BRAKES

G

CATEGORY 2.

BRAKE FLUID SUPPLY TANK.

To prevent any possibility of foreign matter entering the Hydraulic Brake Fluid supply tank, which would endanger the efficient working of the braking system, a gauze filter should be fitted in the top of the tank.

The following cars require the incorporation of this filter, and Retailers are requested to deal with those in their respective areas.

Bentley "S" Type.

B-2-AN to B-400-AN, B-1-AP to B-285-AP.
B-289-AP and B-327-AP.

Bentley "S" Continental.

BC-1-AF to BC-54-AF, BC-56-AF to BC-69-AF,
and BC-74-AF.

Silver Cloud.

SWA-2 to SWA-86, SWA-90, SWA-112 to SWA-130.
and SWA-150.

Remove the supply tank cover and install the 80 mesh gauze filter with one gasket either side of the filter rim. Replace supply tank cover.

The necessary Part Numbers are given below, and Retailers should order these from The London Service Station as required:

UR.2837	Gauze Filter	1 off.
UR.2842	Gasket	2 off.

No. CB.22.

FOR INFORMATION.

DUAL MASTER CYLINDER BRAKING SYSTEM.

From Rolls-Royce Silver Cloud SYB-50, Bentley 'S' Type saloon B-245-BC, Bentley 'S' Type Continental BC-21-BG, all models subsequently produced and a small number previously produced, a dual hydraulic master cylinder braking system is fitted.

The dual system is, in principle, similar to the single system except that two master cylinders are fitted, each with a separate replenishing reservoir. One cylinder actuates one brake shoe in each front brake, the other operates the second shoe in the front brake and both rear shoes. The safety factor is therefore greatly increased in the event of a defect in either cylinder.

The assembly of master cylinder operating levers (Fig.1) is arranged to provide equal pressures in each master cylinder hydraulic system by means of the balance lever pivotted above a needle roller bearing. The bearing is to be greased with Shell "Retinax" every 10,000 miles at the greasing nipple provided on the outside of the operating lever assembly.

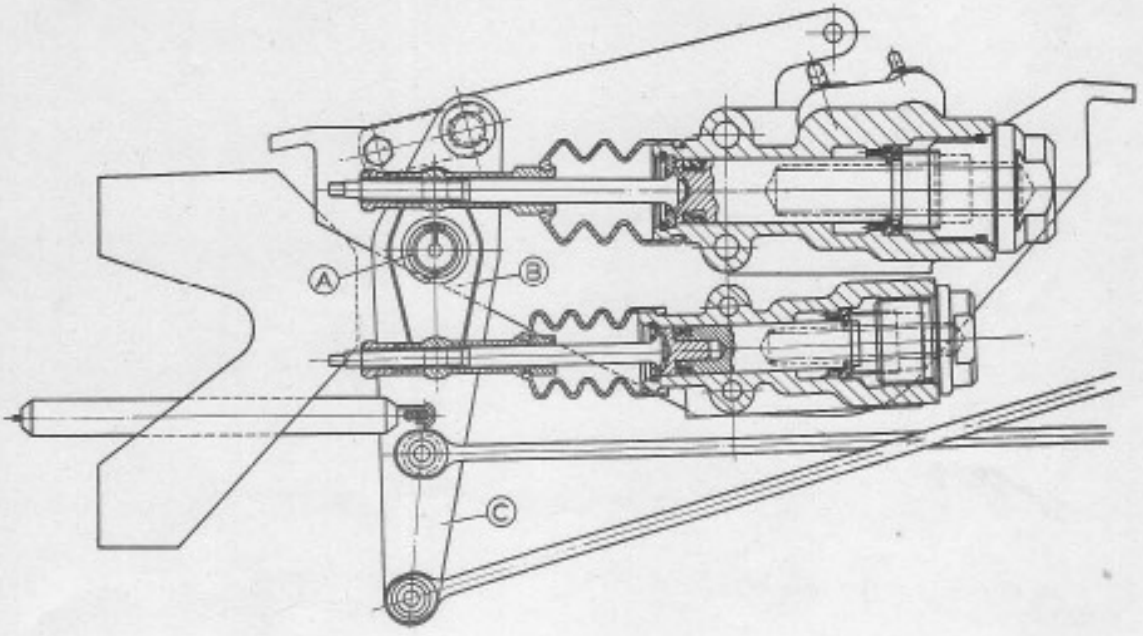


Fig.1.

A. Balance Lever Pivot Needle Roller Bearing.
B. Master Cylinder Balance Lever.
C. Assembly of Master Cylinder Operating Levers.

A check valve has been included in the hydraulic pressure line from each master cylinder to reduce the depression in the hydraulic lines during release of brakes.

As acceleration of the brake fluid on release of the brakes is greater than the acceleration during application of the brakes, there is a momentary depression during release of quite a high value, and if one of the wheel cylinder rubbers will not hold as great a depression as the master cylinder seal, air will be induced into the system through the wheel cylinder. The check valve in the pressure line from the master cylinder will prevent this momentary depression being generated forward of the check valve, and therefore air will not be induced into the system.

The check valve operates both ways at a pressure of 8 lbs sq/in. and does not maintain a permanent pressure difference in the pressure line either side of it, but permits leakage at the valve seat so that the pressure is equal after a short period of time.

