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CHAPTER G

BRAKING SYSTEM

SECTION G1 — DATA AND GENERAL DESCRIPTION

Data

Effective Drum Diameter

S1, S2, Bentley Continental S2 and Phantom V cars	11·250 in. (28·575 cm.)

Brake Lining Type

S1, S2, Bentley Continental S2 and Phantom V cars	Ferodo DS2 or Mintex M14

Length

S1, S2 and Phantom V cars	10·00 in. (25·4 cm.)
Bentley Continental S2 cars (front)	7·707 in. (19·576 cm.)

Width

S1, S2 and Phantom V cars	3·000 in. (7·62 cm.)
Bentley Continental S2 cars (front)	2·980 in. (7·569 cm.)

Thickness

S1, S2 and Phantom V cars	0·322 in. (8·179 mm.)
Bentley Continental S2 cars (front)	0·347 in. (8·814 mm.)

Diameter of Wheel Cylinder Bores

Front	S1, S2, Bentley Continental S2 and Phantom V cars	1·375 in. (3·492 cm.)
Rear	S1 cars	0·875 in. (2·222 cm.)
Rear	S2, Bentley Continental S2 and Phantom V cars	0·812 in. (2·062 cm.)

Diameter of Master Cylinder System Pistons

Dual system	Upper cylinder	0·980 in. (2·489 cm.)
	Lower cylinder	0·747 in. (1·897 cm.)
Single cylinder system		0·980 in. (2·489 cm.)

Servo Lining — all cars

Type	Ferodo DM8

Servo Operating Levers

		Cam angle
Early S1 cars with single master cylinder		52 deg.
Late S1 cars, Bentley Continental S2 cars	with dual master cylinders	47 deg.
S2 cars, Phantom V cars	with dual master cylinders	37½ deg.

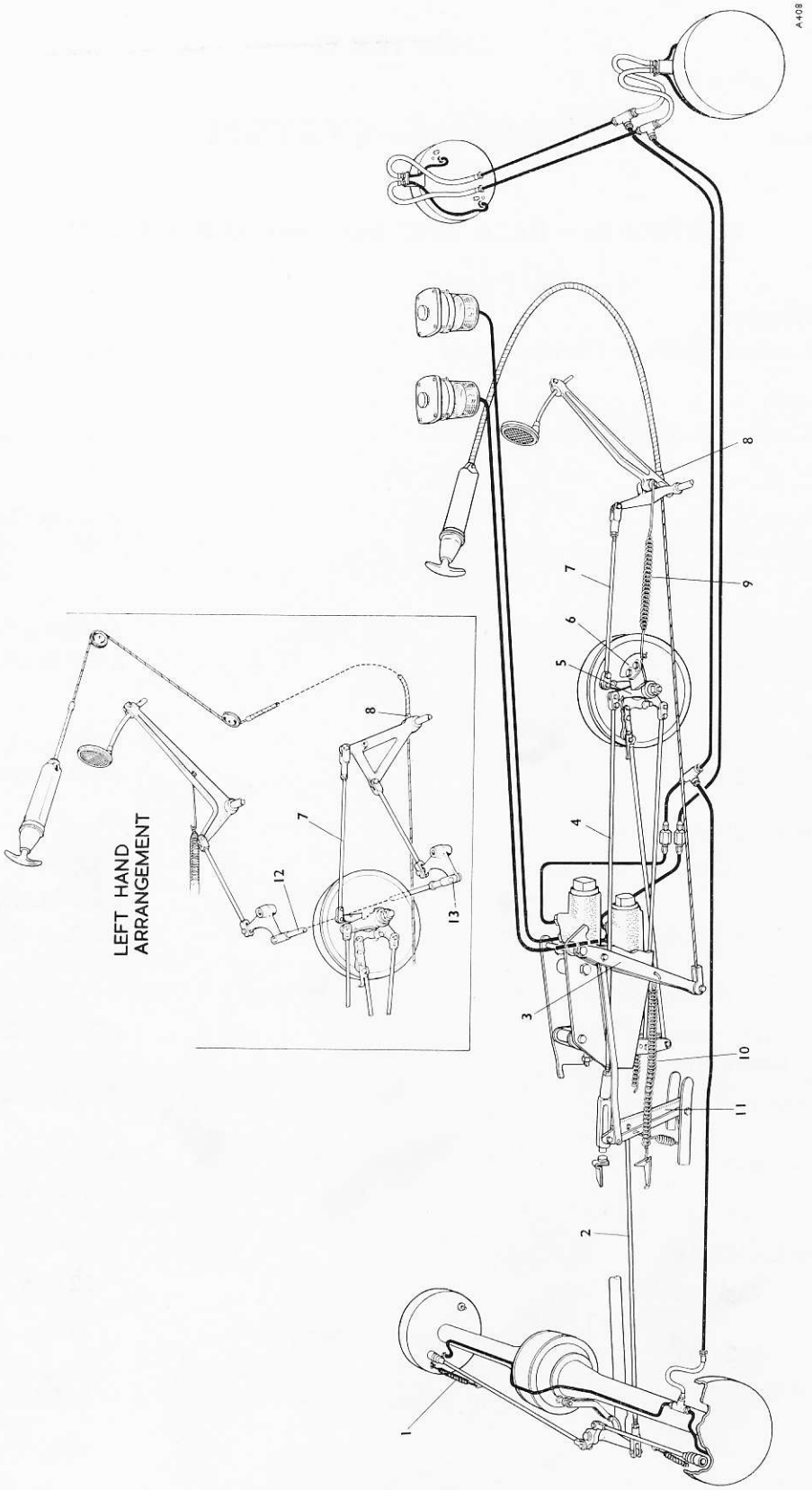

Fig. G1 Diagram — brake linkage

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Description

On both S1 and S2 cars, the braking system incorporates a gearbox-driven friction type servo motor which is engaged by the foot brake pedal. The output from the servo is transmitted through hydraulic cylinders which operate Girling Hydrastatic brakes incorporating special Rolls-Royce features.

In addition to operating the servo, the foot brake pedal is also connected to the rear brakes through a mechanical linkage of rods in tension, as also is the handbrake, and supplies 40 per cent **(S1 cars)** or 30 per cent **(S2 cars)** of the effort applied to the rear brakes, the additional 60 per cent **(S1 cars)** or 70 per cent **(S2 cars)** being provided hydraulically.

The handbrake also is connected to the rear brakes through a mechanical linkage.

Two Shoe Brake System — Front Brakes

Front brakes are of the 'two trailing shoe' type employing two brake operating cylinders for each wheel. The lower 'shoe factor' due to absence of self-wrapping effect with trailing shoes renders them less prone to pulling and grabbing troubles, sometimes associated with leading shoe type brakes. The drum diameter has, of necessity, been reduced to $11\frac{1}{4}$ in. (28·575 cm.) and this, combined with the absence of self-wrapping effect, necessitates the employment of higher shoe tip operating pressures to obtain the same total braking. This higher shoe tip force is derived from the servo motor and increased hydraulic leverage, made possible by the use of self-adjusting shoes.

The importance of self-adjusting shoes in this system lies in the fact that the displacement of fluid when the brakes are applied is much less than in a normal system, since there is virtually no initial shoe clearance to be taken up. With less fluid movement, it has been possible to employ master cylinders of smaller bore diameter than that of the wheel cylinders, thus providing an increased hydraulic leverage without introducing excessive linear travel of the master cylinder pistons.

On all except Phantom V rear brakes, self-adjustment of the shoes is achieved by a friction device known as the 'shake-back stop'. This device retains the front shoes in the expanded position when the hydraulic pressure is released, thus achieving near zero shoe clearance. The 'shake-back stop' is located radially by a steady post attached to the brake carrier plate. Sufficient clearance is provided in this location to allow slight shoe to drum clearance with the brakes off. The tension of the brake shoe return springs (or more correctly 'bias springs') is such that the shoes are in equilibrium with the springs in the wheel cylinders. These exert a slight pressure on the back of the operating rubber cup and piston in the expanders. In consequence, there must be sufficient friction between the shake-back stop and the brake shoe web to prevent the shoe being shaken back by the vertical forces imposed on it when traversing rough roads.

As the front brakes are applied entirely by the servo there would normally be no increase in pedal travel as the linings became worn. A strong pull-off spring is therefore fitted to the shoes which takes effect only when the linings are near the end of their life, and, by the increase in pedal pressure above that which would normally be required, gives warning that the linings require renewal.

Four Shoe Brake System — Front Brakes

On the **Bentley Continental S2** the front brakes are of the 'four-shoe' type.

The four shoe brake consists basically of four neutral shoes mounted in pairs on two trailing shoe carriers. The shoe carriers are operated by two wheel cylinders mounted on a torque plate. A water excluder is fitted to the back of each front brake drum and is positioned between the carrier plate and the stub axle.

With four shoes a greater lining area is obtained, while the arc length of each shoe remains low.

Two bosses with fine limit bores are welded to each shoe carrier and the shoes pivot on hardened pins which are retained in the bosses by spring clips. As the pivots are set well back from the shoe lining surfaces, there is a tendency for the shoes to tip forward due to the rotation of the drum. The two shoes overlap in order to make the tendencies of the shoes to tilt, mutually self-cancelling.

'Shake-back stops' are fitted to the brakes which prevent the shoes from shaking away from the drum when travelling over rough surfaces.

On the four shoe brake, one shake-back stop is fitted to each of the two trailing shoe carriers.

Rear Brakes — all cars

The rear brakes comprise a leading and trailing shoe expanded by a double acting wheel cylinder in conjunction with a mechanical flat wedge type expander, the latter being operated by direct foot pedal linkage and also by the handbrake. The shoes are interconnected by a special equal-wear linkage which converts the floating shoes to a 'fixed-cam' equivalent, thus reducing the self-wrapping effect of the leading shoes and allowing the use of a single shake-back stop on the trailing shoe which simultaneously adjusts both shoes to near zero clearance; it should be noted that shake-back stops are not fitted to the rear brakes **on Phantom V cars.** As lining wear takes place with consequent automatic adjustment, the shoes move away from the tappets of the mechanical expander in the 'Off' position; an adjuster is therefore provided to enable the shoes to be repositioned thus bringing the heels into contact with the tappets again.

A light rubbing when the brakes are 'Off' is quite normal with this type of automatic shoe adjustment.

Operation

Initial movement of the foot brake pedal first applies the rear brakes through the mechanical linkage and supplies 40 per cent (**S1 cars**) or 30 per cent (**S2 cars**) of the effort applied to the rear brakes. Further pressure on the foot brake pedal engages the servo motor which operates the hydraulic master cylinder(s) and supplies the additional 60 per cent (**S1 cars**) or 70 per cent (**S2 cars**) of the effort applied to the rear brakes; the front brakes are operated by the hydraulic system only. On releasing the foot brake pedal, the hydraulic master cylinder piston(s) return by means of an internal spring; the servo operating levers return to their normal positions by means of a torsion spring fitted between the two levers.

The handbrake is also connected to the rear brakes through the mechanical linkage.

Figure G1 shows the brake linkage for a right-hand drive car with the arrangement fitted to left-hand drive cars shown inset. **On Phantom V cars** an extra relay lever is fitted between the intermediate linkage and the rear axle. The lever is fitted to a bracket welded to the right-hand rear member of the propeller shaft tunnel. The single rod (see 2, Fig. G1) fitted **on standard cars,** is divided into two rods **on the Phantom V,** the ends of which are pivoted on the relay lever mentioned above.

A servo motor is mounted on the right-hand side of the gearbox and is driven at approximately one fifth of the propeller shaft speed. A pull-rod (see 7, Fig. G1) is operated by the brake pedal and is coupled to a lever on the servo motor shaft. The lever has inclined cams formed on the face of its boss which engage, through the medium of steel balls, with similar cams formed on the boss of a second lever (5). From the latter lever, rod (4) actuates the rear brakes through an intermediate lever which is pivoted on a bracket bolted to the crossmember of the frame and through rod (2) and the rear equaliser linkage, mounted on a bracket suspended from the rear axle.

Initial movement of the servo lever cams engages the servo motor, and its output is taken to the master cylinder operating lever assembly by one of the two output rods, depending upon whether the motion of the car is forward or reverse.

The handbrake is mounted under the facia, and is connected by an enclosed cable to the handbrake lever carried on the master cylinder support bracket. This lever is linked to a second lever which is connected to the intermediate lever (11) by means of a pin. The remaining linkage is the same as for the foot brake. The intermediate lever is permitted to slide along the slotted link on rod (4) so that application of the handbrake does not disturb the foot pedal.

Hydraulic Systems

On early Rolls-Royce Silver Cloud, Bentley S1 and Bentley Continental S1 cars, a single master cylinder operates all the brakes. In the event of failure of the hydraulic system, the rear brakes remain effective through the mechanical linkage; similarly, provision is made to ensure that the hydraulic system remains effective should the mechanical application fail.

Later S1 cars and all S2 cars are fitted with two reservoirs and two master cylinders; the upper cylinder (0·980 in. (2·489 cm.) piston dia.) operates the upper shoes only in the front brakes and all shoes in the rear brakes, while the lower cylinder (0·747 in. (1·897 cm.) piston dia.) operates only the lower shoes in the front brakes.

Two brake fluid reservoirs, one for each master cylinder, are mounted on the wing valance and

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incorporate fine mesh gauze filters. The pipes leading to the master cylinders are arranged to run in such a manner that no air trapping takes place; any air present in the brake fluid cylinders or pipes is expelled from the reservoirs.

> **Note:** All brake fluid is hygroscopic, i.e. the fluid will absorb and chemically combine with water from the atmosphere.

To overcome this problem, the fluid should be exposed to the atmosphere only for the minimum time. It should always be stored in and used directly from **small** sealed containers.

Check valves were introduced **on early S1 cars** to obviate the possibility of ingress of air at the wheel cylinders, but it was later established that the spreaders were fully capable of maintaining an adequate interference between the lips of the cup seals and the bores, thus preventing air from being introduced into the system. No retrospective action is necessary to remove the check valves. The two sub-divisions of the hydraulic system are not interconnected hydraulically and balance between the two cylinders, and therefore between front and rear brakes, is obtained mechanically by means of a balance lever.

In the event of failure of one system, braking is still retained on all four wheels by the mechanical application of the rear brakes and the operation of the second cylinder.

SECTION G2 — SERVICE OPERATIONS

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Special tools required:

RH.322 — Brake and servo testing lever (single cylinder system)

RH.417 — Brake and servo testing lever (dual cylinder system)

RH.473 — Spring balance — 100 lb. (45·3 kg.) reading

On S1, S2 and Phantom V cars, the front brakes are self-adjusting and no external adjuster is provided. Every 20,000 miles (32,000 kilometres) **on S1 cars** and 10,000 miles (16,000 kilometres) **on all S2 cars,** the brake drums should be removed and the condition of the linings examined. The lining face should not be less than $\frac{1}{32}$ in. (0·794 mm.) above the rivet heads.

