COLUMN GEAR CHANGE

(LEFT-HAND DRIVE CARS)

FOR INFORMATION:

An alteration to the column gear change mechanism has been introduced replacing the early type gear change cross tube assemblies (2 off) and the gear change pull rod assembly by two new cross tube assemblies and one pull rod assembly having keyhole type sockets.

The new parts were incorporated on Chassis No.B-281-LGT and all subsequent left-hand drive cars.

It is proposed to incorporate all the parts detailed below if any one or more of the original parts require renewal.

The two change gear cross tubes are connected at one end to the ball pins of the outer lever (on left-hand side of gearbox) attached to the horizontal selector lever shaft of the gearbox. The other ends of the cross tubes are connected to the upper and lower ball pins of the gear change bellcrank lever. The pull rod is connected at its lower end to a third ball pin of the same bellcrank lever - the upper end being connected to the lever fitted at the lower end of the gear change tube attached to the steering column. The ball joints of the cross tubes and pull rod are the only ones fitted with a rubber dust cover and therefore can easily be recognised.

1. PARTS REQUIRED

NO. OFF.	TITLE.	REPLACING.
RG-6765 2	Gear Change cross tube assembly.	(2 Off RG-5770)
RG-6768 5	Rubber Dust cover-ball joint.	(5 Off RG-5768)
RG-6769 5	Adjusting Plug - ball joint housing.	5 " RG-5767)
RG-6770 5	Contact Piece-ball joint housing.	(5 off RG-5762)
RG-6773 1	Pull rod,assembly-steering column to bellcrank lever.	(1 off RG-5750)
RG-6953 1	Support stay-steering col. to lever	(1 off RG-5774)

NOTE: It can be ascertained from beneath the car whether this alteration is incorporated by reference to one of the five threaded adjusting plugs fitted to the end of each of the five ball joint housings. On the early type, the adjusting plug is provided with a slot for adjustment by means of a screwdriver, whereas,on the later type, the adjusting plug (RG-6769) is hexagon headed, for adjustment by means of a spanner.

2. TO REMOVE THE EXISTING TWO CHANGE GEAR CROSS TUBES & PULL ROD:

NOTE: It is not necessary to remove the floorboards for this work:-

(i) Remove the left-hand side undersheets.

(ii) Remove the pin connecting the upper ends of the two support stays to the strap of the lower bearing housing of the steering column. Remove the pin from the lower end of the stays and remove the stays. Match up the new support stay (RG-6953) to one of the original stays and fit - the new stay being fitted to the left-hand side of the car.

(iii) To remove the cross tubes, first slacken back the locknut at the end of a joint and with a small screwdriver, unscrew the adjusting plug - the joint will then come adrift. Repeat for the remaining three joints and the joint at the lower end of the pull rod.

(iv) Remove the screw from the fork at the upper end of the pull rod and remove the rod. Measure the distance between the screw hole in the fork and the centre of the ball joint housing at lower end of the rod and take note.

(v) Transfer the fork, the two lock nuts and the spring washer from the old pull rod to the new one and adjust the fork (centres) to the dimension previously noted and lock the fork.

3. TO FIT THE NEW CROSS TUBES AND PULL ROD:

(i) Place a contact piece (RG-6770), the correct way round into each of the five sockets and fit a new rubber dust cover (RG-6768) in position on each ball joint before fitting the cross tubes and pull rod to the car.

(ii) Lightly grease each ball pin and fit cross tubes and pull rod to car. Each ball joint should be adjusted as follows:-

a) First transfer the lock nuts from the old adjusting plugs to the new ones.

b) Screw the hexagon headed adjusting plug up to the ball pin and lock. Each ball joint should be free without end float i.e. the cross tubes should be slightly stiff to rotate.

(iii) The final operation is to check the angular position of the change gear lever (i.e. the lever beneath the steering wheel). With the front wheels in the straight ahead position, the lever should, when in the neutral position, be at right angles to the vertical spoke of the steering wheel, i.e. the lever should be horizontal. In the event of adjustment being required, this can be achieved by either lowering or raising the fork on the pull rod with the change gear lever in the neutral position.

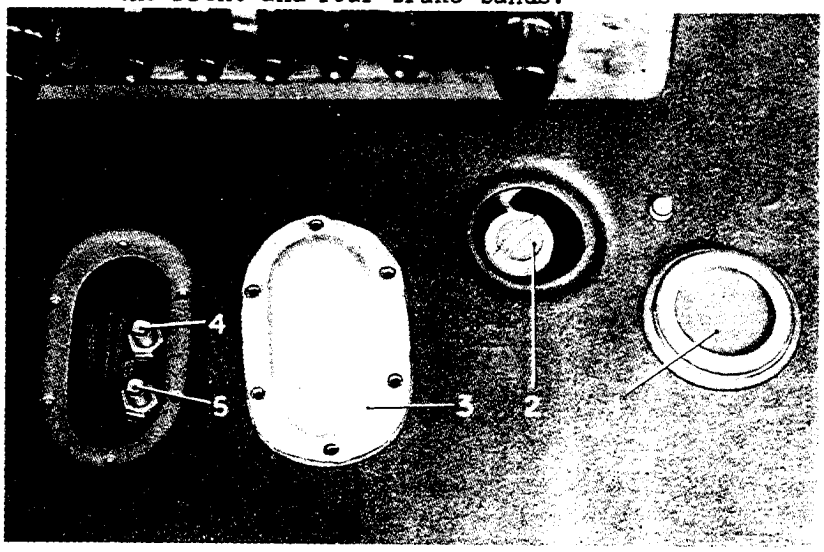
Will all Retailers please notify the London Service Station of the Chassis Number of the car, whenever they incorporate this alteration.

FOR INFORMATION:

THE AUTOMATIC GEARBOX

All owners of cars fitted with the Automatic Gearbox have been advised that it is most important to have the gearbox brake band adjustment checked after the first 1,000 miles of initial running.

The following is the correct procedure for checking and adjusting the front and rear brake bands.



1. Dipstick cover.
2. Dipstick.
3. Cover, brake band adjusters.
4. Front band adjuster.
5. Rear band adjuster.

FIG. 1. ACCESS POINTS IN FLOOR.

Preparation:

(i) Remove the carpet from the front interior floor to expose access cover over band adjuster screws. Remove the cover, see Fig. 1.

(ii) Drive car over pit, or elevate on hoist.

(iii) Thoroughly clean the underside of the gearbox sump around the drain plug, sump joint and the oil pipe connection on the ride control pump, see Fig. 2.

Remove the sump drain plug and drain the fluid into a pan, approx. 10 imp. pints, or 12 U.S. pints, should drain from the sump.

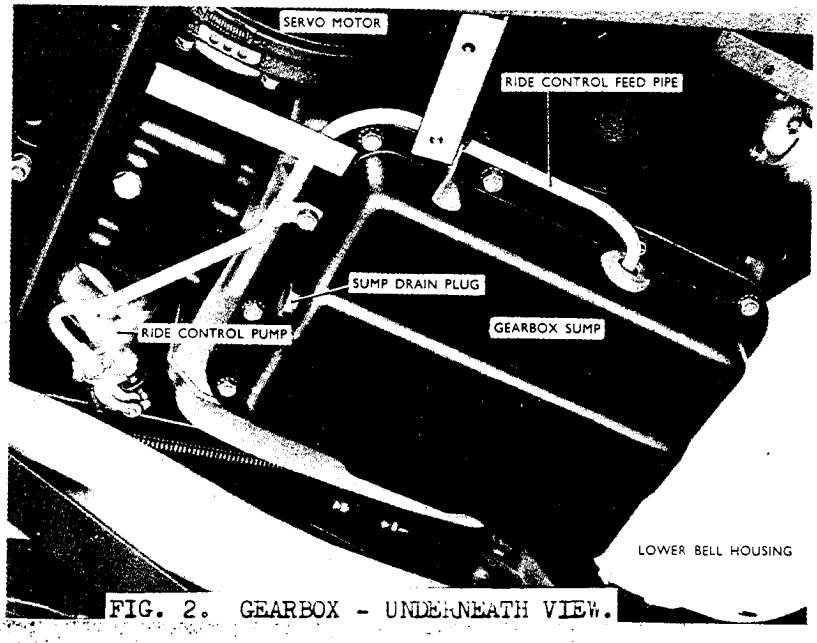


FIG. 2. GEARBOX - UNDERNEATH VIEW.

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(iv) Remove the two bolts securing the ride control feed pipe to the ride control pump, see Fig. 2.

Unscrew the twelve securing bolts and remove the sump and sealing joint, taking care not to damage the ride control feed pipe.

Extreme care must be taken to prevent any dirt, dust or lint, etc., from entering the internal portion of the gear-box. Tools and equipment must be perfectly clean.

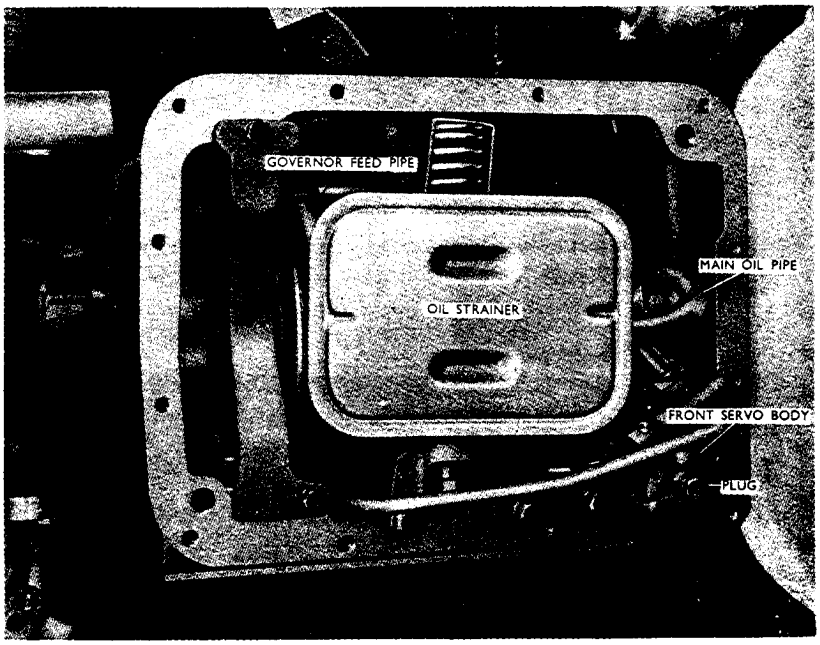

FIG. 3. GEARBOX - SUMP REMOVED.

(v) Remove the oil strainer, Fig. 3, by pulling the rear end of the strainer down slightly, off the governor feed pipe, and then, sliding bodily rearwards off the main oil pipe.

(vi) Slacken off the locknuts securing the two band adjusting screws.

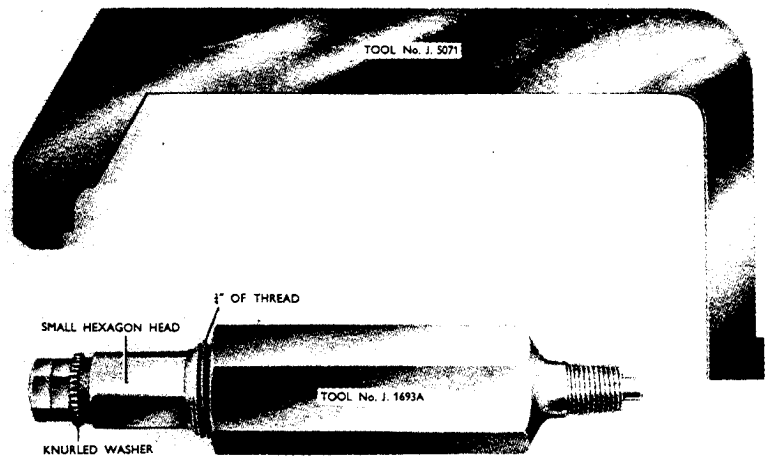

FIG. 4. GAUGES.

Adjusting the Front Band.

(i) Ensure that the front band is centred on the drum and that the band anchor is seated properly on the adjusting screw.

(ii) Remove plug from front servo body. Adjust Gauge GM.No. J.1693A, Figs. 4&5, by loosening the small hexagon head until approximately ¼" of thread is exposed above the gauge body, and screw the gauge, by hand only, into the plug hole.

(iii) Tighten the small hexagon head of the tool, with the fingers, until the stem of the gauge is just felt to contact the front servo piston. Then, using a wrench, continue tightening the small hexagon head 5½ turns.

(iv) From the top of the gearbox, tighten the front band adjusting screw, Fig. 1, until the knurled washer on the top of the gauge is just free to turn by hand.

(v) Hold band adjusting screw and securely tighten its locknut.

(vi) Loosen the gauge adjusting hexagon, 6 full turns, and remove. Replace and tighten servo cover plug.

