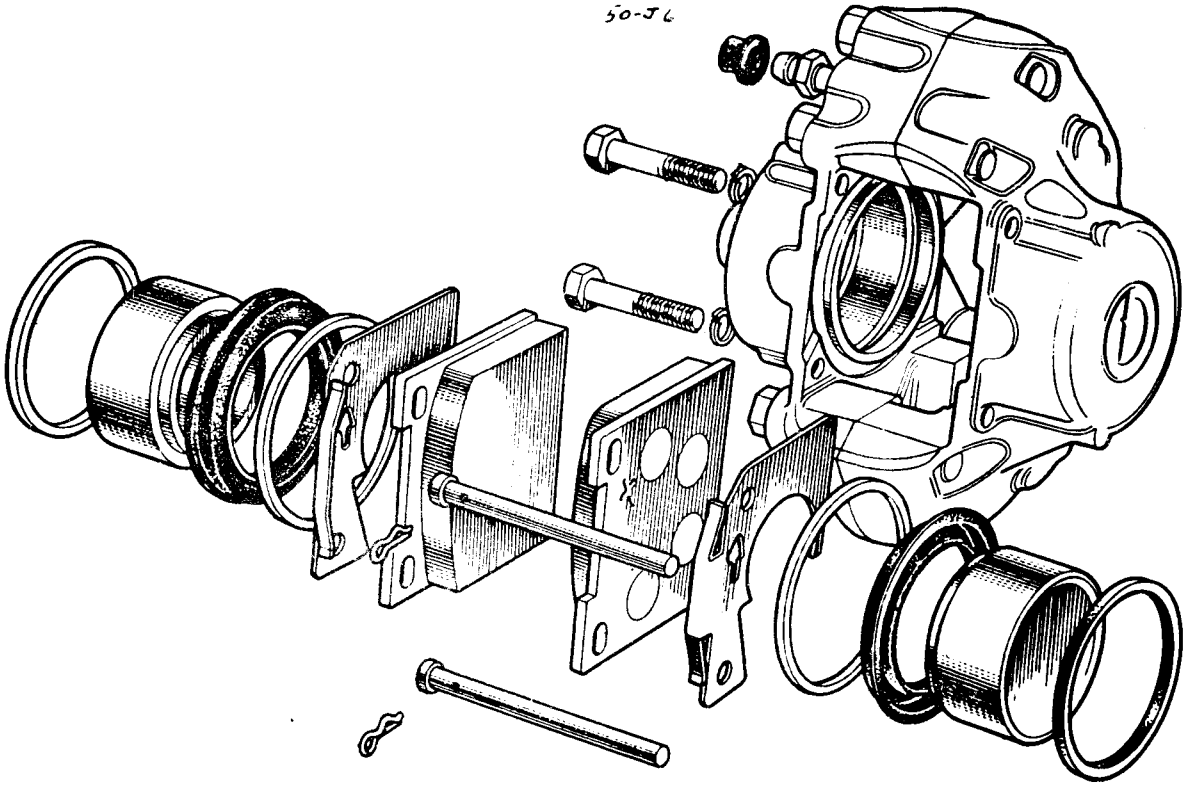

Fig. 6. FRONT BRAKE COMPONENTS

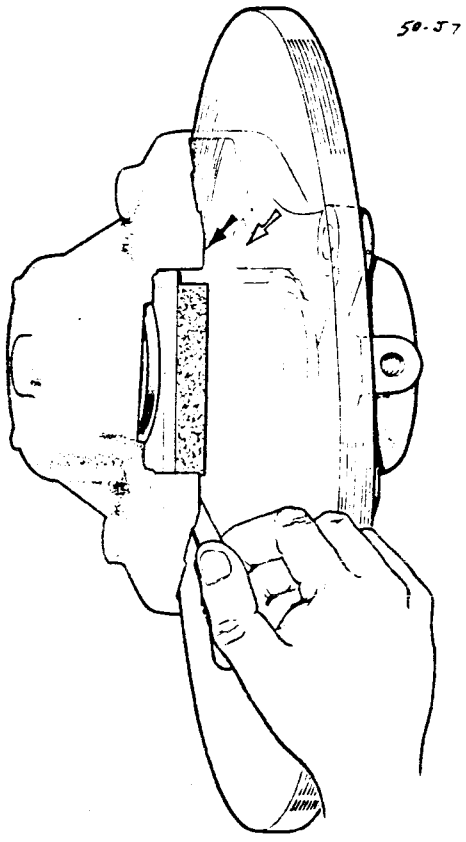

Fig. 7. CHECKING GAP BETWEEN CALIPER & DISC

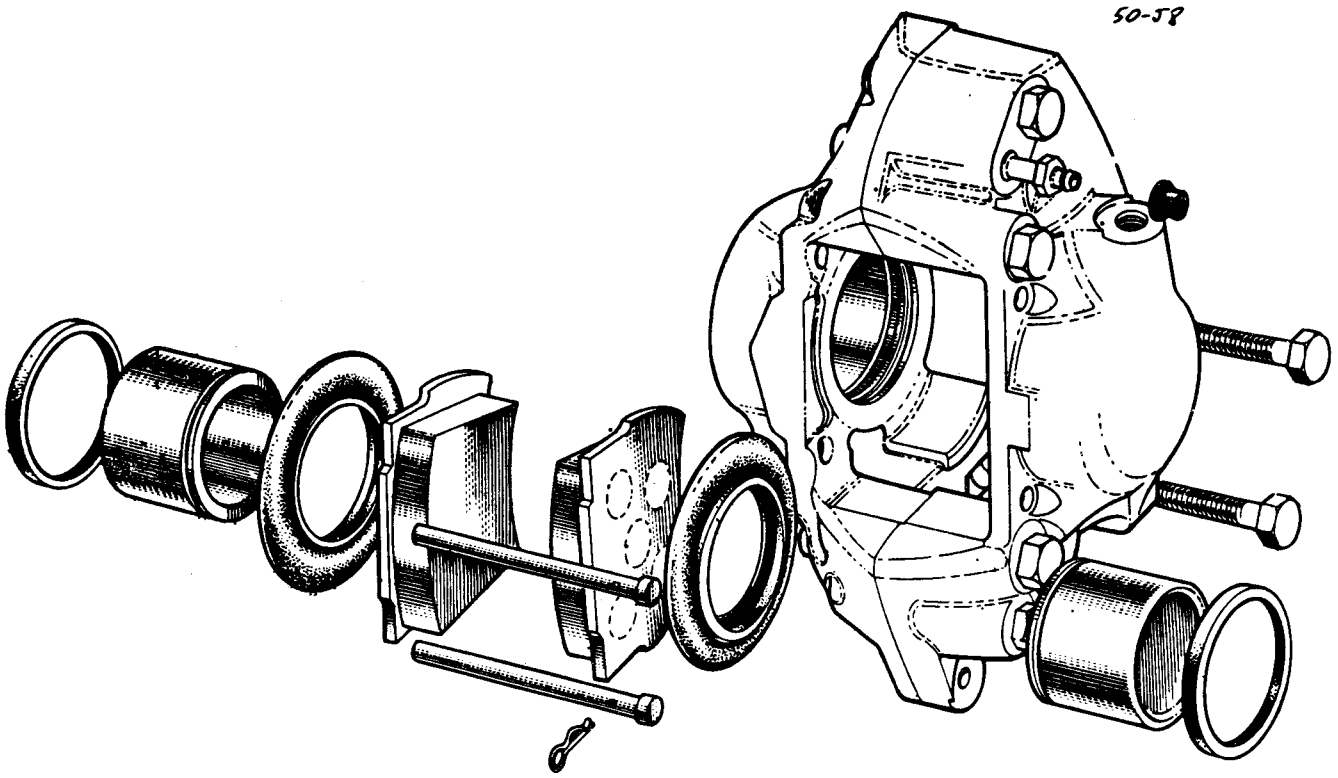

Fig. 8. REAR BRAKE COMPONENTS

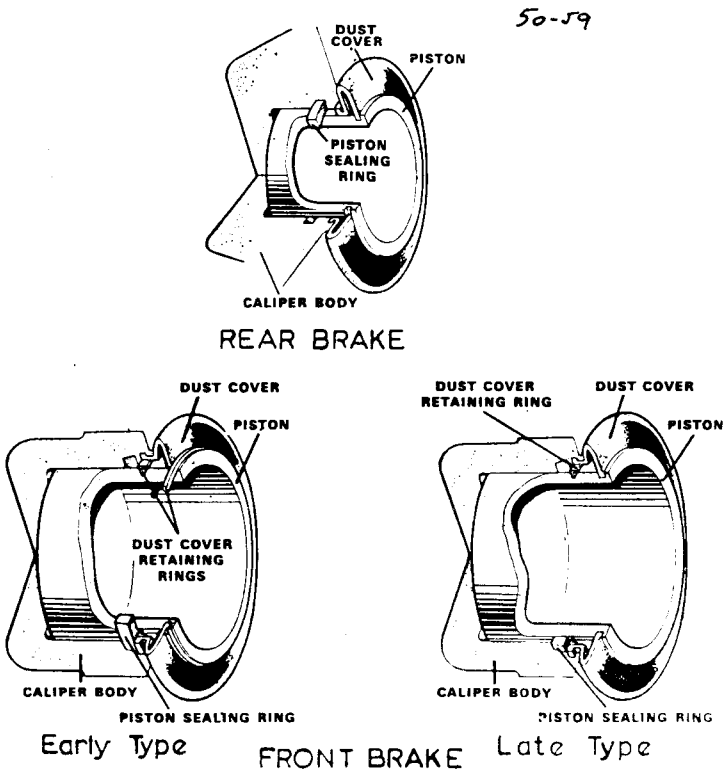

Fig. 9. CALIPER PISTONS & SEALING RINGS

To Re-assemble - Rear

1. Replace the inner sealing ring, followed by the piston (crown end first).
2. Replace the dust cover.
3. Repeat these operations for the other cylinder.

To Replace

1. Refit the caliper (see Section 'J.4' or 'J.5') and bleed the system. (Section 'J.2').

J. 7. - FRONT CALIPER MOUNTING PLATE/DUST SHIELD

To Remove

1. .Remove the wheel (see Section 'G').
2. Remove the brake caliper (Section 'J.4').
3. Remove the front hub (see Section 'G').
4. Remove the bolts securing the caliper mounting plate and caliper dust shield to the vertical link. Note that the two lower bolts also retain the steering arm.

To Replace

1. Replacement is direct reversal of the removal procedure. Tighten all bolts to the torque loading given in 'Technical Data'.

J. 8. - FRONT DISC BRAKE

To Remove

1. Remove the front hub (see Section 'G').