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On S1 and early S2 cars, if wear is excessive, the shoes will catch on the warning springs provided on the brake carrier plate whenever the brakes are applied and self-adjustment will be prevented.

Should it be necessary to remove the wheels before this period, for example when the wheels are interchanged and checked for balance after 5,000 miles (8,000 kilometres), it is suggested that an inspection of front brake linings be carried out at the same time.

Remove any lining dust which may have accumulated on the brake mechanism before re-fitting the drums. Push the shoes inwards and place the drum in position; the shoes should be in light contact with the drum after the brakes have once been applied and released. Slight rubbing between shoes and drums is normal for both front and rear brakes.

On both S1 and S2 cars, wear on the rear brakes has the effect of increasing the travel of the foot brake and handbrake controls, therefore check and if necessary adjust the rear brakes every 2,500 miles (4,000 kilometres). It is important that no attempt be made to adjust at any other point by altering the length of the rods.

On initial build, the linkage is carefully set to synchronise the front and rear stops, ensuring that in the event of failure of any parts of the system at least one pair of brakes is available. If dismantled for any reason, the linkage should be reset to the original setting as described in 'Handbrake Ratchet Assembly'.

Rear Brakes — to adjust

Release the handbrake. The adjustment screw protruding through the brake water excluder has a squared end for spannering purposes (see Fig. G2). Four 'clicks' can be felt during every complete turn of the adjustment screw.

To adjust the brakes, it is necessary to jack the rear wheels clear of the ground. Each wheel should be rotated a few degrees in each direction and the adjustment screw (see Fig. G2) turned clockwise until a solid resistance is felt. The adjustment screw should then be turned back two 'clicks'. This will provide the correct brake setting.

If replacement shoes with new linings have been fitted, the adjustment screw should be set back five 'clicks' to allow for initial 'growth' of the linings during road test. After the road test, the brakes should be re-adjusted and the adjustment screws set back three 'clicks'. By the time further adjustment is necessary, the linings will have stabilised and the normal adjustment may be carried out.

Hydraulic System — to 'bleed'

'Bleeding', for the purpose of expelling all air from the system, should only be necessary when completely recharging the system following the renewal of a component or the disconnection of a brake pipe.

To 'bleed' the system, two operators are necessary.

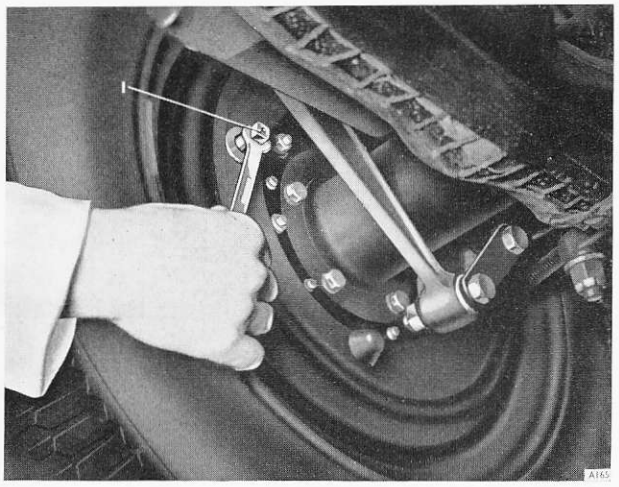

Fig. G2 Adjustment of rear brakes

1. REAR BRAKE ADJUSTING SCREW

Fig. G3 'Bleeding' front brakes

It is important that the following method is always employed, as air can be introduced into the wheel cylinders past the screw threads of the 'bleed' screws, unless the screws are closed on the return stroke of the master cylinder.

1. Fit a rubber 'bleed' tube to one of the front brake 'bleed' screws and immerse the free end of the tube in about one inch of brake fluid in a clean bottle.
2. Ensure that the reservoir(s) situated on the right-hand valance plate is full (the correct fluid is Castrol–Girling Crimson Brake Fluid 6293).
3. Using lever RH.322 on the single master cylinder system or lever RH.417 on the dual master cylinder system, operate the master cylinders with a rapid deliberate forward movement while the second operator slackens the 'bleed' screw. At the end of the forward stroke, close the 'bleed' screw, pull the lever back and pause for 5 seconds to allow the master cylinder plunger to return under the influence of its return spring.

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4. Repeat the pumping action for about 10 cycles or until air bubbles no longer issue from the 'bleed' tube.
5. This operation should be repeated for all wheel cylinders, topping-up the fluid reservoirs as necessary.

On the single master cylinder system, it is necessary only to 'bleed' the front brakes at the point shown in Figure G3, as the two wheel cylinders are inter-connected.

On the dual master cylinder system, it is essential that both cylinders are 'bled' at each front wheel, since these are operated by separate master cylinders and are not inter-connected.

After 'bleeding', a check must be carried out to ensure that the system is completely free of air.

No other method of 'bleeding' is recommended owing to the possibility of aeration of the fluid.

To Check that the System is Free of Air

Single master cylinder system

1. Ensure that the rear brakes are correctly adjusted.
2. Operate the master cylinder with lever RH.322 so that the shoes assume their operating positions.

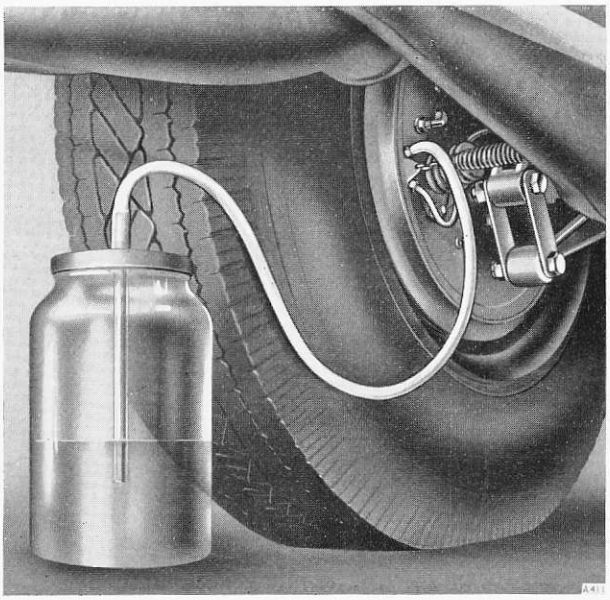

Fig. G4 'Bleeding' rear brakes

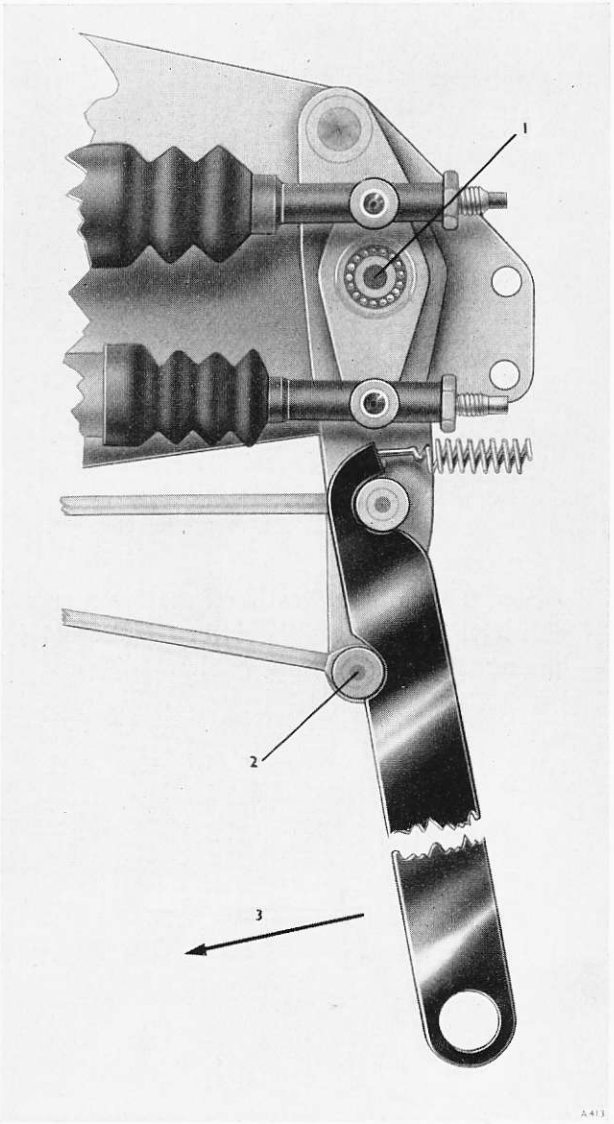

Fig. G5 Lever RH.417 in position

1. MASTER CYLINDER BALANCE LEVER BEARING
2. CLEVIS PIN
3. 100 lb. LOADING

Release the lever and allow the master cylinder plunger to return fully.

3. Attach a spring balance to the lever and operate the master cylinder with a pull of 100 lb. (45·3 kg.) as shown in Figure G5. Measure the length that the push rod has travelled from rest. In the rest position, the 'on-stop' bar should be 1·60 in. (4·064 cm.) from the edge of the master cylinder mounting bracket and the travel of the push rod with the 100 lb. (45·3 kg.) pull on lever RH.322 must not

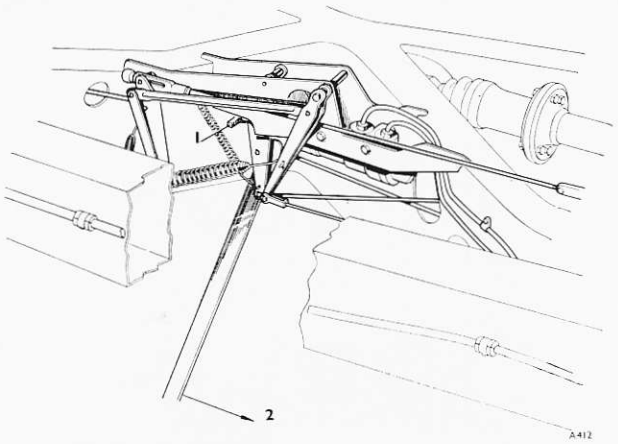

Fig. G6 Lever RH.322 in position

1. 'ON-STOP' BAR 2. 100 lb. LOADING

exceed 0·85 in. (2·159 cm.). If the travel exceeds this figure, the brakes should be 'bled' again and the test repeated.

Dual master cylinder system

Repeat the operation described for the Single Master Cylinder system but refer to Figure G6 for the movement required. Use lever RH.417 for the test.

Movement is measured at the bottom clevis pin on the master cylinder lever 2. Movement of the lever must not exceed 2·250 in. (5·715 cm.); if it does, the brakes should be 'bled' again and the test repeated.

Lubrication

The brake linkage clevis and fulcrum pins should be lightly lubricated with engine or penetrating oil every 5,000 miles (8,000 kilometres).

On the dual cylinder system, the master cylinder balance lever pivot bearing should be lubricated with the approved grease as shown in Chapter D.

The ball bearing cams which actuate the servo motor are packed with grease on initial assembly and require no attention between chassis overhauls.

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SECTION G3 — THE MASTER CYLINDERS

Two Girling master cylinders are fitted to a bracket on the cruciform member and are operated by a servo motor through drag links.

Servo motor operation draws forward the master cylinder operating lever 2 (Fig. G7). Pivoted on this lever is the balance lever to which are connected the two master cylinder push rods.

On the single master cylinder system, the master cylinder push rod is connected directly to the operating lever.

In the rest position, the main seal floats slightly forward and two recuperating holes in the plunger are uncovered, permitting communication between the wheel cylinders and reservoir. This prevents the build-up of pressure differentials due to thermal expansion and contraction.

The initial movement of the plunger brings the recuperation holes forward of the main rubber sealing lip, after which further movement will produce a proportionate movement of the wheel cylinder plungers.

On brake release, the push rod is returned immediately by the operating lever return spring, but master cylinder plunger return is by means of the internal spring only. The plunger should contact the push rod retaining washer between one and four seconds after release.

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Master Cylinder — to remove

Dual cylinder system

Disconnect the brake fluid pipes and drain the reservoirs. Disconnect the return spring and servo rods from the master cylinder operating lever. Disconnect the handbrake cable and return spring from the handbrake operating lever. Remove the pivot bolts and distance pieces from the handbrake operating and intermediate levers, to permit the levers together with rods 4 and 2 (see Fig. G1) to be lowered in order to gain access to the master cylinder carrier plates.

Note: The Phantom V has an extra rod and support bracket positioned in place of the No. 2 rod referred to in the previous paragraph.

Remove the master cylinder operating lever pivot bolt and the carrier plate upper securing bolt. Remove the remaining carrier plate setscrews and master cylinder mounting bolts and withdraw the carrier plate, master cylinders and lever assembly.

Single master cylinder system

Disconnect the return spring and servo motor drag links from the master cylinder operating lever.

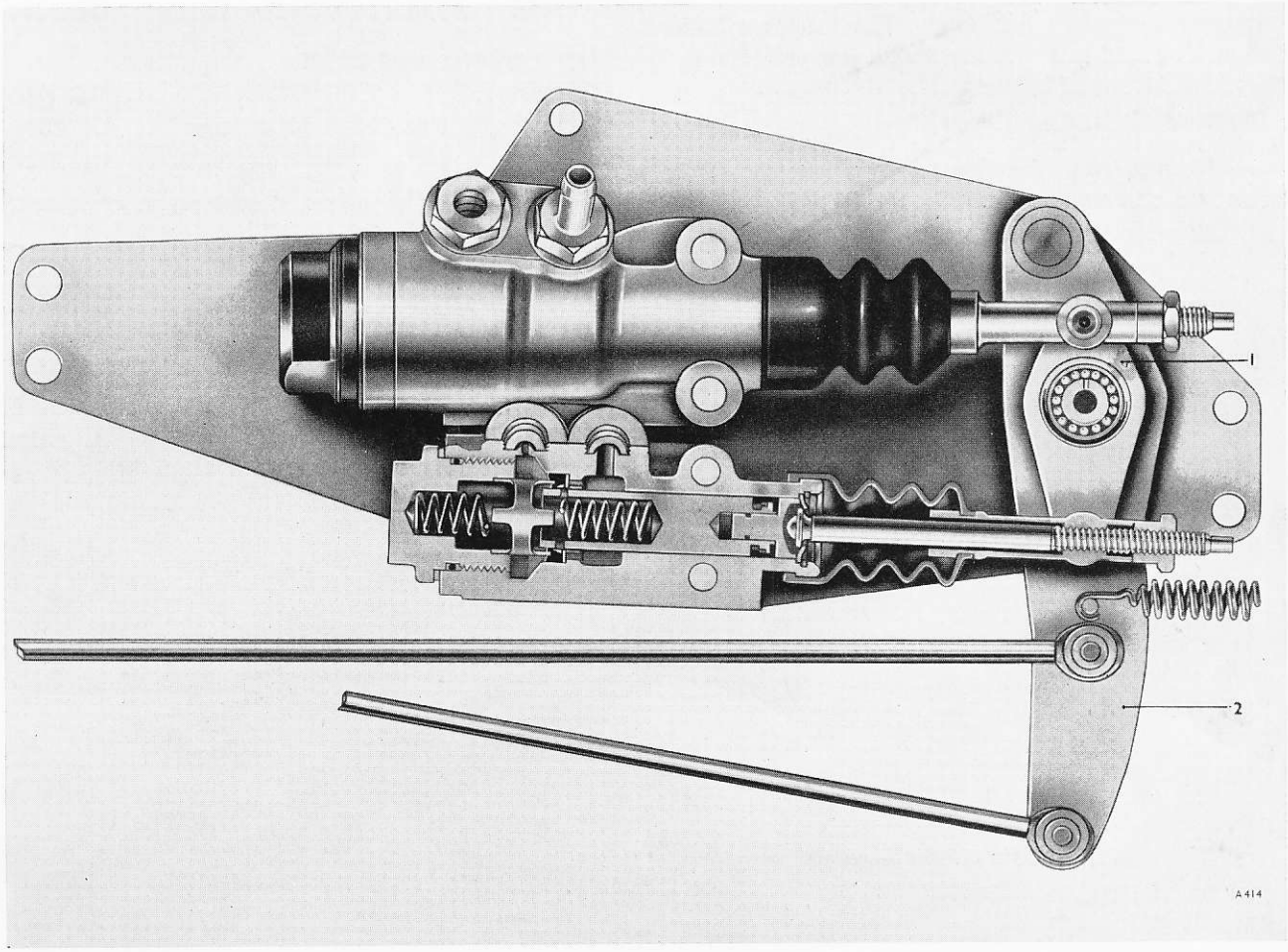

Fig. G7 Dual master cylinder

1. MASTER CYLINDER BALANCE LEVER 2. OPERATING LEVER

Remove the operating lever fulcrum pin and the two through bolts securing the master cylinder to its bracket.

