



MODEL BENTLEY MARK VI

MODIFICATIONENGINE OIL FILLER CAP WASHER.

Owing to the reported loss of oil filler cap washers in service, it is considered advisable that this washer be permanently fixed in its recess.

This modification is now being incorporated on all cars prior to delivery, but a certain number of cars were delivered before the alteration took place and it is necessary that these cars should receive attention.

The process consists of sticking the rubber washer into the cap using Postik No.772, care being taken that surfaces are clean and free from oil before adhesive is applied.

It is a simple matter to verify whether any particular car has been modified, as a washer which has not been stuck down is easily removable from its cap, and Retailers should take the necessary action when cars come in for servicing.

Will all Retailers kindly inform this Service Depot Concerning cars on which they carry out this alteration.



BENTLEY MARINE

FOR INFORMATION.

CANCELS BB43 dated 4.1.54.

REPLACEMENT OF TAPPETS.

This Bulletin supercedes Bulletin BB43 dated 4.1.54. which should be destroyed.

1. INTRODUCTION.

It has been found that a greater running clearance is desirable with the two window type tappet now being supplied for replacement purposes. This tappet, having two windows less than the earlier type, is more rigid, has a greater bearing surface and is slightly heavier, all factors which may cause the tappet temporarily to stick in the bore when the lubricating oil is cold.

Fitting in accordance with previous instructions may lead to this overtightness which is evidenced by considerable valve gear noise when lightly revving a cold engine. The noise is not unlike that of slack pistons. It will occur only when tappets have recently been replaced in service and should not be confused with tappet noise due to wear after considerable mileage.

Briefly, the new instruction is to fit tappets one size smaller than is found by 'feel fit' as previously recommended. The full procedure is detailed in the following paragraphs.

2. COLOUR CODING OF TAPPETS.

A range of tappets is available allowing selective fitting in steps of .00025" on the diameter as set out below. The tappets are colour coded as indicated and do not bear separate part numbers. Replacement orders should be by colour only. Both inlet and exhaust tappets are coloured similarly.

<u>Tappet Diameter</u>	<u>Colour</u>
1.18675 to 1.1870	Blue
1.1870 to 1.18725	Green
1.18725 to 1.1875	Yellow
1.1875 to 1.18775	Black
1.18775 to 1.1880	Black and Yellow
1.1880 to 1.18825	Green and Yellow

Retailers are advised that a set of six of these latest type tappets should be held for gauging purposes. Any of the earlier four window type now held in stock should be used up on repairs and not held as gauges in order to avoid confusion when re-ordering due to previous colour code changes.



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3. TAPPET SELECTION AND FITTING.

Tappets are selectively fitted and should be a close clearance fit in their bores. A master set of six should be used for gauging purposes.

- (i) Carefully wipe clean the tappet bore. Select a tappet from the set of gauges that will just slide down the bore without lubricant with the finger pressing lightly on the top.
- (ii) Select a new tappet from stock that is one size less than the gauge tappet. Thus if a 'yellow' gauge tappet is found to give the required feel fit a 'green' tappet should be selected for fitting to the bore. Repeat for all the tappet bores.
- (iii) Wash and wipe clean the new tappets without removing the 'Parkerising' from the bottom face. This surface, as well as being rustproof, is of value during running in. Etch the appropriate number from 1 to 6 on the top of each tappet to correspond with its bore, inlet or exhaust, commencing from the front of the engine.
- (iv) Fit the tappets to the bores smearing the sides and bottom face with Gargoyle grease 234 or Mobilgrease 234. These greases have a high film strength and will assist in obtaining a good bedding surface during running in. They may be obtained in small quantities from the manufacturers.

Whenever the cylinder head is removed for decarbonising the tappets should be checked for pitting on the bottom face. Pitted tappets should be renewed. Serviceable tappets should be replaced in their original bores.



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CATEGORY 2STICKING OF THROTTLE CONTROLS.

This modification is introduced in order to prevent the possibility of complaints of sticking throttle controls, due to seizure of the lower throttle countershaft mounted in the frame. Briefly, the action to be taken consists of increasing the diametrical clearance between the countershaft and its bearings by reaming the bushes to $.320" + .002"$ dia. or in the event of a reamer of this size being unobtainable, by reducing the diameter of the shaft by approximately $.004"$ to $.306"$ dia. by carefully polishing with emery cloth.

On chassis nos. B-297-CD, B-347-CD and all subsequent cars no action is required as the bores of the countershaft bushes are $.320" + .002"$ diameter, giving the required clearance of $.008"$ to $.012"$.

PROCEDURE.

- (i) Remove the R.H. front and rear undersheets to gain access to the countershaft.
- (ii) Remove the lever from the outermost end of the countershaft, that is, remove the lever from the end of the countershaft which is situated inside the box section of the frame. This operation requires some ingenuity owing to the comparative inaccessibility of this end of the shaft.
- (iii) Disconnect the control rod from the lever on the inner end of the countershaft, then, to provide withdrawal clearance for the countershaft, prop the clutch pedal in the disengaged position with the aid of a piece of wood of suitable length, and then remove the countershaft.
- (iv) Ream the bushes to $.320" + .002"$ dia. It may be necessary to remove the flywheel lower cover in order to obtain the necessary working clearance to carry out the reaming operation.

If a suitable reamer is not available, the countershaft should be reduced in diameter by approximately $.004"$ to $.306" - .002"$ dia. by carefully polishing with emery cloth. The reduced diameter should be localised to the two areas in contact with the bushes.

Continued



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- (v) Re-assemble the countershaft to its bracket after cleaning and lubricating the bushes. Check that the shaft possesses end play, the exact amount is not important as long as some is present.
- (vi) As a means of identification to show that this modification has been carried out, the letter "R" should be stamped on the chassis frame just beneath the rearmost nut of the countershaft bracket.

Will all Retailers please notify this Service Station of the chassis numbers of cars on which the modification is carried out.

TIGHTENING DOWN THE CYLINDER HEAD.FOR INFORMATION:

Further to Paragraph 2 of Service Bulletin BB-42, it is not now recommended that a break back or torque loaded spanner should be used since there is a danger of stretching the cylinder head holding down studs at a tension of 280-lbs/ins. on the 5/16" diameter studs. It should be particularly noted therefore that the only reliable and satisfactory method of tightening down the cylinder heads is under the control of a skilled fitter using a box spanner with a fixed length of tommy bar. The recommended tommy bar length is 6", and the nuts should be tightened down evenly working from the centre until by experienced "feel" the nuts are as tight as is wise having regard to the elasticity of the studs.

It may also be noted for information, that until recently 5/16" studs with standard 5/16" nuts were used. In order to improve the tensile properties of the studs, a special heat treatment operation was introduced. It will also be found that later cars have cadmium plated nuts, and as this has the effect of reducing the thread friction, extra care is necessary in tightening down.

Present production cars are now fitted with $\frac{3}{8}$ " diameter studs and nuts. These will stand a greater degree of tension in tightening down.

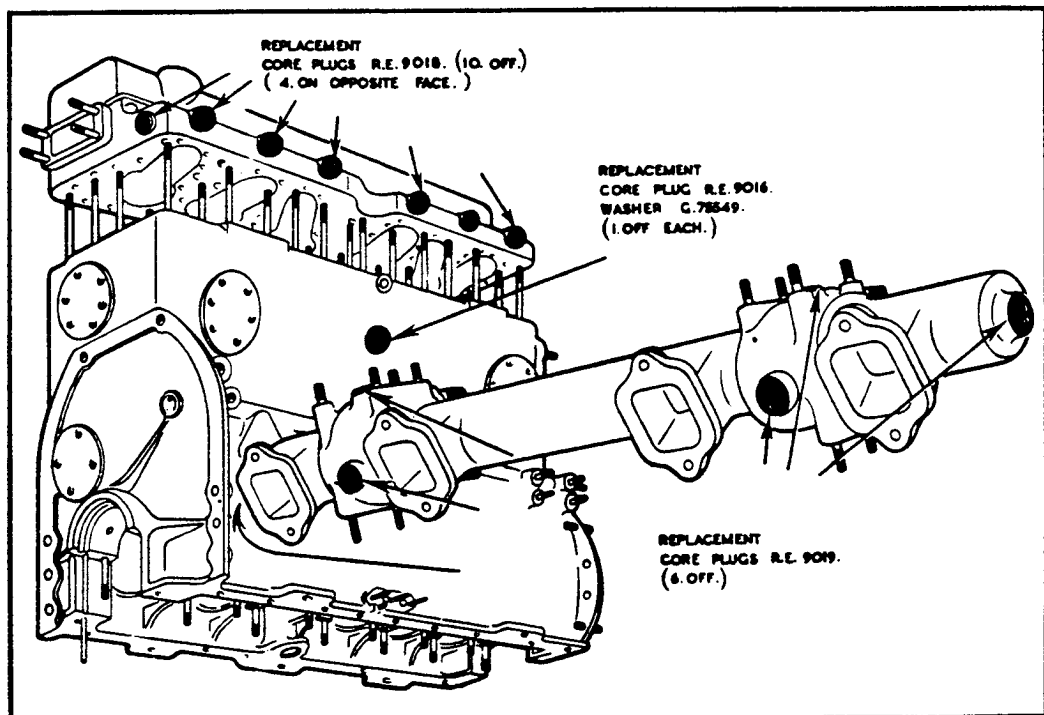
The chief points arising out of these instructions are as follows:-

1. Klingerite gaskets where available, may be used up.
2. Future deliveries of gaskets will be copper asbestos.
3. It is advisable to use a jointing compound along the exhaust side of the C & A gaskets.
4. Care must be taken in tightening down the 5/16" holding down studs. Do not use an excessive length of tommy bar and tighten down uniformly keeping within the elastic limit of the stud.
5. Latest engines have $\frac{3}{8}$ " diameter nuts and studs.

FOR INFORMATION:CORE PLUGS.

Bentley Service Bulletin BB-19 deals with the replacement of engine core plugs on a Category 2 basis, conditional upon partial or complete overhaul.

The following illustration gives fuller details of the location of the core plugs to be replaced, together with replacement part numbers.



It should also be noted that if a coolant leak develops from any of the core plugs when the engine is fitted with the pre-modified type, this may indicate that a state of corrosion exists in other core plugs caused initially by the engine remaining drained of coolant for lengthy periods of storage or shipment. If a leak is apparent therefore, the instructions given in Bulletin BB-19, limiting this modification to overhaul cases only, must be disregarded, and all core plugs replaced with the modified type.



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FOR INFORMATION:CORE PLUGS - ADDENDUM.

When the modification detailed in Bentley Service Bulletin BB-19 is effected, an aluminium alloy crankcase core plug, additional to those illustrated in Service Bulletin BB-65, must be replaced by the modified type.

This core plug is positioned under the coolant pump mounting adaptor and in order to facilitate replacement, the coolant pump and adaptor must be removed.

The replacement core plug is the type specified for the crankcase side (RE.9016) and must be fitted with an aluminium washer (G.75549.) The amended list of parts necessary to incorporate this modification is as follows:-

RE. 9016	Core Plug	2	Off	(Crankcase)
G. 75549	Washer	2	Off	(Crankcase)
RE. 9018	Core Plug	10	Off	(Cylinder Head)
RE. 9019	Core Plug	6	Off	(Induction Pipe)

FOR INFORMATION:ENGINE TUNE-UP.

The recommended operations necessary for a tune-up of the engine.

1. SPARKING PLUGS:

Clean the sparking plugs and reset the gaps to .025" (.635 m/m).

2. IGNITION SYSTEM DISTRIBUTOR:

Remove, clean and reset the gaps of the contact breakers of the distributor as follows:-

- (i) Remove the rotor arm from the top of the spindle.
- (ii) Loosen the small bolt attaching the spring of 'A' Contact breaker, Fig.1, to its anchorage and remove the breaker arm complete with its fibre adjusting washer/s. Remove the locking screw 1, (Fig.1) and remove the contact plate. It is essential that each contact breaker arm, their respective fibre adjusting washer/s and contact plate should be kept together and refitted to the same side of the distributor from which they were removed. Carry out the same procedure for 'B' contact breaker - removing the locking screw 2.

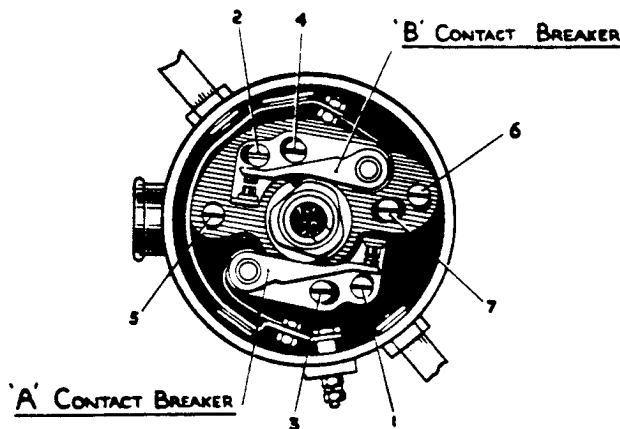


FIG. 1. PLAN VIEW OF DISTRIBUTOR.

- (iii) Trim up the points as necessary with a fine carborundum stone until the faces close flush with each other. All raised portions of the contact surfaces should be removed, but it is not necessary to remove the pit marks. If the points are badly pitted, then they should be renewed.
- (iv) Refit the contact plates, adjusting washers and breaker arms to their original position. Apply a few drops of engine oil to the felt wick at the top of the distributor spindle and one drop of oil to the rocker arm pivot pins. Smear a trace of Mobiloil Grease No. 2 on the cam surface and refit the rotor.

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Note: Should it be found necessary to fit one or two pairs of new contact breakers, care must be taken to ensure that the contact faces of the points close flush with each other. It is usually found that this is obtained by refitting the original fibre adjusting washers, but if this does not suffice, an additional washer R-3975 (thin) or R-3977 (thick) can be fitted or one removed as found necessary.

- (v) Turn the engine until the fibre heel of 'A' contact breaker arm is on a lobe of the cam to give maximum opening, loosen the contact plate locking screw, 1, and turn the adjusting screw 3, to obtain the correct gap between the points i.e. .020" (0.508 mm), and then retighten the locking screw (1). Check that the setting of the gap has not been disturbed by the tightening of the locking screw. Carry out the same procedure for 'B' contact breaker arm by loosening the locking screw 2, and turning the adjusting screw 4.

3. CLEANING THE CARBURETTORS:

- (i) With the ignition switched off, remove the petrol feed pipe from each of the carburettor float chamber covers. Take out and clean the small gauze filter located in each of the covers.
- (ii) Remove the float chamber covers, lift out the floats and wipe out the bottom of the float chambers.
- (iii) Refit the covers, and replace the small filters with the open end outwards. If necessary, fit four new C & A washers (Part No. EB.4580) to the banjo joints of the petrol feed pipe connections.
- (iv) Remove the air valve assembly from each carburettor; first unscrew the knurled cap from the top of each air valve cylinder and carefully remove the plunger (attached to the cap). Next remove the cylinder, then lift out the piston, taking great care not to bend or damage its needle valve or to transfer the pistons. Wipe the piston, cylinder and guide with a piece of clean cloth dipped in petrol. If the piston is found to be "gummy", it is permissible to clean it with metal polish with the exception of the large diameter grooved portion of the piston. On replacement, refill the oil damper reservoir with a viscosity S.A.E. 10 oil, any of the following may be used:-

Price's
Wakefield's
Vacuum
Shell
Essolube

Motorine U.C.L.
Wakefield Oilit
Mobil Handy Oil
Donax A.1.
Esso Shock Absorber Light.

4. FUEL STRAINER:

Remove and clean the filter gauzes of the fuel strainer located on the cross-member in front of the main tank. Drain and clean the strainer sump. If necessary, fit a new cork joint washer (Part No. F-89195) to the cover.



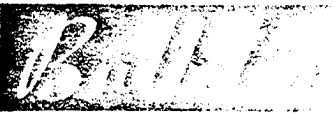
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5. TO RESET IGNITION TIMING:

After attention to the contact breakers as described in paragraph 4, it is essential that the ignition timing should be re-timed. Proceed as follows:-

- (i) Start up the engine and allow it to run for a few minutes and then remove the sparking plugs to relieve the compressions.
- (ii) Slacken the nut of the cover of the flywheel marking inspection hole and ease back the cover. The cover is situated on the left-hand side of the clutch casing adjacent to the starter motor.
Note: Owing to the fact that a friction-damped spring drive is used for driving the valve gear and the distributor, and that the starting handle operates to turn the crankshaft through the medium of this spring drive, it is essential that the crankshaft is rotated for timing purposes from the flywheel end as described below. Also the starting handle should not have been used at all since the engine was last running, and should not be used again until the ignition timing has been reset.
- (iii) To enable the crankshaft to be turned for timing purposes, jack up the left-hand rear road wheel, engage top gear and release the handbrake.
Note: A method of determining precisely when the contact points break, is to connect one lead of a 12 volt inspection lamp (or a 12 volt buzzer) to the contact breaker terminal on the side of the distributor and the other lead to the distributor body (earth). To view the flywheel marking, a small mirror will be necessary.
- (iv) With the distributor cover removed, turn the crankshaft in its normal direction of rotation by means of the rear L.H. wheel until the distributor rotor approaches the No.1. cylinder firing position (approximately 11-o'clock on the distributor), continue to turn slowly until the I.O. (Inlet Opens) marking on the flywheel registers with the pointer. The I.O. marking is $\frac{3}{2}^{\circ}$ past the IGV/T.D.C. marking.
Note: Normally, with the use of high octane fuels (No.1 spirit) the contact points of the distributor are set to break on the IGV/T.D.C. marking, but owing to the present use of low octane fuels in certain countries, it is now recommended that the contact points are set to break on the I.O. marking of the flywheel, i.e. $\frac{3}{2}^{\circ}$ later in order to prevent engine detonation.
- (v) Connect the leads of a 12 volt inspection lamp (or buzzer) to the distributor as previously described and switch the ignition ON.
- (vi) Slacken the screw of the distributor head clamp, and holding the rotor in its fully retarded position (anti-clockwise), rotate the complete distributor body until the points of 'A' contacts just break, i.e. indicated by the lighting of the inspection lamp. Tighten the screw of the distributor head clamp, taking care not to over-tighten to such an extent that the distributor drive bush is distorted.



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- (vii) Turn the crankshaft through two revolutions and check the break of the points against the I.O. marking on the flywheel. If necessary, re-adjust and re-check.

Having set the timing of No.1 cylinder on 'A' set of contacts, it will now be necessary to check the timing of No.6 cylinder controlled by 'B' contacts.