All brake shoe expanders are made from cast iron but differ from the latest fitted to the single master cylinder system in that they are not fitted with air excluders but incorporate mechanical seal spreaders to prevent the possibility of fluid leaking, or air entering the system via the seals. Brake shoe expanders fitted with this seal spreader are stamped with the letter 'S' on the machined external faces. These expanders are not interchangeable with those of the single master cylinder system at present.

The brake shoes of the dual system are made from stronger material and have additional strengthening pieces on the operating end of the shoe, and are not interchangeable with brake shoes of the single master cylinder system unless the operating fork is also changed.

BRAKE ADJUSTMENT, BLEEDING AND CHECKING INSTRUCTIONS (Fig.2).

The following should first be disconnected:-

1. Spring S (Pedal Lever).

2. Spring M (Hand Brake Lever).

3. Pin E (Rod B).

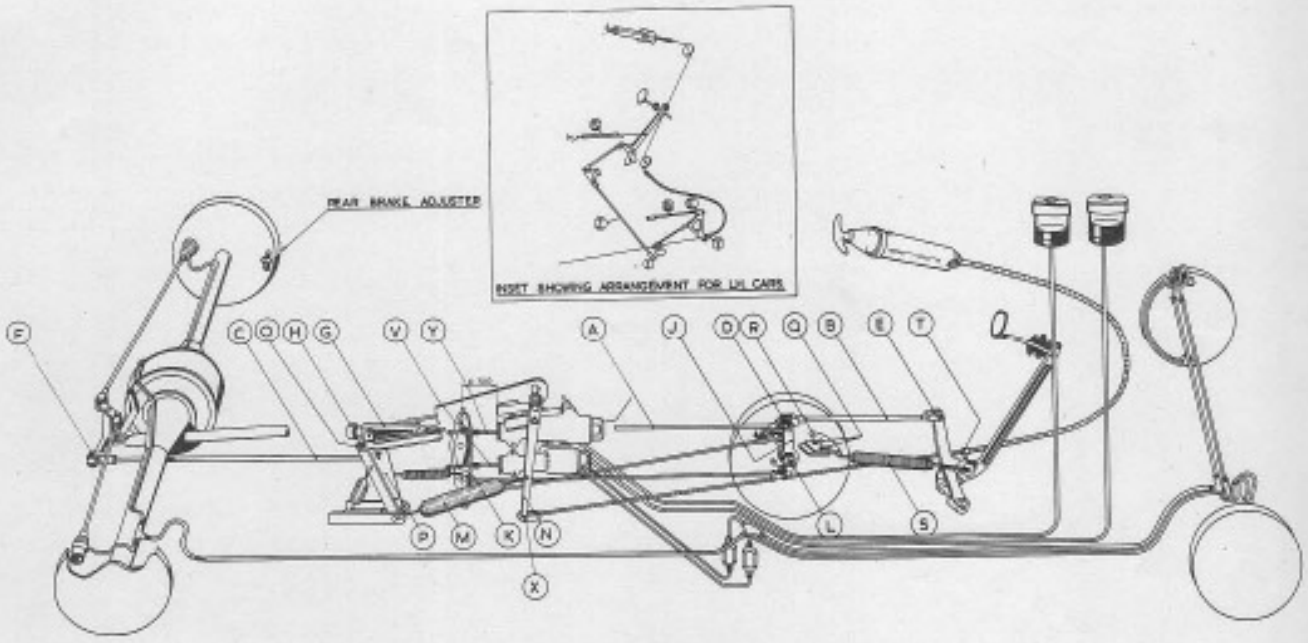


Fig.2.

4. Pin D (Outer Servo Cam Lever).

5. Split pin O. The outer connecting link should then be removed from the pin, lowered and the split pin replaced temporarily. (This is to facilitate spannering of the locknut on rod A.)

6. Pin F (Rear Equaliser).

7. Pin X (Hand Brake Lever).

8. Pin I (Rod Z) L.H. cars only.

In addition the bolts Q retaining on-stop R to the frame should be slackened, and the rear brake adjusters tightened to lock the brake drums.

The linkage can now be adjusted as follows:-

1. Adjustment of Rod A.

Adjust rod A so that when slotted link G is in contact with off-stop H, the clearance between servo cam lever J and the frame is between .200" and .300".

Replace pin D and lock up nut on rod A.

Replace connecting link and renew split pin C.

2. Adjustment of on-stop R.

Place a 1.600" distance piece between slotted link G and off-stop H.

Position on-stop R in contact with the outer servo cam lever J. Lockup bolts Q.

3. Adjustment of Rod Z.

L.H. cars only. Adjust rod Z to the nearest turn of the jaw to give 19.875" centre distance between the two pins.

Replace pin I and lock up nut on rod Z.

4. Adjustment of Rod B.

This rod can only be finally set after the body is in position.

With rod A held rearwards on the off-stop, adjust rod B so that the seal on the pedal stem is compressed approximately .200" by contact with the pedal gap plate.

Replace pin E and spring S and lock up the nut on rod B.

5. Adjustment of Rod C.

Adjust rod C so that there is just sufficient tension in the rods from rear brakes to equaliser to ensure freedom from rattles.

Replace pin F and lock up nut on rod C.

Re-adjust the rear brakes by slackening the adjuster two "clicks".