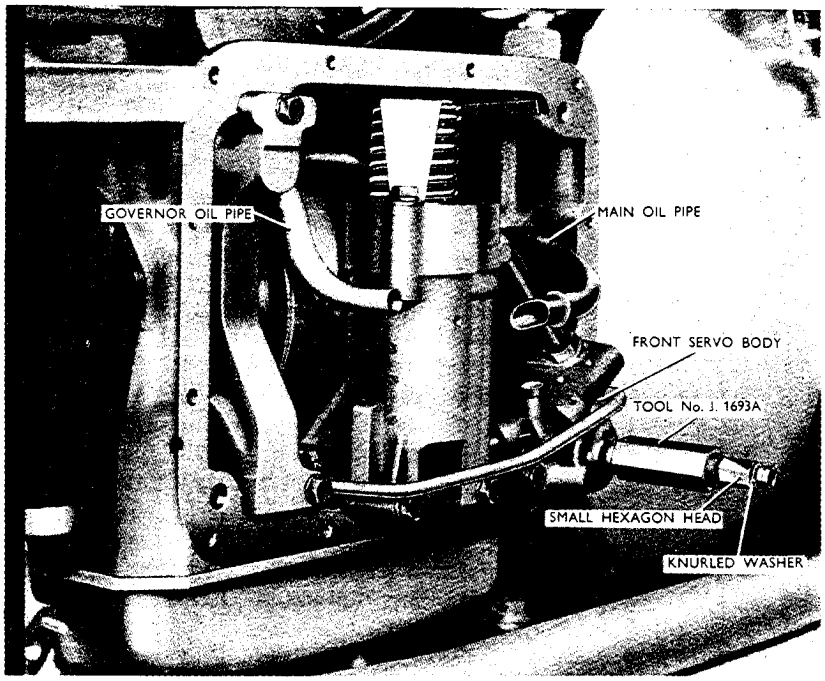

FIG. 5. FRONT SERVO - GAUGE IN POSITION.

Adjusting the Rear Band:

(i) Place the rear band adjusting Gauge GM.No.J.5071, Figs. 4 & 6, so that the small notch in the short end, rests on the corner of the machined face at the spring end of the rear servo body, and the tip of the long end rests along the servo piston rod.

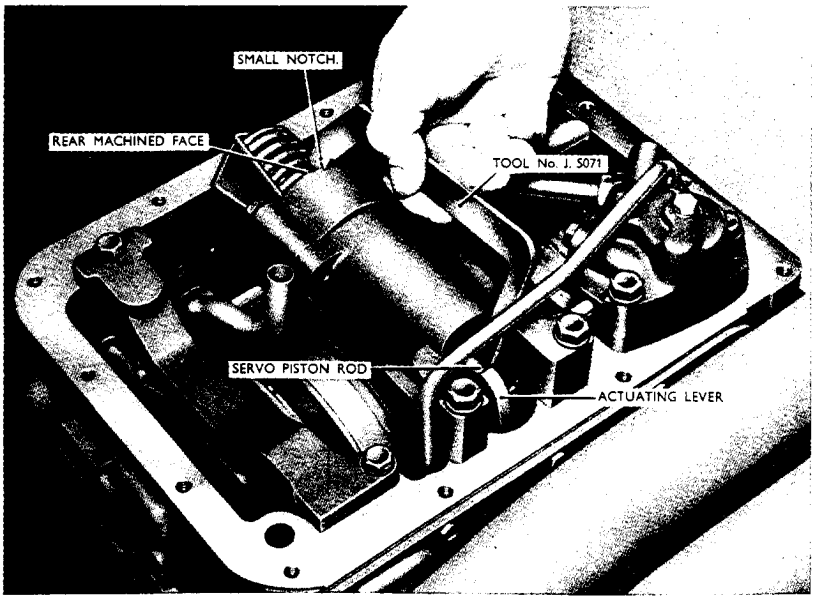

FIG. 6. REAR SERVO - GAUGE IN POSITION.

(ii) From the top of the gearbox, tighten the rear band adjusting screw, Fig.1, until the actuating lever just contacts the face of the gauge.

Do not overrun this adjustment, if necessary, loosen the rear adjusting screw two or three turns and repeat the adjustment.

(iii) Hold the band adjusting screw and securely tighten the locknut. Afterwards, recheck with the gauge that the adjustment is correct.

Re-Assembly:

(i) Replace the oil strainer, sliding it first on to the main oil pipe and then firmly positioning the governor feed pipe, in the hole in the top of the strainer.

(ii) Replace the sump using a new sealing gasket, and check that the ride control feed pipe registers approximately on the boss of the pump. Replace and securely tighten sump drain plug and reconnect feed pipe taking care that it is seating properly when bolts are tightened.

(iii) Replace the cover in the front floor over the adjusting screws, having made sure that the adjusting screw locknuts are securely tightened.

(iv) Refill the gearbox with a recommended transmission fluid.

(a) Add 8 imp. pints (10 U.S. pints) of transmission fluid through the dipstick filling orifice.

(b) Run the engine with the hand control lever at "N" (Neutral) and the hand brake on, for approximately three minutes, at a fast idle, equivalent to about 20 miles per hour.

(c) Reduce engine speed to a slow idle, check the fluid level with the dipstick. With the engine still running, add fluid to bring the level up to the "Full" marking on the dipstick.

Do not overfill; if necessary, drain off to correct level.

(v) Run engine for a few minutes and examine that all seals and joints are oiltight.

(vi) Replace front floor carpet.

FOR INFORMATION:

THE AUTOMATIC GEARBOX

Addendum to BB.151.

When carrying out the 1,000 miles band adjustment, the following notes will be of assistance to service personnel.

Adjusting the Front Band:

When centralising the front band on the drum to ensure that it is seating properly, considerable variation can occur, if the band is centralised by hand.

The correct method is as follows:-

1. Insert screwdriver and operate the lever to apply the band to the drum several times before screwing up the gauge adjusting hexagon. The bands should be allowed to spring back sharply on the servo piston stem, care being taken not to move the band accidentally after this operation.

   This method closely imitates the action of the front band when in operation.

2. Smoother gear changes are obtained by setting the front gauge just to release the knurled washer at 5 turns, instead of $5\frac{1}{2}$ turns as stated in the Bulletin.

Ride Control Pump:

To ensure satisfactory operation of the ride control pump after the above service,

1. Jack up the rear wheels, and remove the blanking plug from the front end of the four-way union, mounted on the chassis crossmember, to which is connected the flexible pipe (outlet pipe) from the ride control pump.

2. Start the engine and run at idling speed. Engage Range 4 and move the steering column ride control lever to "Hard".

3. When a steady stream of oil emerges from the union, stop engine and replace plug.

   Check oil level in gearbox.

SERVICE Bulletin No. BB.152

MODEL: BENTLEY MARK VI

FOR INFORMATION:

AUTOMATIC GEARBOX

THROTTLE AND GEAR CONTROL LINKAGE SETTINGS

Information is given under, of the complete "Factory" settings of the control linkages to enable Retailers to check all or part of these settings as may be necessary. It should be noted that the final check should be made while the car is on road test.

The gear control linkage should be set first, so that the trapeze which also carries the throttle linkage is correctly positioned. Rod lengths quoted are ball joint or clevis pin centre to centre distance.

(i) Disconnect rod "J".

(ii) Adjust the two horizontal gear control rods to equal lengths such that the trapeze is at right angles to the steering column. Note this length.

(iii) With the gear lever in the "3" position, and the manual lever on the gearbox in the "3" detent position (i.e., second detent back from the forward stop), adjust the vertical gear control rod to suit by means of the jaw at its upper end. Check the other gear lever positions.

(iv) Set rod "A" equal in length to the two horizontal gear control rods.

(v) Set rod "B" to 2.875".

(vi) Set rod "C" to 4.5".

(vii) With pin "D" held 1.750" from the face of the dash, set lever "E" to lie approximately 2° below the horizontal by slackening the pinch-bolt on lever "F" and rotating lever "E" with its shaft to the desired position.

(viii) With the carburetter butterfly fully closed (idling screw set back and fast idle cam out of action) adjust rod "G" to maintain the 1.750" gauge distance from pin "D" to the face of the dash.

(ix) Holding rod "A" forwards, so that lever "H" is on its off-stop, adjust rod "I" to suit.

(x) Move the linkage towards its full throttle position, and check that when lever "H" reaches its on-stop, the carburetter butterfly also just contacts its on-stop. If not, alter the linkage ratio slightly by slackening the pinch-bolt on lever "F", rotating lever "E" further below the horizontal, and lengthening rod "G" to maintain the 1.750" gauge distance from pin "D" to the face of the dash.

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(xi) Set the carburetter idling screw to give 400 r.p.m. hot.

(xii) Starting with the accelerator pedal in the fully closed position under the influence of its pull-off spring, adjust rod "J" so that the pedal is just slightly depressed from this position. Set stop "K" to contact the pedal in the full throttle position.

(xiii) Check the gearbox operation on the road. On a level road with the transmission warm, changes from 1 to 2, 2 to 3, and 3 to 4 should occur at 5-7, 10-13, and 19-22 m.p.h. respectively when using the minimum throttle opening necessary just to accelerate the car gradually from rest.

Should the changes occur above these speeds, shorten rod "A" slightly. Check the behaviour when making part throttle starts from rest. If the changes occur with an excessive amount of slip (particularly the 2 to 3 change) or if kick-down changes at full throttle are unobtainable, correct by lengthening rod "A" slightly.

SERVICE Bulletin No. BB.152

MODEL: BENTLEY MARK VI

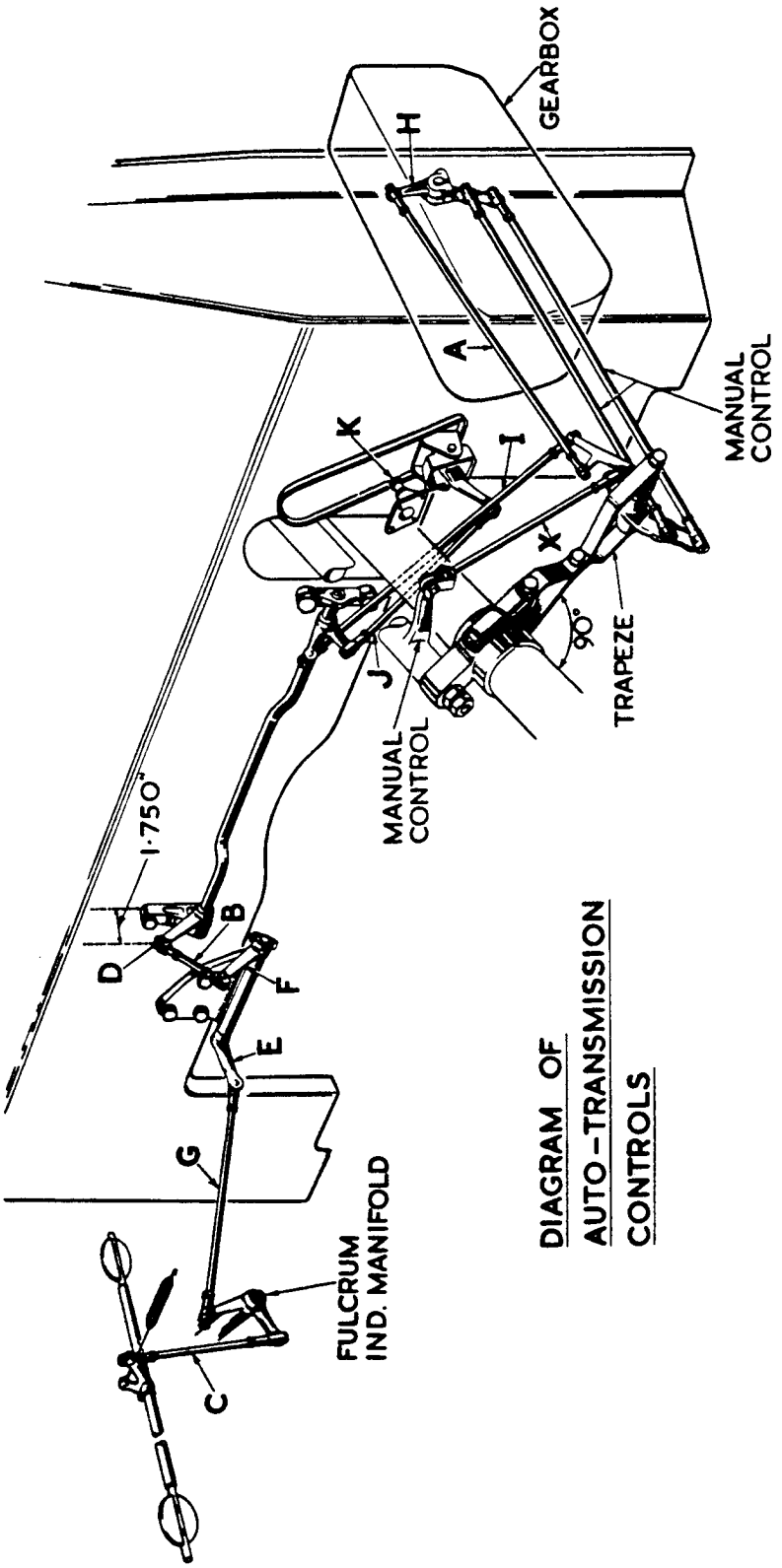

DIAGRAM OF AUTO-TRANSMISSION CONTROLS

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FOR INFORMATION:

AUTOMATIC GEARBOX

COASTING OR TOWING

Owners have been advised that coasting or "freewheeling" down hills with the engine switched off must definitely be avoided, as this is likely to cause severe damage to the Automatic Gearbox mechanism. This damage can occur with the manual control lever in any of the five positions, including position "N".

The reason for this warning is that when the engine is switched off, the front oil pump becomes inoperative, lubrication is reduced, and the rear servo brake band applied.

Under these circumstances, the application of the rear band causes excessive over-driving of the front unit clutch plates when the car begins to move, with the probability that these clutch plates will burn out, necessitating a major gearbox overhaul.