- (viii) Turn the crankshaft so that No.6 piston is approaching T.D.C. and the distributor rotor approaching the firing position for that cylinder (approximately 5-o'clock); continue to turn slowly until the I.O. marking on the flywheel registers with the pointer.
- (ix) Slacken the screws 5 and 6 Fig.1. and with the aid of the inspection lamp (or buzzer), adjust the break of 'B' contact points by rotating the adjusting screw. Retighten the screws 5 and 6.
- (x) Turn the engine through two revolutions and check the break of 'B' contact points against the I.O. marking on the flywheel. If necessary, re-adjust and re-check and then switch off the ignition. The contact breaker arms will now have been synchronised.

6. INLET VALVE ROCKER CLEARANCE - TO ADJUST:

Before commencing to adjust a rocker clearance, it should be ascertained that that particular tappet is on the base of the cam i.e. not on the cam contour, which is best done by turning the crankshaft by hand until the valve has opened and closed, and then cranking half a revolution beyond this point. The standard clearance for the inlet rockers is .006" (.152 m/m) with the engine cold. If, after this setting, the inlet tappet mechanism should prove to be a little noisy, then the clearances may be set to .006" with the engine hot.

The correct clearance for the exhaust tappets is .012" (.305 m/m) with the engine cold. These should need no attention between de-carbonising periods of the engine.

7. ADJUSTMENT OF THE CARBURETTORS: (Mixture Control and Slow Running).

If after carrying out the above mentioned operations, and upon running the engine until it attains its normal running temperature, it is found that the slow running is uneven, it will be necessary to adjust the carburettors as described below:-

NOTE: There are only two adjustments on the S.U. Carburettor i.e. the jet adjusting nut (4 Fig.2) for the mixture, and the idle adjusting screw (3) for the idling speed.

The jet adjusting nut is actually a "stop" against which the jet head (5) should bear. Screwing up the nut weakens the mixture and unscrewing it strengthens the mixture.

If the mixture is weak, the exhaust note will be irregular and splashy, whereas, if the mixture is too rich, the exhaust note will have a constant rhythmical uneven beat, known as "hunting".

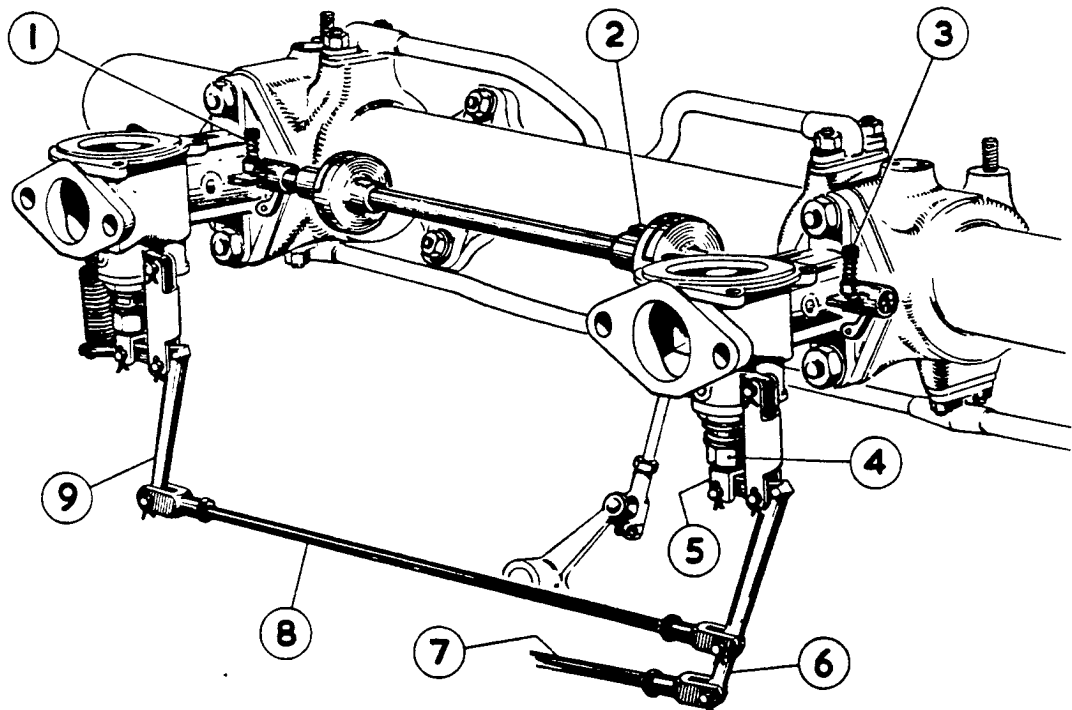


FIG. 2. VIEW OF CARBURETTOR CONTROLS (CARBURETTORS PARTLY DISMANTLED FOR CLARITY).

TO ADJUST:

- (i) Disconnect the bottom control rod (7) from the mixture lever (6) of the front carburettor by removing the pin.
- (ii) Disconnect the control rod (8) from the mixture lever (9) of the rear carburettor by removing the pin.
- (iii) While pushing the lower end of the mixture lever (6) towards the rear of the engine, so as to keep the back of the jaw of the jet head (5) against the jet adjusting nut (4). Turn the latter three or four flats in either direction to determine which position gives the most even slow running. Repeat for the rear carburettor. The degree of movement of the engine on its flexible mountings and the rotation of the fan give a useful indication of the evenness of firing.



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- (iv.) With the mixture control lever on the steering wheel in the position marked "Run", push the lower end of the mixture lever (6) of the front carburettor towards the rear of the engine and while lightly pulling the bottom control rod (7) towards the mixture lever offer up the jaw of the rod to the lever and check whether the pin holes are in line with each other, if not, adjust the jaw on the rod until they line up. Fit the control pin and secure with a new split pin.
- (v.) Again push the mixture lever (6) towards the rear, and offer up the jaw of the control rod (8) to the mixture lever (9) of the rear carburettor, line up pin holes as found necessary. Fit the control pin and secure with a new split pin.
- (vi.) With the hand throttle lever on the steering wheel placed at the bottom of its range, adjust, if found necessary, the throttle stop adjusting screw (3) of the front carburettor until the correct idling speed has been obtained.

8. SYNCHRONISING THE THROTTLES:

If after the adjustment of the carburettors as described above, it is still found that the slow running is uneven, then proceed to synchronise the throttles as follows:-

1. Unscrew the oiler caps and remove the hydraulic dampers from both carburettors.
2. Thoroughly warm up the engine and adjust the front carburettor throttle stop screw to give a fast idle (about 500-600 R.P.M.) sufficient to lift the suction pistons slightly.
3. With a pencil, depress the piston of the front carburettor and listen to the air noise or "hiss".
4. Repeat the operation with the rear carburettor.
5. If the hiss is not the same for both carburettors, slacken the pinch bolt (2) of the inter-throttle linkage and adjust the throttle stop screw of the carburettor which does not produce the correct amount of hiss, until both carburettors sound the same.
6. When synchronised, clamp up the pinch bolt (2).
7. Unscrew the rear throttle stop screw until it no longer makes contact with the stop.
8. Using the throttle stop screw of the front carburettor only, adjust the slow running to give a tick-over of approximately 500 RPM.
9. Make a final check of the synchronisation.
10. Replace the oiler caps and hydraulic dampers.

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MODEL : BENTLEY MARK VI

CANCELS BB-91 dated 12.6.52.
and BB-161 dated 22.12.52.

FOR INFORMATIONVALVE TIMING

This Bulletin sets out the latest instructions for valve timing and cancels Bulletins BB-91 of 12.6.52 and BB-161 of 22.12.52, which should be destroyed.

Basically, owing to the possibility of camshafts and flywheels having been replaced in service, valve timing should be carried out in accordance with the camshaft fitted and not necessarily in accordance with the markings on the flywheel fitted.

1. CAMSHAFTS.

The following camshafts have been fitted to the Bentley Mark VI engine on production.

Chassis Nos: B-2AK to B-501-CD	Camshaft RE.5157.
Chassis Nos: B-2-DA and onwards	Camshaft RE.6885.

Camshaft RE.6885 is the shaft available as a replacement and, where fitted to replace camshaft RE.5157, the letter 'C' should be stamped on the top left-hand side wall of the aluminium wheelcase (timing case) for recognition purposes. Wheelcases of engines reconditioned by the London Service Station are already being stamped in this way where the later shaft has been substituted.

It will be appreciated that, as the camshaft part number is engraved on the end of the shaft near the flywheel, an external mark is essential for recognition where the original shaft has been replaced, so that valve timing may be checked without unnecessary stripping.

Where the camshaft has not been replaced, it may be recognised from the Chassis Number.

It is advised for information that a third camshaft RE.19517 will shortly be introduced on production but this shaft differs from RE.6885 only in the method of retaining the camshaft gear. Eight setscrews are used in place of four studs.

2. FLYWHEEL MARKINGS.

Early type flywheels are marked as shown in Fig. 1 and 2. Later type flywheels and replacement flywheels, will be marked as shown in Fig. 3. It will be noted that the T.D.C. mark only is shown with additional markings at five degree intervals from 5° to 20° on either side of the T.D.C. mark designated EARLY and LATE.

ALL CORRESPONDENCE SHOULD BE ADDRESSED TO

BENTLEY MOTORS (UK) LTD. FIVE LANE CREWE, CHESHIRE

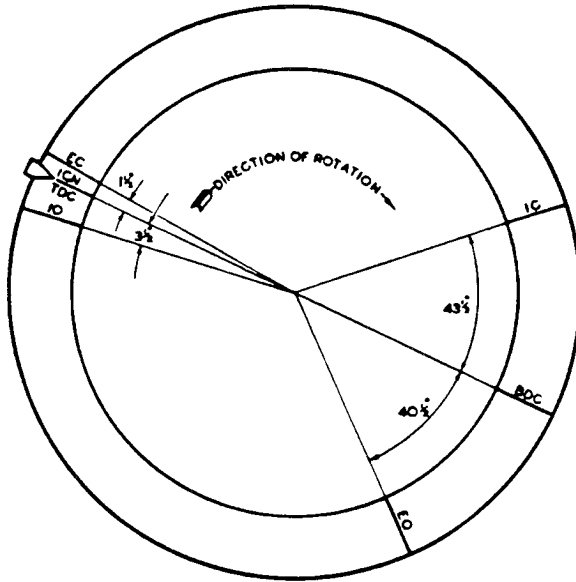


FIG. 1 OLD TIMING MARKINGS ON FLYWHEEL, LEFT-HAND DRIVE CARS.

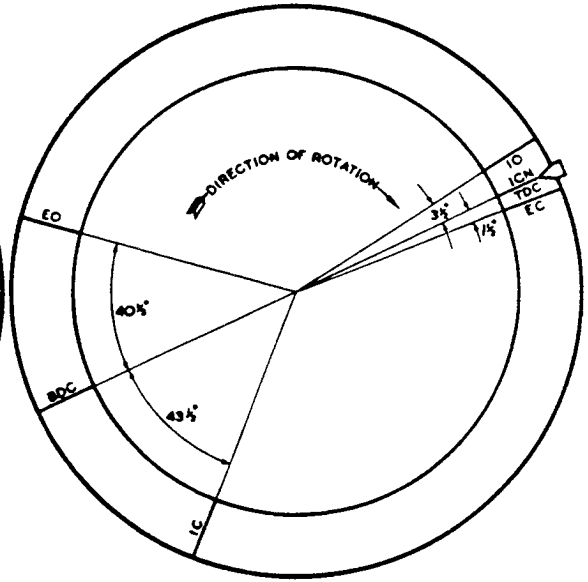


FIG. 2 OLD TIMING MARKINGS ON FLYWHEEL, RIGHT-HAND DRIVE CARS.

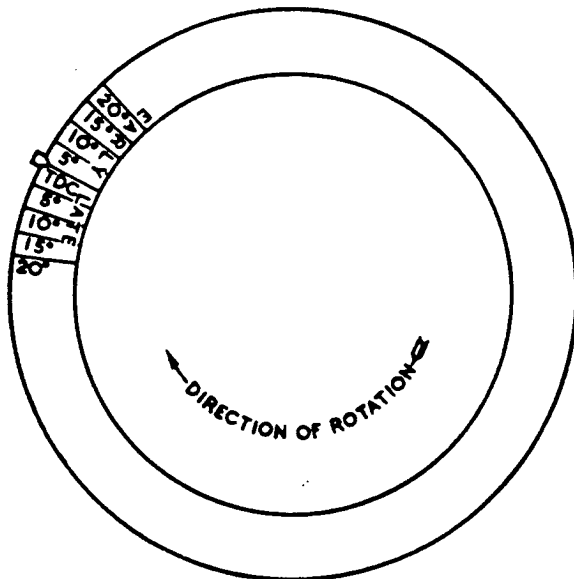


FIG. 3 NEW TIMING MARKINGS ON FLYWHEEL, LEFT-HAND DRIVE CARS.

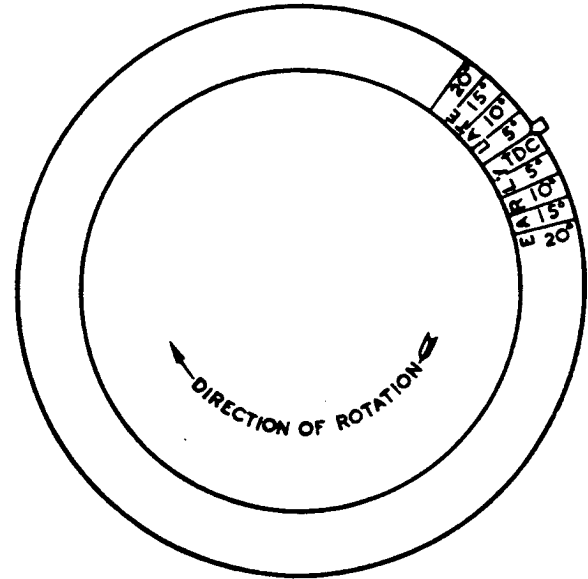


FIG. 4 NEW TIMING MARKINGS ON FLYWHEEL, RIGHT-HAND DRIVE CARS.

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO BENTLEY MOTORS (1931) LTD. 7 YMS LANE, CREWE, ENGLAND

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3. VALVE TIMING DATA(i) Engines fitted with Camshaft RE.5157.

	<u>Timing Mark</u>	
	<u>Old Flywheel</u>	<u>New Flywheel</u>
	<u>Markings</u>	<u>Markings</u>
Inlet opens $3\frac{1}{2}^{\circ}$ A.T.D.C. with .030" valve clearance	I.O.	$3\frac{1}{2}^{\circ}$ LATE ($\frac{1}{8}$ " on flywheel represents 1°)

(ii) Engines fitted with Camshaft RE.6885
or RE.19517

	<u>Timing Mark</u>	
	<u>Old Flywheel</u>	<u>New Flywheel</u>
	<u>Markings</u>	<u>Markings</u>
Inlet opens at T.D.C. with .030" valve clearance	IGN/T.D.C.	T.D.C.

The timing with camshaft RE.6885 has been altered to inlet opens at T.D.C. to give increased torque and engines should be timed to the new setting whenever retiming is necessary.

4. PROCEDURE FOR VALVE TIMING

A flywheel marking inspection hole and pointer is provided on the right-hand side of the clutch casing when viewed from the front. It has a small cover secured by a setscrew. On left-hand drive vehicles, the inspection hole is on the left-hand side of the clutch casing.

Special Tools Required:

1617/T1003	Extractor (or 3759/T1016 Extractor
3759/T1007	Serrated Box Spanner

A. WITH CAMSHAFT DAMPER AND CAMSHAFT GEAR REMOVED

NOTE: The four camshaft gear fixing studs should not be fitted to the camshaft until after timing has been completed, as they do not allow sufficient clearance for the camshaft gear to be removed after the crankshaft damper has been fitted. Two hexagon headed set screws ($\frac{1}{4}$ " B.S.F. -26 T.P.I.), Part No. KC-904/Z, are temporarily required as substitutes. Four of these setscrews were used to fix the early fabric type camshaft gear.

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- (i) Screw the two setscrews into the hub of the camshaft and rotate the shaft with a lever in its running direction until the inlet valve of No.6 cylinder commences to open. No.1 piston will then be on its firing stroke. Set and lock the inlet valve clearance on No.1 cylinder to exactly .030" clearance (.762 mm).
- (ii) Again turn the camshaft in its running direction until the inlet valve of No.1 cylinder just commences to open, as ascertained by the 'nip' on the push rod which should be just turnable.

With the camshaft set in position, the procedure differs according to the type of crankshaft damper fitted. The early or 'Pre-Bench' type, was fitted from Chassis Nos. B-2-AK to B-126-DA inclusive and the later 'Bench' type from Chassis No. B-128-DA and onwards. The two dampers may be distinguished by the fact that the 'Pre-Bench' type has twelve studs (D, Fig.5) fitted to the rim of the rear damper wheel, whereas the 'Bench' type has six bolts (E, Fig.6).

With the 'Pre-Bench' Type Damper.

- (iii) Remove the bottom cover from the clutch casing and turn the crankshaft from the flywheel until the appropriate timing mark on the flywheel lines up with the timing pointer.
- (iv) With the thrust plunger and spring in position, fit the camshaft gear to the camshaft. Fit the locking plate and secure with the two temporary setscrews.
- (v) Offer up the rear half of the damper, assembled as shown in Fig.5, to the crankshaft nose, and align the three keyways in the bore of the damper hub with the keys in the crankshaft nose.

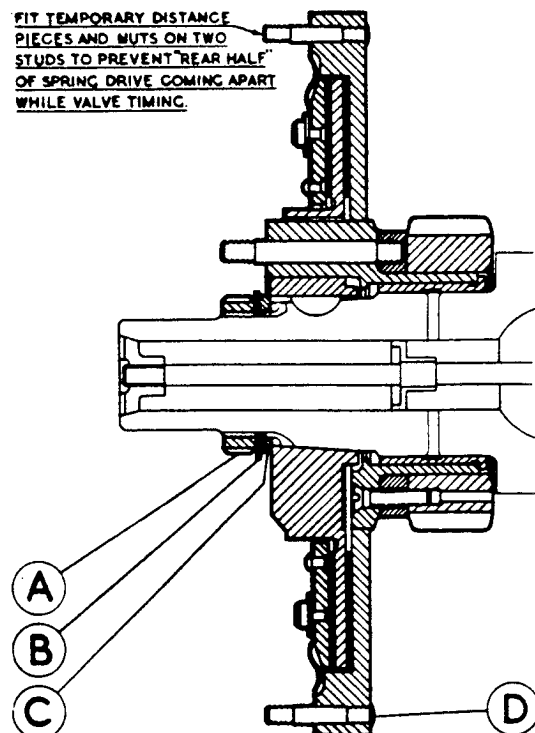


FIG.5 SECTION - 'REAR HALF' OF 'PRE-BENCH' TYPE CRANKSHAFT DAMPER (SPRING TYPE)



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Note the tooth on the camshaft gear which most nearly mates with the crankshaft pinion and turn the damper and pinion in a CLOCKWISE direction, two teeth relative to the camshaft gear. Turn the crankshaft in its running direction just sufficiently to re-align the keys and key-ways and press the damper forward on to the crankshaft nose, engaging both keys and gears. To ease the full engagement of the gears. Rock the crankshaft at the flywheel end whilst urging the damper fully home.