6. Adjustment of Handbrake.

Replace pin X, and spring M.

Adjust the handbrake cable at the abutment T, to give approximately .250" free movement of the lower end of lever N before lever P is picked up and rod C moves. Lock up the nut on the cable adjuster.

7. Adjustment of Master Cylinders.

Set the push rod Y to give 3.7" between the master cylinder and face and the trunnion U as shown. (NB. In the case of a complete car it must be set before assembling the master cylinder on the car).

Set the push rod V to give just no free movement of lever K before the push rods contact the master cylinder pistons, shorten the push rod V $\frac{1}{4}$ turn and lock up nut.

No on-stop adjustment is necessary.

8. Adjustment of Servo.

Adjust locknuts L until drag between the plates can just be felt on rocking the servo. Undo the locknuts two flats to free the servo applying the pedal once to ensure that the outer cam lever has followed back the locknuts.

Tighten the locknuts L.

NOTE: All split pins removed must be renewed and not replaced.

BLEEDING THE HYDRAULIC SYSTEM.

Make certain that both Brake Fluid Reservoirs are full.

Fix a rubber tube to one of the brake bleed screws and immerse the other end in about 1" of brake fluid in a clean bottle.

Fit the lever (Tool No.RH.417 Fig.3) to the lever K and operate the master cylinders with a firm movement, opening the bleed screw at the same time.

At the end of the forward stroke close the bleed screw and allow the master cylinder pistons to return fully.

Pull the lever K right back and wait five seconds before making a further movement forward with lever and opening the bleed screw.

Continue this cycle ten times or longer if air bubbles still appear in the bottle.

Repeat for the other brakes noting that there are two bleed screws for each front brake and one for each rear brake.

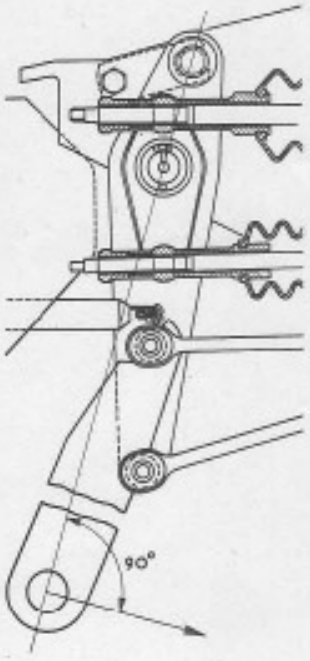


Fig.3.

The 100 lb effort is applied to the lever (Tool No.RH.417) in the direction of the arrow.

During bleeding after two or three cycles, pull the lever K fully forward and then return it fully rearward and note the time taken for the master cylinder pistons to return. This will be evident by the pistons striking the push rod retaining washers on returning. The time permitted is between one and four seconds; if less or more time is taken, the relevant master cylinder or master cylinders must be replaced.

TO CHECK THAT THE HYDRAULIC SYSTEM IS FREE FROM AIR.

Fit the lever (Tool No.RH.417) to the lever K and pull forward pressing the brake shoes hard against the drums, examine the whole hydraulic system for leaks while it is under pressure, then allow the master cylinder pistons to return fully to recuperate.

Fit a spring balance to the lever and exert an effort of 100 lbs forward. Note the distance the bottom clevis pin in the lever K has moved from rest, if this exceeds 2.250" the hydraulic system must be re-bled and re-checked. This distance is known as the "BRAKE SPONGE FIGURE".

CATEGORY 2 MODIFICATION.

MODIFICATION TO THE DUAL MASTER CYLINDER BRAKE FLUID RESERVOIR PIPING.

To overcome any possibility of air being trapped in the master cylinder recuperation pipes and being drawn into the master cylinders on recuperation, larger diameter pipes, rising throughout their length from the master cylinders to the brake fluid reservoirs are to be fitted.

Certain vehicles already have the lower master cylinder recuperation pipe modified and consequently modification is necessary on the upper master cylinder pipe only.