Similarly, if, in the event of an accident, it should become necessary to tow a car fitted with the Automatic Gearbox, the following precautions must be observed before the car is moved.

(i) Make certain that the gearbox was operating satisfactorily until the time of towing. If there is any sign of mechanical failure or breakage in the gearbox, the car must be transported.

(ii) Release the lock nut and slacken off the rear band adjusting screw $4\frac{1}{2}$ complete turns. Re-tighten the lock nut.

(iii) Keep the control lever in "N" throughout and maintain, where possible, a towing speed between 15 and 25 miles per hour. Distances must at all times be kept to a minimum.

IMPORTANT:

At no time must a speed of 25 miles per hour be exceeded whilst towing.

Towing new cars or cars with new gearboxes, which have covered less than 1,000 miles in service, must be avoided.

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SERVICE Bulletin No. BB.159

MODEL BENTLEY MARK VI

FOR INFORMATION:

AUTOMATIC GEARBOX

This Bulletin is issued as advance information on the general operation of the Automatic Gearbox, and whilst not a complete write-up, the information will be found to be of assistance to those who have not previously had experience of this type of transmission.

GENERAL:

The Automatic Gearbox consists of three epicyclic gear trains providing four forward gear ratios and one reverse rati . Fluid transmission replaces the usual plate clutch as this is necessary to smooth out disconcerting jerks when the changes of gear take place. No clutch pedal is therefore necessary.

The gear change is effected automatically by the Control valve unit, operated by oil pressure, and the road speeds at which the gear changes occur, vary ..cording to the demand for power from the accelerator pedal - that is, heavy pressure on the pedal delays the up-change from low to high gears.

AUTOMATIC GEAR SELECTION:

Control is achieved by means of the following main hydraulically operated units.

1. Control valve unit.
2. Governor unit.
3. Front and rear pumps.
4. Front and rear servos.
5. Front and rear clutch pistons.
6. Reverse cone piston.

The two oil pumps provide the operating pressure necessary for control of the units in the gearbox which effect automatic operation. The front pump is of the variable delivery type and adjusts itself automatically to the requisite pressure output. It is driven by the crankshaft and therefore operates at engine speed and only when the engine is running. The main duties of the front pump are.-

1. To provide main oil pressure in the control valve unit for operation of the servos and the clutches.

2. To supply boosted pressure when required.

3. To maintain pressure in the fluid coupling.

4. To provide an adequate lubrication supply to all moving parts.

The rear pump is of the eccentric gear type, and is mounted with the governor on a shaft driven from the output shaft of the gearbox Oil delivery from this pump is therefore always proportional to the road speed of the car.

Oil from the rear pump is fed to the governor and creates a resistance to balance the centrifugal force tending to throw out the governor weights. From the governor valve, oil is fed to the three shift valves in the control valve unit which are kept closed by springs. These shift valves are those which control the delivery of oil to the servos and clutches which give reduction and direct drive in the epicyclic units and each operates one shift, that is 1st to 2nd gear, 2nd to 3rd, 3rd to 4th, and vice versa.

For example, in second gear, the front clutch is applied, front band released, rear clutch released and rear band applied. When the road speed increases to a pre-determined speed, the pressure from the governor is enough to overcome the spring acting against the 2/3 shift valve, which will then move across and:-

(i) Release the front unit clutch-pressure applied to the front clutch unit.

(ii) Apply the front servo band.

(iii) Apply the rear clutch.

(iv) Apply a pressure against the rear servo piston to overcome the pressure spring, thus releasing the band. This engages 3rd gear.

Control by this means would give up-shift and down-shift always at the same vehicle speed, but in order to delay the shifts when high acceleration is required, the accelerator pedal is linked to a valve (throttle valve) in the control valve unit. By pressing down on the accelerator pedal against this valve, main oil pressure is allowed to modulate against governor oil pressure by means of a regulator valve incorporated in each of the three shift valves.

This regulating pressure has the effect of increasing the strength of the shift valve springs, and therefore with heavy pedal, road speed must be greater to obtain the increased governor pressure necessary to overcome the shift valves. Thus if the driver wants quick acceleration and puts his foot down, the excess use of the accelerator in relation to the speed of the car gives up-shift at a higher road speed,

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giving better acceleration by the use of lower gears. For example, up-shift from 3rd to 4th gear can take place at any speed between 20 and 65 m.p.h. depending on the performance required. Approximate up shift ranges are:-

Up-Shift	Light Throttle	Full Throttle
1st - 2nd	6 m.p.h.	25 m.p.h.
2nd - 3rd	11 "	45 "
3rd - 4th	20 "	65 "

Extreme pressure on the accelerator pedal also actuates a plug operating together with the throttle valve which gives forced down-shift for "kick-down" when required. Pressure from the throttle valve also acts proportionately against a compensator valve which feeds boosted pressure to the brake band servos and clutch pistons as engine speed increases, thus giving increased pressure to compensate for additional engine torque.

The manual valve is a simple valve connected to the lever on the steering column which closes or opens passages in the control valve unit to obtain the conditions required in N. 4. 3. 2. and R. positions.

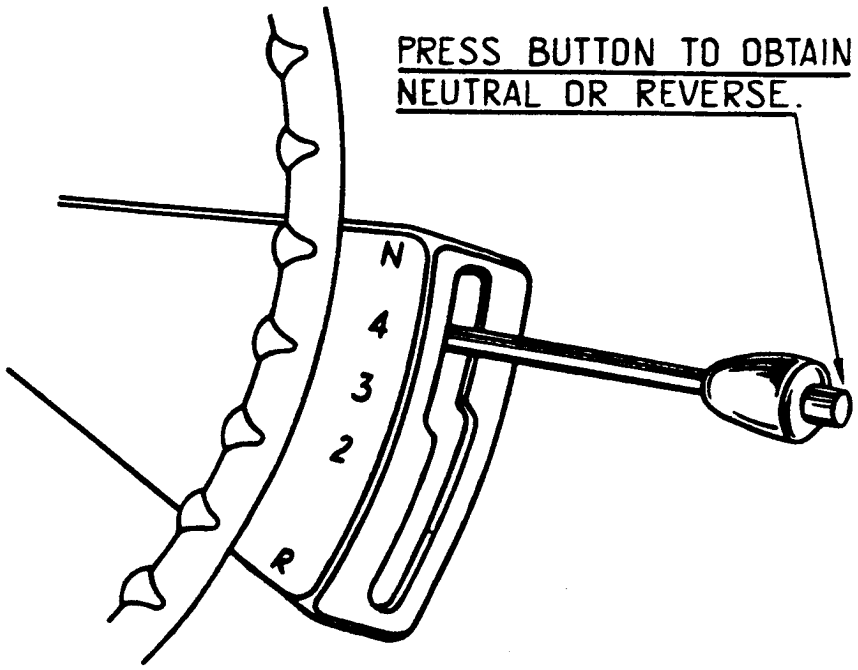

FIG 1. MANUAL CONTROL - GEAR RATIO SELECTOR LEVER.

MANUAL CONTROL:

A 5-position lever is mounted on the steering column in a quadrant and operates in one plane, parallel with the steering wheel. The five positions, reading downwards, are marked, N. 4. 3. 2. R. (See Fig.1.) N. and R. are respectively Neutral and Reverse and can only be engaged and disengaged by depressing the small push-in button in the end of the lever. A gate is provided between 3 and 2 positions to prevent accidental downshift.

Use of position 3 cuts out top gear, and if this is engaged while the car is moving at high speed, downshift from 4th to 3rd gear is automatically delayed until the car slows to a safe 3rd gear speed of 65 miles per hour.

Position 2 is supplied mainly to satisfy Bye-Laws of such American States wherein descent of certain hills must be made in 2nd gear. In this position, 4th and 3rd gears are cut out, but again downshift is automatically delayed until a safe 2nd gear speed of 40 miles per hour is reached. When position 2 is used from rest, the car moves off in 2nd gear and 1st gear can only be engaged by "kicking down" as described later.

DRIVING:

To start the car, the manual selector lever must be placed in the N. or Neutral position. A micro-switch in the circuit to the starter makes starting only possible in this position.

Starting the engine operates the front pump which builds up the requisite hydraulic pressure in the circuits. When starting therefore it is necessary to run the engine a moment or two before engaging the drive, and this allows the oil pressure to build up. For normal driving, position 4 should be selected, and the engine will idle without forward motion of the car until the accelerator is depressed. However, since in this condition the fluid coupling is "slipping off" the engine revs, heat will be generated and the car should not be allowed to idle for long periods in any of the three drive positions. For driving in traffic, it is advisable to use position 3 since, at light acceleration, up-shift from 3rd to 4th gear can occur at 20 miles per hour, and use of this position will prevent hunting between 3rd and 4th gear and the subsequent wear on the gearbox units. Position 3 should also be used when driving in very hilly country.

Forced down-shifts or "kick-down' can be effected in No's. 4. 3. and 2. positions by pushing the accelerator right down into the floor until a light resistance is felt at the bottom of the travel. Down-shift will then occur provided only that the speed of the car is low enough to prevent damage to the engine, and this is automatically controlled by the "control valve unit". 4th to 3rd gear "kick down" is possible at speeds lower than 65 miles per hour. 3rd to 2nd "kick-down" at lower than 40 miles per hour, and 2nd to 1st "kick-down" at lower than 20 miles per hour. The 'R' position can be engaged at a forward speed lower than 10 miles per hour. This enables the car to be rocked out of gullies, snow, etc. by alternate use of positions 2. and R.

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NOTE: The use of the phrase "position 4", "position 3" etc., should not be confused with the phrase "4th gear" "3rd gear" etc. As previously stated "position 4" etc. refers to the selected position of the manual change lever, and for instance, in "position 4" of the manual selector lever, 1st, 2nd, 3rd and 4th gear all normally operate in sequence.

A positive parking lock is provided when the car is stationary by selecting 'R' position when, as soon as the engine stops, a pawl drops into dogs on the periphery of the reverse epicyclic unit. Re-starting the engine automatically disengages this pawl. (Note that this only occurs when 'R' has been selected.)

THE GEAR SYSTEM:

Figure 2 is a diagrammatic section drawing showing the rough layout of the Automatic Gearbox.

Front and rear epicyclic units combine to give the forward gear ratios mentioned earlier. The reverse epicyclic unit is effective only in position 'R' in which all three epicyclic units operate in reduction.

The epicyclic gear units can be compared in operation to a plain roller bearing. The main gear assemblies are:-

(i) A sun gear (similar to the roller bearing inner race) meshing with planet gears.

(ii) Three or four planet gears (similar to the rollers) meshing with the sun gear and the internal gear, and carried in a planet carrier (similar to the cage).

(iii) An internal gear (similar to the outer race) meshing with the planet gears.

The output is taken off the planet carriers which rotate concentrically about the sun gear, and it is possible to obtain two gear ratios from one unit - direct drive and reduction. By locking together any two of the above three gear assemblies, this prevents any of the gears revolving in relation to each other, and direct drive is obtained. This is accomplished by use of multiple clutch plates in the epicyclic units which are engaged by means of a piston operated by oil pressure.

Reduction is effected by holding any one of the three above gear assemblies stationary in relation to the frame. This is achieved by means of band-brakes so arranged that they are self energising on drums attached to either the internal or the sun gears of the units. The bands are applied by servos operated by springs and oil pressure. Note that in any unit the band-brake and clutch are applied alternately, i.e. they must not be applied together otherwise engine stalling of failure of some part must occur.

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	FRONT UNIT			REAR UNIT			
	Condition	Band	Clutch	Condition	Band	Clutch	Reverse Unit
1st Gear	REDUCTION	ON	OFF	REDUCTION	ON	OFF	IDLE
2nd Gear	DIRECT	OFF	ON	REDUCTION	ON	OFF	IDLE
3rd Gear	REDUCTION	ON	OFF	DIRECT	OFF	ON	IDLE
4th Gear	DIRECT	OFF	ON	DIRECT	OFF	ON	IDLE
Reverse Gear	REDUCTION	ON	OFF	COMPOUND REDUCTION	OFF	OFF	REDUCTION

1st GEAR:

Note that the engine speed is reduced by the front epicyclic unit before its power passes through the fluid coupling. Then the rearward torus transmits power to the forward torus, thence back through the rear epicyclic unit which is also in reduction.

2nd GEAR:

Operation is similar to 1st gear only expected that the front epicyclic unit is changed from reduction to direct drive by releasing the front band-brake and applying the clutch.

3rd GEAR:

In both 3rd and 4th gear, the rear unit is in direct drive. This is effected by locking together (by the rear clutch) the rear unit brake drum (or internal gear) to an extension of the front unit planet carrier which drives the driving torus of the fluid coupling. Since at upwards of 1,000 r.p.m. there is virtually no fluid coupling slippage, this means that the rear unit sun gear is rotating at the same speed as the internal gear, giving direct drive. Owing to the difference in the radial distance from the transmission centre line of the teeth of the rear unit sun and internal gears, more power is transmitted via the extension from the front unit planet carrier (or rear internal gear) than via the sun gear - the ratio is 60% : 40%.

This 3rd and 4th gear arrangement which mostly by-passes the fluid coupling, is often termed Split Torque and makes possible a very high transmission efficiency in comparison to other systems making use of fluid couplings.

4th GEAR:

In this gear both front and rear epicyclic units are in direct drive, so that with Split Torque, virtually a straight through mechanical drive is achieved in 4th gear.