- (vi) Fit the plain washer (C, Fig.5), a new locking washer 'B' and the serrated retaining nut 'A'. Tighten the nut with tool 3759/T1007 but do not lock.
- (vii) Check that No.1. inlet valve commences to open on the appropriate flywheel marking.
- (viii) If the timing is incorrect, the location of the camshaft gear on the camshaft must be changed and eight holes are provided in the camshaft gear for this purpose. Turning the gear through 45° to the next stud hole will alter the setting by a quarter of a tooth, equivalent to $7/16"$ (11 mm) on the flywheel periphery; turning the gear through 90° will alter the setting by half a tooth, equivalent to $7/8"$ (22 mm) on the flywheel periphery.

First loosen the serrated nut 'A' (Fig.5) and with extractor 3759/T1016 or tool 1617/T1003, withdraw the damper about $5/16"$ from its fully home position on the crankshaft nose. Remove the camshaft gear and reposition it as required, ensuring that the circular locking plate is refitted.

- (ix) When the correct timing has been obtained, fit two of the four camshaft gear fixing studs, new lockwashers and nuts. Fully tighten and lock the nuts. Remove the two temporary setscrews and similarly fit the other two studs. Tighten and lock the serrated damper retaining nut (A Fig.5).
- (x) Reset No.1 inlet valve clearance to .006" (.15 mm).
- (xi) Fit the front damper wheel complete with the eight damper springs (and adjusting washers if fitted behind the springs), ensuring that the co-relation marks 'O' on both damper wheels are in alignment. Tighten the four hub nuts and lastly the twelve rim nuts, locking with new lockwashers.
- (xii) Align and refit the wheelcase and remaining components.

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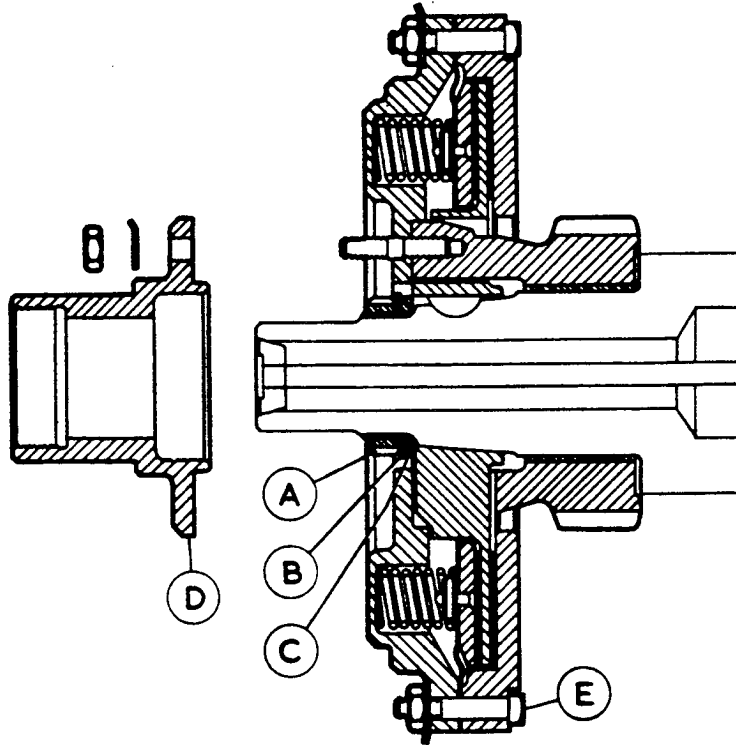


FIG.6 SECTION 'BENCH' TYPE CRANKSHAFT DAMPER
(SPRING DRIVE)

With the 'Bench' Type Crankshaft Damper.

- (xiii) Set the inlet valve clearance of No.1 cylinder to .030" and set the position of the camshaft as in sub-paras. (i) and (ii).
- (xiv) Fit the damper, assembled less the flanged hub D as shown in Fig.6, to the crankshaft nose. Fit the plain washer 'C', a new lockwasher 'B' and the serrated nut 'A'. Tighten the nut with tool 3759/T1007 but do not lock.
- (xv) Turn the crankshaft by the serrated spanner, or the flywheel, until the appropriate timing mark registers with the timing pointer.
- (xvi) With the thrust plunger and spring in position, place the camshaft gear on the camshaft hub, carefully engaging the teeth with those of the crankshaft pinion. Gently push the gear home on the camshaft. Check the alignment of the stud holes in the camshaft with the corresponding holes in the gear. If they line up, fit the locking plate and two temporary setscrews. If they do not, re-mesh the camshaft gear (without moving the camshaft or crankshaft) until they do.

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- (xvii) Check the timing, if necessary repositioning the camshaft gear; fit the camshaft gear fixing studs and re-set the valve clearance as in sub-paras. (vii), (viii), (ix) and (x) above. It is not necessary to withdraw the 'Bench type damper 5/16" to remove the camshaft gear.
- (xviii) Refit the flanged hub 'D', Fig.6 to the damper, ensuring that the co-relation marks 'O' on the front damper wheel and the hub are in alignment.

First tighten and lock the six rim nuts of the damper wheels and then tighten and lock the four hub nuts.

- (xix) Align and refit the wheelcase and remaining components.

B. WITH THE CRANKSHAFT DAMPER ONLY REMOVED.

If the crankshaft damper only has been removed, the procedure for timing is the same for both dampers.

- (i) With No.1 piston on its firing stroke, set the No.1 inlet valve clearance to exactly .030" (.762 mm) and turn the camshaft until No.1 inlet valve just commences to open as ascertained by the 'nip' on the push-rod which should be just turnable.
- (ii) Turn the crankshaft from the flywheel until the appropriate timing mark on the flywheel lines up with the timing pointer.
- (iii) Offer up the rear half of the 'Pre-Bench' type damper assembled as in Fig.5, or the 'Bench' type damper less the flanged hub as in Fig.6, to the crankshaft nose, and align the three keyways in the bore of the damper hub with the keys in the crankshaft nose. Note the tooth on the camshaft gear which most nearly mates with the crankshaft pinion, and turn the damper and pinion in a CLOCKWISE direction two teeth relative to the camshaft gear. Turn the crankshaft in its running direction just sufficiently to re-align the keys and keyways and press the damper forward on to the crankshaft nose, engaging both keys and gears. To ease full engagement of the gears, rock the crankshaft at the flywheel end whilst urging the damper fully home.
- (iv) Fit and tighten the serrated damper retaining nut with its plain and lock washers, and check the timing of No.1 inlet valve commencing to open against the appropriate flywheel marking.
- (v) If incorrect, remove the damper with the extractor and re-mesh the gears until correct timing has been obtained.
- (vi) Lock the serrated retaining nut, re-assemble the damper and align and refit the wheelcase.
- (vii) Reset the clearance of No.1 inlet valve to .006" (.15 mm).

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO:

BENTLEY MOTORS (1911) LTD, PYMS LANE, CREWE, ENGLAND



MODEL

BENTLEY MARK VI

FOR INFORMATION:CYLINDERSREBORING & FITTING LINERS.

This Bulletin supersedes Bulletin No.BB-92 (Section E) reference SB/GF.29.3.50, and also cancels BB-137 (Section E) reference SB/LT.1/SF.22.11.51. The contents of this Bulletin cover the following:-

- a) Standard oversize cylinder bore diameters and corresponding replacement pistons (Para.1).
- b) Fitting a set of short liners ('E' Fig.2) to a 3.500" dia. bore engine on which the upper portion of the bores were previously "Flash Chromed" (Para.2).
- c) Boring a cylinder block to a standard oversize diameter on which short liners were originally incorporated (Para.3).
- d) Fitting twin cylinder bore liners to a 3.500" dia. bore engine when one or more of the bores are deeply scored (Para.4).
- e) Fitting twin cylinder bore liners to a 3.625" dia. bore engine when one or more of the bores are deeply scored (Para.5).

Originally, the cylinders of the 3.500" dia. bore engine were "Flash Chromed" to a thickness of .00075" = .02 m/m (.0015" on bore dia.) for a distance of 2.250" (57.15 m/m) from the top of the bores. "Flash Chroming" commenced at Chassis No.B-2-AK up to Chassis No.B-142-DA, although certain engines in this range of cars have since been fitted with short "Bricrome" liners. Commencing at Chassis No.B-144-DA and onwards, short "Bricrome" liners are fitted.

The following items, 'a', 'b', 'c', 'd' and 'e' should be noted prior to reborning and finally honing the cylinders and 'f' after these operations have been carried out.

- a) The recommended grades for the honing stones, together with the spindle speed are as follows:-

(i)	Rough	Carborundum	C-180	- N - VGN or equivalent.
(ii)	Fine	Carborundum	C-320	- N - VGN or equivalent.
(iii)	Spindle speed. 180 R.P.M.			

The recommended lubricant when honing, is Vaclar Cutting Oil.

- b) A Tungsten Carbide tipped cutter should be used for boring; operating at about 250 R.P.M., no lubricant is required. The radius on the tip of the cutter should not be less than .020" (.5 m/m) and not exceed .025" (.63 m/m).

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- c) Depending upon the type of equipment available, it may be necessary to remove the cylinder head holding down studs, in which case, they must be refitted prior to the final honing operation, because small local "high spots" occur in the upper end of the cylinder bores when tightening down the studs, which disappear during final honing. The studs vary in length, therefore due note should be taken before removing them of the position which they occupy on the crankcase upper face.
- d) The coolant pump support bracket (secured by five nuts) must be left bolted to the cylinder block.
- e) The camshaft must be removed and the crankcase cleaned to prevent adhesion of swarf and dust.
- f) Prior to refitting the camshaft, it is of the **UTMOST IMPORTANCE** that the crankcase should be thoroughly washed and cleaned and the various oilways, drilled oil passages and the oil gallery blown out with paraffin and air under pressure. It will be necessary to remove the two core plugs from the front and rear end of the oil gallery, (situated on the front and rear end face of the crankcase). The oil gallery on R.H. side of engine is integral with the crankcase; running from end to end.

1. STANDARD OVERSIZE CYLINDER BORE DIAMETERS & CORRESPONDING REPLACEMENT PISTONS:

The tables 'a' and 'b' below, show the cylinder bore oversizes for the 3.500" dia. small bore engine and the 3.625" dia. large bore engine together with the available corresponding oversize pistons.

For Chassis Series 'A' to 'L' (B-2-AK to B-4C1-LH).

a) Cylinder bore diameter (finished sizes after final honing). Piston oversize

3.5005"	(89.04 m/m)	.005"	(.13 m/m)
3.5105"	(89.17 m/m)	.010"	(.25 m/m)
3.5155"	(89.29 m/m)	.015"	(.38 m/m)
3.5255"	(89.55 m/m)	.025"	(.63 m/m)
3.5355"	(89.80 m/m)	.035"	(.89 m/m)

NOTE: It is permissible to be +.001" (.025 m/m) on the bore size but **NO MINUS LIMIT IS ALLOWED.**

For 'M' Series Chassis and onwards (commencing at B-2-LD).

b) Cylinder bore diameter (finished sizes after final honing). Piston oversize.

3.6305"	(92.21 m/m)	.005"	(.13 m/m)
3.6355"	(92.34 m/m)	.010"	(.25 m/m)
3.6405"	(92.47 m/m)	.015"	(.38 m/m)
3.6505"	(92.72 m/m)	.025"	(.63 m/m)
3.6605"	(92.97 m/m)	.035"	(.89 m/m)

NOTE: It is permissible to be +.001" (.025 m/m) on the bore size but **NO MINUS LIMIT IS ALLOWED.**

2. TO FIT A SET OF SHORT "ERICROME" LINERS TO A 3.500" DIA. BORE ENGINE ON WHICH THE UPPER PORTION OF THE BORES WERE PREVIOUSLY "FLASH CHROMED":

Note: Should one or more of the cylinder bores be found to be deeply scored, then consideration should be given to fitting twin liners. (See Para.4).

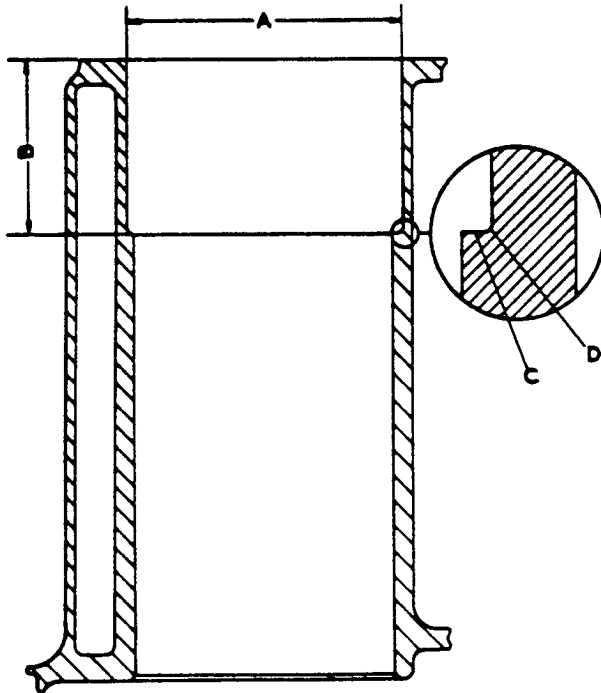


FIG.1. SECTION - CYLINDER-SHOWING COUNTERBORE.

(1) To assist in obtaining the required interference of .0025" to .0035" (.06 to .09 m/m) between the liner and the cylinder counterbore, 'A' Fig.1, the liner RE-6017, is colour coded (graded) in the bore as follows:-

- a) Those marked with blue paint, have an external diameter of 3.628" to 3.6285" (92.15 to 92.16 m/m).
- b) Those marked with yellow paint, have an external diameter of 3.6285" to 3.629" (92.16 to 92.17 m/m).

(ii) Set up the crankcase on a boring machine, taking care that the cylinder bore is CONCENTRIC with the boring cutter, at a position about 2.500" (63.5 m/m) down the

cylinder bore. Next, adjust the boring cutter so that the first cut is heavy enough to get underneath the original chromium plating and counterbore the cylinder to a depth of 2.245" to 2.250" (57.02 to 57.15 m/m). See 'B' Fig.1.

- (iii) Re-adjust the cutter and continue the counterboring to a depth as above and to a diameter that will allow a liner to have an interference fit of .0025" to .0035". The number of secondary cuts will of course, depend upon the depth of the initial cut, but it is recommended that these are kept to a minimum.

The bottom face, 'C' Fig.1, of the counterbore must be machined perfectly true. Any slight discrepancy on this end will cause a gap on one part of the "butt" joint.

- (iv) Repeat for the remaining bores.
- (v) Before pressing in the liners, ensure that the radius, 'D' Fig.1, is smaller than the chamfer ('F' Fig.2) on the lower end of the liners, so that there will be no interference at the butt joints when the liners are pressed fully home.

NOTE: If, when measuring the diameter of a counterbore ('A' Fig.1), it exceeds 3.6265" (92.11 m/m), it will be necessary to fit an R-4610 oversize short liner. This liner is marked with white paint and has an external diameter of 3.631" to 3.632" (92.23 to 92.25 m/m), and one should be selected that will not allow an interference exceeding .004" (.1 m/m), or less than .0025" (.06 m/m).

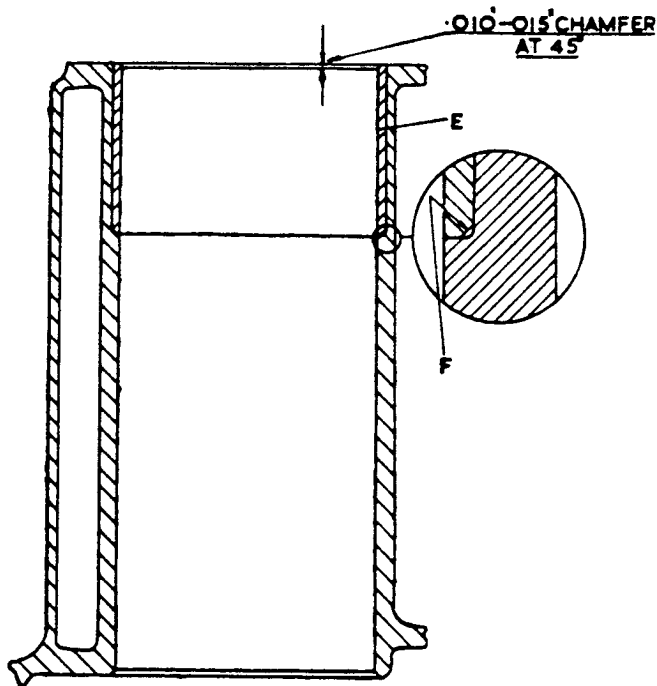


FIG.2. SECTION - CYLINDER - SHORT LINER IN POSITION.

figure of the liners is V.P.N. 320 to 370.

- (ix) With a half-round scraper, cut a .010" to .015" (.25 to .38 m/m) chamfer at about 45° at the upper end of each liner, as shown in Fig.2.
 - (x) If removed, replace the cylinder head holding down studs.
 - (xi) Next, hone the bores to the required standard oversize diameter. (See table 'a' of Para.1). Due to the difference in textures of the liners and the cast iron cylinders, special care should be taken when honing to guard against the possibility of scoring.
3. TO BORE A CYLINDER BLOCK TO A STANDARD OVERSIZE DIAMETER ON WHICH SHORT LINERS WERE ORIGINALLY INCORPORATED (CHASSIS NO. B-144-DA AND ONWARDS):

The following also applies to any chassis prior to Chassis No. B-144-DA on which short liners have been fitted during the course of repairs as described in Para.2.

(vi) Press each selected liner into its appropriate cylinder by means of a hydraulic press. The load required will be 2 to 2½ tons. (2,032 to 2,540 Kgs.) The liners should be pressed in dry.