Press down the master cylinder to gain access to the outlet pipe union. Disconnect the union.

Disconnect the inlet pipe and collect the fluid from the reservoir in a clean container.

Remove the master cylinder and lever assembly.

Master Cylinder — to dismantle

Remove the rubber boot and the circlip retaining the push rod washer. Remove the push rod, plunger and spring.

Remove the end cap. (This cap will be found to be very tight and will require a spanner or tommy bar approximately two feet long. The master cylinder should be held in a vice fitted with jaw protectors).

Master Cylinder Overhaul

All single cast iron master cylinders should be removed and single aluminium master cylinders fitted in their place.

Both single and dual aluminium master cylinders may be overhauled provided that condition of the cylinder bore(s) permits further service.

On S1 and S2 dual cylinder systems, complete master cylinder units are interchangeable.

The components of the master cylinders are interchangeable with the exception of the plunger seals. Both types of seals are included in the overhaul kits; the correct seal should be fitted and the surplus one discarded.

Part numbers are as follows:

Master cylinders

Old type		*New type*
UG.2891	1 in. (2·54 cm.) cylinder	UG.3847
UG.2892	$\frac{3}{4}$ in. (1·905 cm.) cylinder	UG.3848

Master cylinder overhaul kits

Old type		*New type*
CD.1206	1 in. (2·54 cm.) cylinder	CD.2026
CD.1207	$\frac{3}{4}$ in. (1·905 cm.) cylinder	CD.2027

The kit for the single master cylinder system CD.1205 is not affected.

Master Cylinder — to assemble

The importance of cleanliness when re-assembling units of the hydraulic system cannot be over-emphasised. All internal parts must be free from grease, grit and lint from cleaning cloths. All parts should be freely lubricated with clean brake fluid before assembly.

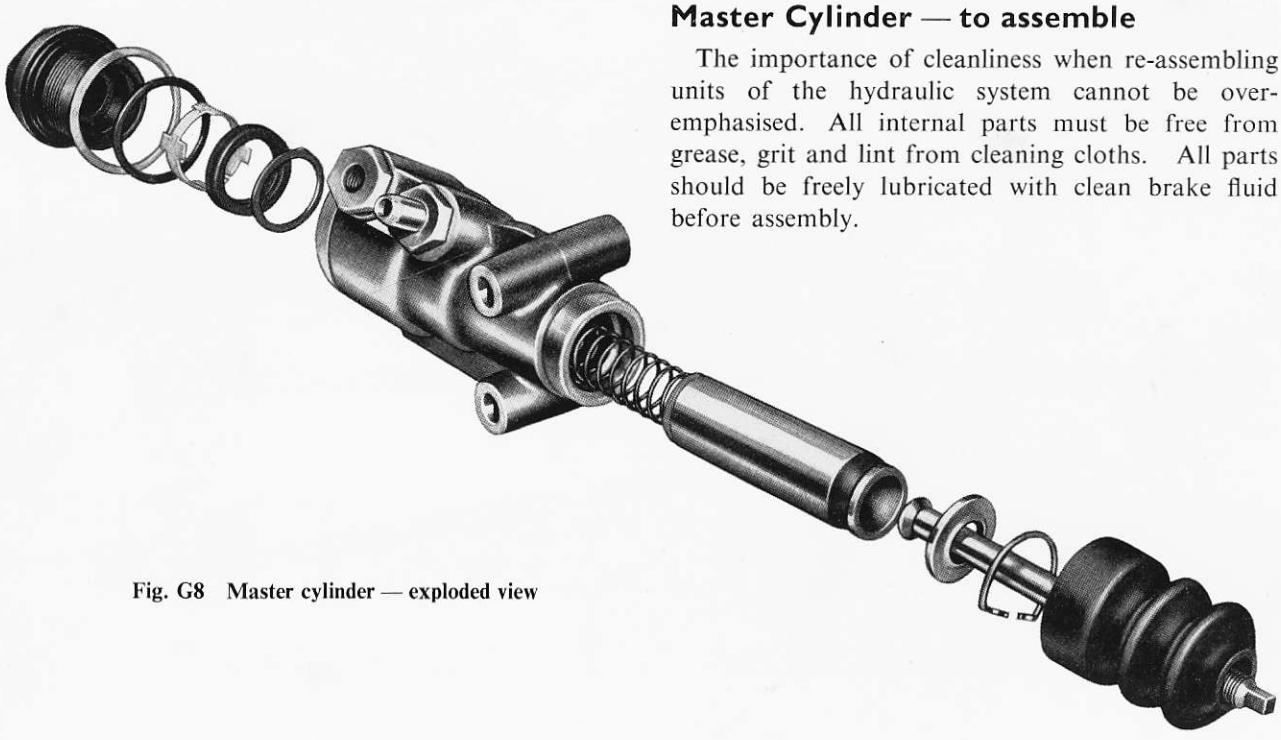

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Fig. G8 Master cylinder — exploded view

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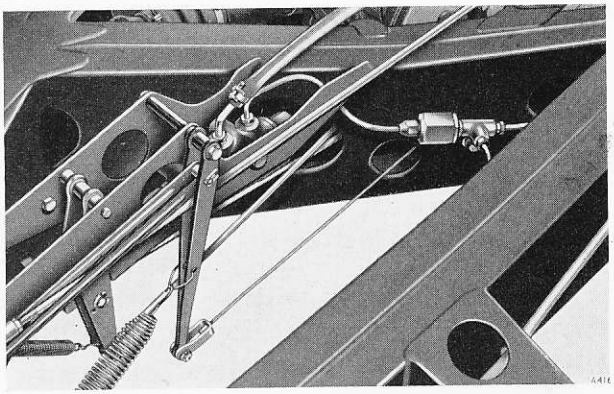

Fig. G9 Master cylinder in position

Fit the seal shim, main seal, gasket and end cap. Tighten the end cap. Insert the plunger spring and plunger, then work the small seal carefully into the cylinder bore.

Fit the push rod and circlip.

Dual Master Cylinder System — to adjust

Before fitting the cylinder to the chassis bracket, adjust the upper cylinder push rod so that the centre of its pivot on the balance lever is 3·700 in. (9·398 cm.) from the master cylinder end face (see Fig. G10).

After fitting the master cylinders and connecting the linkages, take up all clearances on the lower cylinder push rod by means of the adjuster, then slacken the adjuster $\frac{1}{4}$ of a turn.

No 'on-stop' adjustment is provided.

Single Master Cylinder System — to adjust

Fit the master cylinder to the chassis bracket. Press the rear end of the rubber boot forward to allow access to the lock-nut and spannering flats. Release the lock-nut, then shorten the push rod as much as possible so that there is slack between the end of the push rod and the plunger. (The slack can be felt by gently moving the lower end of the operating lever backwards and forwards). Do not pull too hard on the operating lever or the plunger will be forced along the cylinder; as plunger return is slow, the subsequent adjustment may be inaccurate.

Lengthen the push rod until free movement at the lower end of the operating lever is just lost. Shorten the push rod one flat ($\frac{1}{4}$ turn), then lock the nut.

Re-fit the rubber boot.

Adjust the 'on-stop' bar so that it must travel 1·600 in. (4·064 cm.) before contacting the edge of the master cylinder support bracket (see Figs. G5 and G9).

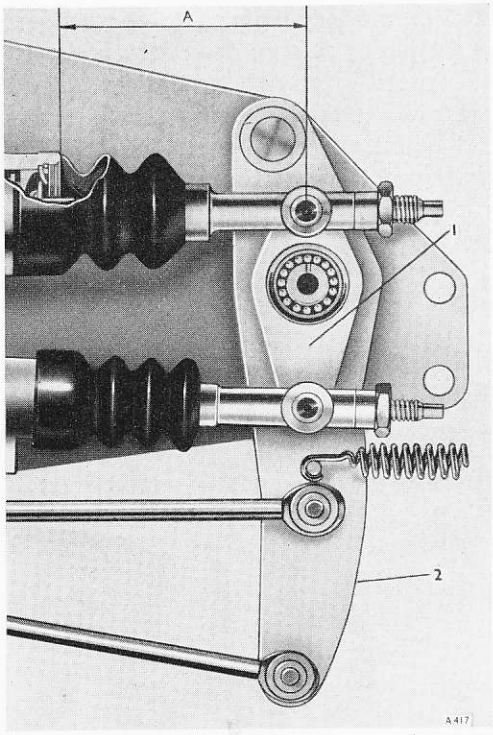

Fig. G10 Dual master cylinder adjustment

A. 3·700 in. (9·398 cm.)
1. MASTER CYLINDER BALANCE LEVER
2. OPERATING LEVER

SECTION G4 — SERVO MOTOR

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The servo motor operates on the same principle as the dry disc clutch. The lined friction plate (see Fig. G11) is driven from the gearbox output shaft at approximately one fifth of the propeller shaft speed and is in continuous rotation whilst the car is in motion.

The pressure plate is freely mounted on a co-axial shaft and is brought into contact with the friction plate, when the foot brake pedal is depressed, by means of cams and steel balls between the operating levers. The motion imparted to the pressure plate causes the pin to pick up one of the brake actuating levers, forward or reverse, according to the motion of the car and to apply the master cylinder by means of the drag link and operating lever. On releasing the foot brake pedal the servo operating levers are returned to their normal positions by a torsion spring fitted between the levers.

Servo — to remove

Remove the right-hand undershield.

Remove the setscrews securing the clevis pin retaining plate and remove the clevis pins.

Disconnect the rods from the servo cam levers.

Disconnect the drag links from the servo brake actuating levers. Remove the servo 'on-stop' to improve access to the servo.

Release the handbrake to slacken the cable which may then be lifted to further improve access to the servo.

Remove the centre bolt and withdraw the servo motor.

Servo — to dismantle

Remove the protector ring and the spring plate.

Should difficulty be encountered in separating the surfaces sealed with Bostik adhesive, the application of trichlorethylene will assist dismantling.

Mount the pressure plate assembly vertically in a vice fitted with jaw protectors, holding it by the inner end of the servo shaft.

Remove the lock-nut and the adjusting nut, then withdraw the components from the shaft (see Fig. G11). Retain the three steel balls and the torsion spring fitted between the servo cam levers. Lightly drive the ball race from the pressure plate hub.

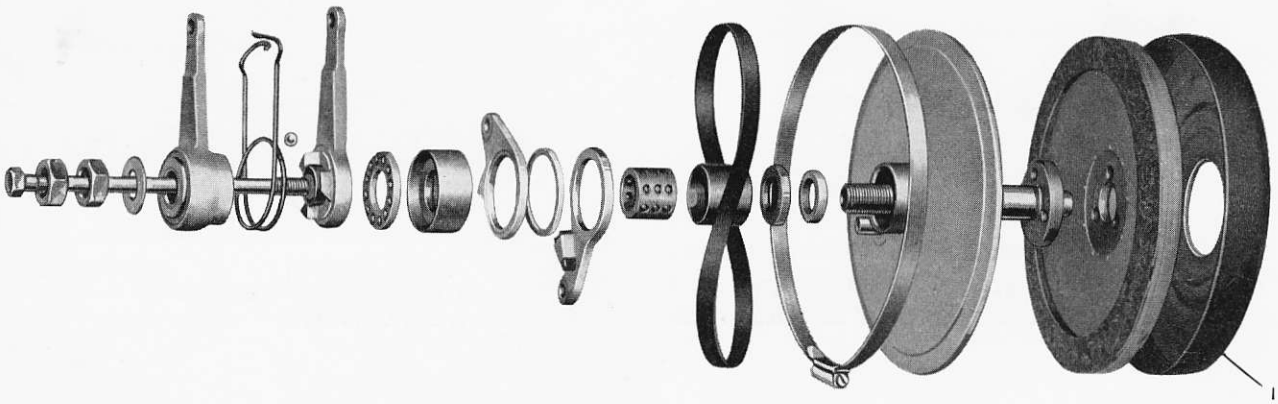

Fig. G11 Servo motor — exploded view

1. SPRING PLATE

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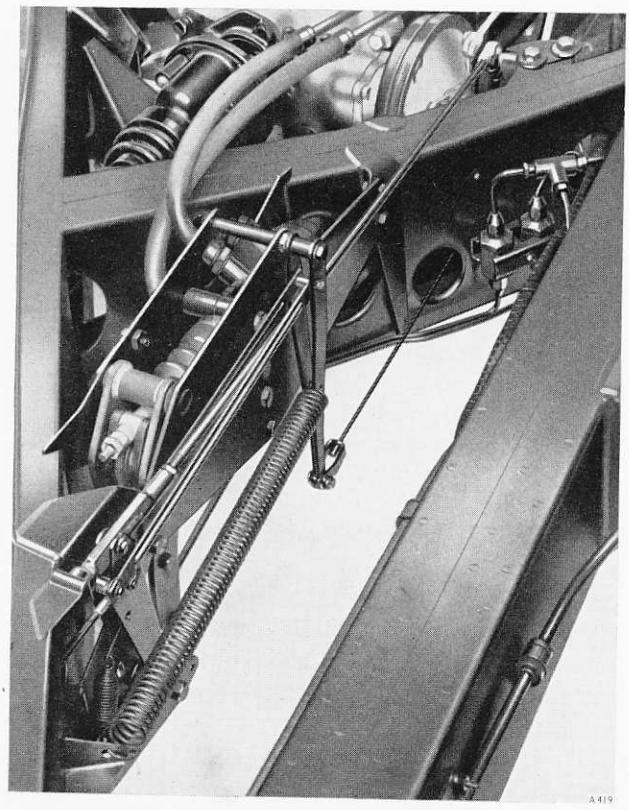

Fig. G12 Servo motor and actuating rods

Servo — to inspect

Thoroughly clean all parts and examine for wear. Special attention should be paid to the friction lining; a glazed friction lining can cause inefficiency of the brakes.