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REVERSE GEAR:

This gear operates only in reduction, therefore no clutch is carried in the reverse epicyclic unit. Owing to the high torque through the combined reduction of the three epicyclic units, a band-brake was found to be insufficient and a double acting cone clutch engaged by a piston operated by oil pressure takes its place. Reverse direction is achieved by compound reduction of the rear epicyclic unit where none of the gears is held. This allows the rear internal gear to idle backwards about the planet gears, and the backwards rotation is transmitted via the reverse drive flange to the reverse unit sun gear.

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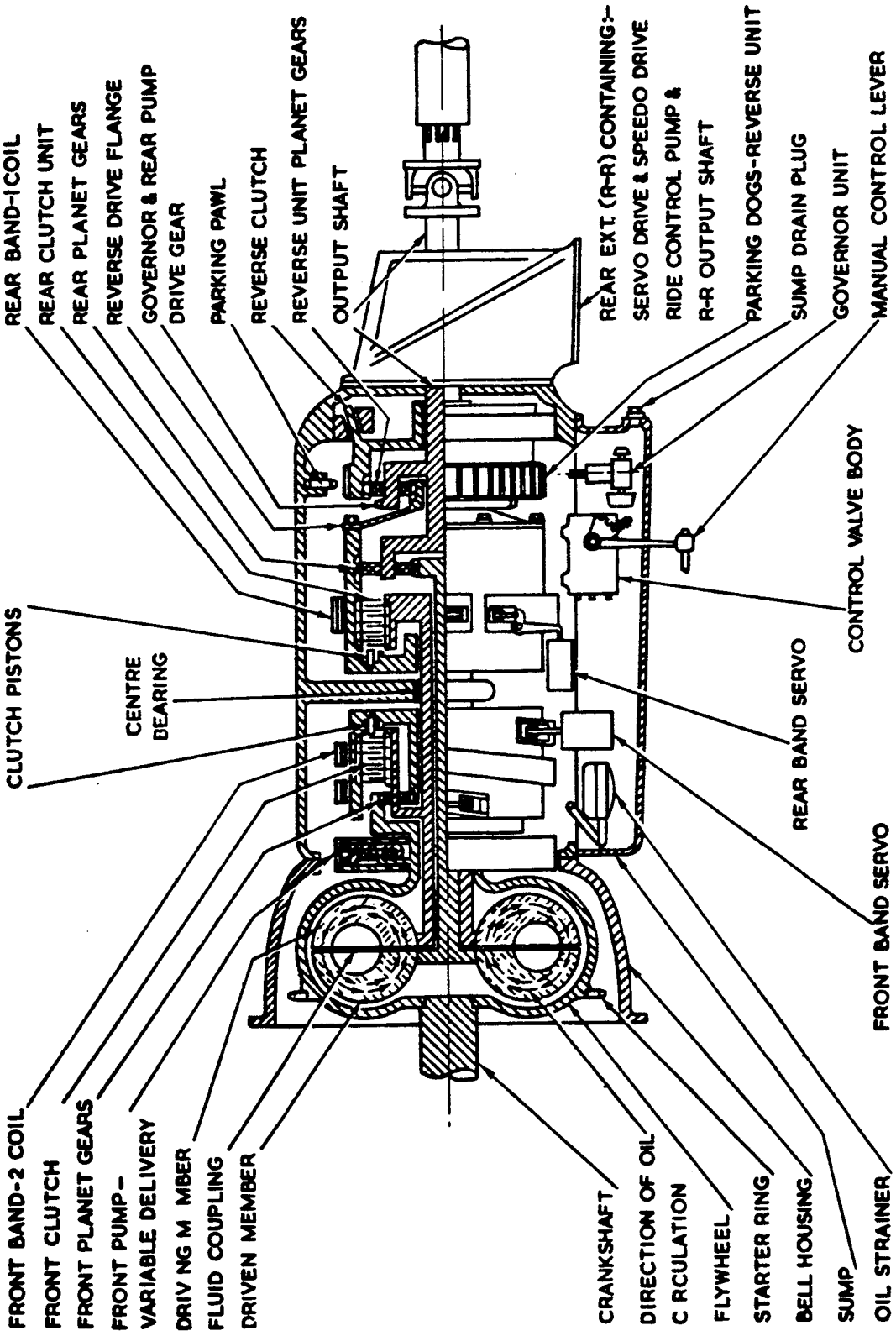
SERVICE
Bulletin
No. BB.159
MODEL: BENTLEY MARK VI



SECTION

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO
BENTLEY MOTORS (1931) LTD., PYM'S LANE, CREWE, ENGLAND

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SERVICE Bulletin No. BB.160.

MODEL : BENTLEY MARK VI

FOR INFORMATION:

AUTOMATIC GEARBOX

In adapting the Hydra-Matic Transmission to the Bentley chassis, it has been necessary to modify the original design in a number of important respects.

These modifications do not affect the principles of the Hydra-Matic design which remain unaltered, but allow for the incorporation of additional Bentley design features.

The resulting Automatic Gearbox has been so designed that only small changes have been necessary in the current production chassis, and the overall length of the Transmission from the engine bolting face to front universal joint flange is the same.

The main differences are embodied in the rear extension of the gearbox (see drawing attached) where the parts of Bentley design are shown in section. Original Hydra-Matic parts are shown in outline only.

The rear extension casting has been re-designed to incorporate the Bentley wheel-brake servo motor, ride control pump, speedometer drive gear, and gearbox output shaft, on which the reverse epicyclic unit from the original Pontiac rear extension is mounted. The ride control pump, which provides variable damping to the rear shock absorbers, employs Automatic Transmission fluid taken from the gearbox sump by means of a pipe through the orifice normally used in 1952 G.M. cars for "under-hood" gearbox filling. The filling of the Bentley Automatic Gearbox is, therefore, carried out through the dipstick orifice.

The throttle-valve linkage has been re-designed to give slightly altered upshift characteristics. The manual control lever on the steering column, and the operating linkage, the starter ring, flywheel and divided bell housing are also of Bentley manufacture.

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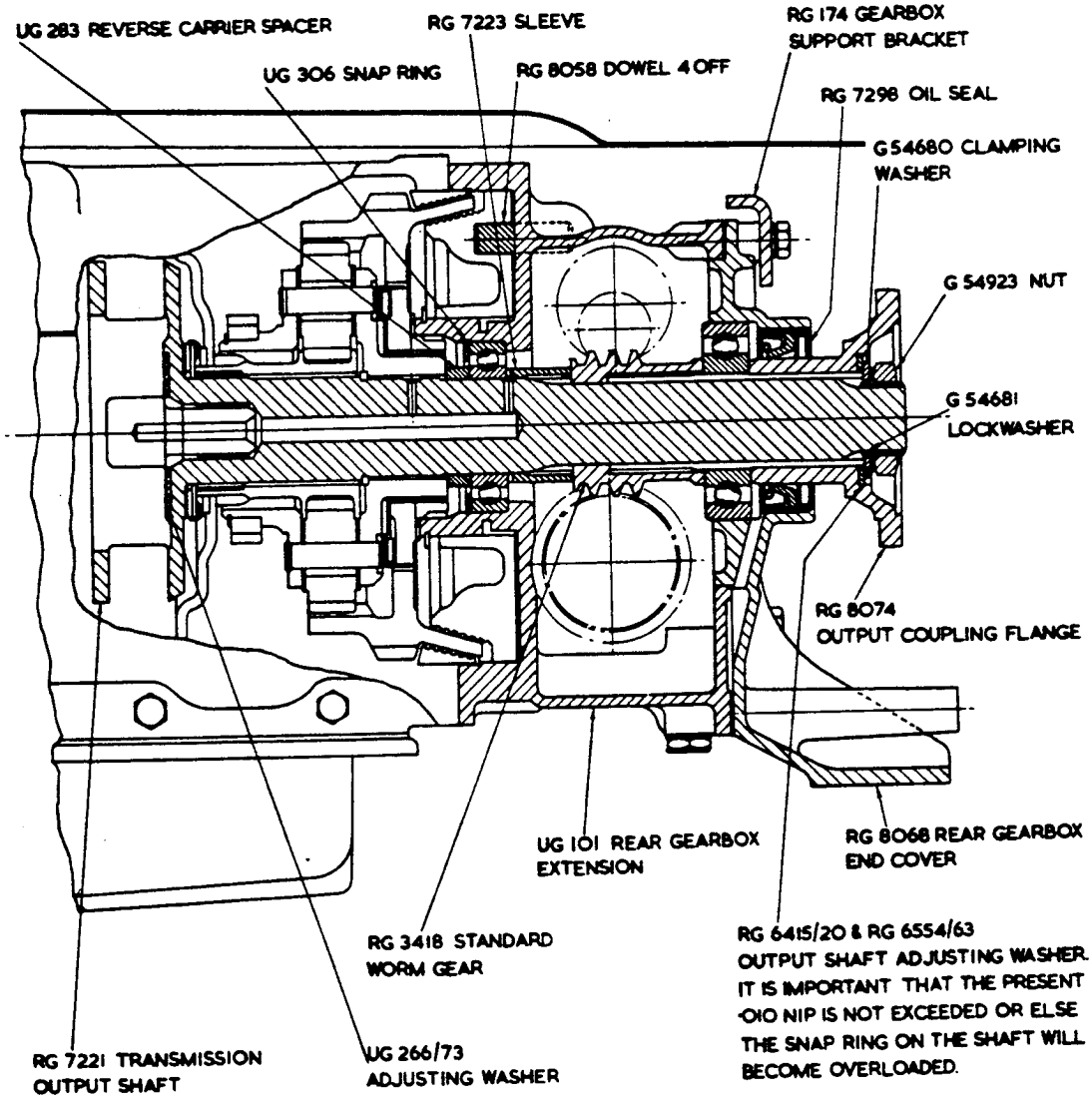

FIG. 1. DESIGN DIFFERENCES - REAR END.

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SERVICE Bulletin No.BB.171.

MODEL: BENTLEY MARK VI

FOR INFORMATION:

AUTOMATIC GEARBOX

Information is given below on the recommended procedure for the Removal and Replacement of a complete Gearbox unit.

Special jacking arrangements are necessary for this operation to ensure the correct alignment of the two dowelled halves of the bell-housing.

The simplest method is to elevate the car on a ramp, or run car over a pit, and use the "Manzel, Trans-lift", a jack which has been specially designed for this purpose.

Where this tool is not available, normal garage equipment can be adapted for use. It will be necessary to provide four steel support trestles to raise the car so that there is a clearance of 2 feet 6 inches between the bottom of the frame and the floor.

Also, a steel support tray, to fit the gearbox sump, will be necessary, as shown in Fig. 1, for attachment to the gearbox lifting jack.

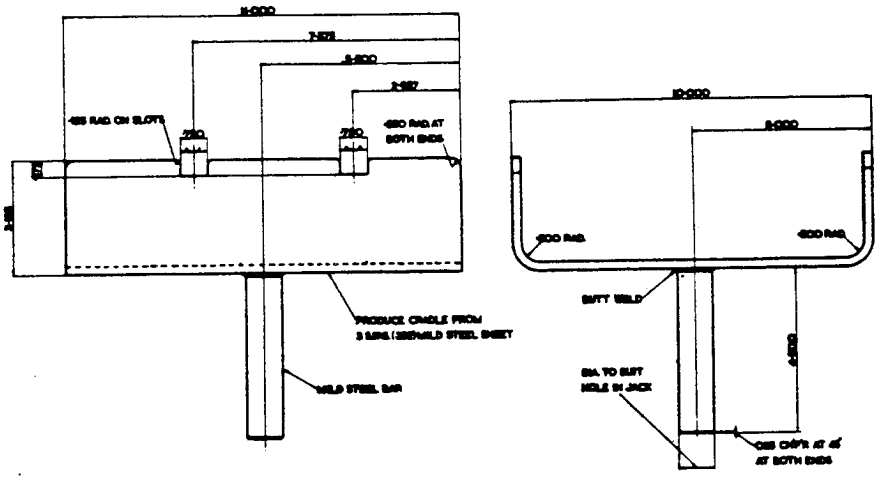

FIG. 1. SUPPORT TRAY - DIMENSIONS.

REMOVAL:

1. Run car onto ramp, or raise car on trestles.

2. Lock Master Switch in OFF position.

3. Remove front seats, and rear seat cushion. Remove carpets from both front and rear floors, leaving centre portion. Suitably cover interior of car.

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4. Drain the coolant system.

5. Remove foot brake pedal, retained by pinch-bolt.

6. Disconnect accelerator operating rod (J) (Fig. 2) at top end. Unhook return spring from accelerator pedal lever and floorboard.