(vii) Face off the upper ends of the liners flush with the top surface of the cylinder block.

(viii) Bore straight through the liners and the original cylinder bores in stages, to the nearest standard oversize diameter to which the lower portion of the cylinders will clean up to: LEAVING .003" (.08 m/m) FOR FINAL HONING. The hardness

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- (i) Set up the crankcase on a boring machine, taking care that the cylinder bore is CONCENTRIC with the boring cutter at a position about $.187'' = 4.7 \text{ m/m}$ (unworn portion of bore) down the cylinder and machine straight through the liners and the cylinder bores in stages to the nearest standard oversize diameter to which the cylinders will clean up to; LEAVING $.003'' (.08 \text{ m/m})$ FOR FINAL HONING. For standard oversize diameters, refer to table 'a' or 'b' of Para.1.

NOTE: Honing instead of boring may be carried out for the removal of metal up to $.010'' (.25 \text{ m/m})$ on diameter, but beyond this point, it will be preferable to bore and then finally hone.

- (ii) With a half-round scraper, cut a $.010''$ to $.015'' (.25 \text{ to } .38 \text{ m/m})$ chamfer at about 45° at the upper end of each liner as shown in Fig.2.
- (iii) If removed, replace the cylinder head holding down studs.
- (iv) Next hone the bores to the required standard oversize diameter.

4. TO FIT TWIN CYLINDER BORE LINERS TO A 3.500" DIA. BORE ENGINE:

General: The following scheme consists of fitting twin liners when one or more of the bores are deeply scored. A long cast iron liner RE-9922 is fitted to the lower portion of the bore and a short "Bricrome" liner (RE-9921) to the upper portion, after which, the cylinder/s can be rebored to the same diameter as the remaining bores and a new piston/s fitted. This scheme may also be used, if after boring a cylinder block to the maximum standard oversize diameter of $3.5355''$ to $3.5365'' (89.8 \text{ to } 89.82 \text{ m/m})$, one or more of the bores have not cleaned up. Twin liners should then be fitted to all the cylinders; and they should be bored and finally honed to the standard diameter of $3.5005''$ to $3.5015'' (88.91 \text{ to } 88.93 \text{ m/m})$. This scheme is applicable to Chassis No.B-2-AK and up to Chassis No.B-401-LH.

If short liners ('E' Fig.2) have not been incorporated (on chassis prior to B-144-DA), it will be necessary to counterbore the unaffected (un-scored) cylinders at their upper end and fit a short Bricrome liner, RE-6017; irrespective to fitting twin liners to one or more of the bores.

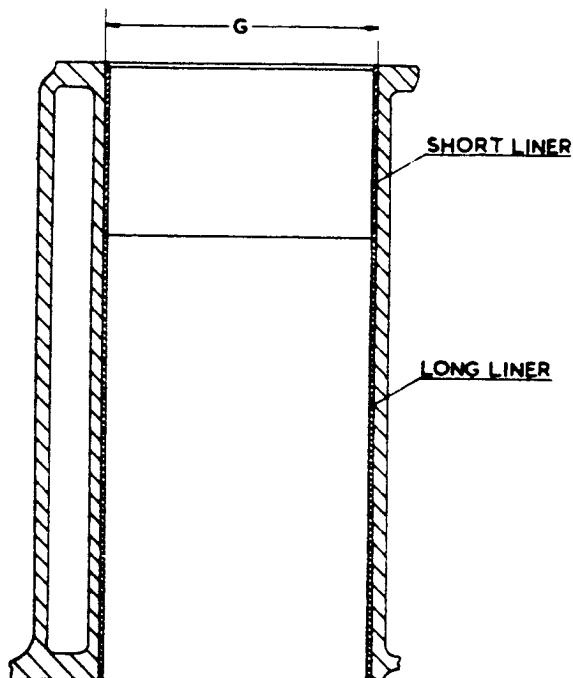
If short liners are already incorporated, the liner must be removed before fitting twin liners. To determine if short liners have been fitted to an engine, note top of cylinder bores; there is a difference in colour and grain between the steel liner and the cast iron block.

Machining & Fitting Procedure:-

Where short liners have not been incorporated, proceed as follows for bores which do not require twin liners:-

- (i) Refer to sub-para.(i) of Para.2 concerning the external diameter and interference fit of the short liners, RE-6017.
- (ii) Carry out the operations as described in sub-paras.(ii) to (viii) inclusive, of Para.2.

- (iii) If short liners are already incorporated, proceed as follows to remove a liner from a scored bore:-
- Set up the crankcase on a boring machine, taking care that the cylinder bore is CONCENTRIC with the boring cutter at a position about $.187'' = 4.7 \text{ m/m}$ (unworn portion of bore) down the cylinder.
 - Bore out the short liner in stages, until it has a wall thickness of not more than $.015'' (.38 \text{ m/m})$. This operation must be carefully carried out in order that the boring cutter does not contact the cylinder counterbore. As a guide when boring, it should be borne in mind that the external diameter of the liner (in position) is $3.625'' (92.07 \text{ m/m})$ i.e. the same diameter as the counterbore 'A' Fig.1. From the upper face of the cylinder block, the liner should be bored to a depth of $2.250''$ to $2.255'' (57.15$ to $57.27 \text{ m/m})$.
 - With a sharp suitable hand tool, carefully break away the upper end of the liner from the cylinder wall and remove the remaining portion.
- (iv) To assist in obtaining the required interference of $.0025''$ to $.0035'' (.06$ to $.09 \text{ m/m})$ between the cylinder and the liners, the short and long liners (RE-9921 and RE-9922) are colour coded (graded) in their bores as follows:-



- Those marked with blue paint have an external diameter of $3.638''$ to $3.6385'' (92.40$ to $92.42 \text{ m/m})$
- Those marked with yellow paint have an external diameter of $3.6385''$ to $3.639'' (92.42$ to $92.43 \text{ m/m})$

- (v) Apart from the liner dimensions given above, the long liners should be measured at six different diametrical points; take the mean of these measurements for the external diameter. Select a suitable short liner to match with the obtained measurement. It is not necessary to similarly measure a short liner; refer to the colour coding.

FIG.3. SECTION - CYLINDER - TWIN LINERS IN POSITION ($3.500''$ DIA. BORE ENGINE).

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- (vi) Again set up the crankcase on the boring machine with the upper end of the 3.625" (92.07 m/m) dia. counterbore CONCENTRIC with the boring cutter and bore out the cylinder in stages, the whole of its length, (See G Fig.3), to a diameter that will allow the correct interference fit between the cylinder and the pair of matched liners. The finish of the bore must be a MACHINED AND NOT A HONED FINISH, prior to pressing in the liners.
- (vii) Lightly smear the selected long liner with engine oil and with the chamfered end facing downwards, press in the liner by means of a hydraulic press, until the upper face is flush with the top surface of the cylinder block. The load required is from 2 to 3 tons (2,032 to 3,054 Kgs).
- (viii) With the chamfered end of the short liner also facing downwards, place it on top of the long liner and press both into position. Do not oil the short liner. The liners should be pressed in until the upper face of the short liner stands .010" to .015" (.25 to .38 m/m) proud of the top surface of the cylinder block.
- (ix) Face off the upper end of the liner/s flush with the top surface of the cylinder block.
- (x) Bore straight through the liners in stages, to the required diameter LEAVING .003" (.08 m/m) FOR FINAL HONING.

NOTE: If the cylinders were originally fitted with short liners and the remaining unaffected (un-scored) bores are for example of standard size, i.e. 3.5005" to 3.5015" (88.91 to 88.93 m/m), then the cylinder/s to which twin liners have been fitted should be bored and honed accordingly. If the unaffected bores are already to a standard oversize diameter, then the re-conditioned cylinder/s should be bored and honed to match, this also applies if short liners have been incorporated during the course of these repairs. For standard oversize cylinder bore diameters, refer to table 'a' of Para.1.

- (ix) With a half round scraper, cut a .010" to .015" (.25 to .38 m/m) chamfer at about 45° at the upper end of the liner/s as shown in Fig.2.
- (xii) If removed, replace the cylinder head holding down studs PRIOR TO FINAL HONING.

5. TO FIT TWIN CYLINDER BORE LINERS TO A 3.625" DIA. BORE ENGINE, (M SERIES CHASSIS AND ONWARDS:)

General : The following scheme also consists of fitting twin liners when one or more of the bores are deeply scored. A long cast iron liner (RE-9927) is fitted to the lower portion of the bore and a short "Bricrome" liner (RE-9926) to the upper portion, after which, the cylinder/s can be rebored to the same diameter as the remaining bores and a new piston/s fitted.

This scheme may also be used if, after boring a cylinder block to the maximum standard oversize diameter of 3.6605" to 3.6615" (92.97 to 93 m/m) it is found that one or more of the bores have not cleaned up, in which case, twin liners should be fitted to all the cylinders; they should then be bored and finally honed to the standard diameter of 3.6255" to 3.6265" (92.08 to 92.14 m/m).

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO

BENTLEY MOTORS LIMITED, SERVICE DEPARTMENT, 11 THE ROAD, WATFORD, HERTS. ENGLAND



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The machining and fitting procedure is the same as for the 3.500" dia. bore engine.

- (i) Remove the short liner from the scored bore as described in Sub-para.(iii) of para.4 and note that when boring out the liner prior to removal that the external diameter (in position) is 3.750" (95.25 m/m) i.e. the same diameter as the cylinder counterbore.
- (ii) To assist in obtaining the required interference of .0025" to .0035" (.06 to .09 m/m) between the cylinder and the liners, the short and long liners are colour coded (graded) in their bores as follows:-

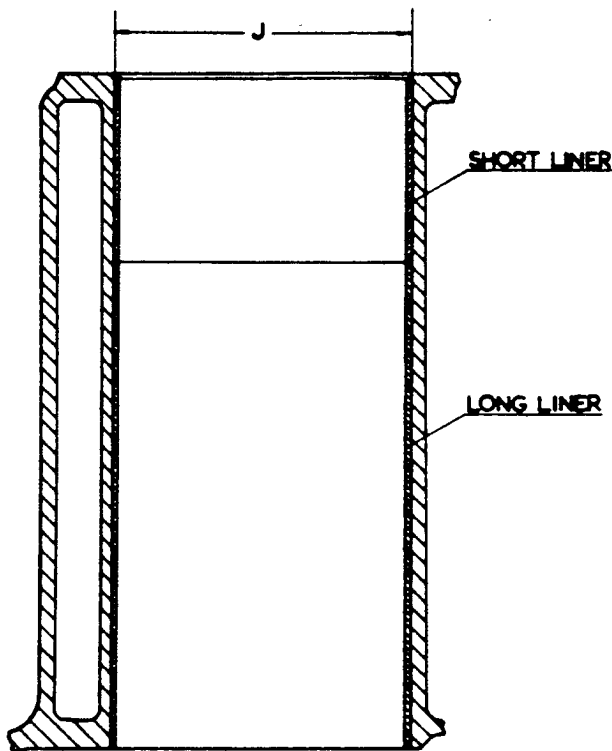


FIG.4. SECTION - CYLINDER-TWIN LINERS IN POSITION (3.625" DIA. BORE ENGINE).

- a) Those marked with blue paint have an external diameter of 3.763" to 3.7635" (95.58 to 95.60 m/m).
- b) Those marked with yellow paint have an external diameter of 3.7635" to 3.764" (95.60 to 95.62 m/m).

- (iii) Measure the long liners (RE-9927) and select a suitable short liner (RE-9926) to match as described in Sub-para.(v) of Para.4.
- (iv) Again set up the crankcase on the boring machine with the upper end of the 3.750" (95.25 m/m) dia. counterbore CONCENTRIC with the boring cutter and bore out the cylinder in stages, the whole of its length (See 'J' Fig.4) to a diameter that will allow the correct interference fit between the cylinder and the pair of matched liners.

- (v) Next, proceed as described in Sub-paras.(vii),(viii),(ix) and (x) of Para.4.

NOTE: If the remaining bores are unaffected and are for example of standard size, i.e. 3.6255" to 3.6265" (92.08 to 92.11m/m) dia. then the reconditioned cylinder/s (to which twin liners have been fitted), should be bored and honed accordingly. If the unaffected bores are already to a standard oversize diameter, then the reconditioned cylinder/s should be bored and honed to match. For standard oversize cylinder bore diameters, refer to table 'b' of Para.1.

- (vi) Finally, refer to Sub-paras.(xi) and (xii) of Para.4.

All communications should be addressed to
BENTLEY MOTORS (GB) LTD. SERVICE STATION, FIFTH ROAD, WILMINGTON, SUSSEX, B98 7AA

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MODEL: BENTLEY MARK VI

FOR INFORMATION.MAIN & BIG END BEARING BUSHES.

The following information and instructions will be of assistance when fitting a new or re-conditioned crankshaft to an engine, together with a set of new main bearing bushes and big end bearing bushes if necessary.

1. FITS & CLEARANCES. DIMENSIONS NEW
- | | <u>INS.</u> | <u>M/M</u> |
|--|----------------|-------------|
| (I) <u>Crankshaft.</u> | | |
| Standard diameter of Main journals. | 2.750"-.0005. | 69.85-.01. |
| Standard diameter of crankpins. | 1.999"-.0005. | 50.77-.01. |
| Radius on Main journals. | .093"-.010. | 2.36-.25. |
| Radius on Crankpins. | .093"-.010. | 2.36-.25. |
| End float of Crankshaft in centre
Main bearing. | .002" to .006" | .05 to .15. |
| Overall thickness of each (2 off)
crankshaft Thrust Washer. | .092"-.002. | 2.33-.05. |
- (II) The diameter of the bores of the Main and big end bearing bushes are "pre-sized" to suit the diameter of the journals and crankpins respectively. This of course also applies to a re-conditioned crankshaft on which the journals and crankpins if necessary have been ground to a smaller diameter. New bearings with undersize bores are then supplied to suit.
- (III) The running clearance between the main bearings and the crankshaft journals is, .002"-.0035" (.05-.088 m/m).
- (IV) The running clearance between the big end bearings and the crankpins is, .0015"-.0025" (.04-.06 m/m) but not less than .0015".
- (V) All crankshafts are "Nitride" treated. This process gives the requisite degree of surface hardness.

1a. CRANKSHAFT OIL RETAINING CAPS.

When a new or reconditioned crankshaft is supplied it is not fitted with journal and crankpin oil retaining caps therefore it will be necessary to remove the caps from the original crankshaft and clean and fit them to the new shaft.

There may be signs of pitting (corrosion) on the inside of the crankpin caps, but if not serious, the existing caps can be used again. Badly pitted caps should be replaced.

On certain crankshafts No.7 journal bore is not adapted to take oil retaining caps, therefore, when this type of crankshaft is supplied a rubber sealing plug, RE.7578, will also be supplied which should be fitted to the bore of No.7 journal as described in the relevant part of Service Bulletin No. BB-32 (Section F).

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When a crankshaft is supplied on which No.7 journal bore is adapted to take oil retaining caps, these caps and a stud will also be supplied and should be fitted to the shaft.

It will be necessary when transferring the caps from the original crankshaft to the new one to fit new aluminium washers to the studs to prevent the possibility of oil leakage.

Additional necessary parts.

- 12. RE.6976 Aluminium Washer (2.B.A.) - Crankpin Stud.
- 13. KB.1076 Aluminium Washer (.250" DIA.) - Journal Stud.
- 6. KA.4602 Split Pin (.062" dia.) - Crankpin Stud.
- 7. K.4602 Split Pin (.062" dia.) - Journal Stud.

2. MAIN BEARING BUSHES. (Copper, lead-indium lined steel shells)

The main bearing bushes are of the "Thin Wall Precision" type. They are so accurately made that no hand fitting is required in any way. The circumferential length or "Shut Height" is held to very fine limits (this also applies to the big end bearing bushes) so that when the housing caps of the crankcase are pulled down to their correct position, the bearing will have sufficient pressure exerted on it to make it conform exactly with the housing; being flexible it will take up the exact shape of it and obtain the maximum support. It will be obvious from the above that the following points should be observed:-

- a) Do not file or touch the joint faces of the bearing shells, or, touch the bores with a scraper. An internal micrometer should not be used on the bores.
- b) Do not file or touch the joint faces of the housings and bearing caps.

3. WASHING AND CLEANING DISMANTLED PARTS.

NOTE:- It is of the utmost importance that all dismantled parts should be thoroughly cleaned prior to fitting new bearings.

- (I) In order that the crankcase can be thoroughly cleaned and the various oilways, drilled oil passages and the oil gallery blown out with paraffin and air under pressure, it will be necessary to remove the camshaft and the two core plugs from the front and rear end of the oil gallery, i.e., from the front and rear end face of the crankcase. The oil gallery (on R.H. Side of engine) is integral with the crankcase running from end to end of it.
- (II) Clean and blow out all external oil pipes.
- (III) In addition to the above it will be necessary to dismantle and clean out the oil pump, the oil relief valve unit and the By-Pass Filter, fitting a new element to the latter. Also clean the wire screen of

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the oil pump intake strainer.

4. TO REMOVE AND REFIT THE CAMSHAFT.

- (I) With the exhaust valves, inlet and exhaust tappets removed from the crankcase first mark the position of the camshaft driving gear in relation to the camshaft by scribing a line on the hub of the gear, then removing the screws or nuts securing the gear to the camshaft and scribing a corresponding line on the camshaft.
- (II) Remove the three $\frac{1}{4}$ " (B.S.F.) nuts securing the camshaft thrust plate to the crankcase and carefully withdraw the camshaft. The camshaft must be supported during its removal to prevent damaging the Babbitt lined steel bearings in the crankcase.

NOTE: If the camshaft driving gear is of the Fabroil type this should be discarded and replaced by an Aluminium gear. In such case it will also be necessary to change the crankshaft pinion as this is a mated gear and is supplied as a pair with the Aluminium gear.

- (III) After cleaning the crankcase refit the camshaft to the crankcase and the driving gear to the camshaft. Parts required, 7 New KB.7106 Lockwashers for locking the nuts of the thrust plate and the hexagon headed nuts of the gear.
- (IV) Place a new aluminium washer (E.75427) on to each core plug, smear plugs and washers with a jointing compound and refit to the oil gallery.

NOTE: The core plugs especially the rear one should be refitted to the crankcase prior to placing the crankshaft and flywheel in position.