Servo motors fitted to **S1 cars** have spring plates fitted behind the lining. Check that the set of the spring plates is between 0·032 in. (0·813 mm.) and 0·035 in. (0·889 mm.) by means of feeler gauges inserted between the spring and the lining and between the spring and the friction plate (see Fig. G13). If the set is below 0·032 in. (0·813 mm.), a replacement assembly or new spring plates should be fitted. The spring plates are riveted to the friction plate.

If the pressure plate is scored or distorted it should be renewed.

Friction Plate Linings — to renew

Release the pressure of the Belleville washer by inserting a screwdriver between the inertia ring and the friction plate, as shown in Figure G14. Turn the screwdriver so that the ring and plate are separated and hold them in that position.

Insert and turn a second screwdriver between the ring and plate diametrically opposite the first; the Belleville washer will spring away from the inertia ring.

Remove the screwdrivers.

Turn the inertia ring until three access holes are aligned with three rivets.

Drill each rivet to a depth of $\frac{1}{16}$ in. (1·575 mm.) with a $\frac{5}{32}$ in. (3·962 mm.) diameter drill, then with the aid of a $\frac{1}{8}$ in. (3·175 mm.) diameter pin punch, remove the rivets.

Re-fit the Belleville washer.

Attach new linings by inserting and lightly swaging over two new rivets fitted opposite each other.

Insert and lightly swage the remaining rivets.

Finally, swage over all rivets with a spigoted flat punch (see Fig. G15).

It should now be possible to turn the inertia ring by hand. If the assembly feels solid, even on applying considerable effort, the Belleville washer should be renewed by drilling out the old rivets and re-riveting.

Fig. G13 Checking set of the spring plates

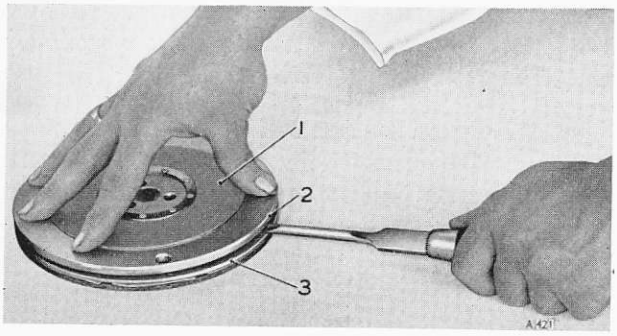

Fig. G14 Releasing the Belleville washer

1. BELLEVILLE WASHER 2. INERTIA RING 3. FRICTION PLATE

Servo Motor Sealing

Early S1 cars

When assembling the servo, care should be taken to obtain complete sealing. On cars fitted with the earlier pattern pressure plate incorporating three ventilation slots, before assembling, the following modifications are required if they are not already incorporated.

By simple unsweating, remove the water drain from the servo spring plate.

Blank off the spring plate drain holes located in the rim by filling with solder. This is best done by tinning the inside of the rim, resting the spring plate (holes downwards) on a sheet of asbestos. The use of asbestos prevents the hot solder from running through the holes and building up on the outside of the rim. The solder should then be smoothed over and the spring plate painted with a good quality, air drying, chassis enamel.

Lubricate the thrust race, operating lever cams and pressure plate ball race with Molytone 265 grease.

Renew and soak the felt washer (located in the pressure plate) in engine oil and lightly coat with Molytone grease. Apply 'Wellseal' sparingly to the end face of the servo drive shaft, both sides of the centre of the inertia plate, to the end face and driving pins of the servo driven shaft and under the head of the servo retaining setscrew after first ensuring that all surfaces are free from oil or grease.

Allow at least five minutes for air drying before assembling the joints.

The Ferobestos seal washer should be assembled, chamfered edge leading, on the spigot formed by the oil seal housing; it should be completely dry and free from adhesive or lubricant.

With the pressure plate uppermost, position the rubber seal with the flap covering the ventilating slots and ease the seal over the rim edge without stretching. Holding the rubber seal in that position, ease the opposite side over the plate edge. It is essential that the pulling is limited to the inner diameter only, thereby preventing distortion of the outer periphery. Ease the remainder of the seal into position until the inner periphery fits closely against the machined surface.

By carefully lifting the rubber seal which overlaps the ventilating slots and machined surface, apply Bostik adhesive 89AA to the inner face of the seal, a small area at a time, until the complete circumference of the inner face has been treated in this way. Allow the adhesive to set for approximately one hour before using the car.

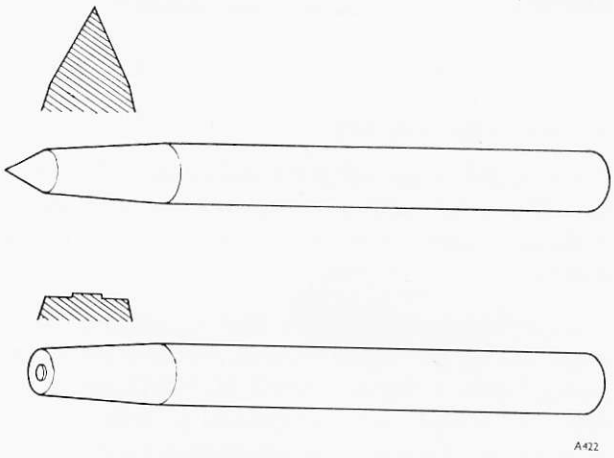

Fig. G15 Punches — servo re-lining

Discard the existing worm drive protecting ring and fit the spring ring in its place. Position the spring towards the rear of the car and not to the lowermost position as was customary on earlier cars.

The position of the baffle plate is immaterial if the earlier type protecting ring is being used.

The servo can then be fitted to the car, the seal being finally checked after road testing.

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Note: (*a*) It is *not* possible to use the rubber seal more than once, nor is it possible to use the seal if it has been distorted in an unsuccessful attempt to fit it.

(*b*) Trichlorethylene applied to the Bostik will assist easy separation when required.

Late S1 and S2 cars

The standard of sealing is improved on late S1 and all S2 cars.

When disturbing the servo for any reason, it will be necessary to carry out the following re-sealing procedure.

Ensure all parts are clean and free from grease.

Pack and lubricate the thrust race, operating lever cams and pressure plate ball race with Molytone 265 grease.

Renew and soak the felt washer (located in the pressure plate) in engine oil and lightly smear the outer surfaces with Molytone grease.

Apply 'Wellseal' sparingly to the end face of the servo driving shaft, both sides of the centre of the inertia plate, to the end face and driving pins of the servo driven shaft and under the head of the servo retaining setscrew after first ensuring that all surfaces are free from oil or grease.

The Ferobestos seal washer is adhered to the spring plate by a special process. In the event of their becoming separated, a replacement spring plate and washer assembly should be obtained and fitted. **Under no circumstances** should the seal washer be fitted to the spring plate using a Bostik adhesive.

Apply Bostik adhesive No. 89AA sparingly to the circumferential joint between the spring plate and pressure plate after assembly, also to the inside of the rubber seal.

With the pressure plate uppermost, place on the rubber seal and ease the seal over the rim edge, without stretching. Holding the seal in that position, ease the opposite side and remainder of the seal into position.

Position the protector ring with the worm drive towards the rear of the car.

Notes (*a*) and (*b*) on the sealing **on early S1 cars** are also applicable to **late S1 and all S2 cars**.

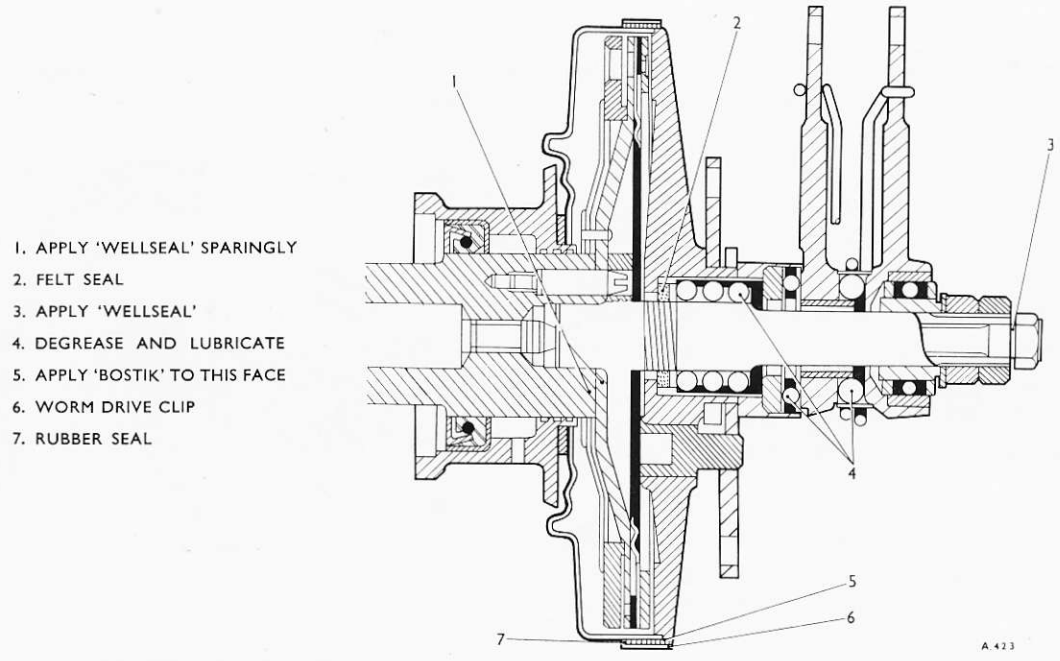

Fig. G16 Servo assembly (late S1 and S2 cars)

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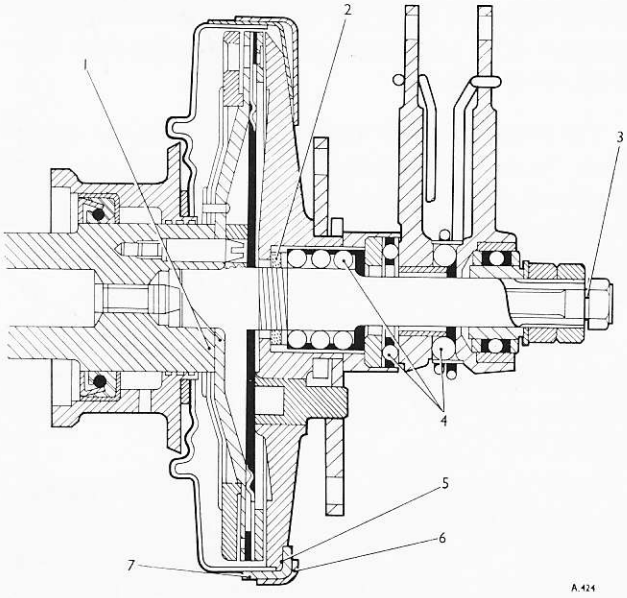

Fig. G17 Servo assembly (early S1 cars)

1. APPLY 'WELLSEAL' SPARINGLY
2. FELT SEAL
3. APPLY 'WELLSEAL'
4. DEGREASE AND LUBRICATE
5. APPLY 'BOSTIK' TO THIS FACE
6. RING RG.3311 OR RG.7997 AND SPRING RH.135
7. RUBBER SEAL RH.377

Servo to Gearbox — to fit

On S2 cars, check the protruding length of the three driving pins above the end of the servo driving shaft; this length should be no more than 0·360 in. (9·144 mm.). If above this length, the driving pins should be unscrewed from the servo driving shaft and modified. Using suitable clamps, hold each pin in a vice and file off the required amount of metal from the slotted end, ensuring that the face is kept square to the centre line of the pin. Remove any burrs, particularly in the slots, then fit the pins in the servo drive shaft ensuring that they are fully tightened. On completion of this modification, the gearbox rear extension must be marked with a blue spot for future identification.

Position the servo motor on the driving shaft, ensuring that the three driving pins engage with the holes in the friction plate and the servo shaft flange. Insert and tighten the centre bolt.

Rock the servo to ensure that it is free.

Slacken the adjusting nut if necessary and re-tighten the centre bolt.

Connect the brake rods.

Fit the servo 'on-stop' and ensure that the handbrake cable is correctly positioned **under** the servo shaft.

Fit the undershield.

Servo Cam Angle

Should the servo motor be changed as a unit, or the cam levers be renewed, ensure that the correct cams are fitted.

Should the servo motor be changed as a unit, or the operating levers be renewed, ensure that the operating lever cam angles are correct.

On early S1 cars, fitted with the single master cylinder system, the operating lever cam angle is 52 deg.; it can be identified by the numbers '1126FC' and '1127FC' on the levers.

On Bentley Continental S2 and late S1 cars, fitted with the dual master cylinder system, the operating cam angle is 47 deg.; there are no identification numbers on these levers.

On S2 and Phantom V cars, the operating lever cam angle is 37½ deg.; there are no identification numbers on these levers.

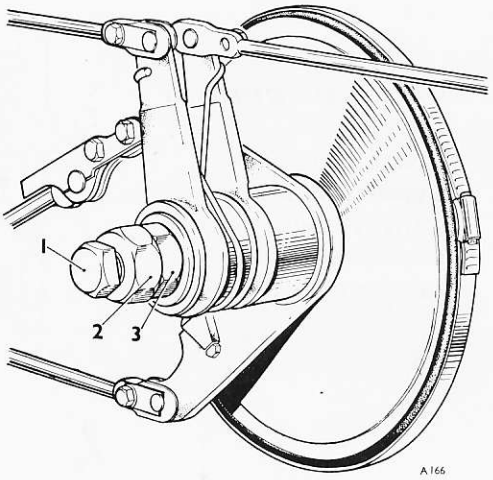

Fig. G18 Servo adjustment

1. CENTRE SECURING BOLT 2. LOCKING NUT 3. ADJUSTING NUT

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Tighten the adjusting nut (see Fig. G11) until drag between the plates can just be felt on rocking the servo. Unscrew the adjusting nut two flats ($\frac{1}{3}$ of a turn) to free the servo. Apply the pedal once to ensure that the outer servo lever has followed the backward turn of the adjusting nut. Hold the adjusting nut and tighten the lock-nut.

Servo 'On-stop' Adjustment

It is essential when fitting the servo 'on-stop' bracket to ensure that it is correctly adjusted (see 'Basic Adjustment of Brake Rods and Linkages — S1 and S2 cars').