7. Unscrew front floorboard retaining screws (39 off), and remove floorboard, through right-hand door.

8. Disconnect and remove battery.

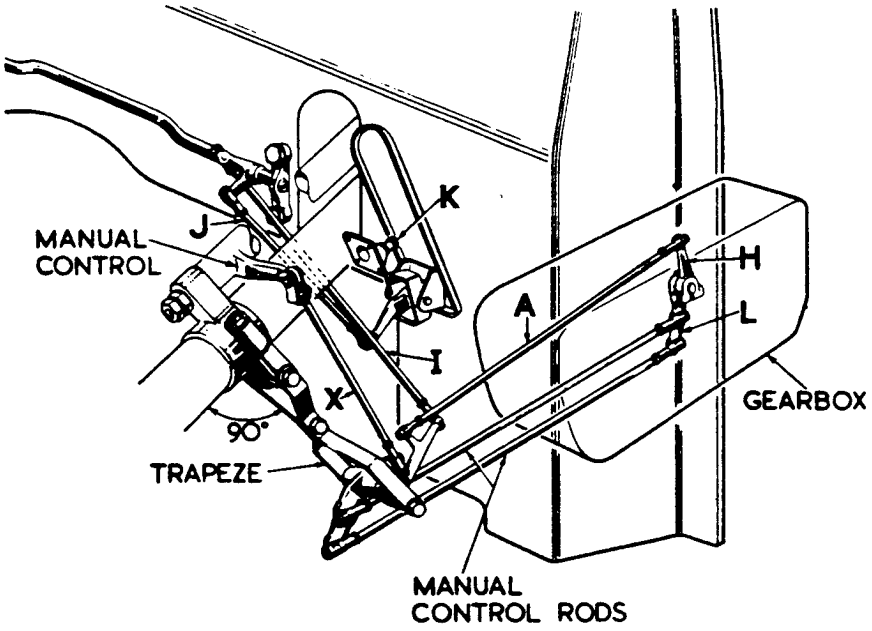

FIG. 2. GEARBOX OPERATING RODS.

9. Disconnect the two horizontal manual control rods (see Fig. 2) from the ball joints on the lower gearbox lever (L).

10. Disconnect the horizontal throttle-valve rod (A) from the ball joint on the upper gearbox lever (H). Slacken pinch-bolts and remove levers (H) and (L) from shaft.

11. Remove split pin from foot brake pedal and disconnect spring. Remove clevis pin, spring link, and sleeve.

12. Place the Ride Control lever on the steering column at NORMAL.

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13. Remove the 2 BA screw and nut securing the operating lever bracket to the ride control pump on the gearbox, and remove lever and bracket complete.
Disconnect from rear of ride control pump, oil pipe to shock absorbers.

14. Disconnect the speedometer drive cable from the gearbox.

15. Remove all undershields, including servo protector.

16. Remove the four retaining bolts and washers from the starter mechanism, and disconnect the cable from the starter motor. Remove the Bijur drive from the rear of the starter motor, together with the spring, two paper gaskets and steel distance piece.

Remove the starter motor and paper gasket.

17. Unscrew the six 3/16" retaining screws and remove the flywheel bottom cover.

18. Slacken back the inner nuts on the gearbox torque reaction brackets, and remove the two oval rubbers from their retaining cups.

19. Remove the front exhaust pipe:- unscrew the six exhaust pipe bolts at the exhaust manifold flange and the four bolts at the silencer flange. Disconnect exhaust pipe from forward and aft brackets. Loosen the bolt at the top of the aft exhaust pipe stay and swing bracket above chassis frame. Collect the two corrugated gaskets.

20. Remove the servo:- disconnect foot brake rod (A, Fig. 3), from lever (Z), disconnect hand brake lever rod (N) from lever (Y). Disconnect rod (G) from lever (R) and unscrew the rod from socket on actuating lever (P) of servo. Remove the $\frac{1}{4}$" bolt (X) from master cylinder equaliser bracket to release the two drag link rods.

Remove the servo retaining setscrew and carefully pull the servo off the three driving pins. Collect the 'Ferodo' sealing washer.

21. Remove the two 5/16" nuts, spring washers and bolts fitted to the bottom rear end and support, these nuts are accessible through holes in the support bracket. Remove the two nuts from the Silentbloc fixing bolts.

22. Remove the chassis frame stiffening tube, underneath front universal joint, retained by two 7/16" bolts.

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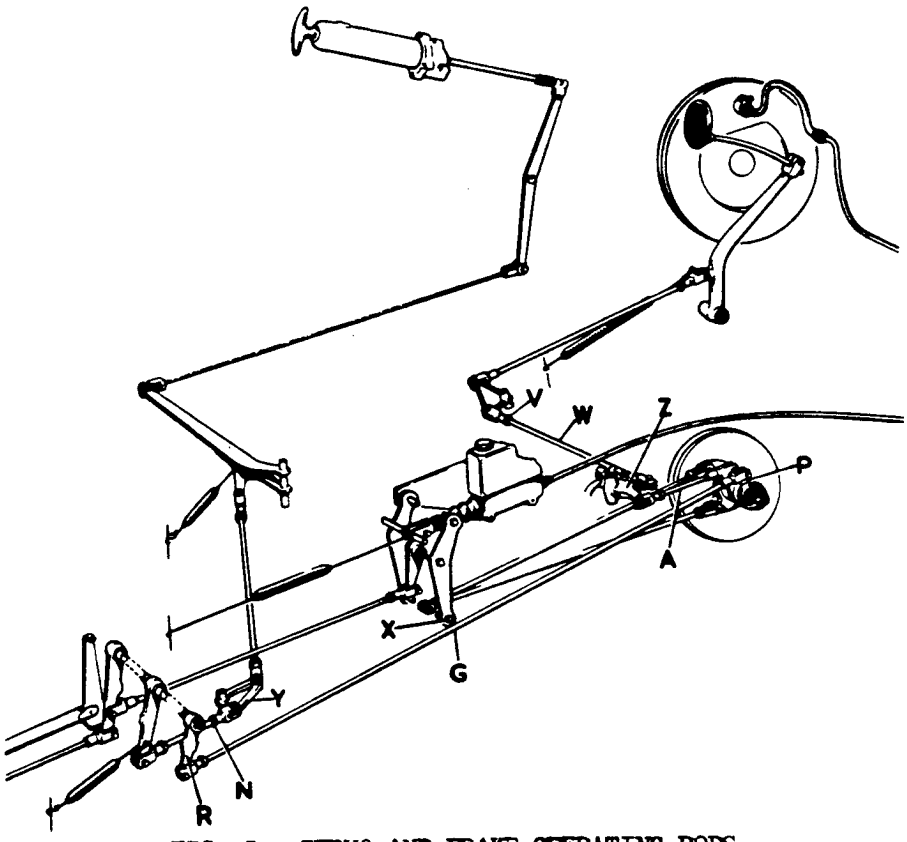

FIG. 3. SERVO AND BRAKE OPERATING RODS.

23. Remove the fore and aft tie-rod, complete with triangular packing piece from under bracket by removing the two 5/16" nuts and washers securing rod to rear of gearbox, and the two 5/16" bolts securing rod to cruciform. The nuts fitted to the stay rod itself should not be disturbed.

24. Disconnect foot brake, transfer rod at (W) Fig. 3, unscrew from joint (V) and remove.

25. Remove cover from brake operated stop light switch.

26. Disconnect and slide rearwards the front propellor shaft. Remove the four bolts from the front and centre universal joint flanges. Remove the three 3/16" bolts from centre universal joint flexible bearing bracket on the cruciform, support rear propellor shaft above cruciform member, and slide front propellor shaft rearwards as far as it will go.

27. Drain oil from gearbox and flywheel into clean receptacle - remove gearbox drain plug, then remove flywheel drain plug after rotating flywheel and torus cover to bring drain plug to lowest point. Examine oil for foreign matter and replace drain plugs.

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28. Disconnect and remove ride control feed pipe from gearbox.

29. Support the engine under the engine sump immediately in front of the flywheel cover by means of a jack. Interpose block of wood between sump and jack to spread load. The engine should be raised just sufficient to take the load off the gearbox rear mounting.

30. Remove the thirty bolts securing together the flywheel, flywheel cover and starter ring, rotating flywheel gradually for access. Remove the two dowel cover strips.

31. Remove the four nuts and bolts securing the rear gearbox mounting cross member bracket, and remove the bracket.

32. From above the gearbox, remove the three left-hand set-bolts and one right-hand set-bolt from front side of bell housing at the centre bolting flange, leaving one dowel bolt each side and four set-bolts at top.

33. With special tray fitted to movable lifting jack as shown in Fig. 4, slide jack under gearbox sump and just take the weight off the gearbox.

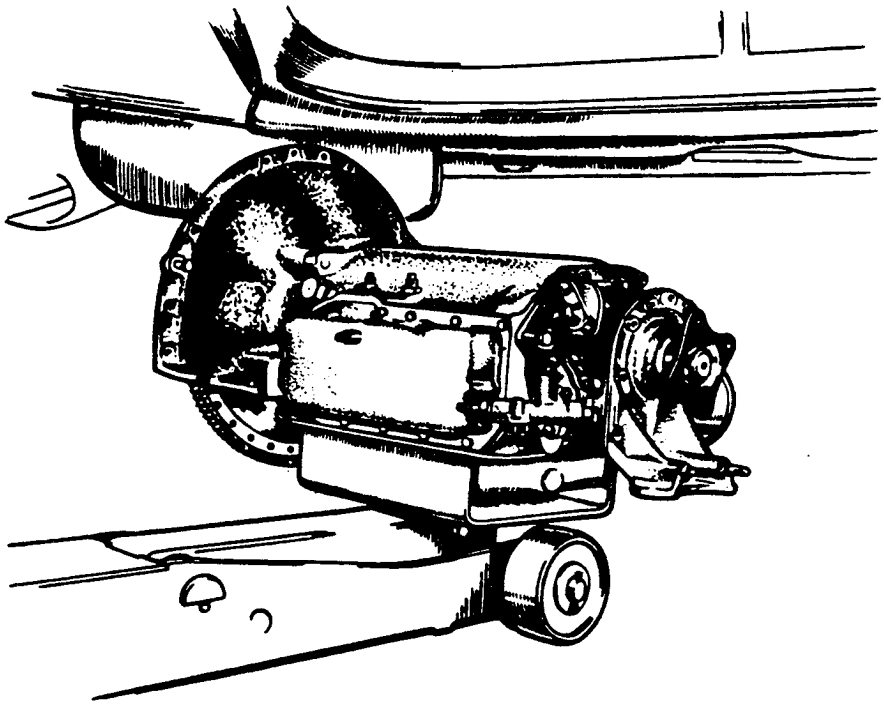

FIG. 4. REMOVING GEARBOX FROM UNDERNEATH SIDE OF CAR.

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34. Removethe remaining four set-bolts and the two dowel bolts from the bell housing flange, tap out the dowel bolts gently rearwards.

35. Remove the seven 7/16" bolts securing the torque reaction bracket and remove bracket.

36. Ease supporting jack and gearbox gently rearwards until spigot bearing is clear of flywheel. Lower the gearbox and clear from car. Discard flywheel sealing gasket.

37. Remove the front half of the bell-housing from the engine secured by eight bolts. It may be necessary to slightly lower the engine for access to two top bolts. Rotate the front bell housing 180° and lower below flywheel.

38. Refix front bell-housing to rear bell-housing on removed gearbox.

NOTE:- The two bell-housing halves are paired and must at all times be kept together.

Refix ride control pump bracket and lever and replace ride control feed pipe.

REPLACEMENT:

1. Place the new automatic gearbox assembly on the lifting jack and remove the front bell-housing.

2. Invert the front bell-housing and place between engine and flywheel raise and turn through 180°. Bolt into place on engine with the eight securing bolts.

3. Remove the ride control feed pipe, and also ride control pump bracket and lever assembly.

4. Remove, from rear of gearbox, the torque reaction bracket retained by seven 7/16" bolts.

5. Inspect all bolting faces for cleanliness and freeness from burrs, paying particular attention to the fluid coupling cover and flywheel bolting faces. Thoroughly clean off gearbox assembly.

6. Measure the diameter of the two dowels on the flywheel, and with a large taper pin measure the diameter of the two locating holes in the starter ring. Rotate the flywheel until the large dowel is in the same relative position as the larger of the locating holes on the starter ring.

7. Lightly smear flywheel bolting face with Duckham's "Keenol". Position a new flywheel gasket firmly on the flywheel bolting face and remove any excess grease.

8. Raise the gearbox and align to engine (1) spigot bearing, (2) Dowels in flywheel.
Ease gearbox into position, taking great care not to damage or buckle the sealing gasket.

9. Refit the two dowel bolts between the front and rear bell-housing halves. Do not tighten nuts at this stage.

10. Reposition the rear gearbox support cross member bracket.

11. Rotate flywheel and check position of the two dowels
If difficulty is experienced in mating flywheel and torus cover, check correct relative position of dowels. Ensure that the sealing gasket is not buckled or displaced.
If necessary, separate gearbox and repeat operations 6, 7, 8, 9 and 10.

12. Refit the four set bolts at the top of the bell-housing, also the three bolts to the left-hand side and the one bolt on the right-hand side, but do not tighten nuts.
Tighten the two dowel bolt nuts and then the eight set bolt nuts. Remove the supporting jack from under gearbox.

13. Refit the four bolts securing the rear gearbox support cross member to the chassis frame. Replace the two bottom Silentbloc fixing nuts, and also the two bolts and nuts securing the gearbox end cover to the cross member bracket, through the recess holes in the cross member bracket.
Remove supporting jack from under engine.

14. Replace the thirty flywheel bolts and the two lockplates over the dowels. Rotate flywheel slowly and tighten bolts as evenly as possible.

15. Replace servo motor fibre washer to gearbox taking care that inner chamfer on washer is towards the gearbox.
Carefully refit the servo motor, locate the driving pins, replace and tighten the centre retaining bolt.

16. Replace all disconnect parts.

Check adjustment of servo motor, see Silver Wraith Workshop Manual, Section RJ 5.

Check that starting and reverse light switch at base of steering column is operating correctly, and that the actuating lever is between the two contacts.

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Refill the cooling system.