5. TO FIT A NEW SET OF MAIN BEARING BUSHES.

A set of Main bearings comprise the following:-

Main bearing - Front - Top.	1 off.
Main bearing - Front - Bottom.	1 off.
Main bearing - Intermediate - Top.	4 off.
Main bearing - Intermediate - Bottom.	4 off.
Main bearing - Centre - Top.	1 off.
Main bearing - Centre - Bottom.	1 off.
Main bearing - Rear - Top.	1 off.
Main bearing - Rear Bottom.	1 off.
Thrust Washer - Top.	2 off.
Thrust Washer - Bottom.	2 off.

- (I) All main bearings should be numbered (etched) in pairs, i.e., the top and bottom half of a bearing should bear the same number. The numbers, 1 to 7, commencing from the front of the engine, should be etched on the lug of the steel shell. If an etching apparatus is not available then use a sharp pointed scriber. When carrying

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out the above, care must be taken not to damage the bearings in any way.

- (II) All top main bearing halves have two oil passage holes drilled in each half, which should correctly register with the corresponding oil passages drilled in the crankcase bearing housing. It will be noticed however, upon assembling the top halves that the oil passage hole in No.6 housing is drilled slightly off centre, this being a feature of design. No attempt should be made to elongate the corresponding hole in the top half of the bearing. It will also be observed that No.1,3,5 and 7 housings have two oil passage holes drilled in each housing, whereas Nos.2,4 & 6 housings have only one oil passage hole. The reason for this is, there are no camshaft bearing bushes fitted to Nos.2,4 & 6 camshaft bearing housings therefore no oil feed is required.
- (III) Lightly smear the back of each top half main bearing with engine oil and place them in their corresponding housings in the crankcase. Repeat for the bottom halves and place them in their corresponding caps.

NOTE:- All bearing surfaces must be perfectly clean and all bearings and bearing surfaces should be freely lubricated with engine oil. The flat faces of the main bearing caps should be lightly smeared with grease.

- (IV) With the balance weights of No.3 & 4 crankpins in a horizontal position, gently lower the crankshaft and flywheel into position taking care to avoid damaging the bearings.
- (V) The next operation is to fit the crankshaft thrust washers to No.4 bearing housing and cap and check the end float of the crankshaft. It is recommended that a new set of thrust washers are fitted.

Proceed as follows:-

- a) Etch the letter "X" on the steel side of a top and bottom half thrust washer near the cut. This washer should be fitted to the side of the housing and cap (No.4) nearest the front of the engine. This is advisable in case the thrust washers have to be removed for any purpose; they can then be replaced in their original positions.
- b) Oil the thrust washers and slide the two top halves into the recess on each side of the bearing housing. The Babbitt (white-metal) grooved side of the thrust washers must be fitted against the crank face, i.e. the Babbitt lined surface must face the crankshaft thrust face.
- c) Likewise, place the two bottom halves of the thrust washers on each side of the bearing cap ascertaining that the tab of each washer correctly locates in the slots of the bearing cap.

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- d) Fit the bearing cap in position, place two new lockwashers, KB-7108, on to the studs and progressively tighten the nuts with a box spanner and check the crankshaft for freedom. The recommended tommy bar length is 6" (152 m/m) and this should be centrally placed in the spanner.

NOTE: When tightening the main bearing cap do not slacken back a nut to accommodate a lockwasher continue to tighten.

- e) Fix a dial type indicator to the front of the crankcase, lever the crankshaft to and fro and note the amount of end float, which should be .002"-.006" (.05-.15 m/m). In the unlikely event of the end float being less than .002" it would be necessary to reduce the two washers (four halves) an equal amount and to the amount required by having the steel sides wet surface ground and re-etching the washers as necessary. After grinding, the four halves should be of equal thickness. It is important that no grinding dust should be allowed to find its way onto the Babbitt lined faces, they should therefore be examined with a magnifying glass before refitting. The overall thickness of a new thrust washer is .092"-2 (2.33-.05 m/m).
- f) After the end float of the crankshaft has been checked, assemble and progressively tighten down the remaining bearing caps (placing a new lockwasher, KB.7108 under each nut) in the following order:-

No.1. No.7. No.3. No.5. No.2. & No.6.

After tightening down a bearing cap check the crankshaft for freedom. When all the caps have been tightened down it should be possible to turn the crankshaft (by hand) quite easily with the flywheel.

NOTE: In the unlikely event of a new bearing being found to be too tight, preventing free rotation of the crankshaft, then the only alternative is to replace the bearing.

- g) The nuts of the main bearing caps should be locked after the oil pressure tests have been carried out (see paragraph 8, sub-paragraph IV). The fitting of new oil seals to No.7 main bearing cap should also be carried out after the oil tests. (See paragraph 9).

6. BIG END BEARING BUSHES (Copper, lead-indium lined steel shells).

The big end bearing bushes are also of the "Thin Wall Precision" type and like the main bearings they are so accurately made that

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no hand fitting is required in any way.
The following points should therefore also be observed:-

- a) Do not file or touch the joint faces of the bearing shells or, touch the bores with a scraper. An internal micrometer should not be used on the bores.
- b) Do not file or touch the joint faces of the connecting rods and caps.

7. TO FIT A SET OF NEW BIG END BEARING BUSHES.

- (I) All top and bottom bearing halves (12 off) are identical with one another. Each having a .125" (3.17 m/m) dia. hole drilled in it. The oil hole in the half bearing to be fitted to a conn. rod, as distinct from the cap of the rod, should register correctly with the corresponding oil hole drilled in the rod, through which oil passes to lubricate the small end bush.
- (II) The bearing bushes should be numbered (etched) in pairs (1 to 6) i.e., the top and bottom of a bearing should bear the same number. They should be etched on the lug of the steel shell on each half of the bearing.
- (III) Smear with engine oil the back of each top and bottom half of bearing and place them in their corresponding rods and caps.
- (IV) The following points should be borne in mind during the assembling of the connecting rods (complete with pistons) to the engine.
 - a) On the large majority of engines a small hole is drilled in the side of the connecting rods which allows a fine squirt of oil to be projected on to the walls of the cylinders to assist lubrication of the bores. When re-assembling the rods to the engine these "squirt holes" must face the thrust side of the engine, i.e., not the camshaft side.
 - b) If split skirt pistons are used, the split must face the camshaft side of the engine.
 - c) The markings (Nos.) on the connecting rods should be on the camshaft side of the engine.
- (V) With the pistons in place on the connecting rods space the rings so that the end gaps are approximately 120° apart. Position the crankcase so that the cylinders are horizontal. The pistons should be placed in the cylinders and the connecting rods assembled to the crankpins in the following order:-

No. 1 & 6. No. 2 & 5. & No. 3 & 4.

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(VI) Place No.1 crankpin half way down its stroke. Using a piston ring clip, lightly tap No.1 piston into its bore with the aid of a small hammer shaft. Pull the rod towards the crankpin and rotate the crankshaft until No.1 crankpin is at the bottom of its stroke and pull the rod (bearing) on to the crankpin.

(VII) Place the two bolts in position on the rod making sure that the lugs on the bolts enter and correctly locate in the recess provided on the rod.

(VIII) Fit the cap (with Nos. on cap and rod corresponding with each other) and progressively tighten the nuts with a box spanner until the split pin holes are in line. The recommended tommy bar length is 6" (152 mm) and this should be centrally placed in the spanner.

NOTE: Do not slacken back a nut to accommodate a split pin, i.e., tighten up until pin hole registers with next castellation on nut.

(IX) Check the rod for freedom of end float on the crankpin and gudgeon pin.

(X) Refit the remaining rods in a similar manner but do not secure the nuts with split pins until the oil tests have been carried out.

8. OIL TESTS.

(I) It will be necessary to connect to the crankcase a source of oil supply (hand operated gear type pump, for example) and a reservoir with a reliable pressure gauge in circuit. To carry out the oil tests proceed as follows:-

- a) Blank off oil relief valve passages situated externally on right-hand side of crankcase, by means of a suitable blanking plate and joint, utilising the three studs which secure the oil relief valve unit to the crankcase.
- b) On early type crankcases, the right-hand side of the engine carries two tapped bosses which lead into the oil gallery. With an aluminium washer and a bolt .375" dia. (B.S.F.) 20.T.P.I. - RH, blank off the tapped boss (hole) situated midway along the oil gallery. The bolt should have a length of .500" (12.7 mm) to .625" (15.8 mm) beneath the head and fully threaded. (Before blanking off see paragraph (d) below.).
- c) With an aluminium washer and a bolt .4375" dia. (B.S.F.), 18.T.P.I. - R.H. blank off the other tapped boss situated towards the rear of the oil gallery. This bolt should also have a length of .500"-.625" beneath the head and fully threaded.

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- d) On later type crankcases the boss towards the rear of the oil gallery is not used, the external oil feed pipe being deleted. An internal high pressure oil jet is used to spray oil direct on to the distributor drive gears from the oil gallery. The jet is 5.375" (136.5 m/m) long and is removable, being screwed into position through the tapped boss midway along the oil gallery. It is advisable to leave the jet in position but if absolutely necessary it can be removed by use of a suitable screwdriver. It can be cleaned in place by first passing the end of a piece of wire about 10" (254 m/m) long through the .0468" (1.17 m/m) diameter orifice at its inner end (the inner end is not visible) and subsequently blowing out the interior of the jet with paraffin and air under pressure through the boss midway along the oil gallery. During the oil tests a fair amount of oil should escape from it and flow down the side of the crankcase. Blank off the tapped boss (midway along the oil gallery) as described in (b).
- e) Blank off the four oil feed holes in the front end of the crankshaft by means of two suitable Jubilee clips and two strips of rubber.
- f) Make a suitable adaptor (for connecting up the external oil supply) and attach it to the oil pump pipe connection flange, (inside the crankcase) by means of the two existing setscrews and connect up the oil supply.
- g) Using oil to correct specification (S.A.E.20) raise and maintain oil pressure at 20-25 lbs per sq.in. Turn the crankshaft slowly and ascertain that there are no oil leakages past any of the oil retaining caps and their studs as fitted to the bores of the journals and crankpins.
- (II) Bearing leak should not be excessive, but it should be confirmed that oil reaches all main journals, big ends and gudgeon pins.
- (III) If the connecting rods are provided with a small squirt hole on the side of the rod as mentioned in paragraph 7, a check should be made, while slowly turning the crankshaft, that a squirt of oil emerges from each rod twice during a revolution of the crankshaft. While maintaining the oil pressure and continuing the slow turning of the crankshaft also turn the camshaft slowly until a free flow of oil emerges from the oil hole drilled at the front end. Also ascertain that the camshaft rear bearing cover and the front and rear end plugs of the oil gallery are oil tight. All leaks should be corrected.
- (IV) After the completion of the oil tests, lock the 14 nuts of the main bearing caps and secure the nuts of the conn. rod bolts with 12 new

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split pins, E.84689, bending the legs of the pins around the nuts.

9. TO FIT NEW OIL SEALS TO THE REAR MAIN BEARING CAP.

The next operation is to fit two new circular oil seals, RE.7144, to the rear main bearing cap and crankcase (having previously removed the original ones). These seals are made of White Pine and are provided with a square head for tapping in purposes. Tap the new seals into position as far as they will go i.e. until they make contact with the upper face of the bearing cap housing of the crankcase. Neatly cut off the heads with a sharp knife flush with the crankcase facing. They should be a light drive fit.

NOTE:- Before replacing the crankcase lower half a final check should be made that all necessary parts have been correctly locked. This also applies before replacing the wheelcase.

10. TO REFIT CRANKCASE LOWER HALF.

The following is the correct procedure:-

- a) Place the crankcase lower half in position and assemble all setscrews finger tight then nip up one setscrew on each side of the lower half at the front end.
- b) Place the wheelcase in position and nip up all nuts and setscrews.
- c) Progressively tighten up all lower half setscrews and repeat for the wheelcase. After the road test/s have been carried out all the setscrews of the lower half should be checked for being tight.

Will all Retailers kindly inform the London Service Station whenever the Main or Big End Bearings have been replaced.

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FOR INFORMATIONALUMINIUM CAMSHAFT DRIVING GEAR.

Retailers are advised that the material of the camshaft driving gear has been altered from Fabroil to aluminium and the latter should be used for all replacements.

Will Retailers kindly note that whenever an engine is being overhauled or whenever the radiator or engine front is dismantled for other reasons this opportunity is to be taken to change the camshaft driving gear. With this in view we are arranging to send small stocks of the necessary parts to all Overseas Retailers.

In addition to changing the camshaft driving gear it will also be necessary to replace the crankshaft pinion in view of the fact that the gears are paired to obtain the correct amount of backlash.

The gears are paired on a rig to give a backlash of .002" - .004" (.05 - .10m/m) but when fitted to an engine the backlash may be found to be .006" (.15 m/m). This should not cause any disability. After fitting an aluminium gear, the letter 'A' should be stamped on the top nearside (L.H. Side) wall of the aluminium wheelcase (timing case) where it will be easily visible on lifting the bonnet.

The original crankshaft pinion should be returned to the London Service Station as soon as possible for re-grinding and re-pairing to a new aluminium camshaft driving gear.

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

1. PARTS REQUIRED.

The following parts and incidental parts will be required when the Spring Drive fitted to the engine is of the "Wraith" type (i.e. "Pre-Bench" type). See page 2 of Sub-Section BE-9, of the Workshop Manual.

a) <u>Part No.</u>	<u>Title.</u>	<u>No. off.</u>
RE.12120.	Camshaft Driving Gear.	1.
RE.146.	Crankshaft Pinion.	1.
R.4420.	Camshaft Driving Gear.	1.)
R.4418.	Crankshaft Pinion.	1.)
		(Alternatives to RE.12120 & RE.146.)
RE.163.	Driving Pin.	2.
K.2819.	Countersunk Screws - Pinion Assy.	2.
RE.7172.	Locking Plate - Gear.	1.
KB.752/Z	Studs - Gear.	4.
K.4310/Z	Nuts - Studs.	4.
KB.7106	Lockwashers - Nuts.	4.

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b) Incidental Parts required due to dismantling the Spring Drive.

E.54566.	Lockwasher - Damper Wheel.	12.
KB.7106.	Lockwasher - Pinion to Dog.	4.
EB.3228.	Lockwasher - Crankshaft Nut.	1.
EW.935.	Friction Washer (Cotton Duck).	2. When replacement is necessary.
RE.6341.	Joint, Wheelcase to crankcase.	1.
RE.3589.	Rubber Hose - Radiator Pipes.	2.

1A. PARTS REQUIRED.

The following parts and incidental parts will be required when the Spring Drive fitted to the engine is of the "Bench" type. (See page 2 of Sub-Section BE-9).

a) Part No.	Title.	No. off.
RE.12120.	Camshaft Driving Gear.	1.
RE.3938a.	Crankshaft Pinion.	1.
R.4420.	Camshaft Driving Gear.	1.) Alternatives to
R.4419.	Crankshaft Pinion.	1.) RE.12120 & RE.3938a.
RE.7172.	Locking Plate - Gear.	1.
KB.752/Z.	Studs - Gear.	4.
K.4310/Z.	Nuts - Studs.	4.
KB.7106.	Lockwashers - Nuts.	4.

b) Incidental Parts required due to removal of the Spring Drive.

RE.3947.	Lockwasher - Damper Wheel.	6.
EB.3228.	Lockwasher - Crankshaft Nut.	1.
KB.7106.	Lockwasher - Pinion Studs.	4.
EW.935.	Friction Washer (Cotton Duck).	2. When replacement is necessary.
RE.6341.	Joint, Wheelcase to crankcase.	1.
RE.3589.	Rubber Hose - Radiator Pipes.	2.

Note:- A full description of the "Wraith" ("Pre:Bench" Type) and the "Bench" type Spring Drive is given in Sub-Section BE-9, of the Workshop Manual, including the fitting of new Cotton Duck friction washers and setting the damper poundage (slipping load).

2. TO REMOVE THE RADIATOR, WHEELCASE AND THE SPRING DRIVE.

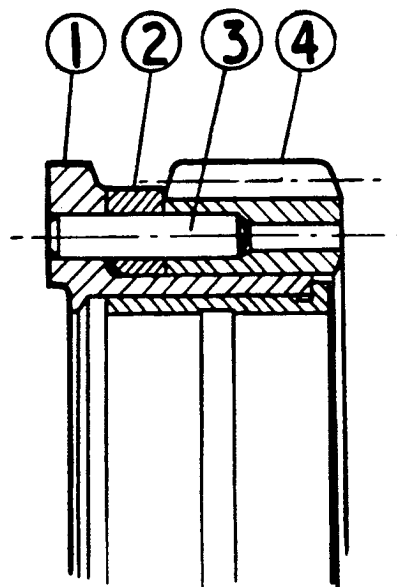
- (i) Refer to paragraphs 4 & 5 of Sub-Section BE-9. If the Spring Drive is of the "Bench" type then refer to paragraphs, 14 & 15 concerning the removal of the Wheelcase and the removal of the Spring Drive from the crankshaft.
- (ii) After removal of the outer and inner radial driving springs from the friction drum and the driven dog of the Spring Drive it will

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be necessary where a "Wraith" type Spring Drive is fitted to dismantle the crankshaft pinion assembly and fit the new pinion as described in the following paragraph.

3. TO DISMANTLE THE CRANKSHAFT PINION ASSEMBLY OF A "WRAITH" TYPE SPRING DRIVE AND FIT THE NEW CRANKSHAFT PINION.

- (i) Remove the two (2 BA.) countersunk screws from the crankshaft pinion assembly. With a flat ended steel punch $.150''$ (3.8 m/m) dia; drive out the two driving pins (3. Fig.1). These pins are a tight drive fit. With an aluminium drift remove the crankshaft pinion (4) from the driven dog (1). These two parts have a taper of 1 in 200.



1. Driven Dog.
2. Distance Piece.
3. Driving Pin (2 off).
4. Crankshaft Pinion.

FIG.1. Scrap Section - Crankshaft Pinion Assembly. ("Wraith" type Spring Drive).

- (ii) From a piece of Silver Steel rod $.250''$ (6.4 m/m) dia., make two dummy aligning pins about $3.000''$ (76 m/m) long for lining up the driving pin holes in the driven dog, distance piece and the crankshaft pinion prior to fitting the new driving pins (RE.163). Try these dummy pins in the two driving pin holes in the new pinion which have a depth of $.425''$ (10.79 m/m) if found to be tight reduce one end of each dummy pin until they are a light push fit in the pinion. With all parts free from any burrs, place the distance piece (2) and the new crankshaft pinion on to the driven dog. The chamfer on the distance piece should mate with the radius on the driven dog as shown in Fig.1.