SECTION G5
BRAKE SHOES, DRUMS AND EXPANDER MECHANISM

Special tools required:

RH.627 — Trammel

Spring balance — 30 lb. (14 kg.) reading

Replacement shoe and lining assemblies are available and should always be fitted when re-lining is necessary. The front shoe operating fork of the dual master cylinder system has a larger jaw than that of the single master cylinder system in order to accommodate the stiffened web of the later pattern shoe. Shoes are only interchangeable if the operating forks are interchangeable.

When renewing the brake linings due to wear, it is recommended that the following operations are carried out:

1. Fit service replacement shoes.
2. Overhaul the wheel cylinders and fit new rubber seals.
3. Overhaul the master cylinders and fit new rubber seals.
4. Dismantle, clean and grease the rear adjusters.
5. Renew the flexible brake hoses. In the interest of safety it is recommended that these hoses be renewed every 40,000 miles (64,000 kilometres).

Front Brakes — to dismantle

The procedure for the removal of the front shoes **on the S2 Continental** differs from that for the remaining **S2 and all S1 cars.**

Action after removal is common to **all S1 and S2 cars.**

Raise the front of the car using a hydraulic jack.

Remove the wheel and brake drum; if the drum is tight, screw two $\frac{1}{4}$ in. U.N.F. bolts into the tapped extraction holes provided.

Withdraw the shoes from the steady posts and from the wheel cylinder rubbers. Withdraw the shoes from the anchor slots in the rear of the wheel cylinders.

Unhook the pull-off springs and remove the shoes.

It is possible to extract the internal parts of the wheel cylinders, including the rubber seals, without removing the wheel cylinder from the carrier plate (see Fig. G22).

Renew the paper gaskets and locking strips if removed.

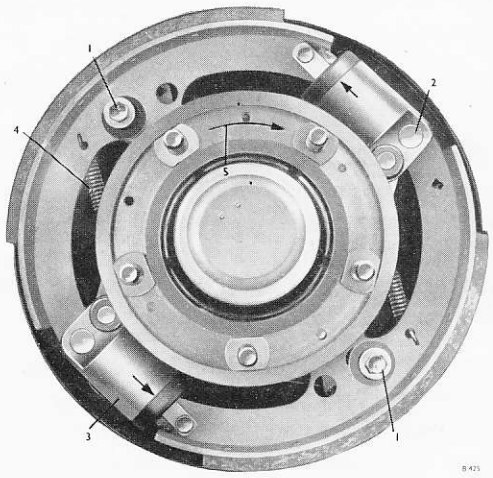

Fig. G19 Front brake — two shoe system — drum removed

1. SHAKE-BACK STOP
2. SHOE PIVOT
3. WHEEL CYLINDER
4. RETURN SPRING
5. FORWARD WHEEL ROTATION

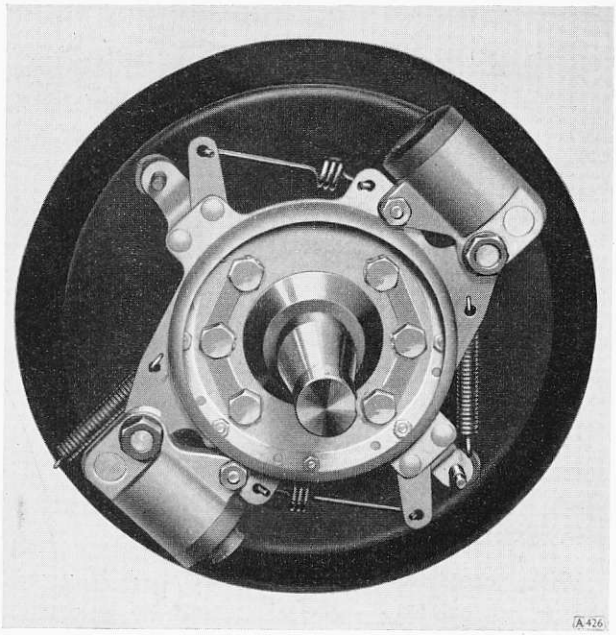

Fig. G20 Front brake — two shoe system — hub and shoes removed

Overhaul

In the past, wheel cylinders requiring reconditioning have always been returned for service replacement. With the co-operation of the Manufacturers it is now possible to release complete overhaul kits, when required, to Retailers who are desirous of carrying out their own repair service on these units.

All aluminium wheel cylinders should be discarded and spreader type cast iron cylinders fitted.

Cast iron cylinders fitted with air excluders should be converted to comply with the latest specification. This entails a systematic renewal of used parts and the installation of spreaders. All parts necessary to bring about the conversion are contained in the wheel cylinder overhaul kits.

On each front wheel cylinder, discard the dust cover, seal abutment, spring and air excluder, together with the bleed valve dust cover and ball; fit new parts as instructed in the leaflet enclosed with the kit.

When overhauling cast iron cylinders already fitted with spreaders, the straightforward method of renewing used parts by those supplied in the overhaul kit should be applied.

The braking system of all cars undergoing extensive overhaul should be fitted with cast iron wheel cylinders incorporating spreaders and either a single or dual, aluminium master cylinder unit.

In all cases, discretion must be used by the Retailer in deciding whether a master cylinder or wheel cylinder is suitable for further service and consequently overhauled, or whether it should be discarded and replaced by a new unit.

Separate overhaul kits are issued containing the necessary parts:

Cast iron front wheel cylinder	Part No. CD.1203	1 off
Cast iron rear wheel cylinder	Part No. CD.1204	1 off

Shake-back Stops

The shake-back stops which are fitted to all rear brakes, **except Phantom V**, prevent the shoes from being shaken away from the drum when the car is moving over rough surfaces. The stop consists of two unpolished chromium plated washers held on either side of the web of the shoe by a spring-loaded collar as shown in Figure G23. The shoe is free to move whenever the frictional resistance of the washers is overcome by the brake actuating mechanism.

With the shoes assembled on the carrier plate, the shake-back stop collar fits over the steady post and on brake application the shoe web slides between the friction washers until zero clearance between shoe and drum is maintained. The radial clearance between the steady post and collar allows the operating movement for the shoes.

When fitting replacement shoes, the slipping poundage on the shake-back stops should be checked with a spring balance and should be between 20 and 30 lb. (9·06 and 13·59 kg.) for two shoe brakes and between 22½ and 32½ lb. (10·193 and 14·723 kg.) for four shoe brakes. Hold the shoe vertically in a vice and connect the spring balance to the shake-back stop collar with a suitable wire hook. Pull on the spring balance so that the direction of pull is parallel to the shoe web and along the centre line of the slotted hole. Note the spring balance reading at which the shake-back stop begins to move. If the poundage is outside the above limits, fit new washers or spring as

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necessary. No grease or lubricant of any kind should be used on the stop assembly.

Ensure that the steady posts are correctly entered into the shake-back stop collars. In order to give more positive engagement, the steady posts were increased in length; where replacement shoes have been fitted, it is essential that the steady post and shake-back stop are a pair as the early pattern post allows the end of its thread to take the thrust of the later pattern collar. It is important that there is a small clearance between the thread and collar, as shown in Figure G23.

A modification was introduced to the shake-back stop collar fitted **on S1 cars**; this modified collar is standard **on S2 cars**.

The modified collar, having a $\frac{1}{4}$ in. diameter external thread and a plain nut, is used to clamp the friction

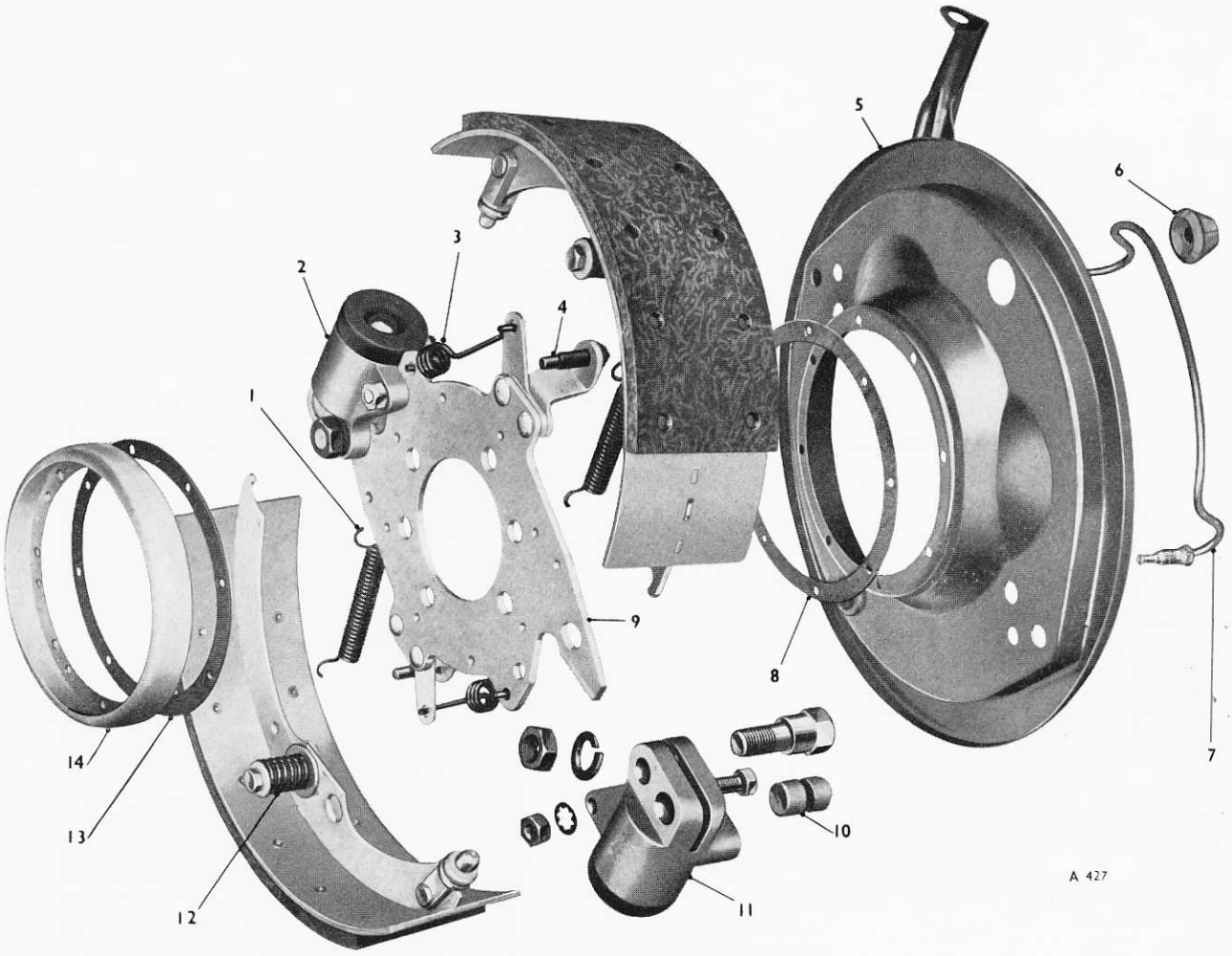

Fig. G21 Front brake — two shoe system — exploded view

1. PULL-OFF SPRING
2. WHEEL CYLINDER
3. WARNING SPRING (NOT FITTED ON LATE S2 CARS)
4. STEADY POST
5. WATER EXCLUDER
6. RUBBER DUST CAP
7. WHEEL CYLINDERS CONNECTING PIPE (SINGLE CYLINDER SYSTEM ONLY)
8. JOINT
9. CARRIER PLATE
10. BRAKE SHOE ANCHOR PIN
11. WHEEL CYLINDER
12. SHAKE-BACK STOP
13. JOINT
14. GREASE CATCHER

washers and spring, whereas the earlier collar is threaded internally and a bolt is used to clamp the friction washers and spring; the modified type of collar is shown in Figure G23. The reason for the introduction of a modified collar is primarily one of economy and it is therefore intended that supplies of the earlier collar and bolt should be used until stocks are exhausted, after which requests for the collar and bolt will be dealt with by supplying the modified collar and nut.

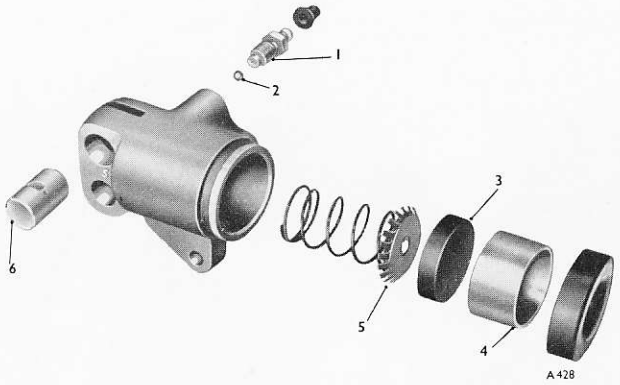

Fig. G22 Wheel cylinder — exploded view

1. 'BLEED' SCREW
2. STEEL BALL
3. RUBBER SEAL
4. PISTON
5. SPREADER
6. BRAKE SHOE ANCHOR PIN

Front Brakes — to fit

Reverse the procedure described for the removal of the brakes.

Check that the lining faces are at right angles to the hub flange. The check may be made with a trammel, Special Tool RH.627, or a parallel bar and set square as shown for the rear shoes in Figure G30; adjustment is made by screwing the steady post in or out as necessary.

Remove the dust cover in the rear of the water excluder and release the steady post lock-nut just sufficiently to permit rotation of the post.

Adjust the steady post by means of a screwdriver in the slot provided in the end of the post, then tighten the outside lock-nut with a box spanner concentric to the screwdriver.

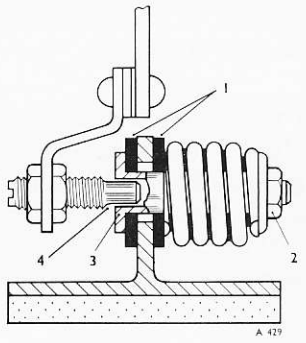

Fig. G23 Shake-back stop

1. FRICTION WASHERS
2. NUT
3. SHAKE-BACK COLLAR
4. CLEARANCE

On early S1 cars, pull the shoe forward, away from the carrier plate and tighten the inner lock-nut on the steady post. **On later cars,** the inner lock-nut is welded to the steady post bracket and does not therefore require tightening.