Remove the ride control feed pipe and the gearbox sump, and adjust the gearbox servo brake bands in accordance with Bulletins RDB.46. and RB.114.

After replacing sump, check drain plug is secure and refill gearbox in accordance with Bulletins RB.116 and RDB.48.

Expel all air from the oil pressure pipes to rear shock dampers, see Workshop Manual, Section RR.1.

17 Run the engine with the control lever at (N) for a few minutes, and examine underside of gearbox for oil leaks.

Check adjustment of all gearbox controls, see Bulletins RB.115 and RDB.47.

Test car on road and make final adjustments as necessary.

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SERVICE Bulletin No. BB-171A

MODEL BENTLEY MARK VI

FOR INFORMATION

FITTING A NEW AUTOMATIC GEARBOX

The crankshaft assembly on cars fitted with an automatic gearbox is carefully balanced, both statically and dynamically, and it is important when fitting a new gearbox as a replacement that this balance be maintained.

The torus cover, which is bolted to the flywheel and encloses the fluid coupling, should at all times be retained with the engine crankshaft to which it was originally fitted, and it is therefore necessary to fit the original torus cover to the new gearbox. It is also for this reason that replacement stock engines are supplied with a torus cover already fitted.

After removing the automatic gearbox assembly from the chassis as set out in Bulletin BB-171 the procedure is as follows:-

(i) Free the lock washer securing the main shaft clamping nut, and remove the nut, lock-washer and driven (front) torus member.

(ii) Remove the circlip securing the driving (rear) torus member and remove the torus member.

(iii) Remove the torus cover, drawing it forward carefully to avoid damaging the oil seals. Remove the rear half bell-housing and gasket.

(iv) Re-fit the original rear half bell-housing to the new gearbox using a new gasket as necessary. Carefully install the original torus cover onto the splines of the front drive gear, pushing it gently without rocking to prevent damage to the oil seal and rings.

(v) Re-fit the driving torus on to the splines of the front planet carrier and re-fit the snap ring, ensuring that it seats securely in the groove.

(vi) Re-fit the front driven torus member against the main shaft snap ring. Move the shift lever into reverse position to lock the rear train.

(vii) Fit a new mainshaft lock plate with the ear over the flat on the torus hub. Fit the mainshaft nut and tighten to 30-35 ft. lbs. torque before locking.

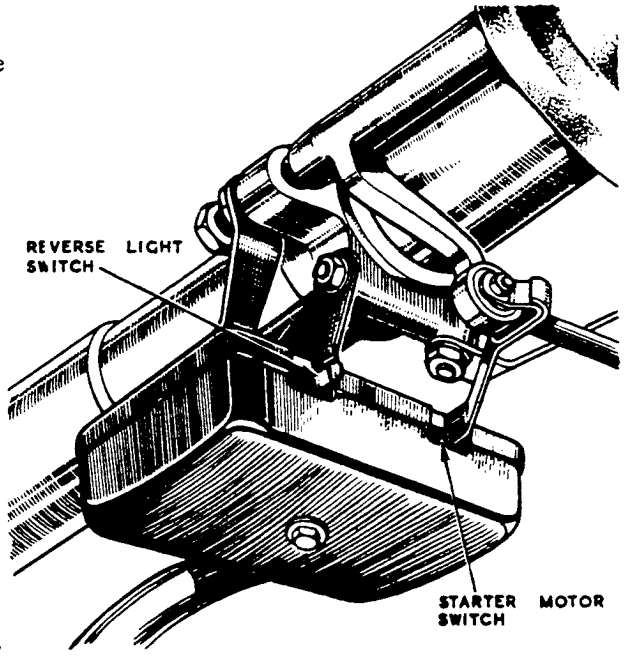
The gearbox is then ready for fitting to the chassis.

FOR INFORMATION:

AUTOMATIC GEARBOX
MICRO-SWITCH.

Certain chassis fitted with the Automatic Gearbox, incorporate a micro-switch assembly as shown in sketch below. The micro-switch, operated by the gear range selector lever, comprises two independent switches. With the lever in the Neutral position, one switch is closed to complete the circuit to the starter motor solenoid, and when the lever is moved to the Reverse position the other switch is operated to illuminate the reverse light.

Should Retailers receive complaints of inability to start cars fitted with the Automatic Gearbox, it is possible that the operating finger on this type of switch is failing to make good contact with the Neutral switch operating leaf, and thus not completing the solenoid circuit.



MICRO-SWITCH.

Inspection and rectification should be as follows:-

1. Place selector lever in 'N' (Neutral). Switch on ignition and press starter button.
2. If the starter motor fails to work, move selector lever to 'R' (Reverse) and confirm that reversing lights are illuminated.
3. Re-engage Neutral and insert a suitable shim between the switch leaf and the operating finger to ensure switch is operating. Again press starter button, if the engine now starts, the setting of the operating lever is at fault. If the starter motor still fails, check starter wiring circuit for continuity.

Remedy:- by loosening the switch bracket fixing nuts and reposition the switch. Engage position 4 and switch on ignition. Keeping the starter button depressed, gradually move the selector lever into Neutral. The starter should then begin to operate approximately 1/10th inch before the lever reaches the Neutral detent position. Position micro-switch to operate starter at this setting.

Do not bend the operating lever unless the above adjustment does not remedy fault.

Finally test for satisfactory starting and Reverse lighting.

FOR CATEGORY 2 ACTION

MODIFICATION

Left Hand Drive Bentley 'R' Type Fitted with Automatic Gearbox.
Ride Control Pump Flexible Pipe.

Experience has shown that, on the left hand drive Bentley 'R'Type fitted with an Automatic Gearbox, the flexible pipe from the ride control pump to the four-way union mounted on the frame cruciform member just behind the gearbox, can be burnt by fouling the exhaust pipe. In exceptional cases this may lead to considerable loss of oil from the gearbox, which, although causing no permanent damage, will give rise to immediate erratic and noisy operation. A shorter pipe, Part No. RF.9971, has been fitted on production on chassis No. B-20-UN and from B-26-UN onwards.

Retailers should check all left-hand drive 'R' Type Bentleys, fitted with an Automatic Gearbox, in their area at the earliest opportunity on service and if necessary, reposition the flexible pipe as described below.

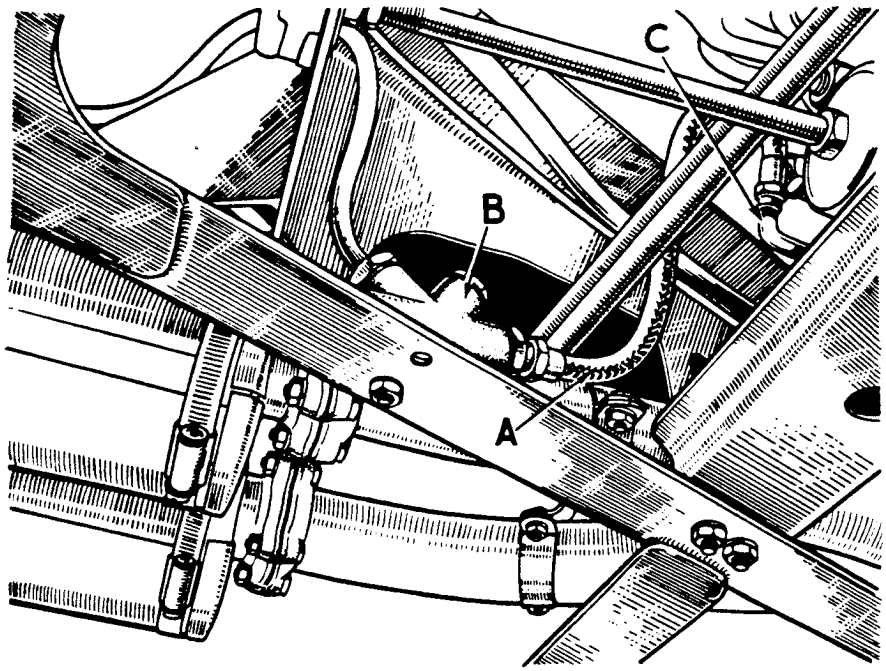


FIG.1 THE FLEXIBLE PIPE RE-POSITIONED.

A. Repositioned Flexible Pipe.
B. Four-Way Union.
C. L-Shaped Outlet Pipe.

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Procedure:

The flexible pipe may be re-positioned away from the exhaust pipe as follows:-

(i) Loosen the bolt attaching the four-way union to the frame cruciform and turn the union so that it lies parallel to the propellor shaft and the car centre line. Tighten the bolt.

(ii) Loosen the union nut and turn the L-shaped outlet pipe from the ride control pump so that it points vertically upwards. Tighten the union nut.

(iii) If necessary loosen the flexible pipe unions so that the pipe may be positioned to run freely well clear of the exhaust pipe and its support bracket.

(iv) Tighten the unions, jack up the rear of the car, run the car in gear and test for leaks.

Fig.1 shows the flexible pipe repositioned. If satisfactory clearance cannot be obtained in this way the shorter pipe RF.9971 must be fitted.

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SERVICE Bulletin No. BB.178

MODEL: BENTLEY MARK VI

For Category 3A Action

MODIFICATION

The Automatic Gearbox Ride Control Pump

Experience has shown that on some cars fitted with an Automatic Gearbox, the operation of the ride control pump has proved inconsistent.

This may be attributed to two causes:

1. Air locking in the pump delivery lines due to incorrect positioning of the pump allowing the gears to draw in small quantities of air.

2. Failure of the pump driving key to engage fully with the driving gears.

This Bulletin details the method of correction and incorporates a modification for increasing the diameter of the pump intake passage, which further improves its operation.

Whenever a complaint is received of the ride control system on a chassis with automatic gearbox the following procedure should be carried out.

PROCEDURE:

To Remove and Dismantle

(i) Remove the left hand rear shield under the gearbox to expose the ride control pump.

(ii) Remove the nut, bolt and spring washer securing the ride control operating lever to the pump body and remove the lever and bracket as one.

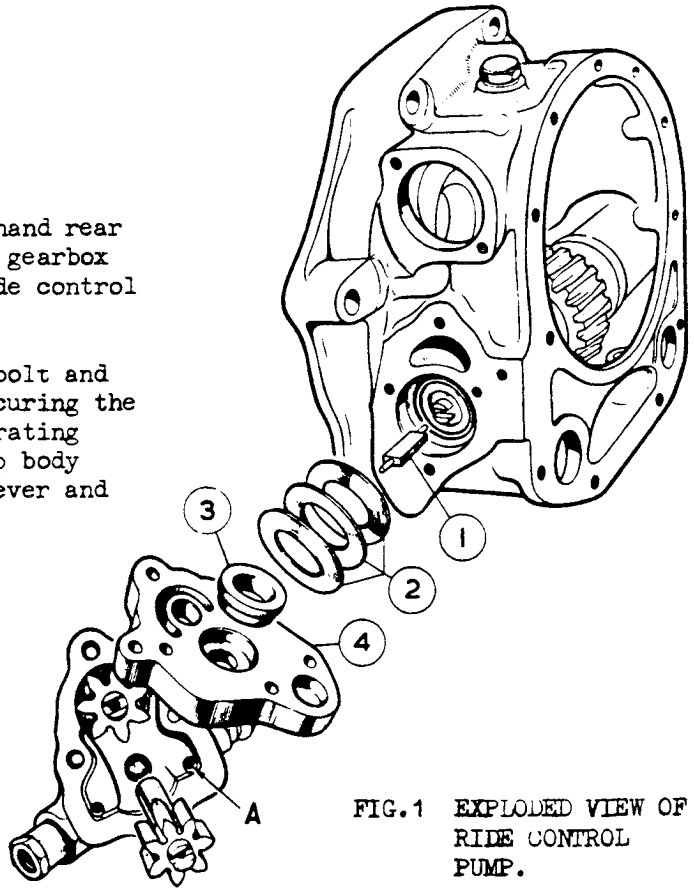


FIG.1 EXPLODED VIEW OF RIDE CONTROL PUMP.

(iii) Remove the two nuts and spring washers securing the feed pipe flange. Disconnect the flexible outlet pipe.

(iv) Remove the four screws retaining the pump to the gearbox rear extension and remove the pump. Collect the driving key (1 Fig.1).

(v) Remove the two screws securing the intermediate plate (4). The plate will spring outwards as the screws are loosened under the influence of the three Belleville washer (2) which apply the pre-load to the taper bearing. Remove the plate and collect the Belleville washers and distance piece (3).

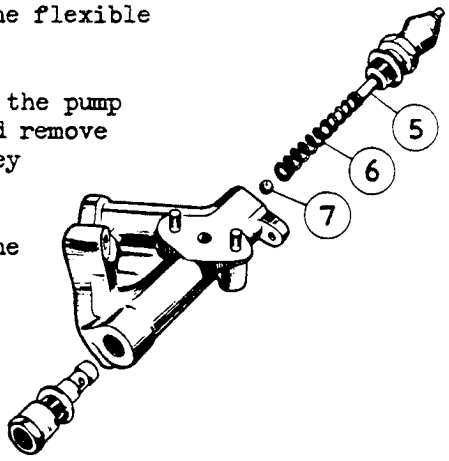


FIG.2 THE PUMP AND VALVE ASSEMBLY.

(vi) Undo the hexagon nut and remove the ride control valve rod (5 Fig.2), spring (6) and steel ball (7).

(vii) Thoroughly clean all parts and remove all traces of jointing compound from the joint faces with a flat stone.