2. From the rear of the hub, extract the four bolts which retain the disc.

To Replace

1. Clean the mating faces of both the disc and hub. These must be scrupulously clean if disc run-out is to be avoided.
2. Insert the bolts through the disc and into the hub, tightening 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 run-out of the disc 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 faces of disc and hub, or mal-adjusted hub bearings, etc., must be eliminated.

J.9. - REAR BRAKE DISC

To Remove

1. Remove the rear wheel (see Section 'G').
2. Lower the outer end of the wishbone and push down to clear disc. (See Section 'D').
3. Remove the brake caliper (Section 'J.5').
4. Remove the outboard Rotoflex coupling noting that three of the retaining bolts also secure the brake disc (see Section 'R').
5. Turn disc to clear outboard drive shaft and remove.

To Replace

1. Replacement is a direct reversal of the removal procedure. Ensure that the mating faces of disc and outboard drive shaft are scrupulously clean if disc run-out is to be avoided. Tighten the bolts to the torque loadings given in 'Technical Data'.
2. Using a magnetic dial gauge mounted on the damper, check the run-out of the disc as detailed in paragraph '4' of Section 'J.9'.

J.10. - PEDALS

To Remove

1. Remove the throttle pedal cable (see Section 'L'). Disconnect the brake and clutch fluid pipes at their respective master cylinders, fitting plugs into the ends of the pipes to avoid unnecessary wastage of fluid and the ingress of foreign matter. Remove the cables from the stop lamp switch. Remove the split pins and release the master cylinder operating push-rods from their respective pedals.
2. From the outer face of the foot well, remove the nuts securing the master cylinders.
3. From the inner upper face of the foot well, remove the nuts securing the pedals assembly bracket.
4. Slide the pedals assembly inwards (towards centre of car) and lift out from its side bracket.

To Dismantle

1. Remove the split pins and slide off washers and spacers followed by the pedals, noting positions of spacers.

To Rebuild

1. Mount the pedals onto their shaft, using the spacers and washers in the positions from which they were removed.
2. Using new split pins, secure the pedals to the shaft.

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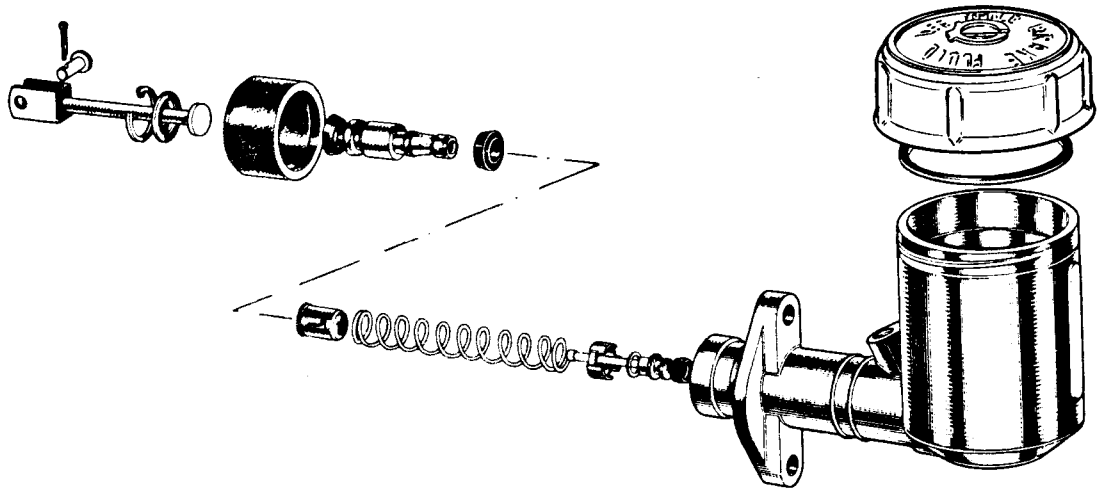