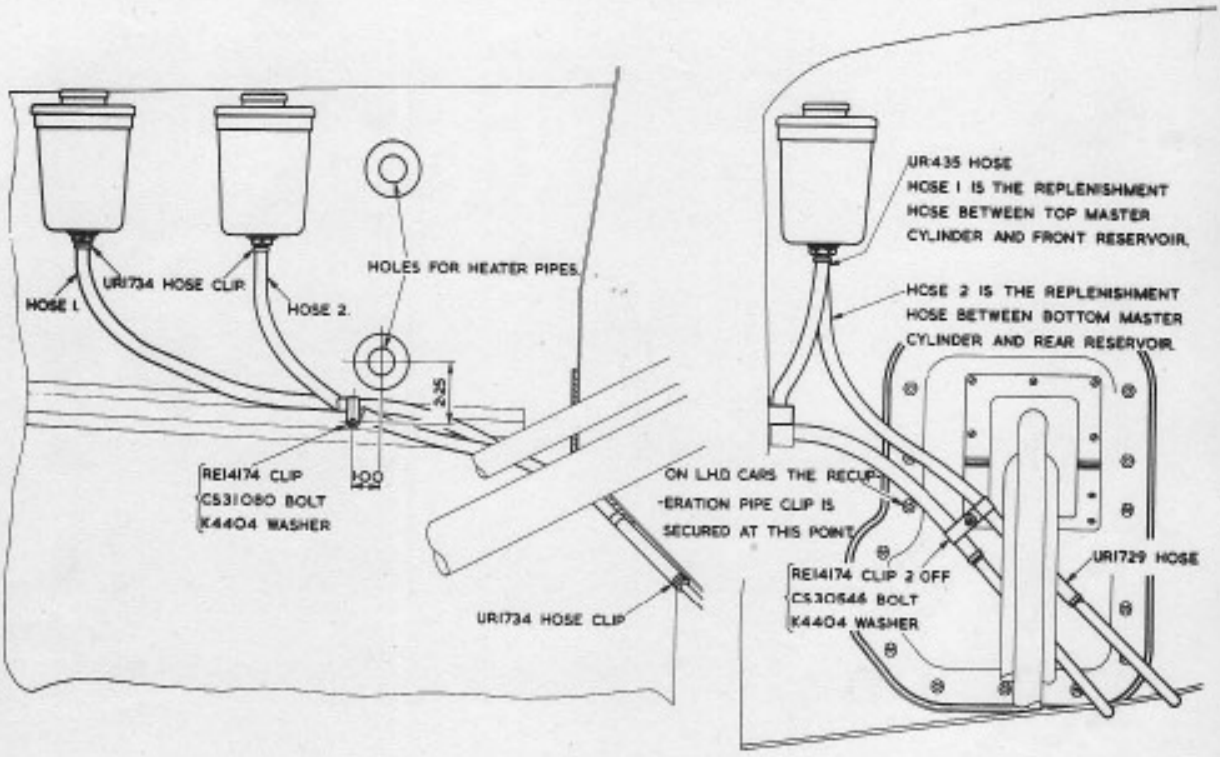
PROCEDURE.

General.

Inspect the car from below and ascertain the extent of modification necessary if any.

Adjust the rear brakes and check and record the Brake Sponge Figure as indicated in the Brake Adjustment and Bleeding Instructions. If the figure is above the limit, any defective master cylinder which can be detected by observing the movement of the master cylinder balance lever, must be replaced. Remove the front carpets, and if only the upper master cylinder requires modification, drain the front brake fluid reservoir, if both master cylinders require modification, drain both reservoirs and keep the brake fluid in a scrupulously clean sealed container until it can be returned to the braking system. The wiring loom fitted along the right hand undersurface of the floor is then to be removed from its clips and eased towards the side of the car to avoid possible damage when drilling the pipe clip fixing holes through the floor as indicated below.

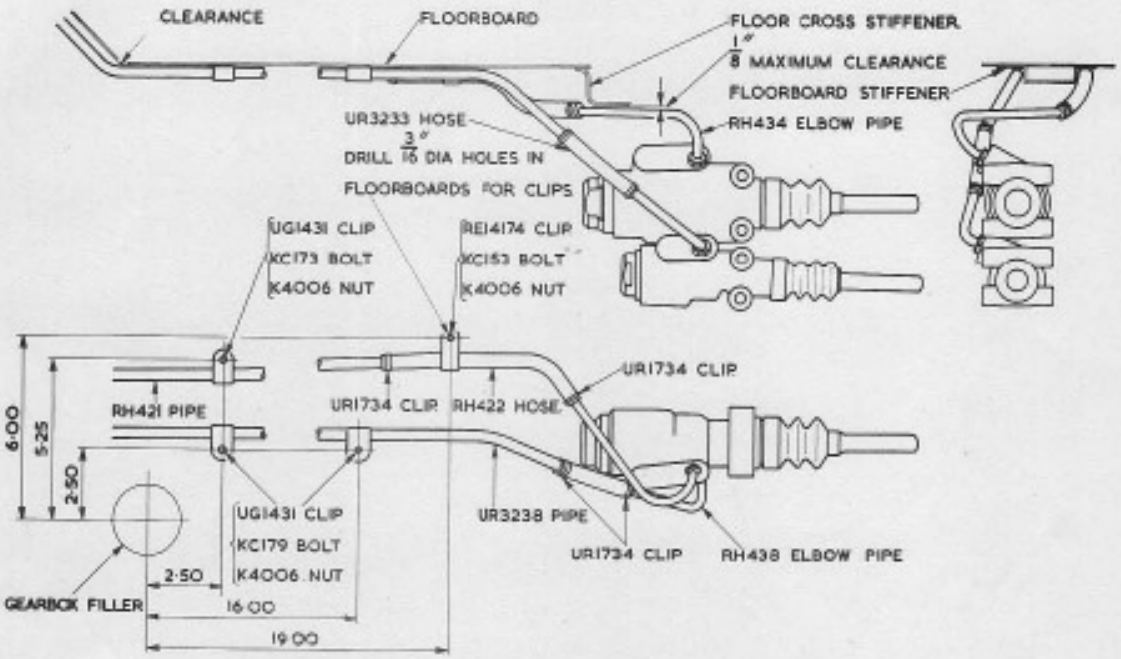
Marking out and drilling the floor to take the hose securing clip setscrews has to be extremely accurate, and it is recommended that the fore and aft centre line of the car be marked on the floor in chalk by measuring the floor width at the front door post, and at the front of the seat which will then indicate the vehicle's centre line, bisecting these dimensions to obtain the centre of the car, and joining the two points. Another line is then drawn parallel to it rearwards from the centre of the gearbox filler; this will provide an accurate position line for the clip fixing holes to be marked from.