To Enlarge the Intake Passage

(viii) The pump intake passage is shown at A Fig.1. The drilling should be increased from .250" (6.3 mm) to .343" (8.7 mm). First enlarge the hole with a 5/16" drill and then with a 11/32" drill. In order that the drill may enter centrally, the shoulder on the pump flange may be relieved with a round file. Care must be taken to ensure that the drill does not protrude too far beyond the end of the drilling to damage the threads for the control valve rod nut.

(ix) Remove all traces of swarf.

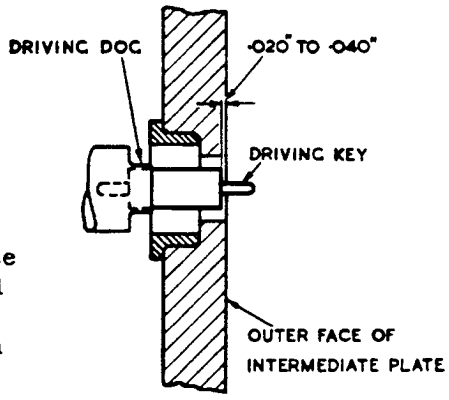


FIG. 3.

To Reassemble and Refit.

(x) Temporarily refit the intermediate plate with the distance piece and Belleville washers assembled as shown in Fig.1, and fully tighten the two securing screws. Rotate the propellor shaft until the driving dogs on the driving shaft are vertical.

Insert the key and, pressing it fully home, measure the depth of the end of the driving blade below the outer surface of the intermediate plate (Fig.3.) This should lie between .020" and .040" .5 mm to 1.0 mm).If below this limit the outer face of the intermediate plate should be faced off sufficiently to achieve it.

This operation ensures that the driving blade of the key satisfactorily engages the dogs of the pump driving gear.

(xi) Remove the intermediate plate and refit it with a minimum quantity of Heldite jointing compound. The Belleville washers may be held in position with white grease. Do not fully tighten the securing screws. Fit the driving key.

(xii) Reassemble the pump control valve and turn the pump gears so that the driving dogs are vertical. Loosely bolt the pump body to the gearbox, using a minimum of Heldite jointing compound and engaging the driving key. Push the pump body forward towards the front of the car to the limit of the screw hole clearance and tighten the retaining screws. Tighten the intermediate plate retaining screws. Remove all excess jointing compound. This method of positioning the pump is most important and should be followed exactly, to ensure the required face seal between the gears and the intermediate plate.

(xiii) Refit the ride control operating lever and bracket.

(xiv) Refit the pump feed pipe with the two 2BA nuts and washers. Refit the flexible outlet pipe ensuring that it is well clear of the exhaust pipe.

(xv) Jack up the rear wheels and bleed the pump from the blank plug in the four-way union on the frame just behind the gearbox. with the eingine running in Range 4 at idling speed and the steering column hand control at 'Hard'. Continue running until a steady flow of oil emits from the union and then replace the plug.

(xvi) Replace the gearbox undershield and check the gearbox oil level (see Bulletin BB.153)

SERVICE Bulletin No. BB-180

MODEL BENTLEY MARK VI

FOR CATEGORY 2 ACTION

MODIFICATION

Gearbox Tie-Rod Bracket.

1. GENERAL

It has been found necessary to modify the transverse mounting bracket for the rear end of the gearbox tie-rod fitted to the Bentley 'R' Type and to the Bentley Continental from B series onwards.

On the earlier rivetted frame the tie-rod bracket is to be strengthened by the addition of a stiffener and a backing plate. The aluminium seating for the tie-rod rubbers is to be replaced by a steel seating.

On the later welded frame the tie-rod bracket is to be cut away and replaced with the Mark VI type bracket.

Details of both modifications are set out in this Bulletin and Retailers are asked to incorporate them on a Category 2 basis, dealing with cars as they come in for service.

The original Mark VI type bracket is now being fitted on production. Both modifications apply equally to cars fitted with either automatic or synchromesh gearbox.

2. RIVETTED FRAMES MODIFICATION

(a) Chassis Nos. Affected:

Bentley 'R' Type

B-2-RT to B-159-SP (inclusive)
B-163-SP to B-21-TO (inclusive)
B-25-TO to B-55-TO (inclusive)
B-59-TO to B-117-TO (inclusive)
B-121-TO
B-125-TO to B-347-TO (inclusive)
B-387-TP, B-401-LTO.

Bentley Continental

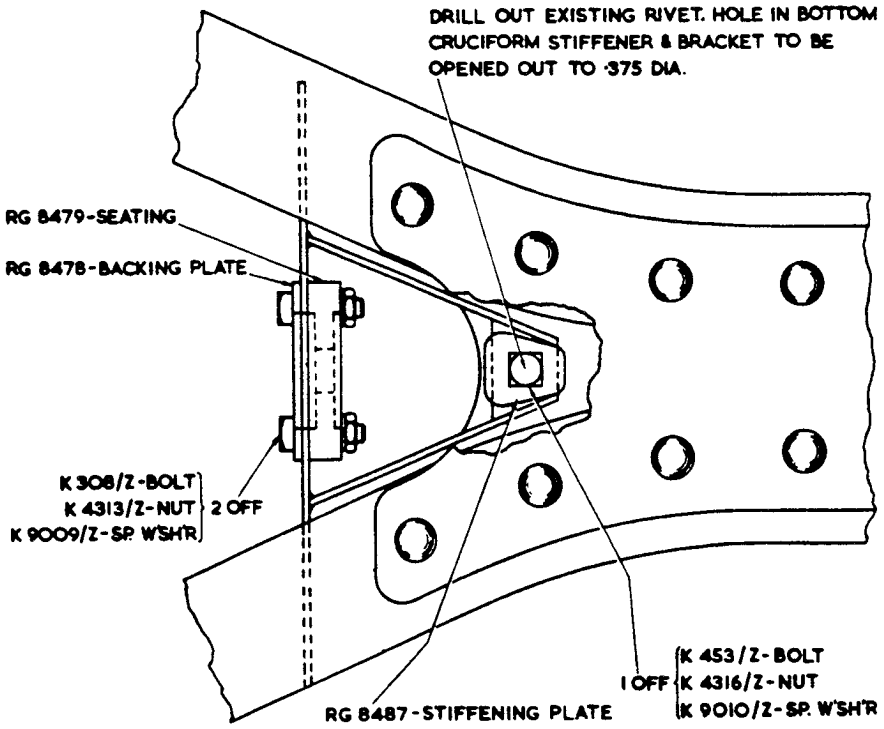
BC-1-LB to BC-20-C (inclusive)

(b) Material Required:

RG.8479	Seating - Rubber	1 off
K.308/Z	Bolt .312" Tie-Rod Seating	2 off
K.4313/Z	Nut .312" Tie-Rod Seating	2 off
K.9009/Z	Washer Tie-Rod Seating	2 off
RG.8478	Backing Plate - Tie-Rod Bracket	1 off
RG.8487	Stiffener Plate - Tie-Rod Bracket	1 off
K.453/Z	Bolt .375"dia. - Tie-Rod Bracket	1 off
K.4316/Z	Nut .375"dia. - Tie-Rod Bracket	1 off
K.9010/Z	F.S. Washer - Tie-Rod Bracket	1 off

This material is available from the London Service Station.

(c) Procedure



VIEW LOOKING ON TOP OF FRAME SHOWING NEW RUBBER SEATING & BRACKET STIFFENERS FITTED

FIG. 1

(i) Place the car on a ramp or over a pit.

(ii) Remove the gearbox tie-rod by removing the two nuts and spring washers retaining the rubber seating to the gearbox at the front end and to the mounting bracket at the rear end.

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(iii) Drill out the existing rivet securing the bracket to the lower cruciform stiffening plate (Fig.1). Enlarge the hole to .375" (9.52 mm) dia. Fit the bolt and stiffening plate. The stiffening plate fits between the bolt head and upper face of the bracket.

(iv) Fit the new rubber seating and backing plate (Fig.1).

(v) Discard the old rubber seating and refit the tie-rod.

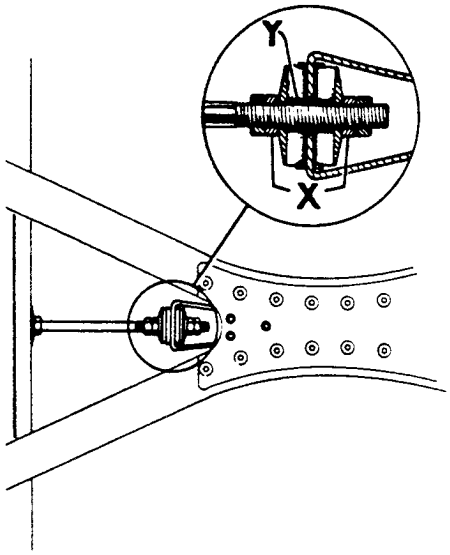

FIG. 2 ADJUSTING THE TIE-ROD LENGTH.

(vi) To adjust the length of the rod, screw up the adjusting nuts (X Fig.2) finger tight and then tighten them an equal amount until the distance piece Y is clamped. Tighten the locknuts. The adjustment should impose no fore and aft deflection on the gearbox rear rubber mounting block.

(d) Charges

A time of 2 hours is allowed and charges should be submitted on a Guarantee Form in the usual way.

3. WELDED FRAMES MODIFICATION

(a) Chassis Nos. Affected

Bentley 'R' Type

B-161-SP, B-23-TO, B-57-TO,
B-119-TO, B-123-TO.
B-349-LTO to B-385-LTO (inclusive)
B-389-LTO to B-399-TO (inclusive)
B-2-TN to B-8-UM (inclusive)
B-12-UM to B-160-UM (inclusive)
B-164-UM to B-176-UM (inclusive)
B-180-UM to B-184-UM (inclusive)
B-202-UM to B-210-UM (inclusive)

Bentley Continental

BC-21-LC to BC-49-LC (inclusive)

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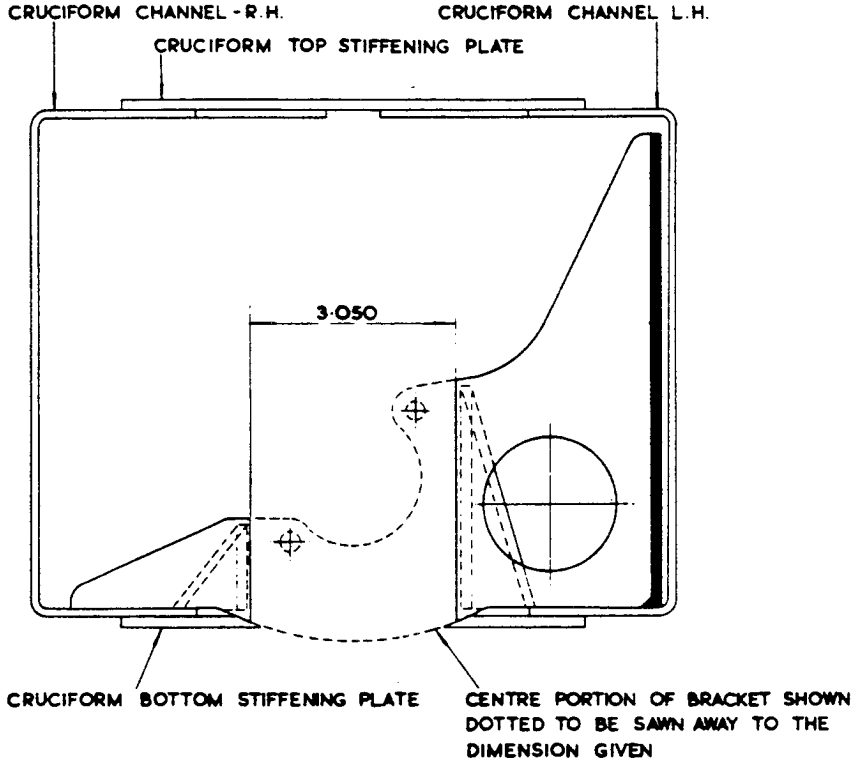
(b) Material Required

RG.8482	Assembly Tie-Rod Bracket	1 off
RG.3434	Packing Plate, Tie-Rod Bracket	1 off
K.345/Z	Bolt 5/16" Tie-Rod Bracket	1 off
K.4313/Z	Nut 5/16" Tie-Rod Bracket	1 off
K.9009/Z	Spring Washer, Tie-Rod Bracket	1 off
K.243/Z	Bolt ¼" Tie-Rod Bracket	2 off
K.4310/Z	Nut ¼" Tie-Rod Bracket	2 off
K.9008/Z	Spring Washer, Tie-Rod Bracket	2 off

This material is available from the London Service Station.