Fig. 10. MASTER CYLINDER

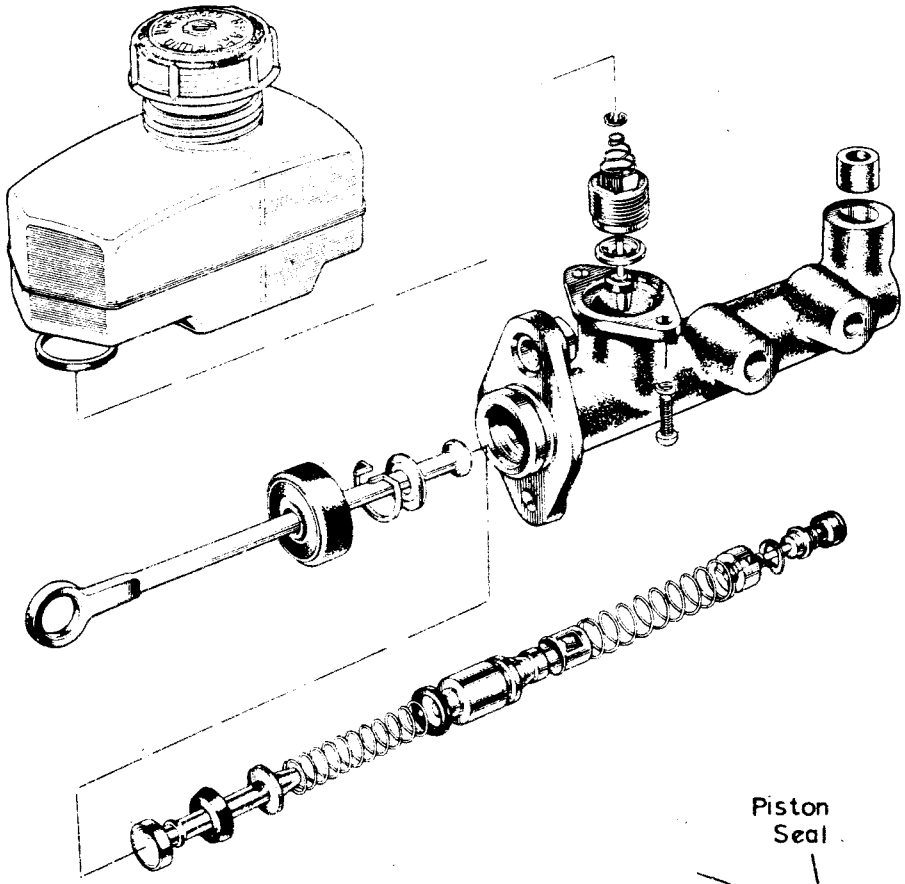

Fig. 11. TANDEM MASTER CYLINDER

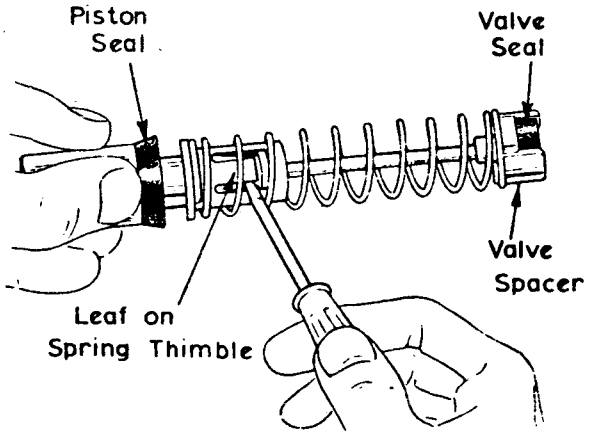

Fig. 12. DISMANTLING SEALS TD-50-09

To Replace

1. Reverse the removal procedure.

J.11. - MASTER CYLINDER

To Remove

1. Disconnect the hydraulic fluid pipe from the master cylinder. Fit a plug into the end of the pipe to avoid unnecessary wastage of fluid, or the ingress of foreign matter.
2. Remove the split pin and withdraw the clevis pin securing the master cylinder push rod to the brake pedal. Remove the nuts and bolts retaining the master cylinder to the foot well.