MODIFICATION TO THE RECUPERATION PIPE TO THE UPPER MASTER CYLINDER.

Mark and drill the two 3/16" dia. holes in the floor and 1/8" dia. hole through the valance as indicated for the upper master cylinder only.

Take the component pipes and assemble them loosely. The rubber hoses are to be eased over the metal pipes with brake fluid as lubricant, for a distance of one inch. The hose clips and pipe securing clips are then slipped on, and the assembly offered in position, screwing the master cylinder elbow union finger tight only. Adjust the pipe assembly for an even and smooth rise from the master cylinder and adjust the position of the elbow pipe as indicated, so that there is no more than 1/8" clearance between the pipe and the floor panel cross stiffener. The rubber hose at that point is not to be fitted close under the stiffener but clear of it, as indicated. Note that the elbow piece passes over the apex formed by the chassis cruciform member and left hand master cylinder support plate and is above the recuperation pipe from the lower master cylinder at that point.



Allow clearance for the pipe as it passes upwards, at the toe board. When the arrangement of the pipe is satisfactory, tighten the hose clips first, then the master cylinder elbow union and finally the pipe securing clips to the floor; the longer setscrew fits the front clip. Connect the front reservoir to the recuperation pipe with the longer hose provided, tighten the hose clips and then secure the hose to the valance and the steering column seal.

MODIFICATION TO THE RECUPERATION PIPE TO THE LOWER MASTER CYLINDER.

Fitting the lower master cylinder recuperation pipe is carried out in a similar manner to that for the upper system, care being taken to ensure a smooth and continuous rise from the master cylinder. The existing hose from the brake fluid reservoir is to connect the rear reservoir to the lower master cylinder recuperation pipe, contrary to the standard un-modified arrangement.

Refill the brake fluid reservoirs, filtering the fluid previously drained from the system or employing new fluid if satisfactory filtration is

not possible, bleed the braking system, and once more check and record the brake sponge figure after road test.

It is requested that the two brake sponge figures, one obtained before modification and one after, be recorded on the Guarantee Claim Form which is then to be dealt with in the usual manner.

The time permitted for modifying the upper master cylinder is five hours and a further two hours are permitted for modifying the lower master cylinder.

CHASSIS NOS.

Silver Cloud - (SXA. 247, 249, 251.
(SYB. 2, 4, 6, 10, 12, 30, 36, 38, 50, onwards to
(SZB. 67 and LSZB. 19.

Bentley 'S' Type B-BC. 75, 237, 245 onwards to B.378-CK.

Bentley Continental BC-BG. 16, 17, 18, 19, 21 to BC.28-BG.

PARTS REQUIRED.

For Modification to the Upper Master Cylinder.

	RH.421.	Pipe - Recuperation.	1 off.
	RH.422.	Connector - Hose - Rubber.	1 off.
	RH.434.	Piece - Elbow - Upper Cylinder.	1 off.
	UR.1734.	Clips - Hose - Connector.	4 off.
	RE.14174.	Clip - Valance - Wing.	1 off.
	RE.14174.	Clip - Seal - Column.	1 off.
	UG.1431.	Clip - Floor Panel - Front.	1 off.
	RE.14174.	Clip - Floor Panel - Rear.	1 off.
	KC.173.	Screw - 2BA.	1 off.
	KC.153.	Screw - 2BA.	1 off.
	K.4006/Z.	Nut - 2BA.	2 off.
*	CS.30544/Z.	Screw - 2BA.	1 off.
≠	CS.30546/Z.	Screw - 2BA.	1 off.
≠	K.4006/Z.	Nut - 2BA.	1 off.
≠	K.4404/Z.	Washer - 2BA.	1 off.
	CS.31080.	Screw - Self Tapping.	1 off.
	K.4404/Z.	Washer - 2BA.	4 off.

RH.435.	Pipe - Flexible - Reservoir.	1 off.

x Not required on L.H. drive cars.

≠ To be used for the toe-board clip on L.H. drive cars only.

For modification to the Lower Master Cylinder.

UR.3238.	Pipe - Recuperation.	1 off.
UP.3233.	Connector - Hose - Rubber.	1 off.
RH.438.	Piece - Elbow - Lower Cylinder.	1 off.
UR.1734.	Clips - Hose - Connector.	3 off.
RE.14174.	Clip - Seal - Column.	1 off.
UG.1431.	Clip - Floor Panel - Front.	1 off.
UG.1431.	Clip - Floor Panel - Rear.	1 off.
KC.179.	Screw - 2BA.	2 off.
K.4006/Z.	Nut - 2BA.	2 off.
K.4404/Z.	Washers - 2BA.	2 off.

CATEGORY 2 MODIFICATION.

MODIFICATION TO THE SINGLE MASTER CYLINDER BRAKE FLUID RESERVOIR PIPING.

To prevent any possibility of air being trapped in the master cylinder recuperation pipe, which may be drawn into the master cylinder on recuperation, a larger diameter pipe rising throughout its length from the master cylinder to the brake fluid reservoir is to be fitted.

PROCEDURE.

Firstly adjust the rear brakes and check and record the BRAKE SPONGE FIGURE (see below). If the sponge figure is excessive the master cylinder must be changed for one of the latest type.