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Line up the driving pin holes and insert the dummy aligning pins into the driven dog, distance piece and pinion and press or tap the pinion fully on to the driven dog. Screw in the two counter-sunk screws (K.2819) and fully tighten. Remove one dummy pin and pass a .250" dia., parallel reamer down the driving pin hole in order to ream the hole in the new pinion. Remove swarf and drive in a new driving pin which must be a tight drive fit. Repeat for the other hole. Pean over metal of driven dog to secure the pins.

- (iii) Place the crankshaft pinion on to the crankshaft. Attach a dial type indicator to the front end of the crankcase and check the crankshaft pinion for backlash in four places.

Note:- In the unlikely event of being unable to obtain the correct backlash then the only alternative would be to try another set of gears.

5. TO ASSEMBLE THE SPRING DRIVE ON THE BENCH AND CHECK THE DAMPER POUNDAGE.

- (i) At this stage it will be necessary to assemble the spring drive (less the outer and inner radial driving springs) on the bench and check the damper poundage; fitting two new Cotton Duck friction washers should it be found necessary and re-fitting the inner and outer radial driving springs.

6. TO REFIT THE "REAR HALF" OF THE SPRING DRIVE ("WRAITH" TYPE) AND CHECK THE VALVE TIMING.

Refer to paragraph 9, of Sub-Section BE-9 of the Workshop Manual.

7. TO ALIGN AND REFIT THE WHEELCASE AND THE REMAINING DISMANTLED PARTS ("WRAITH" TYPE SPRING DRIVE).

Refer to paragraph 10, of Sub-Section BE-9, of the Workshop Manual.

8. TO REFIT THE SPRING DRIVE ("BENCH" TYPE) AND CHECK THE VALVE TIMING.

Refer to paragraph 19, of Sub-Section BE-9. of the Workshop Manual.

9. TO ALIGN AND REFIT THE WHEELCASE AND THE REMAINING DISMANTLED PARTS. ("BENCH" TYPE SPRING DRIVE).

Refer to paragraph 20, of Sub-Section BE-9, of the Workshop Manual.

NOTE:- As studs have been fitted to the camshaft in place of the original setscrews it will be necessary when carrying out the valve timing, (i.e., when altering the position of the camshaft driving gear, rotationally, in relation to the camshaft) to remove the spring drive.

After timing the engine and finally tightening up the four nuts securing the camshaft driving gear to the camshaft do

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NOT omit to bend back the tabs of the lockwashers.
Also prior to re-fitting the wheelcase check that all
other necessary parts have been correctly locked.

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SB/VA/1/PVS. 17.7.50.

SECTION E.

MODELS BENTLEY MARK 4

FOR INFORMATION:ALUMINIUM CAMSHAFT DRIVING GEAR

(Addendum)

With reference to Service Bulletin No. BB-103 (Section E), it should be noted that chassis numbers bearing the suffix letters, AK, AJ, BH, BG, CF, CD, DA, DZ, EY, EW, FV, FU, and GT, have been fitted with a Fabroil camshaft driving gear unless the wheelcase has been stamped with the letter 'A' as described in Bulletin No. BB-103, denoting that an aluminium gear has been fitted.

Commencing at chassis No. B-2-HR (Series H) and onwards an aluminium camshaft driving gear is fitted.

NOTE:

Where Retailers have fitted an aluminium gear to a car, prior to the issue of Bulletin No. BB-103, will they please arrange, where possible, to stamp the wheelcase with the letter 'A' at the first opportunity.



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FOR INFORMATION:ALUMINIUM CAMSHAFT DRIVING GEAR.

Concerning Service Bulletin Nos: BB-103 and BB-103a, we wish to point out that the name "Fabroil" has been loosely applied to the original camshaft driving gear, this name, should not have been used, being the registered trade mark of a particular manufacturer, and the gears were not a product of this manufacturer.

Will Retailers and other persons interested, kindly refer to these gears as fabric and not "Fabroil".

FOR INFORMATION:ALUMINIUM CAMSHAFT DRIVING GEARADDENDUM.

Concerning Paragraph 4 on Page 1 of Service Bulletin No. BB-103 (Section E), the camshaft driving gear should be checked for run-out and backlash as follows:-

- (i) After dismantling the spring drive unit, including the removal of the crankshaft pinion assembly, temporarily fit the new gear to the camshaft. Prior to checking the backlash, place the registering member of a dial indicator on the front face of the camshaft gear (just beneath the teeth) as shown in Fig.1 and check the gear for run-out which should NOT exceed .002" (.05 m/m). This operation is carried out without the crankshaft pinion in position.

NOTE: The small diameter counterbore of the camshaft gear registers with the camshaft.

- (ii) Place the crankshaft pinion on to the crankshaft. Secure the dial indicator to the crankcase as shown in Fig.2 and check the camshaft driving gear for backlash at four equidistant places. The registering member of the dial indicator should rest on a driving lug of the pinion as shown in the illustration and at a radius of 1.680" (42.7 m/m) from the centre of the crankshaft.

In the unlikely event of the backlash being less than .002" (.05 m/m) or exceeding .006" (.15 m/m), then the only alternative would be to try another set of gears.

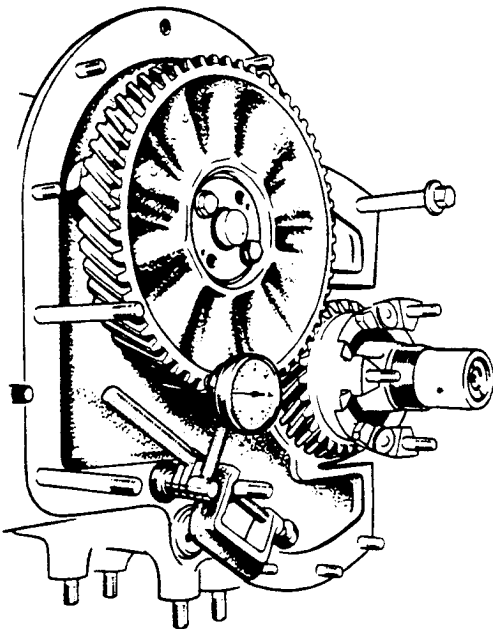


FIG. 1. CHECKING RUN-OUT OF CAMSHAFT GEAR.

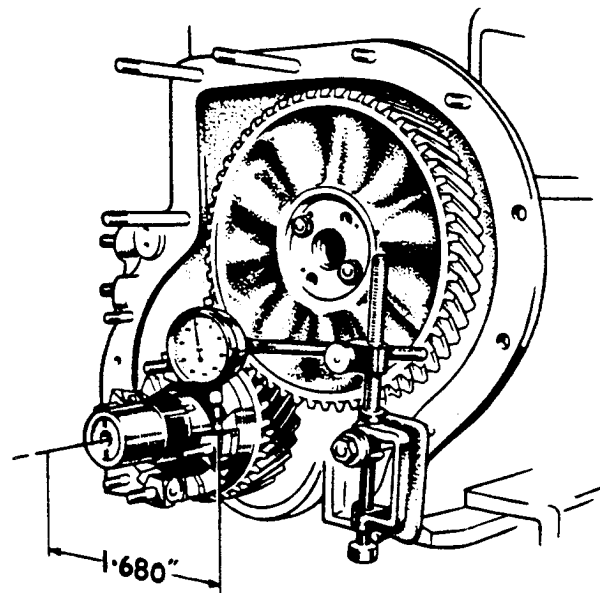


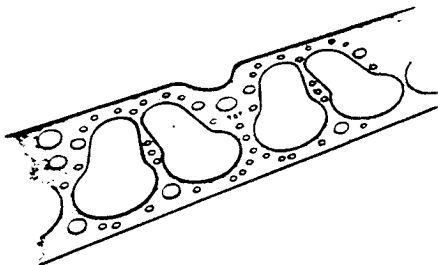
FIG. 2. CHECKING BACKLASH BETWEEN PINION & CAMSHAFT GEAR.

Bentley

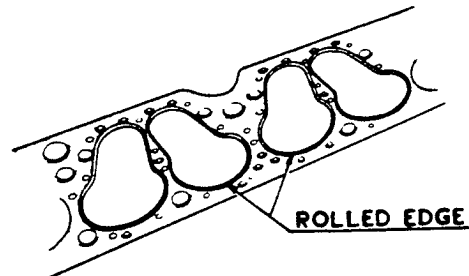
MODEL BENTLEY MARK VI

FOR INFORMATION:**C & A CYLINDER HEAD GASKETS.**

Retailers are advised that the correct procedure when fitting replacement C & A cylinder head gaskets in service is to ensure that these are fitted with the plain face uppermost and the rolled, or lapped, face to the cylinder block.



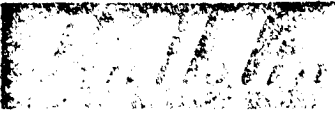
PLAIN (TOP) FACE.



ROLLED (BOTTOM) FACE.

As an aid to recognition the characteristic differences between the top and bottom faces of the gasket are illustrated in the above two sketches. A further means of identification is provided by the word "TOP" which will be found stamped between Nos. 3 & 4 cylinder openings on the plain face as shown.

NOTE: It should be particularly noted that the only reliable and satisfactory method of tightening down the cylinder head is by means of a box spanner with a fixed length of tommy bar under the control of a skilled fitter. The recommended tommy bar length is 6", and the nuts should be tightened down evenly, working from the centre, until by experienced "feel" these are as tight as is wise having regard to the elasticity of the studs.



A T T E N T I O N B E N T L E Y S A F E S

FOR INFORMATION:ENGINE LUBRICATION SYSTEM.

There is a possibility that two plugs used on the external oil pipes of the engine lubrication system may be transposed if the engine is dismantled.

The attached diagram illustrates the two plugs in question, and as they are dimensionally interchangeable, it is important that their respective functions should be recognised.

Plug 'A' in the diagram (Part No.E-85380) is a normal swivel plug which transfers low pressure oil to the rocker mechanism. The diameter of the visible hole in the centre is .201" and is obviously not intended to be a restrictor.

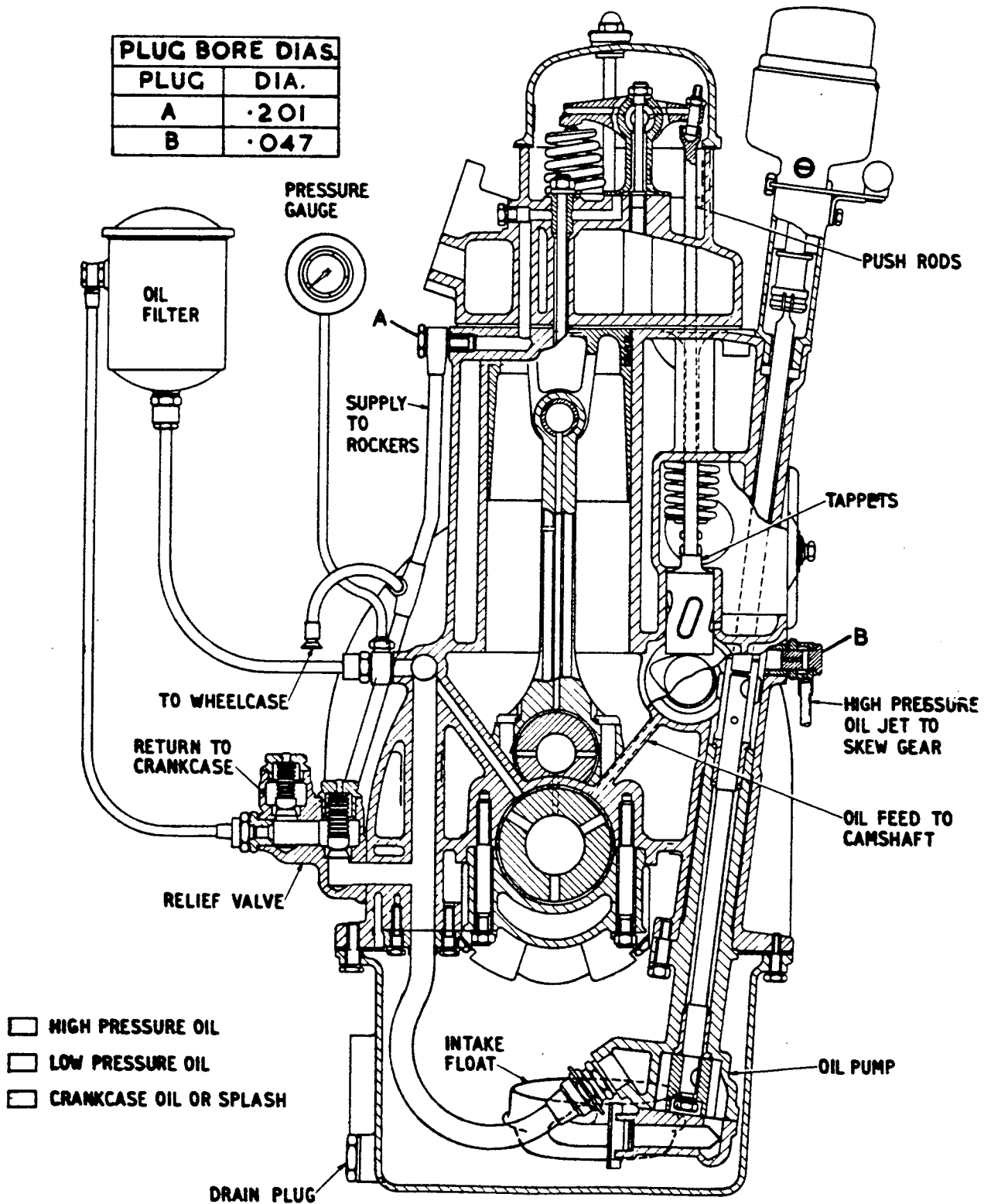
Plug 'B' (Part No.EB-4036) is a restrictor plug in the high pressure oil feed to the skew gears driving the oil pump and distributor.

If the two plugs are interchanged, Plug 'A' with the large hole, will deliver less oil to the bearings because of the increased amount bled off to the skew gears, Plug 'B' fitted in the low pressure system will cut off most of the oil to the rocker mechanism.

The above only applies to cars prior to Chassis No.B-2-FV, as the design was subsequently changed to incorporate the high pressure jet in an internal feed from the main oil gallery, and the question of interchangeability does not arise.

MODEL BENTLEY MARK VI

PLUG BORE DIAS.	
PLUG	DIA.
A	.201
B	.047



ENGINE LUBRICATION SYSTEM

Bulletin

MODEL BENTLEY MARK VI

FOR INFORMATION & ACTION:FULL FLOW ENGINE OIL FILTERS.

A full flow oil filter is fitted to all engines from Chassis No. B-2-MD onwards, and it is of the **UTMOST IMPORTANCE THAT THE ELEMENT SHOULD BE RENEWED AT PERIODS OF 5,000 MILES RUNNING.**

If the element becomes clogged, a filter by-pass device comes into operation to ensure the continued supply of oil, but in this case there is no filtration and further running may harm the engine.

Will Retailers please ensure that they have adequate stocks of elements and that this operation is always included in the Schedules A and B at 5,000 and 10,000 miles.

An appropriate insert has been placed in Owners Handbooks, but your co-operation is requested in advising owners in your territory, who have full flow filters fitted, of the necessity for this periodic maintenance.

The logo features the word "Bulletin" in a stylized, cursive script font, set against a dark, textured rectangular background.

MODEL : BENTLEY MARK VI

FOR INFORMATION & ACTION:FULL FLOW OIL FILTERS.RENEWAL OF FILTER CARTRIDGE:

When renewing the cartridge in full flow oil filters, the container should be filled with engine oil to a depth of 1" above the circular groove on the type with the six bolt fixing and 2" above the groove on the centre bolt type, before refitting.

If the container is replaced empty, there will be a certain time lag before oil pressure is registered on restarting, while the container is filling up. This delay in the supply of oil to the engine may have a detrimental effect on the ultimate life of bearings.

ACCESSIBILITY:

On right-hand drive cars, access to the filter is easier if the carburettor intake branch is removed.

Bulletin

MODEL BENTLEY MARK VI

FOR INFORMATION:FULL FLOW ENGINE OIL FILTER.GENERAL:

Full flow filtration was introduced on Chassis No.B-2-MD.

The scheme dispensed with the By-Pass filter and embodied a Vokes Type E-30 filter interposed in the oil delivery line between the oil pump and the crankcase oil gallery which feeds the main bearings.

The crankcase casting was altered for this purpose, the vertical passage to the gallery being diverted to the lower orifice of a new "external" facing approximately 3"(76mm) above the oil relief valve unit; the upper orifice in this facing communicating with the gallery. The pipes leading to and from the Vokes filter, and also the oil pressure gauge pipe, are connected to an adaptor mounted on the facing. Fig.3 illustrates the external layout, but depicts a Vokes E-62 filter (centre bolt lid fixing) which is now used instead of the E-30 type (six bolt lid fixing).

In order to meet requests for the installation of full flow filtration on cars prior to B-2-MD, two separate schemes are described later in this Bulletin.

SCHEME 'A' conforms to the layout shown in Fig.3, and is relatively simple in installation, being confined to external alteration only. It can be applied to engines, the crankcase of which have the adaptor facing referred to above. Generally speaking, this modification to the crankcase was first introduced at the commencement of 'H' series to provide a means of employing full flow filtration on unit test, and in anticipation of the scheme becoming standardised later. Crankcases of this type may be recognised by reference to Figs. 1 & 2, which show special adaptors used in conjunction with the original By-Pass Filters.

SCHEME 'B' is applicable where the adaptor facing is non-existent, and other means of diverting the main oil supply are necessary, involving crankcase drilling and internal alteration of oilways. For this reason, the work is best undertaken with the engine out of the chassis, on the grounds of both accessibility and cleanliness.

THE REMOVAL OF SWARF FROM THE SYSTEM FOLLOWING MODIFICATION CANNOT BE TOO GREATLY STRESSED.