To Overhaul

1. Remove the rubber boot. Withdraw the circlip and remove the push rod.
2. Pull the piston and valve assembly from the cylinder. (Twin assembly on tandem 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 base fluids such as petrol, paraffin or carbon tetrachloride.
8. Inspect the piston and cylinder for score marks and the rubber seals for damage to the sealing lips. Renew any parts that appear unsuitable for further service.
9. Fit the piston seal to the piston with the sealing lips 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.
11. Fit the return spring over the valve stem and insert the spring thimble into the end of 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 piston assembly into the cylinder, refit push rod with its retaining circlip. Replace rubber boot.

To Replace

1. Mount the master cylinder to the foot well and secure with its nuts and bolts, tightening these to the torque loading given in 'Technical Data'.
2. Attach the push rod to the brake pedal with its clevis pin and a new split pin.
3. Replace hydraulic fluid pipe, after removing plug and bleed system (Section 'J.2').

J.12. - MULTI-BRANCH UNIONS

To Remove

1. Disconnect the brake pipes from the respective unions. Plug the ends of the pipes, particularly the pipe from the master cylinder, to avoid unnecessary wastage of hydraulic fluid or the ingress of foreign matter.
2. Remove the nut and bolt (or setscrew) securing the union to its location.

To Replace

1. Replace and secure the union to its location, tightening bolts to the torque loading given in 'Technical Data'.
2. Replace the pipes after removing the plugs, tightening unions to the torque loadings given in 'Technical Data'.
3. Ensure that all brake pipes are not fouling any other parts of the vehicle. Note that prior to Chassis No. 50/0090, the rear supply pipe may be fouling the exhaust system in the vicinity of the gearbox mounting.
4. Bleed the braking system (Section 'J.2').

J. 13. - SERVO UNIT (When Fitted)

Two types of servo unit have been fitted in Production, these being the Mk.IIA and Mk.IIB. Externally the Mk.IIA has a flat plate bolted on to the body, whereas the Mk.IIB body is in two halves which are held together with a retaining band. In certain territories the body of this latter type also incorporates the non-return valve. Where the non-return valve is not incorporated in the servo unit, it will be found in the vacuum supply pipe from the engine.

Internally, the main difference is that the vacuum piston on the Mk.IIA has been replaced by a diaphragm in the Mk.IIB.

Dismantling either of the two servo units is NOT recommended and will not be

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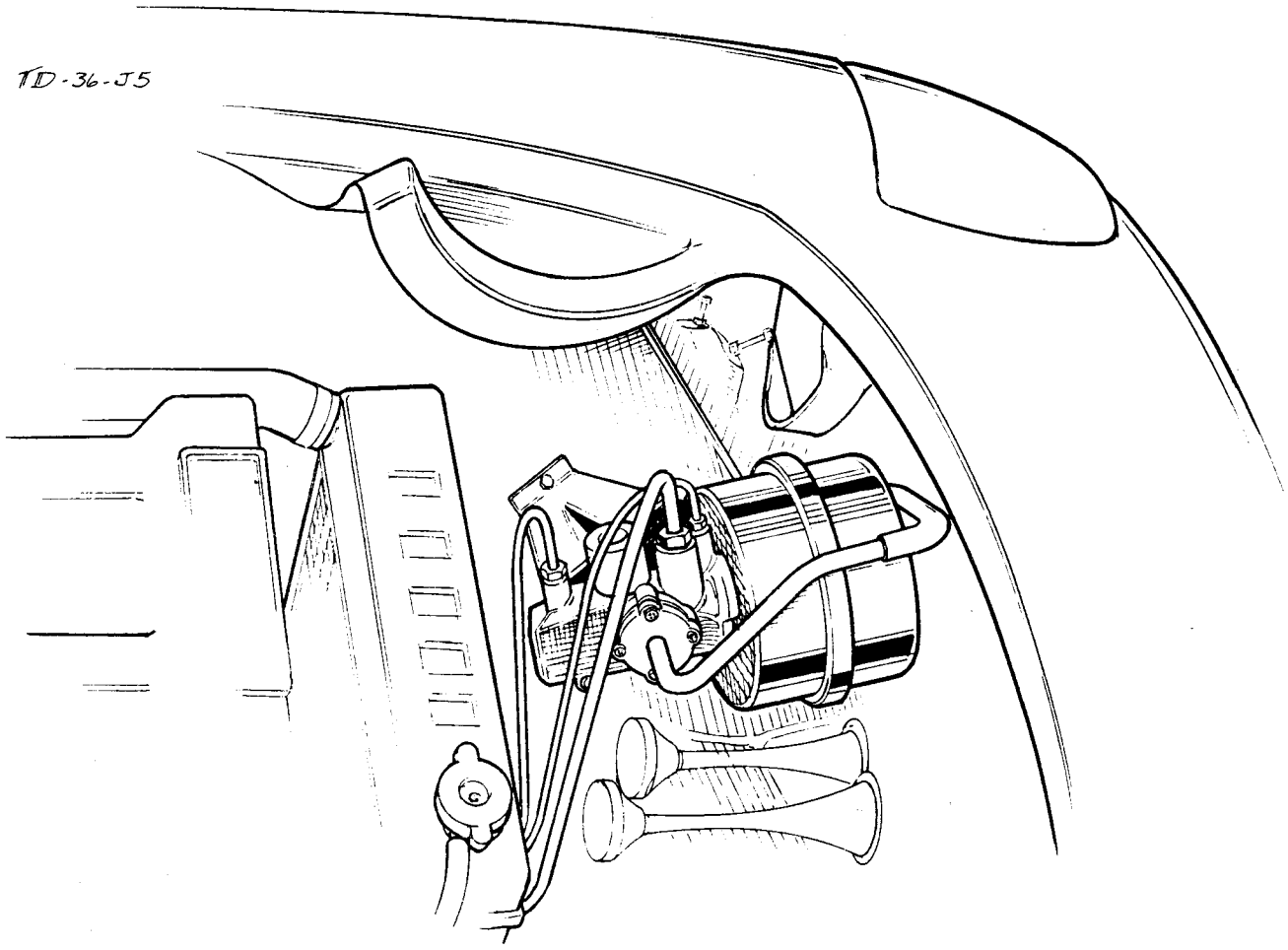