Remove the front carpets. The flexible pipe from the brake fluid reservoir is then to be removed from the recuperation pipe, draining as much fluid as possible into a scrupulously clean container which is then sealed until the fluid can be returned to the reservoir. Disconnect the other end of the pipe from the master cylinder (on cast iron master cylinders the union is unscrewed from the cylinder itself, whereas on aluminium master cylinders the union is unscrewed from the "banjo" union and not the master cylinder). Remove the pipe securing clips and demount the pipe; the pipe may be cut a short distance from the master cylinder to make removal simpler.

Remove the wiring loom fitted along the right hand undersurface of the floor from its clips and ease it towards the side of the car to avoid damage when drilling the two 3/16" dia. holes in the floor which are to be marked and drilled as indicated to take the new hose clip securing setscrews (Fig.1). Drill the 1/8" dia. hole in the right hand valance as indicated (Fig.2).

The two clip holes through the floor must be drilled with great accuracy which will be facilitated if the fore and aft centre line of the car is marked on the floor in chalk and a line drawn rearwards from the centre of the gearbox filler parallel to it to provide an accurate position line for the holes to be marked from.

Take the master cylinder elbow pipe and immerse the end of it in brake fluid so that the short rubber hose can be simply eased over it until the end of the hose coincides with the edge of the large diameter of the elbow pipe where it joins the smaller diameter section, next immerse the straight end of the long pipe in brake fluid and insert it into the other

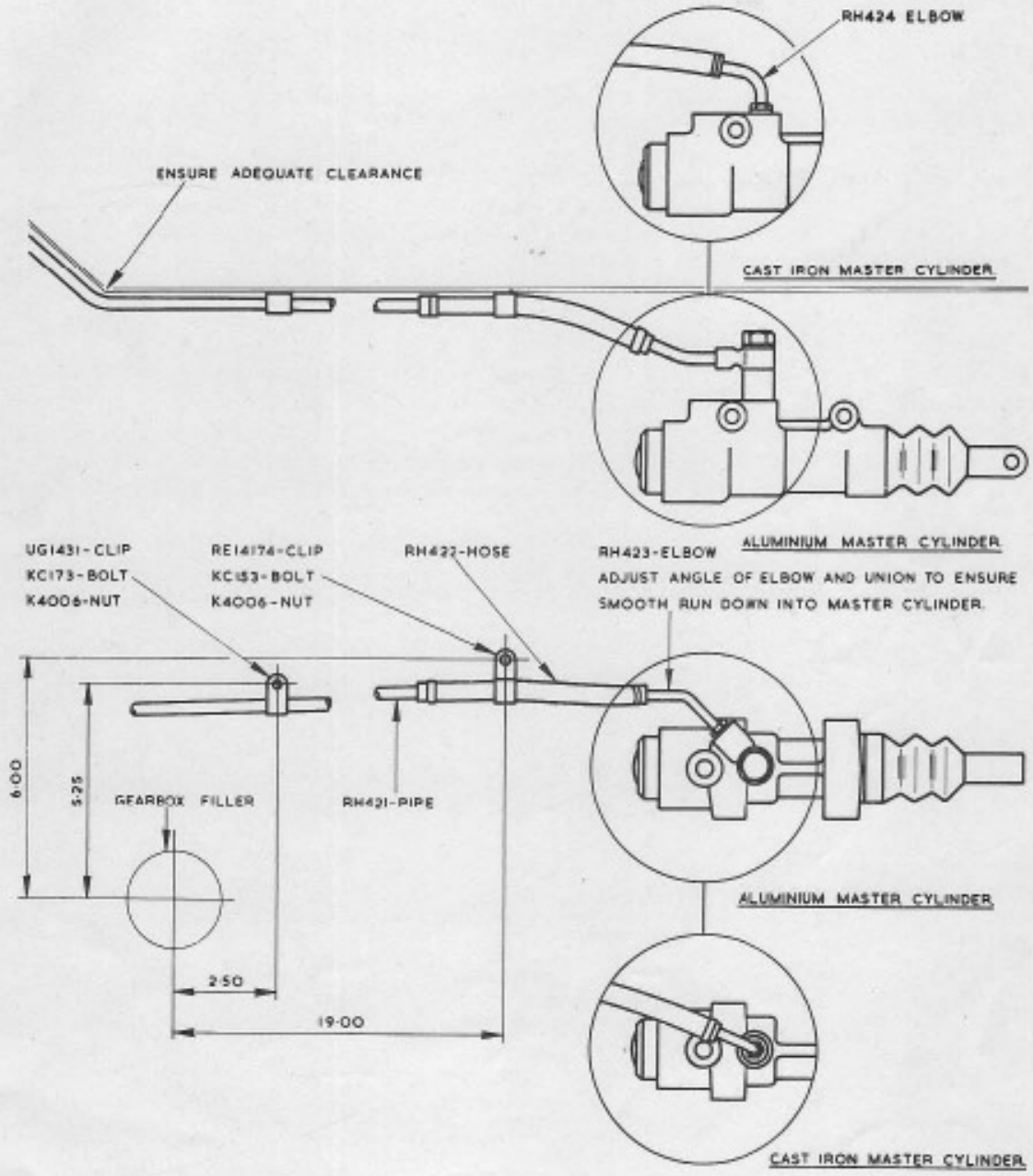

RH424 ELBOW
ENSURE ADEQUATE CLEARANCE
CAST IRON MASTER CYLINDER
ALUMINIUM MASTER CYLINDER
UG1431-CLIP
KC173-BOLT
K4006-NUT
RE14174-CLIP
KC153-BOLT
K4006-NUT
RH422-HOSE
RH423-ELBOW
ADJUST ANGLE OF ELBOW AND UNION TO ENSURE SMOOTH RUN DOWN INTO MASTER CYLINDER.
6·00
5·25
GEARBOX FILLER
RH421-PIPE
2·50
19·00
ALUMINIUM MASTER CYLINDER
CAST IRON MASTER CYLINDER