(c) Procedure



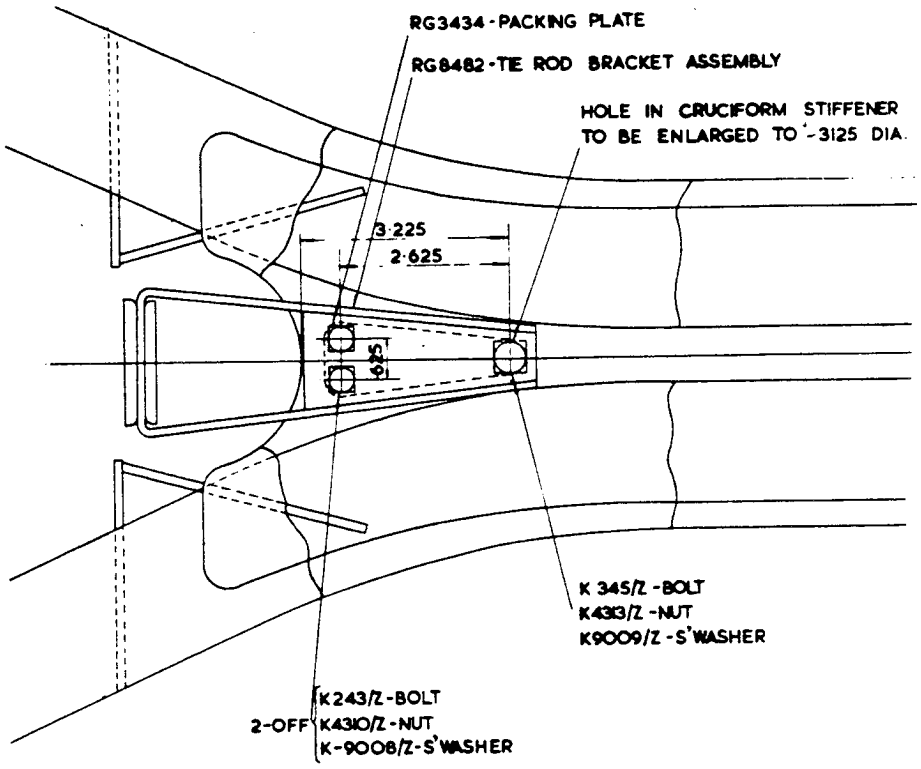
VIEW LOOKING FROM FRONT OF CAR SHOWING MODIFICATION TO EXISTING TIE ROD BRACKET

FIG. 3

(i) Place the car on a ramp or over a pit.

(ii) Remove the gearbox tie-rod by removing the two nuts and spring washers retaining the rubber seatings to the gearbox at the front end and to the mounting bracket at the rear end.

(iii) Cut out the centre portion of the transverse mounting bracket with a hacksaw as shown in Fig.3. Clean up and paint the cut edges.



VIEW LOOKING ON TOP OF FRAME SHOWING NEW TIE ROD BRACKET FITTED IN POSITION

FIG. 4

(iv) Increase the diameter of the rear centre hole in the cruciform bottom stiffener plate from ¼" (6.35 mm) to 5/16" (7.93 mm) (Fig.4). On some frames the three holes in the stiffening plate may not already exist and should be drilled in accordance with the dimensions given in Fig.2.

(v) Fit the new bracket and packing piece to the top of the stiffening plate securing with the three bolts, spring washers and nuts.

(vi) Remove the old rubber seating from the rear end of the tie-rod and refit the rod to the gearbox and bracket.

(vii) Set the length of the rod as in para 2 sub.para (vi) above.

(d) Charges

A time of 2 hours is allowed and charges should be submitted on a Guarantee Form in the usual way.

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SERVICE Bulletin No. BB-196.

MODEL BENTLEY MARK VI

FOR INFORMATION AND ACTION.

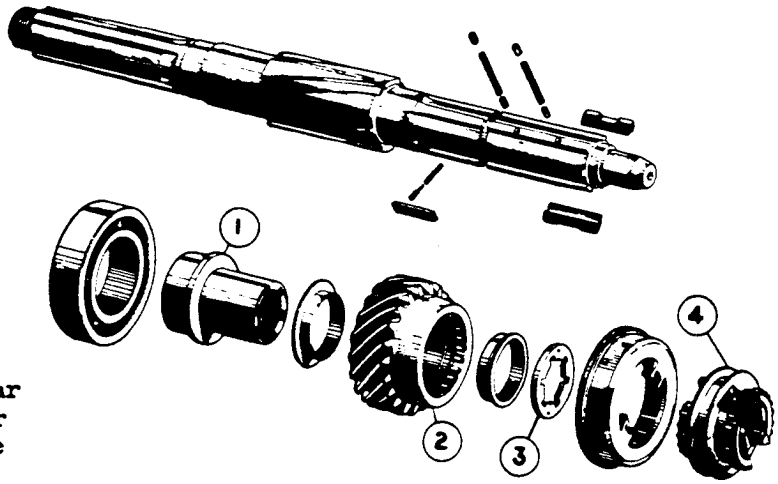
THE SYNCHROMESH GEARBOX.

THRUST WASHER THIRD MOTION SHAFT.

A strengthened thrust washer for the 3rd speed gear on the third motion shaft, .050" (1.25 m/m) thicker than the earlier types, is now available for replacement purpose. The washer has an overall thickness of .225" (5.72 m/m) and should be fitted whenever a gearbox is stripped down for any reason. The groove in the third motion shaft must be chamfered to accomodate the new washer and full details are set out in this Bulletin.

On current production a washer of .275" (6.98 m/m) thickness is now being fitted. Its fitting requires machining operations to existing parts which it is not intended should be undertaken on a service basis. However, full details are included in the second part of this Bulletin for information and for guidance where sufficient new parts are being fitted to warrant fitting the production type washer.

Full details of dismantling and re-assembling the gearbox are given in Section G of the Workshop Manual.



1. Sleeve
2. 3rd Speed Gear
3. Thrust Washer
4. Sliding Piece

FIG.1 THIRD MOTION SHAFT RG.5469 AND COMPONENTS.

1. SERVICE SCHEME.

Parts Required.

RG.8529 Thrust Washer-3rd Motion Shaft	1 Off
RG.8530 3rd Motion Shaft or RG.5469 modified to RG.8530 (Fig.3)	1 Off

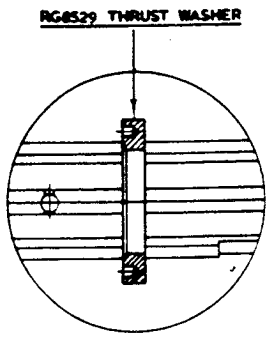


FIG.2 SECTION THROUGH THRUST WASHER IN POSITION ON SHAFT.

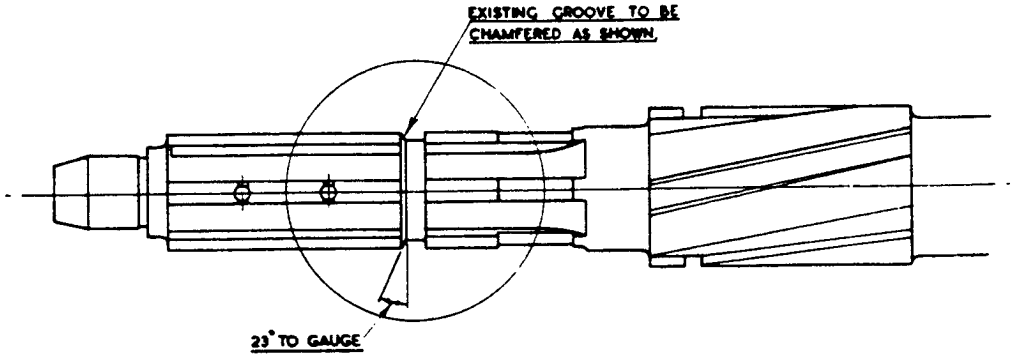


FIG.3 TO MODIFY THE THIRD MOTION SHAFT RG.5469 to RG.8530.

The chamfer on the front f ce of the groove in the third motion shaft should be ground off if necessary using the thrust washer itself as a gauge. The washer should rotate freely in the groove but endfloat must not exceed .004" (.10 m/m).

2. PRODUCTION SCHEME.

Parts Required.

RG.8473	Thrust Washer-3rd Motion Shaft	1 Off
RG.8472 (or RG.5469 modified to RG.8472 - Fig.4)	3rd Motion Shaft	1 Off
RG.8459 (or RG.100 modified to RG.8459 - Fig.5)	3rd Speed Gear	1 Off
RG.8461 (or GB.5374 modified to RG.8461 - Fig.6)	Sleeve - 3rd Motion Shaft	1 Off
RG.8467 (or RG.5470 modified to RG.8467 - Fig.7)	Sliding Piece - 3rd Motion Shaft	1 Off

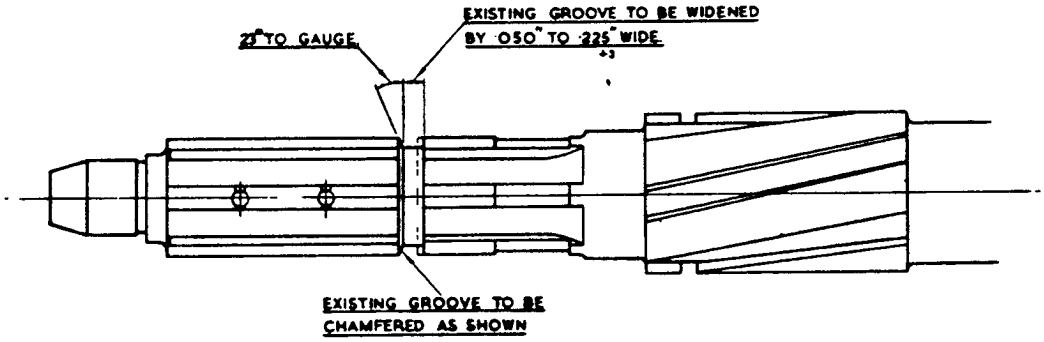


FIG.4 TO MODIFY 3RD MOTION SHAFT RG.5469 to RG.8472

The machining operations are detailed in Figs.4,5,6 and 7. The sleeve RG.8461 may be turned in a lathe using a carbide tipped cutting tool but other parts should be ground. The machining of the 3rd speed gear requires an internal grinding machine.

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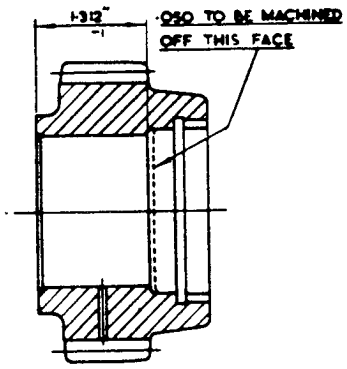

FIG.5 TO MODIFY 3RD SPEED GEAR RG.100 TO RG.8459.

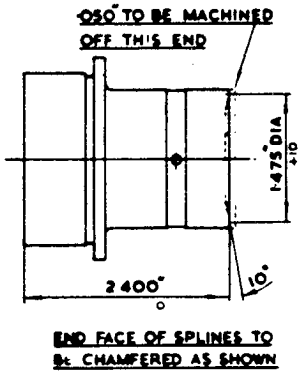

FIG.6 TO MODIFY SLEEVE GB.5374 TO RG.8461.

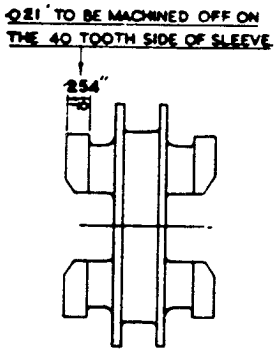

FIG.7 TO MODIFY SLIDING PIECE RG.5470 TO RG.8467.

3. RECOGNITION MARKINGS.

Gearboxes overhauled by the London Service Station will be stamped on the boss for the second motion shaft locating screw under the rear end of the gearbox as follows:

Boxes fitted with washer RG.8529 "W.1".

Boxes fitted with washer RG.8473 "W.2".

Retailers are asked to mark boxes overhauled by them in the same manner.

IMPORTANT.

Please note that the thrust washer RG.8529, which has an overall thickness of .225", fits the groove in the third motion shaft RG.8530 or RG.5469 modified as above, and that the thrust washer RG.8473, which has an overall thickness of .275", fits the third motion shaft RG.8472 or modified shafts: the relevant dimensions being the width of the groove at the top, and not the bottom of the chamfer groove, coinciding with the overall thickness of the thrust washer.

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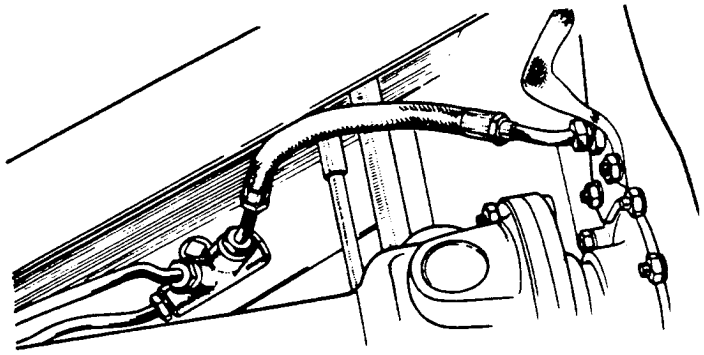
RIDE CONTROL PUMP.
FLEXIBLE OUTLET PIPE.

The flexible pipe from the ride control pump to the four way union on the chassis frame was shortened to avoid a possible foul with the exhaust pipe on certain models fitted with an Automatic Gearbox. The shorter pipe Part No. RF.9971, is now the only available replacement.



On chassis fitted with a synchromesh gearbox the shorter pipe should be positioned, as shown in the illustration, in the higher of the two forward connections in the four way union in order to gain the maximum free length. This is the connections to which a blanking plug is normally fitted. The plug and washer should be removed and fitted to the lower connection.

RF.9971 is fitted with olives and sleeve nuts and the following parts should therefore be ordered for replacement:

RF.9971	Pipe flexible	1 Off
F.85005	Olive	2 Off
F.85053	Sleeve Nut	2 Off

On chassis fitted with an Automatic Gearbox the pipe is positioned in the lower of the two forward connections as previously.