Fig. 13. SERVO UNIT

described here. After 40,000 miles (65,000 km.) or 3 years, whichever is reached first, the servo unit should be replaced together with vacuum hose by new parts.

Testing the Servo Unit

It is assumed that any faults connected with the braking 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.

   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 operate and the operation should be detected as in '1'.

   Unsatisfactory result of this test indicates leaking gaskets, air valve or rubber grommet.

   Run the engine, clamp the hose, and repeat test. If satisfactory the non-return valve is faulty.

   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.

   Unsatisfactory result of this test can only be found by elimination.

   Check for leaks and if no leak of hydraulic fluid is evident, clamp each hose successively and repeat 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

1. Remove hydraulic and vacuum pipes from the servo unit. Plug the ends of all pipes to avoid the ingress of foreign matter.

2. Remove the setscrews securing the servo unit to the mounting bracket.

To Replace

1. Replacement is a direct reversal of the removal procedure, using clips (Part No. 50 J 6076) with screws (Part No. RSTS 0812) for the retention of the vacuum pipes.
2. Bleed the braking system (Section 'J.2'), after replacing the pipes.

J.14. - HANDBRAKE

To Adjust

1. Fully release the handbrake lever on the facia.
2. Raise the rear of the car until the wheels are free to rotate. Adjust the handbrake pads on the rear calipers (by means of the knurled nuts) to give a maximum clearance on either side of the disc of .003 in. (.076 mm.).
3. Take up any excess slack in the cable by means of the adjuster which is located on the R/H engine mounting support bracket.

Cable

To Remove

1. Fully release handbrake lever and cable adjuster, so that there is as much slack as possible in cable, then pull the cable forwards (towards rear of car) to free it from its clevis.
2. Slacken the bolt at the forward end of the handbrake lever outer casing. From the upper end of the outer casing, release the pin retaining the handbrake lever, pull out the lever, then release cable.
3. Remove the cable adjuster from its location, then fully remove the faulty cable.

To Replace

1. Replacement of the handbrake cable is a direct reversal of the removal procedure. Note that the tube clamping bolt on the forward end of the handbrake lever should only be 'nipped' to tighten, fully tightening will cause the tube to collapse.
2. Adjust cable after fitting as given under 'To Adjust'.

Handbrake Lever

To Remove

1. Release the handbrake cable from the lever (see 'To Remove Cable').
2. Release both the lower and upper bolts securing the outer casing of the handbrake lever to its support brackets.