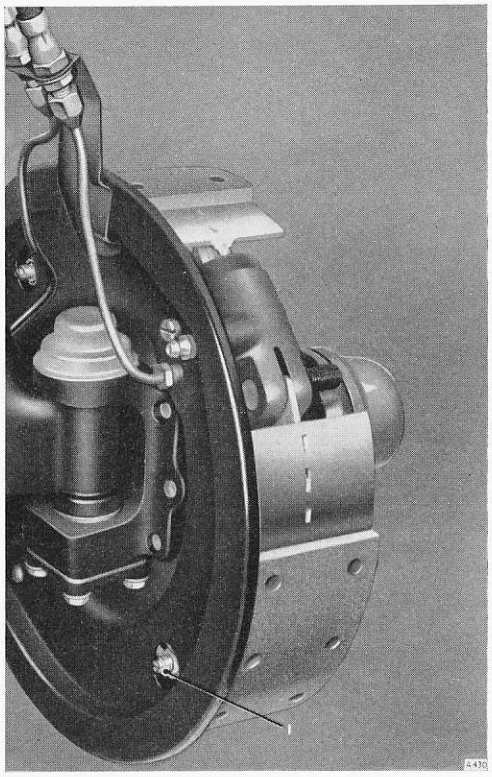

Fig. G24 Front brake — rear view

1. ADJUSTING SCREW

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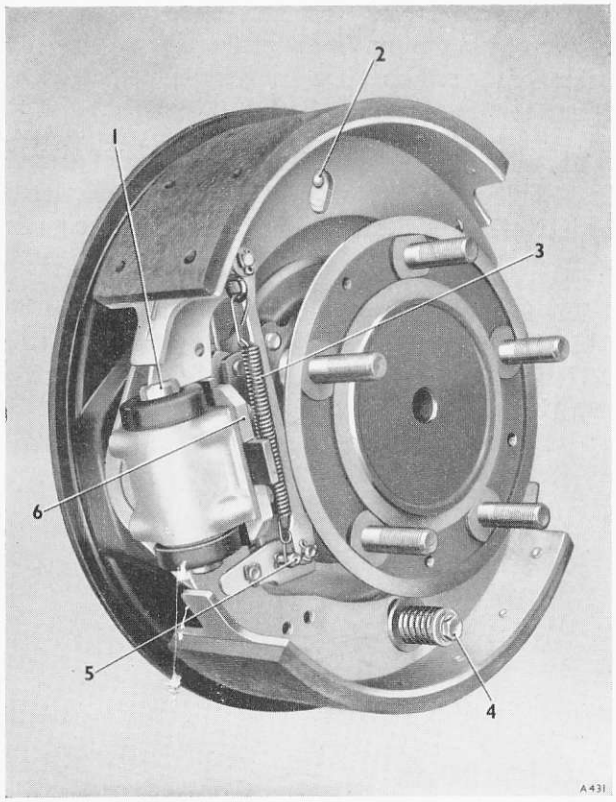

Fig. G25 Rear brake — drum removed

1. HYDRAULIC EXPANDER
2. STEADY POST
3. RETURN SPRING
4. SHAKE-BACK STOP
5. ANCHOR PIN
6. MECHANICAL EXPANDER

Press both shoes inwards and temporarily re-fit the drum, taking care that the shake-back stops are not pulled off their steady posts.

Apply the brakes by means of Special Tool RH.322 or RH.417, to centralise the shoes.

Remove the brake drum, tighten the cylinder mounting bolts then finally re-fit the drum.

Rear Brakes — to dismantle

Raise the rear of the car using a hydraulic jack.

Remove the wheel and brake drum; if the drum is tight, screw two $\frac{1}{4}$ in. U.N.F. setscrews into the tapped holes provided.

Pull the shoes from their steady posts and away from the adjuster plungers. Unhook the return spring adjacent to the expander from its anchor pin on the inter-shoe linkage. A loop is provided to enable the spring to be gripped with pliers.

It should be noted that on **Phantom V rear brakes,** no springs are fitted at the expander end of the brake shoes.

Remove the shoes, working the inter-shoe linkage out between the expander unit and the hub (see Fig. G26).

Disconnect the hydraulic pipe from the expander unit.

Release the lock-tab and remove the 2 B.A. setscrew securing the expander unit to its cover plate on the water excluder.

Remove the expander unit forward.

Remove the two setscrews and plain washers retaining the adjuster unit and remove the unit. Collect the distance pieces fitted between the water excluder and the carrier plate.

Expander Unit — to overhaul

Remove the dust covers and extract the pistons, rubber seals and spreaders.

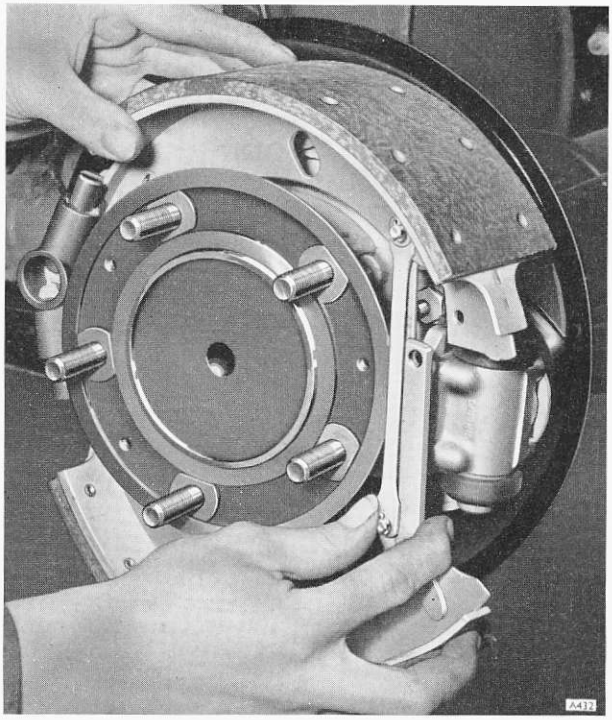

Fig. G26 Rear brake — shoe removal

Remove the four 2 B.A. nuts, shake-proof and plain washers. Remove the tappet guide (see Fig. G28).

Thoroughly clean all parts and inspect for wear.

Renew the rubber seal, smearing the pistons with Molytone C grease.

Inspect the wheel cylinder bores for scoring and corrosion. Renew the cylinder if necessary.

Lubricate the wheel cylinder parts liberally with clean brake fluid and re-assemble.

Re-assemble the mechanical expander, applying Molytone grease freely to the internal parts.

On early S1 cars, instances have occurred of seizure of the tappets in the guide plate resulting in failure of the rod operated expander with consequent failure to release the rear brakes.

The seizure is caused by the accumulation of packed brake lining dust and this condition can be alleviated by increasing the clearance of the tappets in the guide plate.

The four distance pieces have been lengthened by 0·020 in. (0·508 mm.), to give an overall length of 0·274 in. (6·96 mm.), a clearance of 0·025 in. (0·635 mm.) between the tappet and guide plate.

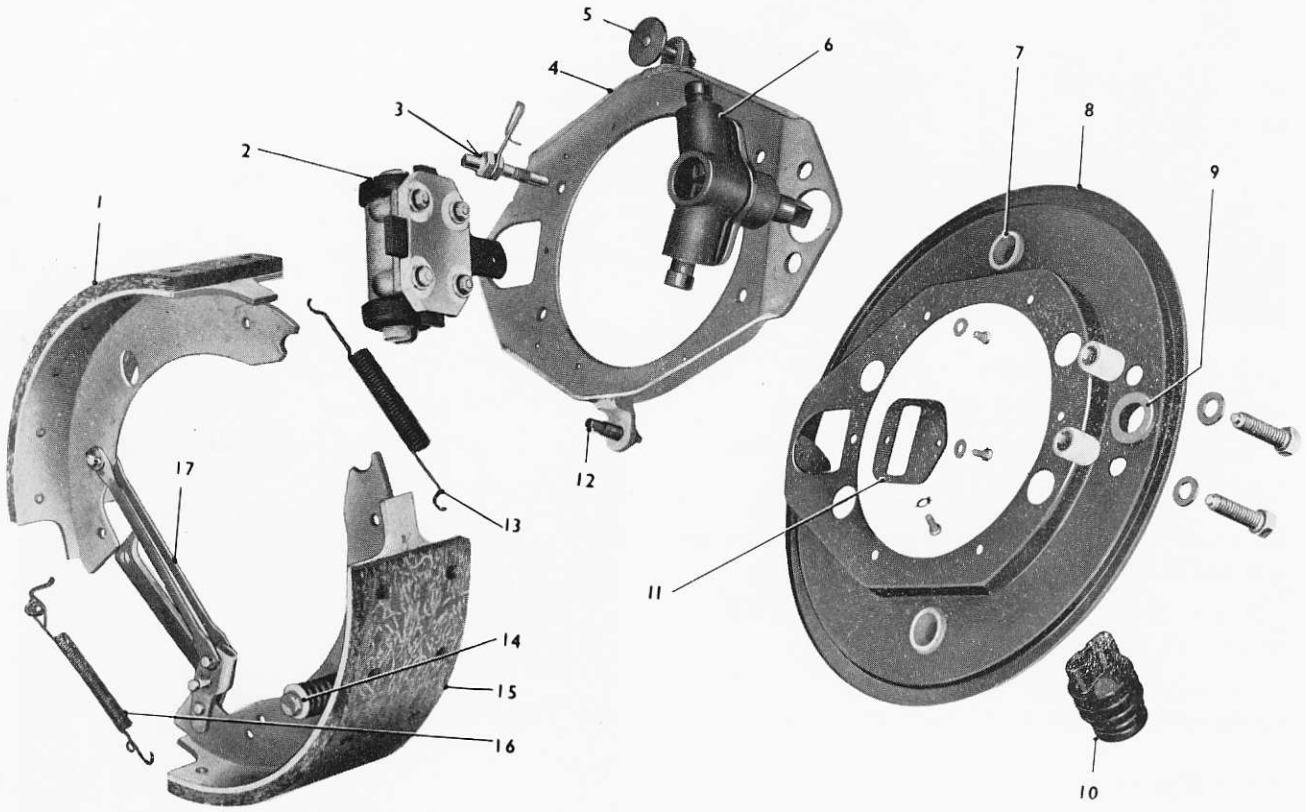

Fig. G27 Rear brake — exploded view

1. LEADING SHOE
2. WHEEL CYLINDER ASSEMBLY
3. ECCENTRIC PIN
4. CARRIER PLATE
5. STEADY POST
6. ADJUSTER UNIT
7. RUBBER DUST CAP
8. WATER EXCLUDER
9. RUBBER SEAL
10. RUBBER BOOT
11. WHEEL CYLINDER COVER PLATE
12. STEADY POST
13. ADJUSTER SPRING
14. SHAKE-BACK STOP
15. TRAILING SHOE
16. PULL-OFF SPRING
17. INTER-SHOE LINKAGE

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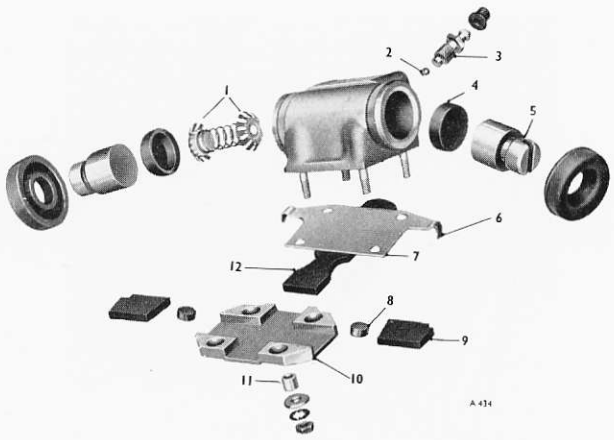

Fig. G28 Expander unit — exploded view

1. SPREADERS
2. STEEL BALL
3. 'BLEED' SCREW
4. RUBBER SEAL
5. PISTON
6. TAPPET STOP
7. SANDWICH PLATE
8. ROLLER
9. TAPPET
10. TAPPET GUIDE
11. DISTANCE PIECE
12. DRAW LINK

Indication of seizure of the tappets can be felt in the operation of the foot brake pedal. If two distinct pressures can be felt, the first movement taking up the slack in the rods and the second operating the servo, it is advisable to check the condition of the tappets. Overheating of the rear brakes may also be experienced.

Should trouble of this nature be experienced, the expander unit should be dismantled, cleaned and washed free of any lubricant.

Re-assemble the expander unit, using the new longer distance pieces and applying Molytone grease freely to the internal parts.

To indicate that this modification has been carried out, a white spot is painted on the angular surface at the extreme rear end of the right-hand side chassis member.

Material

The new part UG.3462 should be ordered and stored for use as necessary. All stocks of the old distance piece should be discarded.

For ease of identification, the expander unit for the right-hand side of the car has a straight draw link; the unit for the left-hand side has a draw link which is bent in order to obtain a direct pull from the rear.

Adjuster Unit — to overhaul

Remove the plungers, noting that they are handed and must be re-fitted in their original bores on re-assembly (see Fig. G29).

Thoroughly clean all parts and re-assemble using white grease. If the plunger ends are pressed in against the adjusting cone there should be four evenly-spaced 'clicks' for each turn of the adjuster screw.

Shoes — to re-fit

Turn the adjuster screw fully anti-clockwise.

Fit the return spring at the adjuster end of the shoes. Position the shoes against the back plate, working the inter-shoe linkage between the hub flange and expander unit.

Fit the shoes into the expander slots and the compression link of the inter-shoe linkage onto the eccentric pin.

Fit the shoes into the adjuster slots, ensuring that the shake-back stop of the lower trailing shoe fits over its steady post; it will be noted that no shake-back stops are fitted on **Phantom V rear brakes** and that no return spring is fitted at the expander end of the shoes.

Fit the return spring at the expander end of the shoes. The top end of the spring is retained by the wire hook attached to the eccentric pin. A loop is provided in the spring to enable it to be gripped by pliers while stretching its lower end onto the anchor pin on the inter-shoe linkage.

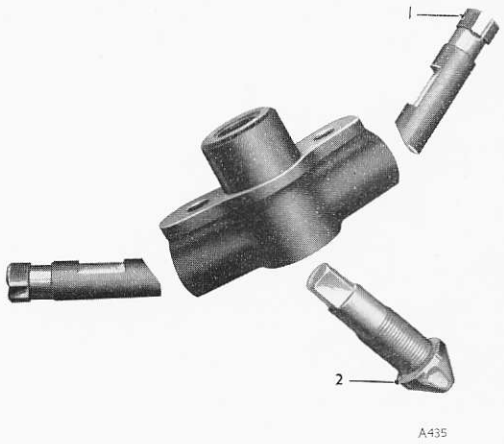

Fig. G29 Adjuster unit — exploded view

1. PLUNGER 2. ADJUSTER SCREW

Brake Shoes — to set

S1 and S2 cars

The alignment gauge RH.627, or a parallel bar and set square, is necessary to ensure that the brake shoes are fitted concentric and square to the drum.

Do not fully tighten the adjuster unit setscrews until the shoes have been aligned by screwing the steady posts in or out as necessary.

Remove the dust cover in the back of the water excluder and release the steady post lock-nut.

Adjust the steady post by means of a screwdriver in the slot provided in the end of the post, then tighten the lock-nut with a box spanner concentric to the screwdriver.

Pull the lower shoe away from the carrier plate and tighten the inner lock-nut on the steady post. It should be remembered that on later cars the nut is welded to the steady post bracket and therefore does not require tightening. The mushroom-headed steady post for the leading shoe has no inner lock-nut.

Slightly slacken the adjuster unit setscrews and the eccentric pin lock-nut (see Fig. G27). The latter should not be slackened more than half a turn, or more than is just sufficient to permit the pin to be turned by means of the inlet valve adjusting spanner provided in the tool kit.