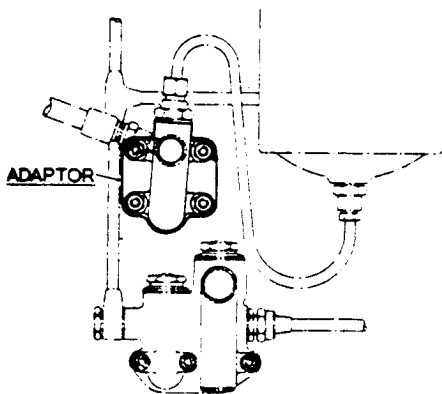


FIG.1. ADAPTOR-OIL FEED (EARLIER TYPE)

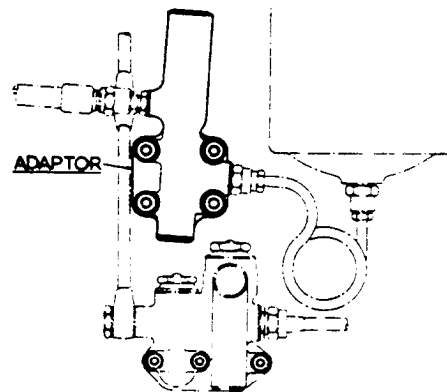


FIG.2. ADAPTOR-OIL FEED (LATER TYPE)

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO

BENTLEY MOTORS (UK) LTD. SERVICE STATION, 10 THE ROAD, WILLESDEN, MIDDLESEX.

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SCHEME 'A'1. PARTS REQUIRED:

Part No.	Title.	No. Off.	Fig.No.	Ref.
RE-15088	Inlet pipe assembly - filter to adaptor	1	3	10
RE-15090	Outlet pipe assembly " "	1	3	6
RE-13894	Adaptor casing - oil feed	1	3	12
RE-9425	Joint - adaptor casing to crankcase	1		-
KB-359/Z	Stud " " "	4	3	14
K-4310/Z	Nut " " "	4		-
KB-7304	Core plug - adaptor casing	1	3	8
KB-1089	Washer - core plug.	1		-
RE-13938	Screw plug - adaptor casing	1	3	13
KB-1078	Washer - screw plug	1		-
RE-6240	Union - adaptor casing	2	3	7
KB-1186	Washer - union - adaptor casing	2		-
KB-5101/Z	Union - pressure gauge conn.adaptor casing	1	3	9
KB-1096	Washer - union - adaptor casing.	1		-
RE-13818	Vokes Oil Filter - Type E-62	1	3	4
RE-6424	Union - filter cover.	2	3	2
AGS-568/F	Washer - Union - filter cover.	2		-
RE-13935	Mounting plate - filter	1	3	5
RE-13939	Distance piece - mounting plate	1		-
KB-751/Z	Stud " "	1	3	1
K-9008/Z	F.S.Washer " "	1		-
K-4310/Z	Nut " "	1		-
K-4410/Z	Plain Washer " "	2		-
KC-277/Z	Setscrew - filter to mounting plate.	2	3	3
K-4407/Z	Plain washer " " "	2		-
K-9009/Z	F.S.Washer " " "	2		-
KB-7301	Core plug - oil relief valve casing.	1	3	15
KB-1081	Washer - core plug.	1		-
EB-3953	Joint - oil relief valve unit.	1		-

2. SPECIAL TOOLS THAT MAY BE REQUIRED:

Title.	No. Off
Twist drill, .213" (5.41 m/m) dia.	1
Taper Tap, .250" dia. 26 T.P.I.-R.H.	1
Plug Tap, .250" dia 26 T.P.I.-R.H.	1

These tools are also included in Para.6 in connection with Scheme 'B'.

3. INSTRUCTIONS FOR FITTING: (REFER TO FIG.3)

Having removed the induction pipe, the existing By-Pass filter, adaptor (Fig.1 or 2), the connecting pipes and the oil relief valve unit, proceed as follows:-

- (1) Measure the length of the four adaptor studs (in position) and if these are less than 1.350" (34.3 m/m), fit the new studs, KB-359/Z.

- (ii) Remove the union from the oil relief valve unit, and with a suitable pin spanner, fit the core plug(15) and joint washer. Refit the unit to the crankcase including a new joint, EB-3953.
- (iii) Fit the following parts to the adaptor casing(12). The two unions (7), the core plug (8), the union(9), and the screw plug(13), together with their joint washers. Fit the adaptor and its joint to the crankcase.
- (iv) Observe whether the crankcase front lug, 'A' Fig.8(situated at top of cylinder block on R.H.side of crankcase,) has been machined back and tapped to take stud (1). If not, proceed as follows:-
- File back the face of the lug until the filter mounting plate(5) when offered up to the crankcase lies FLAT against this lug and the two lower studded lugs.
 - With the filter mounting plate in position, centralise its two lower holes with the existing studs on the crankcase and temporarily secure in position. Using the mounting plate as a template, mark off the lug and drill a .213"(5.41m/m) dia. hole to a depth of .450"(11.42 m/m) and tap .250" dia. 26 T.P.I.-R.H. Remove the mounting plate and fit the stud(1) KB-751/2. This makes the 3rd fixing point for the filter mounting plate.
NOTE: If the lug referred to above has been machined back, then it will be necessary to fit the circular distance piece, RE-13939, to the stud interposing it between the mounting plate and the lug when carrying out the next operations (v).

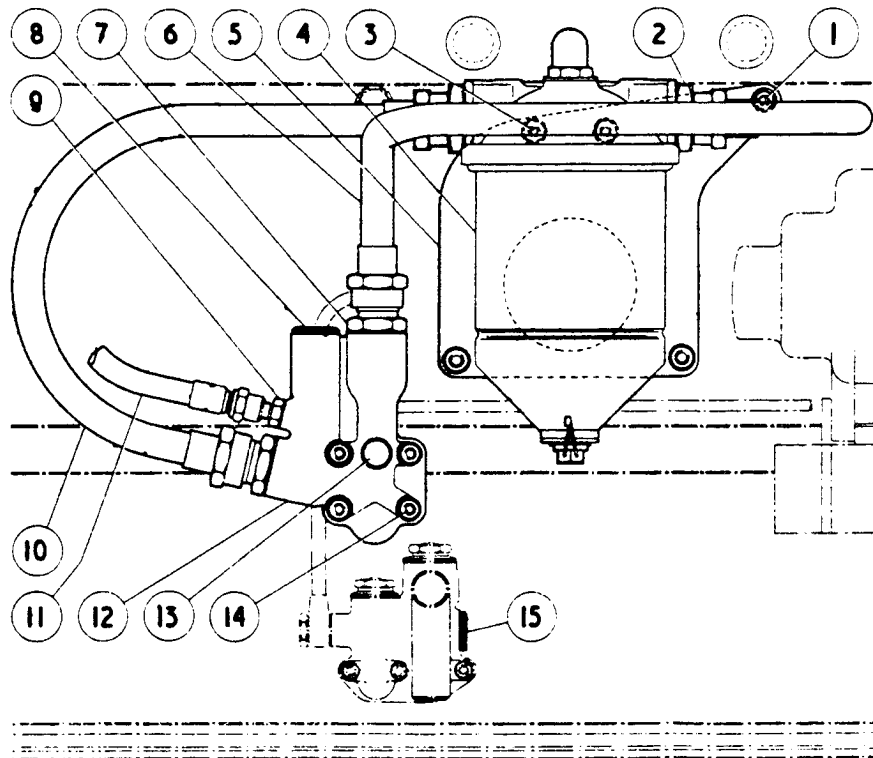


FIG. 3. FRONT ELEVATION - FULL FLOW OIL FILTER.

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO

BENTLEY MOTORS (1931) LTD. SERVICE STATION, 41 THE ROAD, WILLSDEN, LONDON, W.9

Bulletin

MODEL : BENTLEY MARK VI

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- (v) Fit the two unions (2) and joint washers to the filter. Attach the filter to the mounting plate (5), by means of the two set-screws (3), spring and plain washers and fit the assembly to the crankcase.
- (vi) With a syringe, inject a recommended S.A.E.20 engine oil into the filter through EACH of the two unions until it is full, then connect the inlet and outlet oil pipes (10 & 6) to the transfer block and filter.
- (vii) Connect the existing flexible oil feed pipe, 11, (from pressure gauge) to the adaptor.
- (viii) After the installation of the Full Flow oil filter, the filter system must be primed with engine oil as follows:-
- a) Before starting up the engine, unscrew the union nut of the inlet oil pipe (10) from the union on the filter, and with a syringe, fully prime the pipe and then prime the oil filter. Reconnect the union nut.
 - b) When starting up the engine, allow it to idle until pressure shows on the oil gauge.
 - c) When engine is warmed up, check all connections for oil leaks.

4. LEAFLETS:

- (i) The following leaflets will be sent under separate cover which must be inserted in the Owner's Handbook to advise him of the change and the necessary alterations for maintenance which this modification has involved.

Leaflet SB/3/51. (English)
Leaflet SB/4/51. (English)

(or)

Leaflet SB/3/51. (French)
Leaflet SB/4/51. (French)

- (ii) Will Retailers please notify the London Service Station of the chassis number of the car whenever they fit a Full Flow Oil Filter, either to Scheme 'A' or 'B'.

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SCHEME 'B'5. PARTS REQUIRED:

Part No.	Title.	No Off.	Fig.No.	Ref.
R-4596A	Inlet pipe assembly-filter to transfer block.	1	9	6
R-4597A	Outlet pipe assembly-filter to transfer block.	1	9	8
R-4598A	Oil pipe assembly-relief valve to crankcase & wheelcase.	1	9	15
RE-3523	Washer-banjos-LP Oil pipe assy.	4		-
R-4652A	Oil feed pipe-pump to stand pipe.	1	10	20
R-4469	Transfer block - crankcase.	1	9	10
R-4536	Adaptor-transfer block.	2	9	9
KB-1089	Washer-adaptor-transfer block.	2		-
R-4497	Joint-transfer block to crankcase.	1	10	16
KB-659/Z	Stud " " "	1	9	14
KB-757/Z	Stud " " "	2	9	13
KB-1075	Washer " " "	1		-
KB-1076	Washer " " "	2		-
K-4006/Z	Nut " " "	1		-
K-4310/Z	Nut " " "	2		-
KB-660/Z	Stud-oil relief valve unit to transfer block.	3	10	18
K-4006/Z	Nut " " " " "	3		-
K-9006/Z	Spring washer " " " "	3		-
EB-3953	Joint " " " "	1	10	17
KB-7301	Core plug-oil relief valve unit.	1	9	11
KB-1081	Washer - core plug.	1		-
R-4472	Stand pipe - crankcase.	1	10	21
KB-1091	Washer - stand pipe.	1		-
RE-13935	Mounting plate - filter.	1	9	5
RE-13939	Distance piece - mounting plate.	1	10	23
KB-751/Z	Stud " " "	1	9	1
K-9008/Z	Spring washer " " "	1		-
K-4310/Z	Nut " " "	1		-
KC-277/Z	Setscrew-filter to mounting plate.	2	9	3
K-4407/Z	Plain washer " " "	2		-
K-9009/Z	Spring washer " " "	2		-
RE-13818	Vokes Oil Filter Type E-62	1	9	4
KB-5132	Union - filter cover.	2	9	2
KB-1186	Washer - Union.	2		-
RE-5720	Cover - Feed to oil gallery.	1	10	22
KB-7106/Z	Lockwasher - cover.	2		-
KC-202/Z	Setscrew " "	2		-
EB-4035	Swivel Plug - oil gallery.	1	9	7
RF-3274	Washer - swivel plug.	2		-
K-1813	Cheese head screw 3-BA-plug crankcase.	1		-
KB-7104	Lockwasher-Oil baffle-sump.	4		-



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6. SPECIAL TOOLS REQUIRED TO MODIFY CRANKCASE:

Part No.	Title.	No.Off	Application
R-4743	Piloted parallel reamer, .703"(17.85m/m)dia.	1	Reaming crankcase for oil feed stand pipe.
	Taper tap .750"dia 20 T.P.I.(RH)	1	Tapping crankcase
	Plug tap .750"dia 20 T.P.I.(RH)	1	for oil feed stand pipe.
R-4670	Spot facing tool and pilot.	1	Spot facing seating for standpipe.
	Taper tap, 3-BA 34.8 T.P.I.(RH)	1	Tapping taper pin hole on RH side of crankcase.
	Twist drill .375"(9.5m/m)dia.	1	Drilling through crankcase oil relief valve facing
R-4671	Drilling template.	1	For use with the .375" dia. drill.
	Twist drill, .213"(5.41)dia.	1	Enlarging the two outer stud holes in crankcase oil relief valve facing and drilling hole in crankcase lug.
	Taper tap, .250"dia 26 T.P.I.(RH)	1	Tapping outer stud holes in crankcase.
	Plug tap, .250"dia 26 T.P.I.(RH)	1	oil relief valve facing and stud hole in crankcase lug.

7. INSTRUCTIONS FOR FITTING:

Having removed the induction pipe, the existing By-Pass filter and connecting pipes, the oil relief valve unit and pipes and the crankcase lower half, proceed as follows:-

- (i) Remove the oil relief valve overflow pipe, (11/16"dia) from the interior of the crankcase, by twisting to shear the small securing taper pin. With a suitable punch tap out the remaining portion of the pin from the crankcase. For position of pin, refer to point 'A' Fig.7. Remove the sheared portions.
- (ii) Plug the pin hole by first tapping it with the 3-BA taper tap sufficiently to make the screw, K-1813 an interference fit. To prevent the screw protruding into the bore of the overflow pipe hole, shorten it to $\frac{3}{8}$ " (9.5m/m) measured from underside of head. Fit screw and remove head flush with crankcase and finally peen over to secure.
- (iii) With the R-4743 (.703"dia) piloted parallel reamer, ream out the hole in the crankcase from which the overflow pipe has been removed and tap .750"dia 20 T.P.I.-R.H. using both taper and plug taps(See Fig.4).

(Cont'd)



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The hole should be tapped sufficiently to allow the threaded end of the pilot of the spot facing tool, R-4670 to be a 'feel' fit when screwed into position, this will also allow the threaded end of the stand pipe, (21 Fig.10) to be a similar fit, i.e. not tight or slack, when fitted. As the wall thickness of the hole may vary from engine to engine, the reaming and tapping operations should be carefully carried out.

- (iv) Screw the pilot of the spot-facing tool into the tapped hole and spot face 1.000" (25.4m/m) dia. until a clean surface is obtained (See Figs. 4 & 5). Check fit of stand pipe in hole and then remove it.
- (v) Place the drilling template R-4674 (Fig.6) in position against the oil relief valve facing of the crankcase and secure. Drill a .375" (9.5m/m) dia. hole through the side of the crankcase (See Fig.7) and remove the template. Remove the three 2-BA studs from the facing, and with the .213" (5.41m/m) dia. drill, open out the two OUTER stud holes and tap .250" dia. 26 T.P.I.-R.H. (See Fig.7.)

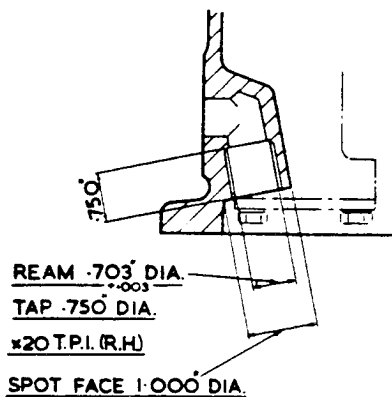


FIG. 4. SECTION SHOWING MODIFICATION TO CRANKCASE FOR OIL FEED STANDPIPE.

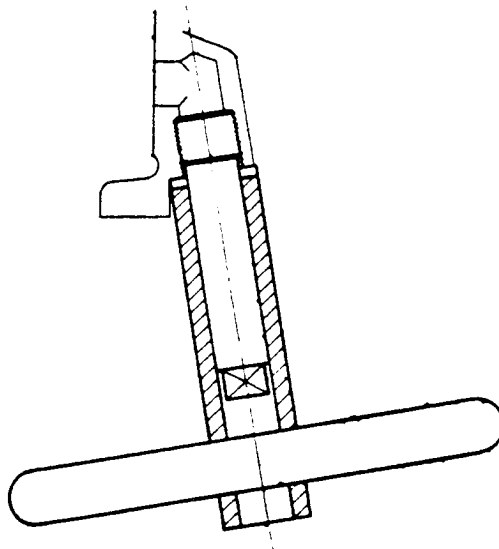


FIG. 5. VIEW SHOWING SPOT-FACING TOOL IN POSITION ON CRANKCASE.

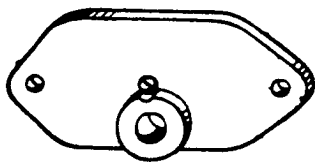


FIG. 6. DRILLING TEMPLATE - CRANKCASE OIL RELIEF VALVE FACING.

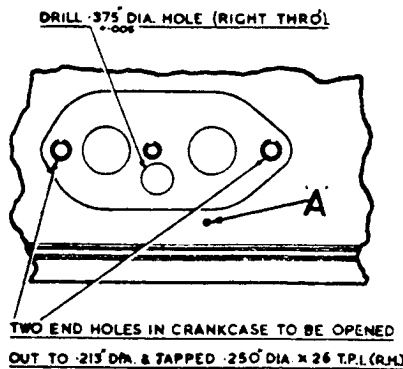


FIG. 7. SCRAP VIEW SHOWING DRILLING ETC. OF CRANKCASE OIL RELIEF VALVE FACING.

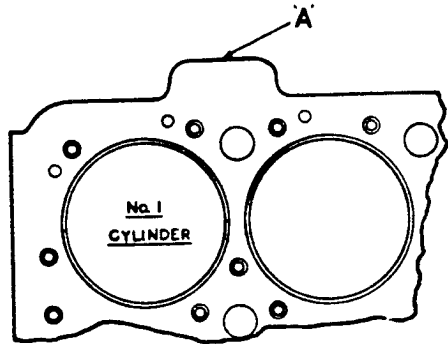


FIG. 8. SCRAP VIEW SHOWING CRANKCASE LUG ('A').

- (vi) File back the face of the crankcase front lug, 'A' Fig. 8 and fit the stud (1) KB-751/Z as described in sub-para. (iv) of Para. 3 for Scheme 'A'.

NOTE: In the unlikely event of the lug having been machined back on an engine prior to 'H' series chassis, then it will be necessary to fit the circular distance piece (23 Fig. 10) interposing it between the filter mounting plate and the lug when fitting the mounting plate and filter assembly to the crankcase as described in Sub-para. xv.

On very early crankcases, the lug may be absent altogether in which case, refer to Para. 8.