To Replace

1. Reverse the removal instructions.

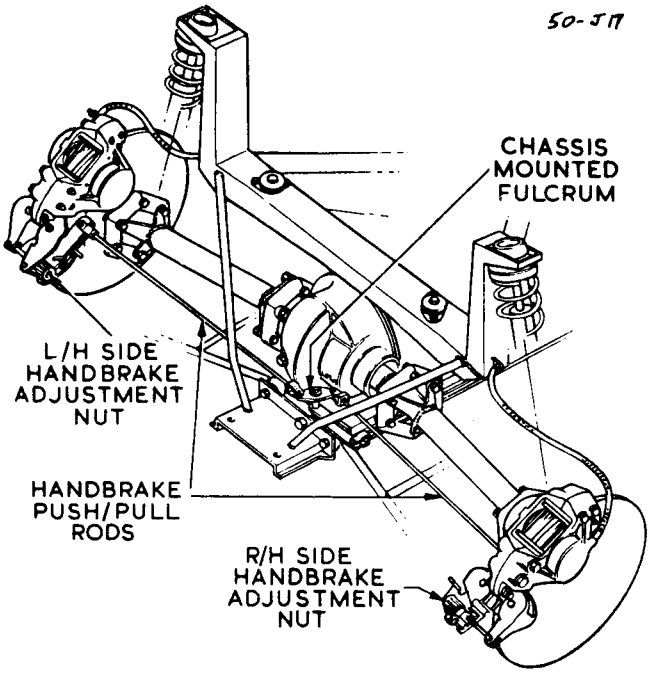

Fig. 14. HANDBRAKE MECHANISM

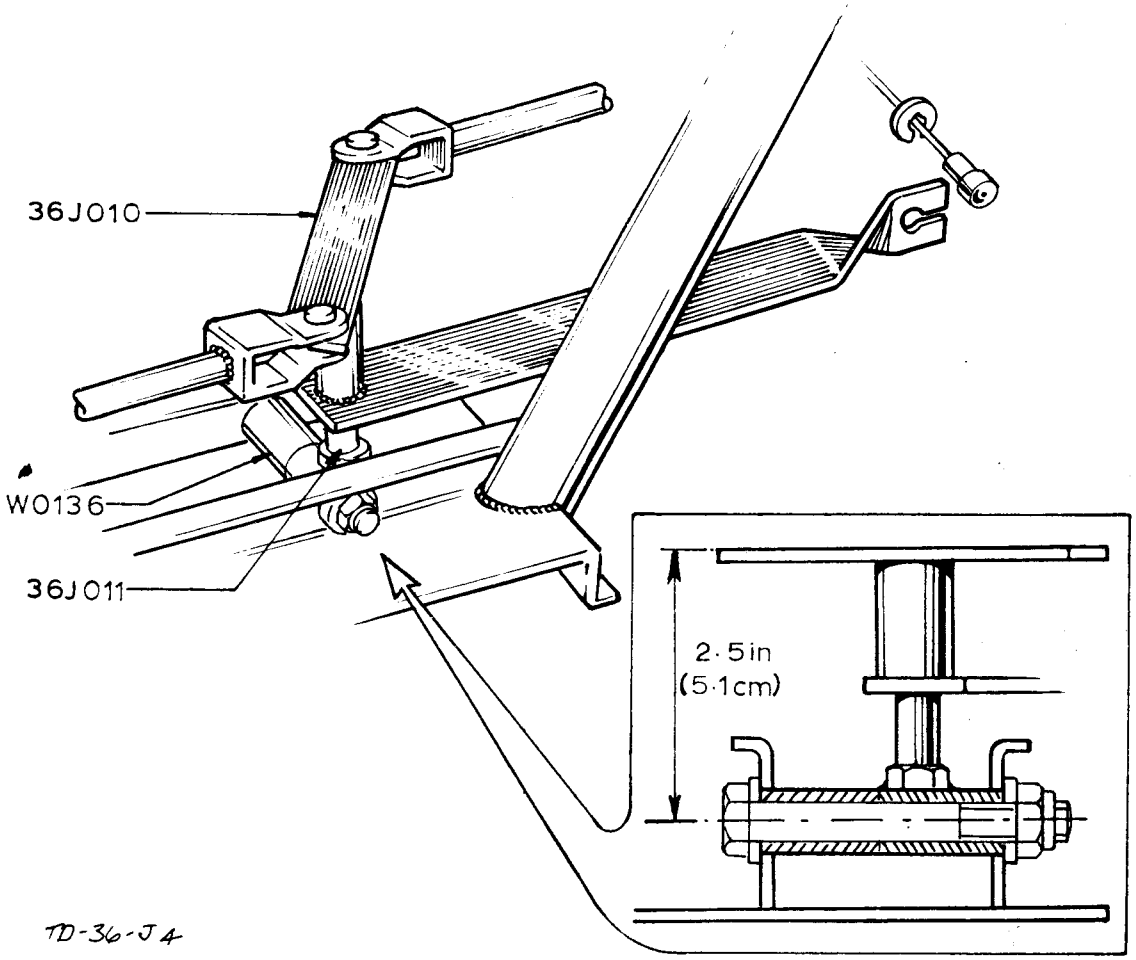

Fig. 15. HANDBRAKE LINKAGE & ACTUATING RODS ASSEMBLY

Handbrake Linkage

To Remove

1. Remove rear wheels (see Section 'G') and place chassis stands under wishbones to give simulated ride height.
2. Release the outer ends of the actuating rods at the calipers, taking care not to misplace the spacer from the clevis. Fully slacken the handbrake cable (see 'To Adjust').
3. Extract the nut and bolt securing the lever spindle/swivel tree assembly to the chassis and remove assembly from car.