Fig.1.

end of the short rubber hose. Any adjustments to the length of the pipe assembly, and to the angular position are to be made at this point and not where the master cylinder elbow pipe is fitted into the rubber hose.

Fit loosely the two rubber hose clips and the two clips which will secure the pipe to the floor and offer the assembly in position.

Screw the master cylinder union nut finger tight and adjust the pipe for length to provide adequate clearance at the toe-board as indicated (Fig.1) and for angular displacement so that the pipe will align correctly at the master cylinder elbow and also at the steering column seal clip fixing (Fig.2). All adjustments for length and angle are to be made at the point previously described.

Inspect the pipe assembly to ensure that there is a smooth and continuous rise from the master cylinder to the toe-board. The master cylinder elbow union nut for the cast iron master cylinder is left slack and the "banjo" union on the aluminium master cylinder is slackened to permit this final adjustment.

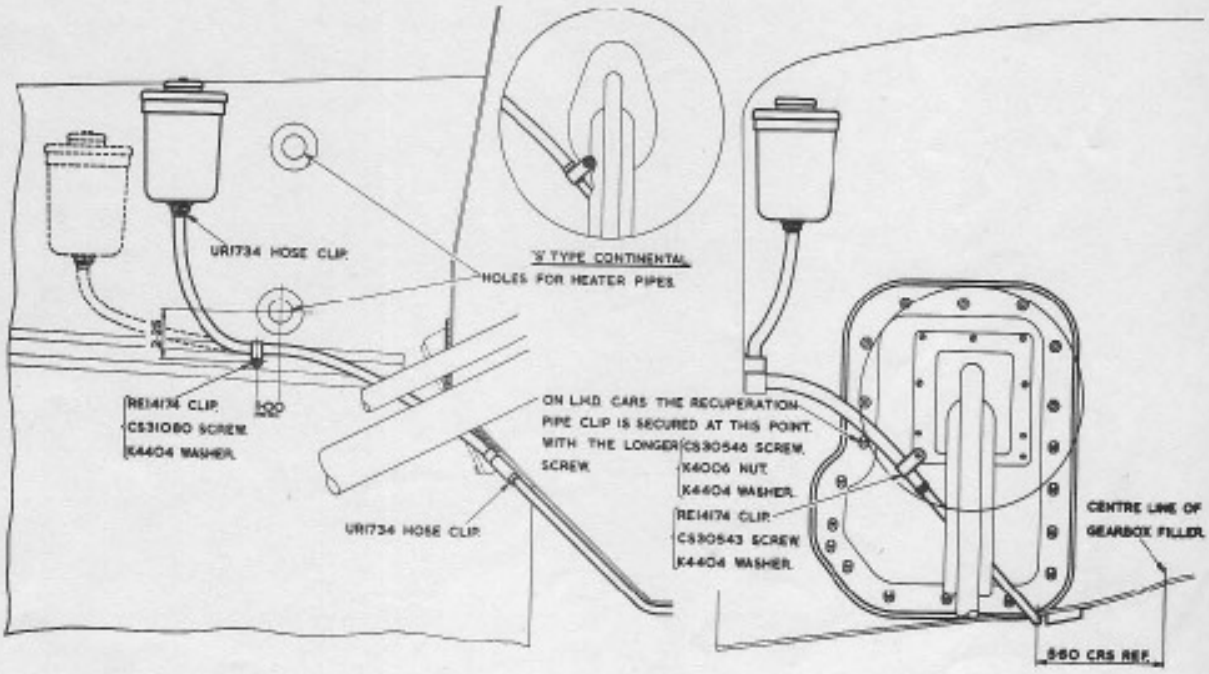


Fig.2.

When satisfactory, tighten the clips on the short rubber hose, the master cylinder elbow union nut and where applicable, the master cylinder banjo union. Fit the longer of the two 2BA setscrews to the front clip and the shorter to the rear and fit the pipe securely to the undersurface of the floor. Note that the larger diameter clip is fitted to the rear and circumscribes the rubber hose and not the metal pipe as the front clip does. Connect the rubber hose from the reservoir to the metal recuperation pipe, tighten the hose clip and secure the hose to the valance with the self tapping screw in the hole drilled in the valance, and also to the floor board at the steering column seal with the longer screw provided, (Fig.2). On LHD cars, the clip is secured to one of the rivet nuts in the pedal gap plate as indicated, by replacing the existing setscrew with a longer one and securing the clip with a spring washer and nut. The reservoir hose should lie along the top edge of the valance stiffener for a short distance before running down to the recuperation pipe.