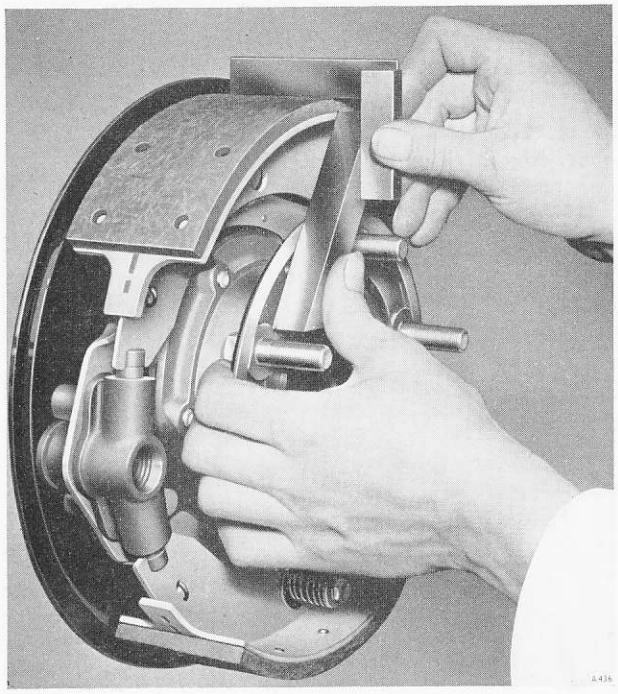

Fig. G30 Aligning the brake shoes

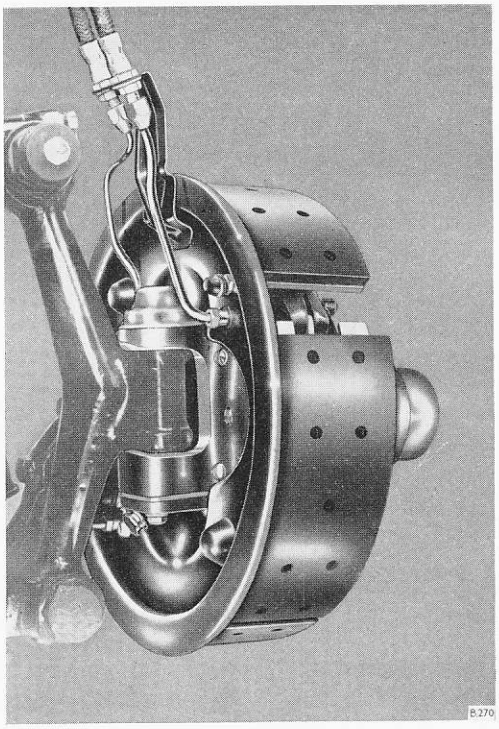

Fig. G31 Bentley Continental S2 — four shoe brake — rear view

Temporarily fit the brake drum and disconnect the rear end of rod 2 (see Fig. G1) from the rear brake equaliser.

Tighten the adjuster screw to centralise the adjuster unit by expanding the brake shoes, then tighten the adjuster setscrews.

Slacken the adjuster screw two 'clicks'.

Remove the brake drum and adjust the eccentric pin to obtain final centralising of the shoes using the trammel, Special Tool RH.627.

Tighten the pin lock-nut.

In cases where a trammel is not available, the eccentric pin must be adjusted with the drum in position. The pin should turn about 45 deg. in either direction when a positive stop will be felt as the shoes are expanded against the drum.

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If the pin appears to toggle over when turned in either direction, tighten the adjuster screw one 'click' and repeat the test.

Set the pin midway between its stop positions and tighten the lock-nut.

The adjuster screw is normally adjusted two 'clicks' back but when new linings have been fitted this should be increased to **five** 'clicks' to allow for their initial growth during road test.

Connect the brake actuating rod and fit the pull-off spring and rubber boot.

'Bleed' the brakes; refer to 'Hydraulic System — to bleed'.

Front Brakes — to dismantle

Bentley Continental S2

Dismantle the four shoe brake in the same way as described for the two shoe brake but as two shoes are fitted to each shoe carrier, the following additional operations are necessary.

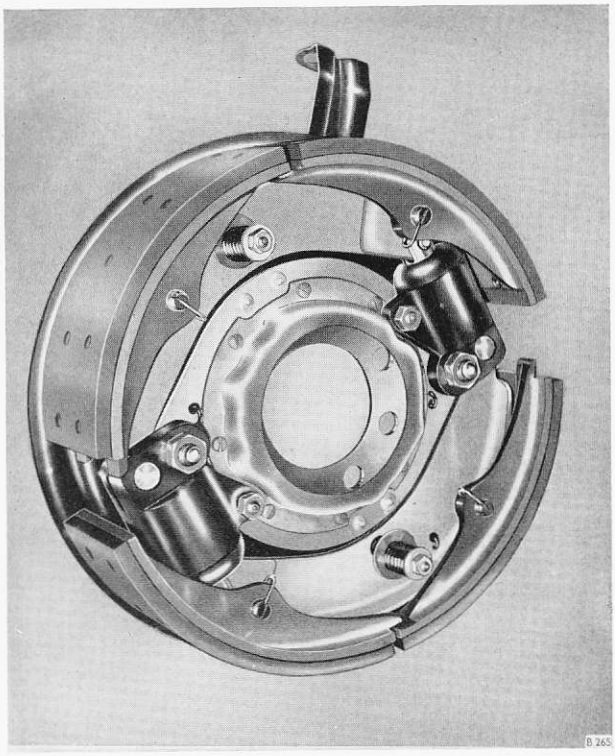

Fig. G32 Bentley Continental S2 — four shoe brake — assembly

Remove the spring clips retaining the hardened pivot pins.

Withdraw the pivot pins and remove each brake shoe.

To assemble

The method of assembly is the reverse of the dismantling procedure, ensuring that the wheel cylinders are hard against their abutment faces but that the wheel cylinder fixing bolts are only partially tightened. This will assist in the following brake setting instructions.

Front Brake — to set

By adjusting the shake-back steady post 'E' (see Fig. G34), set the shoes 'A' and 'B' so that they are square to the hub at the points 'X' and 'Y'.

If it is impossible to position both shoes so that they are square to the hub at the same time, then the difference in 'out of squareness' of the two shoes should be split so that the shoes are an equal amount out of square.

Repeat this operation for shoes 'C' and 'D'.

Fit the special window drum RH.7119.

Disconnect the feed pipes to the wheel cylinders.

Expand the brake shoes against the drum by applying a load to each shoe carrier in the vicinity of the operating link. The load is best applied with a suitable piece of bar.

Release the pressure, thus allowing the shoes to take up their normal 'Off' position.

Check clearances (x) and (y) between the shoes and the drum at points 'X' and 'Y' respectively. Also check the interference or possible clearance at point 'I'.

The clearances (x) and (y) must be equal within 0·003 in. (0·076 mm.) and at the same time the fit at 'I' should be between 0·003 in. (0·076 mm.) clearance and 0·015 in. (0·381 mm.) interference. The interference at 'I' is equivalent to the clearance between the leading edge of shoe 'B' and the drum, provided that the trailing ends of both shoes 'A' and 'B' are touching the drum.

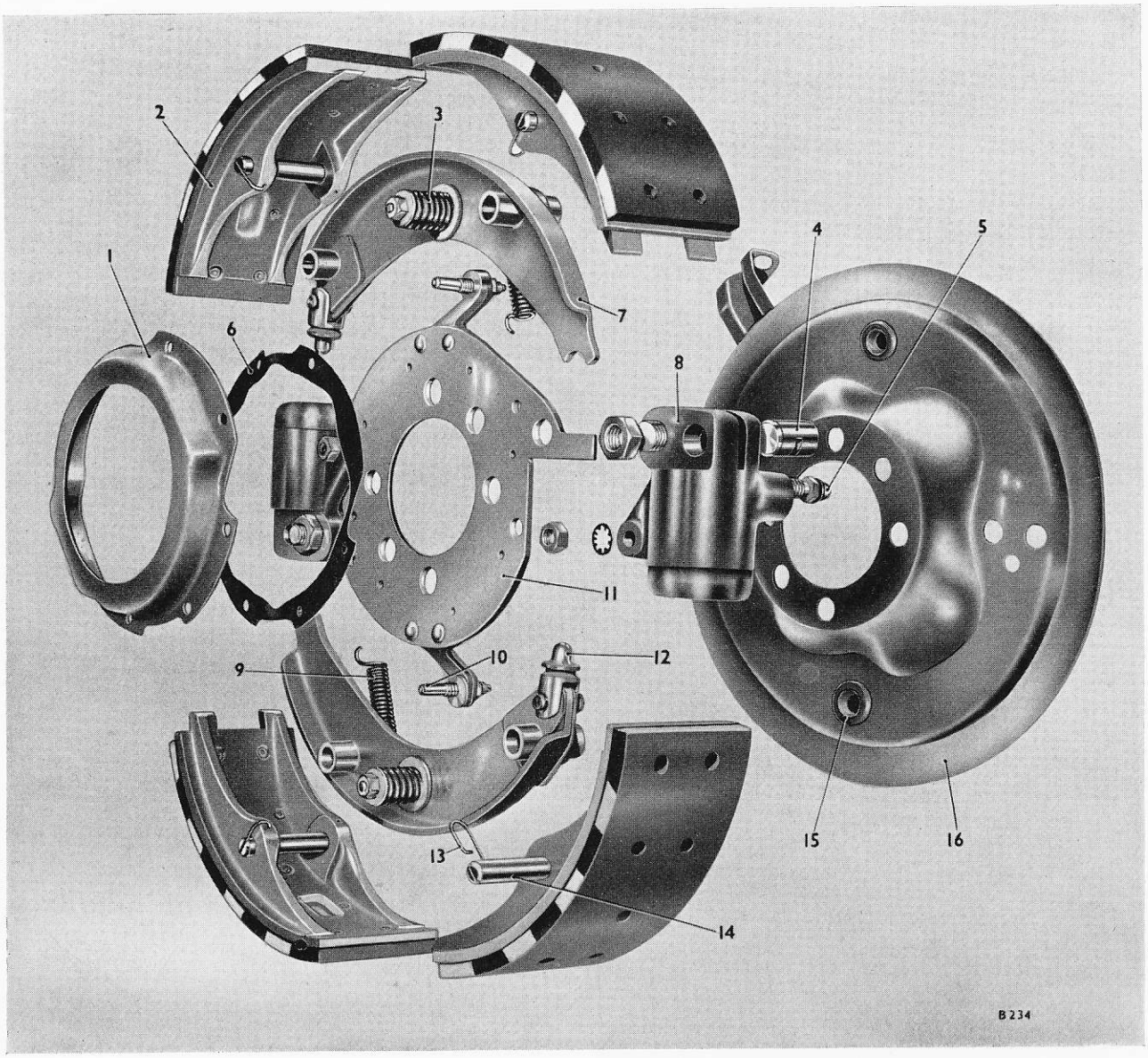

Fig. G33 Exploded view — Bentley Continental S2 four shoe brake

1. GREASE CATCHER
2. SHOE ASSEMBLY
3. SHAKE-BACK STOP
4. BRAKE SHOE ANCHOR PIN
5. BLEED SCREW
6. JOINT
7. SHOE CARRIER
8. WHEEL CYLINDER
9. SHOE RETURN SPRING
10. STEADY POST
11. CARRIER PLATE
12. LINK
13. RETAINING SPRING
14. PIVOT PIN
15. DUST CAP
16. WATER EXCLUDER

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If the clearances are not within the above limits, the wheel cylinders must be re-positioned on the abutment faces. For example, if clearance (x) is much greater than (y), the wheel cylinder 'G' must be moved out from the centre of the brake along the abutment face until (x) and (y) become equal to within 0·003 in. (0·076 mm.).

It is recommended that during this adjustment the brake shoes and carriers be removed to ensure that the wheel cylinder remains hard against its abutment face during movement. As a rough guide, it will be necessary to move the wheel cylinder approximately the same distance as the difference between (x) and (y).

> **Note:** The interaction interference (i) at the point 'I' has precedence over the shoe drum clearance at (x) and (y) and the inequality of (x) and (y) may be varied anywhere in the limit of 0·003 in. (0·076 mm.) in order to achieve the correct tolerance in (i).

Before re-checking clearances, the shoes should be expanded and then brought back to their 'Off' position as previously described.

Repeat the procedure for shoes 'C' and 'D'.

Torque tighten the wheel cylinder fixing bolts; the $\frac{5}{16}$ in. (7·925 mm.) dia. bolts should be tightened to 16–18 lb.ft. (2·21–2·48 kg.m.) and the $\frac{1}{2}$ in. (12·7 mm.) dia. bolts to 48–52 lb.ft. (6·62–7·17 kg.m).

Finally, check once more the fits at 'X', 'Y' and 'I'.

Re-connect the feed pipes.

Repeat the whole procedures for the other brake unit.

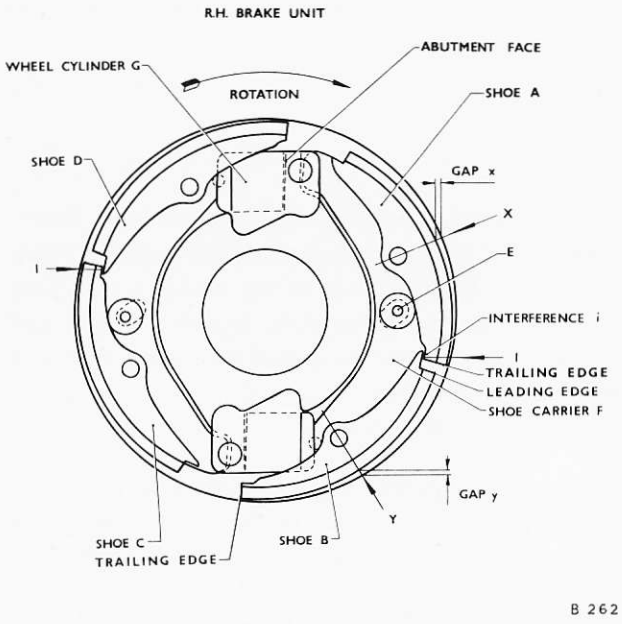

Fig. G34 Setting of four shoe brakes

'Bleed' the brakes; refer to 'Hydraulic System — to bleed'.

> **Note:** Once shoes have bedded in, they are not interchangeable.

Brake Drums

It is permissible to re-grind the brake drums to remove scores or ovality in accordance with the following data.

Standard internal diameter of the brake drum	...	11·250 in. (28·575 cm.)
Grinding limit	... ...	0·050 in. (1·27 mm.) oversize

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If the clearances are not within the above limits, the wheel cylinders must be re-positioned on the abutment faces. For example, if clearance (x) is much greater than (y), the wheel cylinder 'G' must be moved out from the centre of the brake along the abutment face until (x) and (y) become equal to within 0·003 in. (0·076 mm.).