To Replace

From approximately October 1968 an improved handbrake linkage was fitted in Production, therefore this system is given here.

Parts Required:-

36 J 011	Lever spindle	1 off
36 J 010	Lever assembly	1 off
W 0136	Spacer	1 off

1. Assemble lever spindle (36 J 011) to the lever assembly (36 J 010) ensuring that the spindle has been adequately greased (use Shell Retinax 'A') BEFORE assembly. Screw the spindle fully up, then turn back TWO FULL TURNS, this giving the required setting height of 2.5 in. (63.5 mm.) for assembly to the chassis.
2. Replace the handbrake actuating rods by securing them to the lever assembly with their clevis pins and split pins.
   NOTE: When re-assembling the rods to the swivel tree it is essential that the SHORTEST rod is fitted to the RIGHT-HAND side.
3. Fit the new assembly to the chassis as in Fig. 15 and connect the outer ends of the actuating rods to their locations on the rear calipers, ensuring that the spacer is in the clevis before securing with the clevis pins and new split pins.
4. Lubricate all pivot points with Shell Retinax 'A' grease before adjusting the handbrake cable.
5. Adjust handbrake cable, then refit rear wheels.

J. 15. - FAULT FINDING

Fault	Cause	Action
Fade:-	Incorrect pads. Distorted Pads. Overloaded vehicle. Excessive braking. Old hydraulic fluid.	Replace the pads, decrease vehicle load or renew hydraulic fluid as necessary.
Spongy Pedal:-	Air in system. Pads distorted. Weak master cylinder mounting.	Bleed system. Check master cylinder mounting and pads.
Long Pedal Travel:-	Discs running-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 push rod. Seals swollen. Seized pistons. Shoe 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 servo.
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 bounce.	Replace the shoes, or if glazed, lightly rub down with rough sandpaper. Check caliper for damage and repair as necessary. Fit new dampers.
Brakes pulling:-	Seized pistons. Variation in linings. Unsuitable tyres or pressures. Worn dampers. Loose brakes. Greasy linings. Faulty drums, suspension or steering.	Check the tyres and pressures seized pistons, greasy linings, or loose brakes; then 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 and for hydraulic fluid leakage. Fit new servo.
Brake squeal or Pad rattle:-	Worn retaining pins. Worn discs. No pad damping shims or springs. With new pads or discs, brakes being used too lightly causing glazing of pads.	Renew retaining pins or discs. Fit damping shims or springs. Use heavier braking action.
Uneven or excessive pad wear:-	Discs corroded (by salt). Disc badly scored.	Check the disc for corrosion or scoring and replace if necessary.

Fault	Cause	Action
Slow action of servo unit:-	Blocked filter 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. 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.	Re-connect pipes. Fit new servo.

NOTE:

Pad Squeal - Where squeal is attributed solely to pads, the manufacturers, Girling Limited, will NOT replace pads under Warranty.

ADDITIONAL INFORMATION

J.16 - REAR BRAKE HOSE ARMOURING SPRING

To prevent the possibility of chafing of the rear brake hoses(flexible pipes) due to misalignment, an armouring spring (Part No. A036 J 6097) can be fitted to the hoses. The springs can be fitted to cars already in service without detaching the hoses, simply by winding onto the hoses.

If, of course, chafing is apparent prior to fitting the armouring springs, then new hoses must be fitted. The hose/spring assembly is available under Part No. 36 J 6086.

J.17 - MASTER CYLINDER EXTENSION CAP

It is possible that the extension cap fitted to the master cylinder can be fouled by the carburetters throttle lever when the car is equipped with Zenith-Stromberg carburetters. This will only affect cars with Chassis Numbers between 7003050009A and 7005090030A. Where fouling does occur, remove the extension cap and replace with the standard cap (Part No. 026 J 6075).

Note that all Series 4 cars are not 'Standard Fixed Head' models (see Page 8a at front of Manual), therefore in addition to these ('A' suffix), models with Chassis Numbers commencing 700305 to 700509 with a suffix 'C', 'E' or 'G' should also be checked.