Replace the wiring loom under the floor into its clips, refill the brake fluid reservoir, bleed the hydraulic system and check and record the BRAKE SPONGE FIGURE once more.

The two BRAKE SPONGE FIGURES obtained, the first before any work has been done, and the second when everything has been completed, are to be noted on the Guarantee Claim Form and sent to Rolls-Royce Limited, in the usual way.

NOTE: The Continental Bentley will require a longer flexible hose from the reservoir to the recuperation pipe and consequently new hoses are provided. (The reservoir and part of the recuperation pipe for the Continental Bentley are shown dotted in Fig.2).

The time permitted for this work is 4 hours.

BLEEDING THE HYDRAULIC SYSTEM

Make certain that the Brake Fluid Reservoir is full.

Fix a rubber tube to one of the brake bleed screws and immerse the other end in about 1" of brake fluid in a clean bottle.

Fit the lever (Tool No.RH.322 or RH.312) to the lever K and operate the master cylinder with a firm movement, opening the bleed screw at the same time.

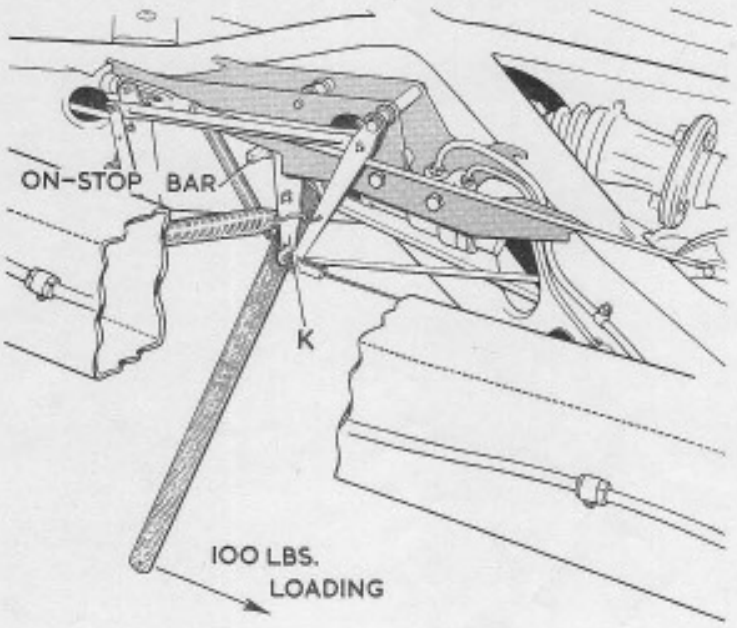
At the end of the forward stroke close the bleed screw and allow the master cylinder piston to return fully.

Pull the lever K right back and wait five seconds before making a further movement forward with lever and opening the bleed screw.

Continue this cycle ten times or longer if air bubbles still appear in the bottle.

Repeat for the other brakes.

During bleeding, after two or three cycles, pull the lever K fully forward and then return it fully rearward and note the time taken for the master cylinder piston to return. This will be evident by the piston striking the push rod retaining washer on returning. The time permitted is between one and four seconds; if less or more time is taken, the master cylinder must be replaced.



CHECKING AND RECORDING "BRAKE SPONGE FIGURE".

Fit the lever (Tool No. RH.312 or RH.322) to the lever K and pull forward, pressing the brake shoes hard against the drums, examine the whole hydraulic system for fluid leaks while it is under pressure then allow the master cylinder piston to return fully to recuperate.

Fit a spring balance to the lever and exert an effort of 100 lbs forward. Note the distance the master cylinder on-stop bar has moved from rest, if this exceeds 0.85" the hydraulic system must be re-bled and re-checked.

This distance is known as the "BRAKE SPONGE FIGURE" and gives indication of the presence of air in the braking system.

CHASSIS NOS:

Rolls-Royce Silver Cloud.	
Up to SYB-50.	Where fitted with the single master cylinder.
Bentley "S" Type.	
Up to B-245-BC.	" " " "
Bentley "S" Type Continental.	
Up to BC-21-BG.	" " " "

MATERIALS.

		No.Off.
RH.421.	Pipe - Replenishment.	1.
RH.422.	Connector - Hose - Rubber.	1.
RH.423.	Piece-Elbow (Aluminium Master Cylinder)	1.
RH.424.	Piece-Elbow (Cast Iron Master Cylinder)	1.
UR.1734.	Clips - Hose - Connector	3.
RE.14174.	Clip - Valance - Wing.	1.
RE.14174.	Clip - Seal - Column.	1.
UG.1431.	Clip - Floor Panel - Front.	1.
RE.14174.	Clip - Floor Panel - Rear.	1.
KC.173.	Screw - 2BA.	1.
KC.153.	Screw - 2BA.	1.
K.4006/Z.	Nut - 2BA.	2.
CS.30543/Z.	Screw - Binding Head - 2BA.	1.
CS.31080.	Screw - Self Tapping.	1.
K.4404/Z.	Washer - 2BA.	4.

Additional Parts Required for the Bentley Continental.

UR.3232.	Pipe - Flexible - Reservoir.	1.
UR.1734.	Clip - Hose - Connector.	1.

Additional Parts Required for Left Control Cars.

CS.3-546/Z.	Screw.	1.
K.4006/Z.	Nut.	1.
K.4404/Z.	Washer.	1.