It is recommended that during this adjustment the brake shoes and carriers be removed to ensure that the wheel cylinder remains hard against its abutment face during movement. As a rough guide, it will be necessary to move the wheel cylinder approximately the same distance as the difference between (x) and (y).

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Before re-checking clearances, the shoes should be expanded and then brought back to their 'Off' position as previously described.

Repeat the procedure for shoes 'C' and 'D'.

Torque tighten the wheel cylinder fixing bolts; the $\frac{5}{16}$ in. (7·925 mm.) dia. bolts should be tightened to 16–18 lb.ft. (2·21–2·48 kg.m.) and the $\frac{1}{2}$ in. (12·7 mm.) dia. bolts to 48–52 lb.ft. (6·62–7·17 kg.m).

Finally, check once more the fits at 'X', 'Y' and 'I'.

Re-connect the feed pipes.

Repeat the whole procedures for the other brake unit.

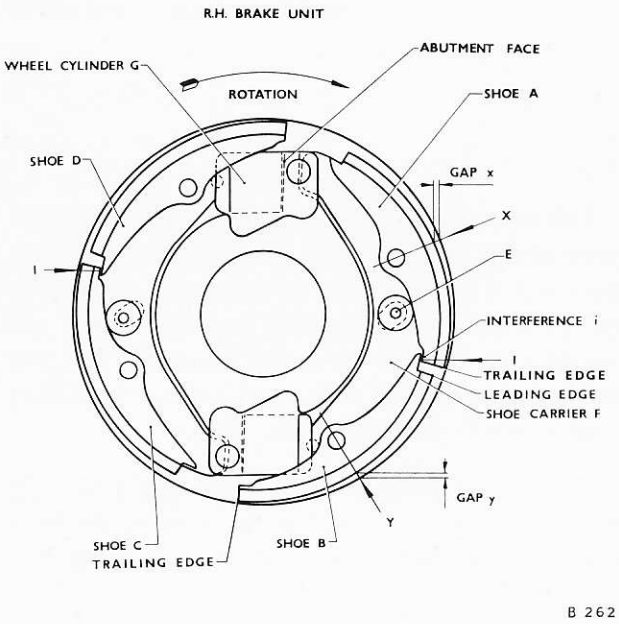

Fig. G34 Setting of four shoe brakes

'Bleed' the brakes; refer to 'Hydraulic System — to bleed'.

> **Note:** Once shoes have bedded in, they are not interchangeable.

Brake Drums

It is permissible to re-grind the brake drums to remove scores or ovality in accordance with the following data.

Standard internal diameter of the brake drum	...	11·250 in. (28·575 cm.)
Grinding limit	... ...	0·050 in. (1·27 mm.) oversize

SECTION G6 — HANDBRAKE RATCHET ASSEMBLY

This assembly is of the twist-to-release type. Incorporated in it are two ratchet pawls which provide lock positions at half the pitch of the ratchet teeth. Two rollers running in guide slots, together with a coil spring, carry the forward end of the ratchet slide and retain the slide rod in the normal position for ratchet engagement (see cut-away Fig. G35).

The ratchet pawls may be eased and lubricated should the necessity arise. In the event of the inner cable bracket becoming loose, the clamping bolt should be tightened through the aperture at the forward end of the assembly.

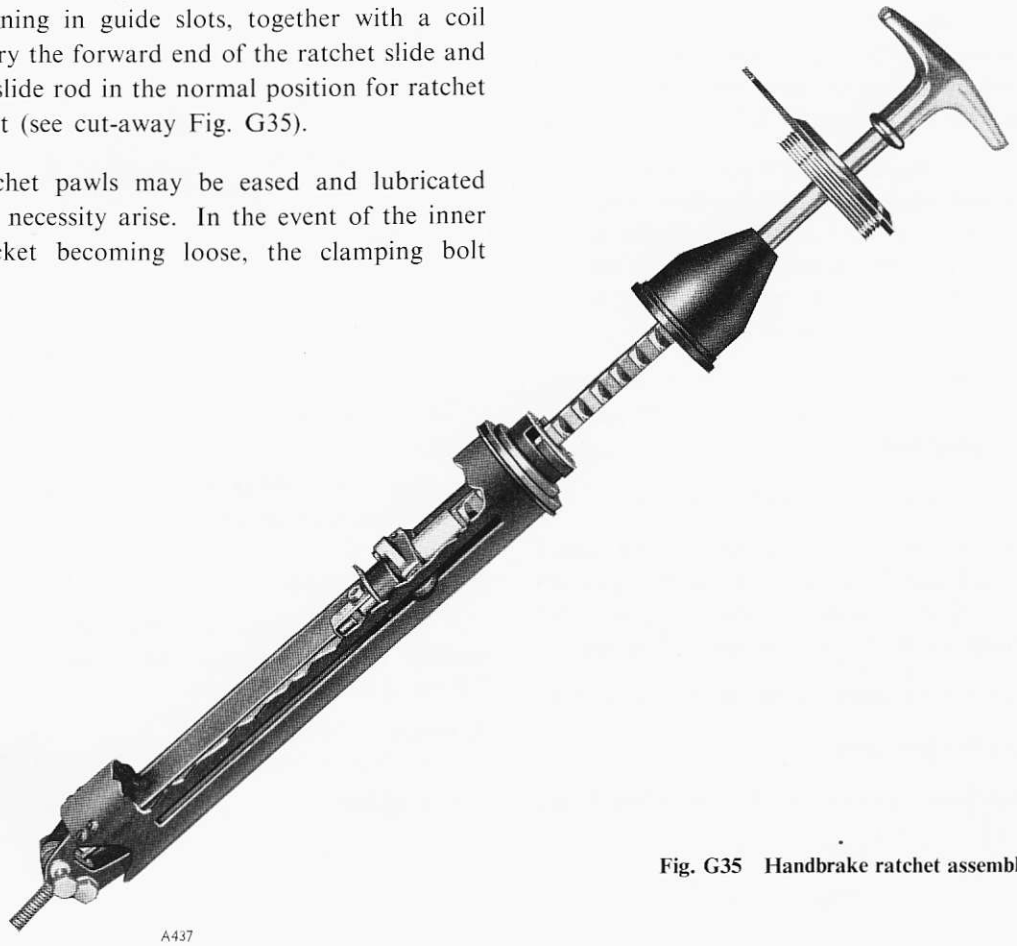

Fig. G35 Handbrake ratchet assembly

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Investigation has shown that there is a possibility of the handbrake cable being placed over the adjustment nuts on the servo shaft, following installation of the servo motor from beneath the car or when for any reason the cable has been disturbed. This incorrect positioning of the cable will cause gradual fraying with consequent breakage of the cable. Damage is also incurred by the servo adjustment nuts where frictional contact is made.

To prevent this trouble occurring, a check of the cable run should be made following displacement of either the servo motor or handbrake cable.

SECTION G7 — BASIC ADJUSTMENT OF BRAKE RODS AND LINKAGES

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Refer to Figure G1 and disconnect the following:

1. Pedal return spring 9.
2. Handbrake cable and return spring 10 from lever 3.
3. Front end of handbrake transfer link from lever 3.
4. Front ends of rods 4 and 7 and the rear end of rod 2. (On Phantom V cars, two rods are fitted instead of the one numbered 2 in Fig. G1).
5. Pin 13 (rod 12) left-hand cars only.
6. Rod return springs from rear brake back plates 1.

Slacken the bolts retaining the 'on-stop' 6 to the frame and tighten the rear brake adjusters to lock the rear brakes.

'On-stop' Adjustment

The following adjustments should be carried out with the rubber 'off-stop' 1 in position on the chassis frame bracket. Refer to Figure G36 to identify the components.

Adjust rod 3 so that when the end of the slotted link 2 is in contact with the rubber 'off-stop' 1 the servo outer lever 4 leans 10 deg. ± 2 deg. towards the rear of the car. Lock the nut on rod 3.

To adjust the 'on-stop' 5, place a 1·250 in. (31·75 mm.) distance piece for S1 cars and a 1·000 in. (25·4 mm.) distance piece for S2 cars, between the end of the slotted link 2 and the rubber 'off-stop' 1. The servo outer lever 4 should now be in contact with the 'on-stop' 5; if not, the 'on-stop' should be adjusted and locked in position.

As a check when the distance piece is removed, the distance between the servo outer lever 4 and the 'on-stop' 5 should be 1·050 (26·67 mm.) **for S1 cars** and 0·800 in. (20·32 mm.) **for S2 cars**.

The continued operation of the hydraulic system in the event of failure of the mechanical rear brake will depend on this adjustment and it is essential that this be carried out correctly.

Rod Adjustment (12) — left-hand cars only

Refer to Figure G1 for all the following adjustments.

Adjust the rod to the nearest turn of the yoke to give a distance of 19·875 in. (50·483 cm.) between the pin centres.

Rod Adjustment (7)

With rod 4 held rearwards on the 'off-stop', adjust rod 7 so that the seal on the pedal stem is compressed approximately 0·200 in. (5·08 mm.) by contact with the pedal gap plate.

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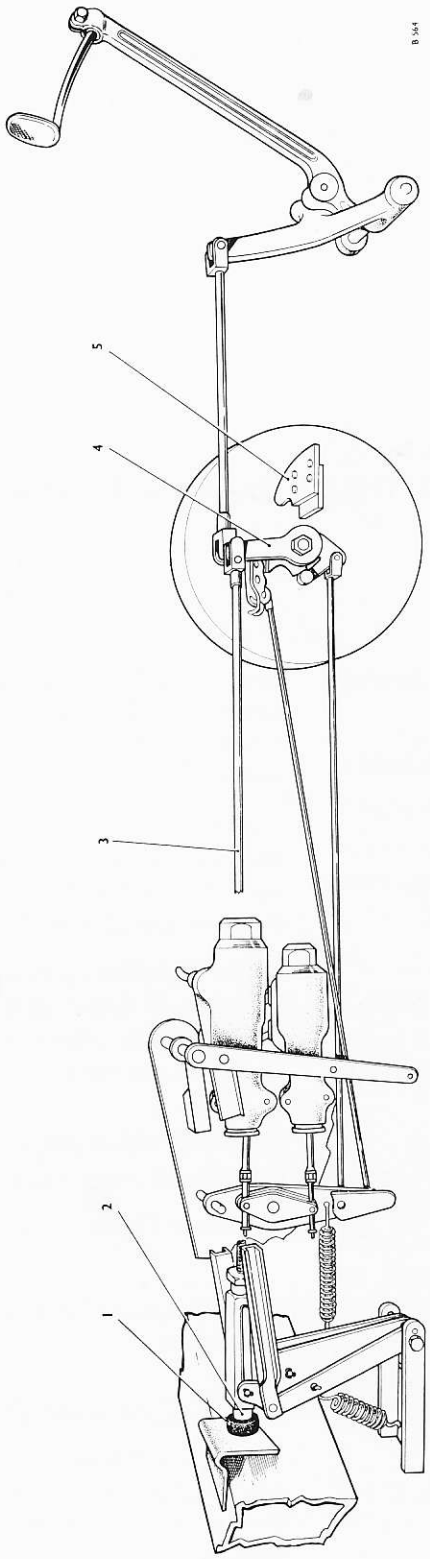

Fig. G36 'On-stop' adjustment

1. RUBBER 'OFF-STOP'
2. SLOTTED LINK
3. MECHANICAL LINKAGE OPERATING ROD
4. SERVO OUTER LEVER
5. 'ON-STOP'

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Rod Adjustment (2)

Adjust to eliminate all the free movement without tensioning the rods. In some cases it may be found that there is insufficient thread on this rod to permit adjustment of the forkpiece. In this case the rear end of rod 2 should have its screw thread extended by $\frac{1}{4}$ in. with a $\frac{1}{4}$ in. dia. U.N.F. die nut.

Check to ensure that no foul occurs between the end of the rod where it protrudes through the forkpiece and the equaliser lever when the brakes are fully applied. If a foul occurs, rod 2 should be shortened by cutting a $\frac{1}{4}$ in. length off its rear end.

Re-adjust the rear brakes as detailed in 'Master Cylinders'.

Handbrake Adjustment

Connect the handbrake cable and return spring.

Adjust the cable at the abutment (8), to give $\frac{1}{4}$ in. free movement of the cable before rod 2 moves. Adjust the master cylinder and servo as detailed in 'Servo Motor and Brake Shoes, Drum and Expander Mechanism'.

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CHAPTER G

BRAKING SYSTEM

SECTION G 1 — DATA AND GENERAL INFORMATION

Four shoe brake system — Front brakes

(Page G 3 in Workshop Manual)

The fitting of four shoe brakes to Bentley Continental cars has been discontinued from Chassis No. BC164XA and replaced by two shoe brakes as fitted to standard S2 and S3 cars.

The information in this Section which applies to Bentley Continental S2 cars is also applicable to Bentley Continental S3 cars to Chassis No. BC164XA inclusive.

The information in this Section which applies to S2 cars is also applicable to S3 cars and Bentley Continental S3 cars from Chassis No. BC166XA inclusive.

SECTION G 4 — SERVO MOTOR

Servo cam angle on Bentley Continental S2 and late S1 cars

(Page G 16 in Workshop Manual)

The information in this Section which applies to Bentley Continental S2 cars is also applicable to Bentley Continental S3 cars to Chassis No. BC164XA inclusive.

On S2 and Phantom V cars

The information in this Section which applies to S2 cars is also applicable to S3 cars and Bentley Continental S3 cars from Chassis No. BC166XA inclusive.

SECTION G 5 — BRAKE SHOES, DRUMS AND EXPANDER MECHANISM

Front brakes — To dismantle

(Page G 17 in Workshop Manual)

The information in the first paragraph of this Section which applies to Bentley Continental S2 cars is also applicable to Bentley Continental S3 cars to Chassis No. BC164XA inclusive.

The remaining information in this Section which applies to S2 cars is also applicable to S3 cars and Bentley Continental S3 cars from Chassis No. BC166XA inclusive.

Front brakes — To dismantle Bentley Continental S2

(Page G 25 in Workshop Manual)

The information in this Section which applies to Bentley Continental S2 cars is also applicable to Bentley Continental S3 cars to Chassis No. BC164XA inclusive.

SECTION G7 — BASIC ADJUSTMENT OF BRAKE RODS AND LINKAGES

Hand brake warning lamp — Description

A warning lamp is fitted to all present production cars to indicate to the driver that the hand brake is either 'on' or 'off'. The warning lamp is operated by a micro-switch mounted on a bracket on the chassis frame behind the hand brake operating lever. For the warning lamp to function correctly, it is essential that when the hand brake is applied, the light comes on before the hand brake reaches the first notch on the ratchet. Any warning lamp which is incorrectly set should be adjusted as follows

Hand brake warning lamp — To adjust

With the hand brake in the 'off' position and with the button on the micro-switch held down, the micro-switch should be adjusted so that a 0·060 in. gap is obtained between the button and the hand brake operating lever.

After carrying out the adjustment, check to ensure that the warning light comes on before the first notch on the hand brake is reached.

The remaining information in this Section which applies to S2 cars is also applicable to S3 cars.