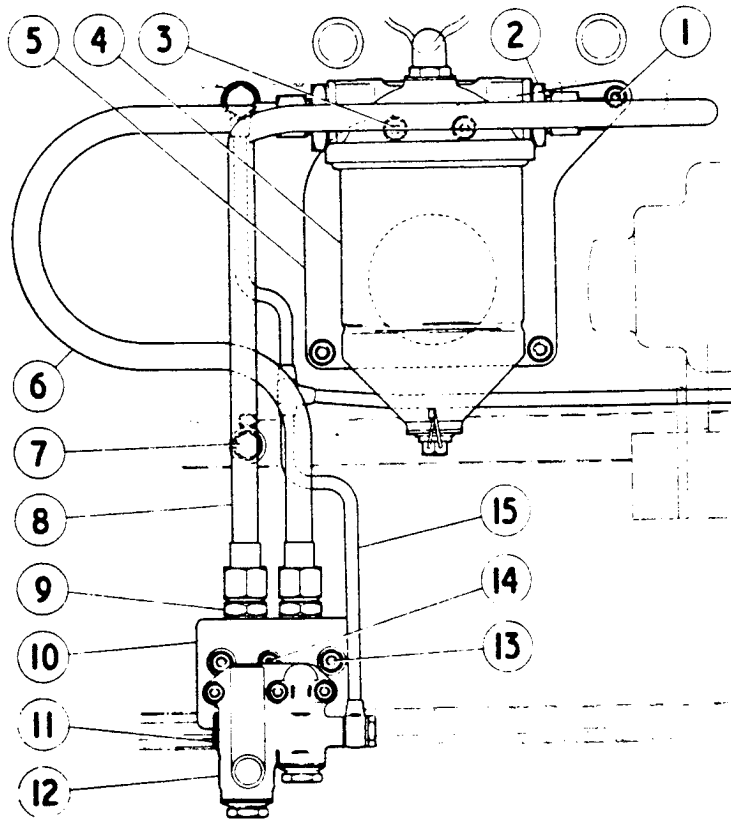


FIG. 9. FRONT ELEVATION - FULL FLOW OIL FILTER.

ANY STRAIN ON STANDPIPE WHEN UNION NUTS ARE TIGHTENED UP.

- (vii) After removing ALL TRACES OF SWarf from the crankcase, blank off the original vertical oil feed hole to the oil gallery inside the crankcase by fitting the cover, 22 Fig. 10, securing it with the two setscrews and lockwashers. Thoroughly clean internally all oil pipes.

- (viii) Fit the standpipe (21) and joint washer to the .750" dia. tapped hole in the crankcase. With the oil pump in position, fit the new oil feed pipe (20), securing the union nut (near pump) with the existing locking plate (19). SET NEW PIPE IF NECESSARY TO AVOID

- (ix) Fit the two studs, 13 (.250" dia. x 1.575" long) to the outer tapped holes of the oil relief valve facing of the crankcase, then fit the centre stud (2-BA x 1.500" long).



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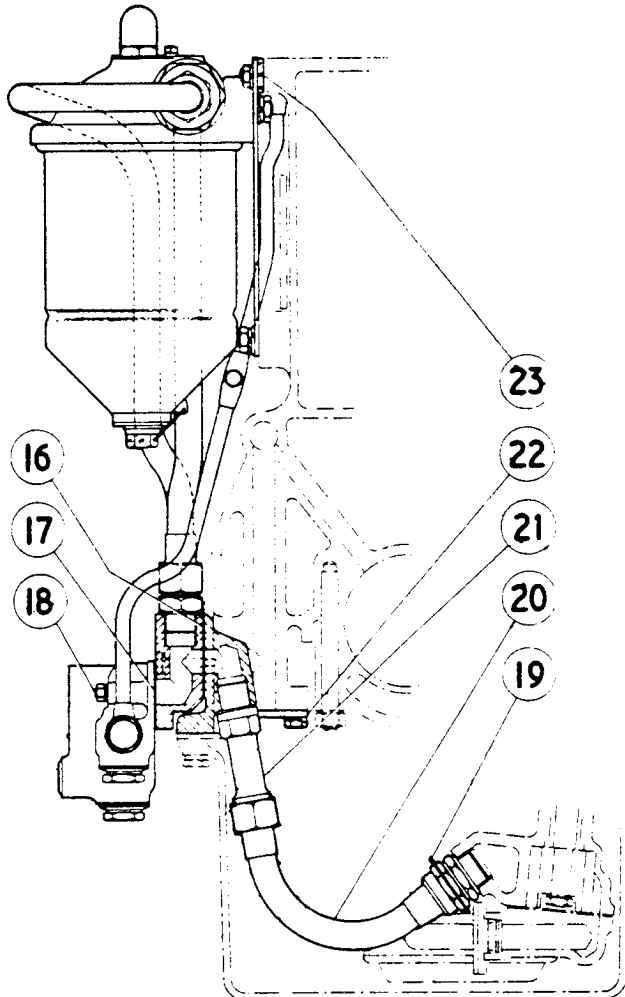


FIG. 10. END ELEVATION - FULL FLOW OIL FILTER.

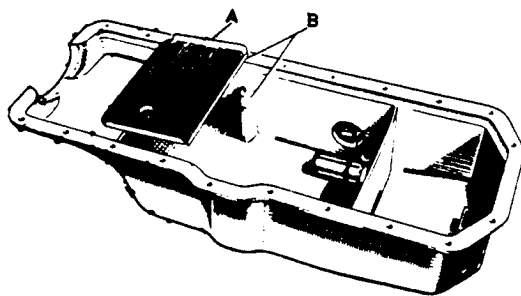


FIG. 11. CRANKCASE LOWER HALF.

- (x) Fit the three studs, 18 (2-BA x 1.600" long) to the transfer block (10 Fig.9), also the two adaptors (9) and joint washers. Place the block complete with its Vellumoid joint R-4497, on to the crankcase.

NOTE: As the joint is similar to the joint (EB-3953) for the oil relief valve unit except for a .375" (9.52mm) diameter hole in the former, it is important the the CORRECT joint is fitted. Place an aluminium washer only on to each of the three studs and secure. (NO OTHER WASHERS ARE REQUIRED).

- (xi) Remove the union from the oil relief valve unit and fit the core plug (11) and joint washer. Place the unit and the Vellumoid joint (EB-3953) on to the transfer block. While tightening up the three nuts to secure, check that the end of the centre stud (14) or nuts securing the transfer block to the crankcase do not foul the casing of the oil relief valve unit. The unit is inverted for fitting under this arrangement as shown in Fig.9.

- (xii) Remove the existing two-way feed swivel plug from the tapped boss situated midway along the oil gallery on R.H. side of engine. Place the banjo connection of the existing flexible

oil feed pipe (to pressure gauge) and joint washers on to the new one-way feed swivel plug, EB-4035 and screw it into the boss.

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MODEL BENTLEY MARK VI

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- (xiii) When offering up the lower half of the crankcase, it will be found that the union nut securing the oil feed pipe to the standpipe (24) fouls the oil baffle ('A' Fig.11) and the locating lug at points 'B'. Remove the baffle and file the lug until it just clears the nut and then file the edge of the baffle to suit. It may also be necessary to file the inside of the lower half of the crankcase to clear the nut. Refit the baffle.
- (xiv) With the crankcase lower half assembled to the engine, fit the low pressure oil pipe assembly, (15) and joint washers.
- (xv) Fit the two unions (2 Fig.9) and joint washers to the filter and attach it to the mounting plate by means of the two setscrews, (3) spring and plain washers. Fit the assembly to the crankcase. (See "Note" under Sub-para. vi of Para. 7, concerning the circular distance piece, 23 Fig.10). With a syringe, inject a recommended S.A.E.20 engine oil into the filter through EACH of the two unions until it is full, then connect the inlet and outlet oil pipes (6 & 8) to the transfer block and filter.
- (xvi) After the installation of the Full Flow oil filter, and having changed the engine oil, the filter system must be primed with engine oil as follows:-
- a) Before starting up the engine, unscrew the union nut of the inlet oil pipe (6 Fig.9) from the union on the filter, and with a syringe, fully prime the pipe and then prime the oil filter. Reconnect the union nut.
 - b) When starting up the engine, allow it to idle until pressure shows on the oil gauge.
 - c) When the engine is warmed up, check all connections for oil leaks.

NOTE: IMPORTANT

After fitting the parts to Scheme 'B', check for foul between the steering pendulum lever ball end pin and the oil relief valve casing on left-hand lock. If this occurs, fit a modified ball pin and nut. Parts that would be required are:- R-4715 Ball end pin; R-4716 Nut and K-4614 split pin.

See para. 4. concerning Leaflets for Owner's Handbook.

8. METHOD OF FIXING UPPER END OF FILTER MOUNTING PLATE TO CYLINDER HEAD WHEN THE CRANKCASE FRONT LUG 'A' FIG.8 IS ABSENT (REFER TO FIG. 12.)

On very early crankcases where the lug has not been incorporated, it will be necessary to attach the upper end of the modified mounting plate, 6 to the cylinder head by means of a bolt and a special hexagon headed threaded plug (2) fitted in place of No.2 core plug.



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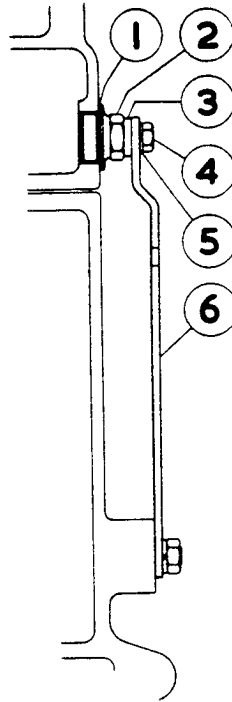


FIG.12. METHOD OF
FIXING FILTER MOUNTING
PLATE TO CYLINDER HEAD.

PARTS REQUIRED:

Part No.	Title.	No. Off	Fig.No.	Ref.
KB-1092	Washer - plug	1	12	1
RE-9015	Plug - cylinder head.	1	"	2
RE-13939	Distance piece - plug.	1 (additional)	"	3
KC-905/Z	Bolt - mounting plate.	1	"	4
K-9008/Z	Spring washer - bolt.	1	"	5
R-4747	Mounting plate - filter.	1	"	6

NOTE: When the above parts are required, the following parts which figure in Para. 5 for Scheme 'B' will not be needed.

Part No.	Title.	No. Off.
RE-13935	Mounting plate - filter.	1
KB-751/Z	Stud. "	1
K-4310/Z	Nut. "	1

Bulletin

MODEL BENTLEY MARK VI

FOR INFORMATION - (IMPORTANT)FULL FLOW ENGINE OIL FILTER.(ADDENDUM)

Concerning Scheme 'B' of Service Bulletin No. BB-143 (Section E), it has been brought to our notice that in one or two instances the external inlet and outlet oil feed pipes, (6 & 8 Fig. 9 of Bulletin No. BB-143) to and from the Full Flow Filter have been reversed when fitting to the transfer block (10). This arrangement causes the filter element to collapse and block the oil flow.

To obviate this, we have re-designed the two oil pipes on which additional bends have been incorporated to make it impossible for the pipes to be incorrectly fitted, but until the existing stocks are used up, care must be taken to see that the pipes are correctly connected. To assist in this, we have marked the pipes at the transfer block end, "Front" and "Rear" and they should be fitted accordingly.

It will be observed upon reference to Fig. 9, that the lower end of the inlet oil pipe (6) is connected to the right-hand side of the transfer block and the outlet oil pipe (8) to the left-hand side.

For Category 2 ActionMODIFICATIONAluminium Core Plugs $\frac{5}{8}$ " Bore Engine

On certain $\frac{5}{8}$ " bore engines two aluminium alloy core plugs were fitted on the left hand side of the crankcase above the tappet covers as shown at A Fig.1.

The aluminium plugs have proved subject to corrosion in service and are to be replaced with cadmium plated steel core plugs and aluminium washers as a retrospective modification. Retailers are asked to carry out replacement on all affected cars in their area when they are next being serviced.

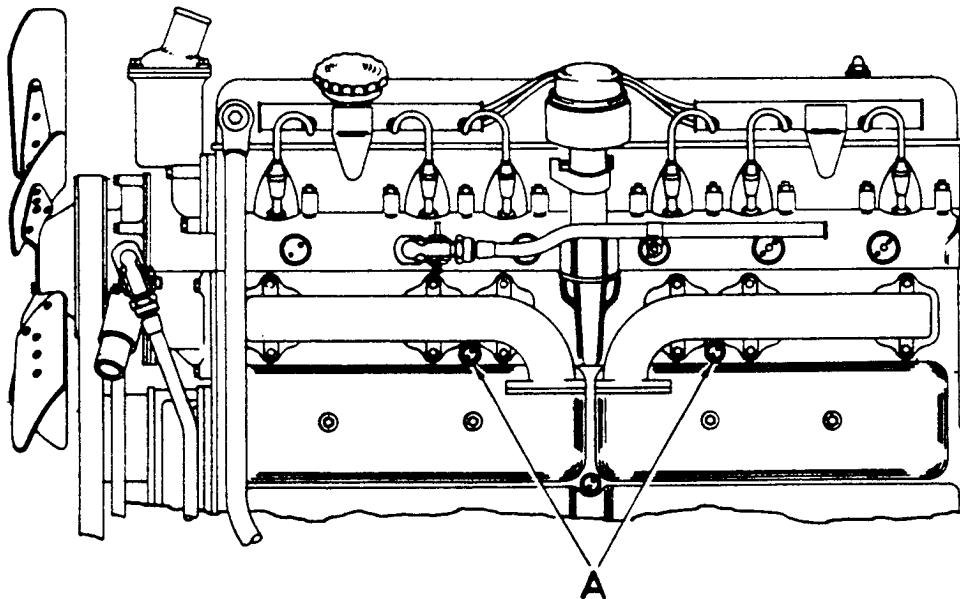


FIG.1 LOCATION OF CORE PLUGS

Chassis Numbers AffectedBentley Mk. VI

B.2 MD to B.169 SP inclusive
 B.187 SP to B.201 SP inclusive
 B.207 SP and B.255 SP

Bentley Continental

BC-1-A to BC-14-B inclusive
 except BC-17-A

Bulletin

MODEL BENTLEY MARK VI

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Tools Required:

Core plug spanner R.4956
Tap $\frac{5}{8}$ " x 20 T.P.I. second.

Material:

RE.20740 Core plug water jacket 2 off (Replaces KB.7301)
E.27488 Washer, aluminium 2 off

Special arrangements are being made to despatch a set of tools and a supply of core plugs to Retailers affected.

Procedure:

The spanner supplied enables the core plugs to be replaced without removing the exhaust manifold.

- (i) Drain the cylinder block.
- (ii) Remove the aluminium core plugs, clean the threads with the tap provided and fit the steel plugs and aluminium washers.
- (iii) Refill the cooling system.

Charges:

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

FOR INFORMATION:ROCKER COVER JOINT.

The rocker cover joint RE.5151 originally supplied for the 3.500" bore engine, is no longer available, and RE.10477 as issued for the 3.625" bore engine, will be used as a replacement for all engines.

This joint is .400" (10.16 m/m) longer than the previous joint, and will require shortening as under, before fitting to 3.500" bore engines:-

- (i) Lay the joint on a flat surface, and, at about the centre of its length, diagonally cut one side of the joint in half. (See Fig.1).
- (ii) Next manoeuvre the joint into the recess provided in the rocker cover; moulding the corners into the recess by hand.
- (iii) Shorten the joint until the joint faces, when in contact with each other, will over-lap as shown in Fig.2. This will provide an oil-tight joint and allow for shrinkage.
- (iv) Remove the joint and smear the recess in the rocker cover with "Heldite" or a similar jointing compound, and place the joint in position.



Fig. 1



Fig. 2

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MODEL BENTLEY MARK VI

FOR INFORMATION:PREMIUM GRADE FUELS

The re-introduction of Premium grade fuels in the United Kingdom invites many enquiries from Owners as to the effect of these fuels in their cars, and the following advice should therefore be noted on this subject.

1. As the calorific value of most grades of motor fuel is approximately the same, no increase in power can be expected when operating at the same compression ratio and ignition timing.
2. The benefit of Premium grade fuels lies in the increased anti-knock value which eliminates pinking which would occur on Pool petrol, and allows the use of increased ignition advance and/or higher compression ratios to be employed, with a resulting increase in power.
3. It follows that in order to obtain any appreciable improvement in performance with Premium grade fuels, it is necessary to re-set the ignition timing to the optimum setting if the engine is at present de-tuned to avoid pinking on Pool petrol. The optimum ignition setting on the Bentley engine is 2° B.T.D.C. It is most important that before attempting to re-set the timing, the contact breaker points should be carefully cleaned and adjusted, and the timing should be set accurately by reference to the flywheel marking (1° represents $\frac{1}{8}$ " on the flywheel). Any attempt to advance the ignition to pinking point on Premium fuels will almost certainly result in loss of power.
4. A further small improvement in performance can be obtained by raising the compression ratio from 6.25 to 6.62 : 1 on the large bore engine. This can be achieved by fitting a steel gasket (.025" compressed thickness, Part No. RE.16320) in place of the present C & A gasket (.055" compressed thickness). Thinner gaskets are not available for the 4½ litre engine. Customers who wish to have the higher compression ratio, should be warned that some increase in engine roughness might be noticeable.
5. No change in jet needles or carburation is necessary.
6. We do not recommend any particular Brand of petrol. The customer makes his own choice.

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO:

BENTLEY MOTORS LTD., 10, JAMES LANE, CREWE, ENGLAND

Bulletin

MODEL: BENTLEY MARK VI

FOR INFORMATION:

CANCELS: BB.169

CYLINDER HEAD AND GASKETS

This Bulletin cancels our Bulletin BB.169, reference SB/VK/SL 1/NT, which should be destroyed.

The return of high grade fuels to the home market has made possible the introduction of a new cylinder head (RE.19451) giving a higher compression ratio and this Bulletin gives details of the Chassis Numbers to which it is fitted.

THE BENTLEY 'R' TYPE:

The new cylinder head has been fitted to the following chassis:-

B-11-TO	B-19-TO
B-15-TO	B-49-TO to B-87-TO
B-17-TO	(inclusive)

and is being fitted as standard production from B-93-TO onwards.

This cylinder head is fitted with a copper and asbestos gasket (RE.14764) and gives a compression ratio of 6.75:1 compared with 6.4:1 with the former cylinder head (RE.10429).

The two cylinder heads can easily be distinguished as the part number is cast on the top of the left-hand side.

THE BENTLEY CONTINENTAL SPORTS SALOON

The new cylinder head (RE.19451) is also being fitted to the Bentley Continental from Chassis Number BC-4-C onwards.

It is fitted with a steel gasket (RE.16320) and gives a compression ratio of 7.20:1.

Earlier chassis are fitted with a smaller capacity cylinder head (RE.16876) and a copper and asbestos gasket (RE.14764).

CAUTION:

In no circumstances must the steel gasket (RE.16320) be fitted to the Bentley Continental with the small capacity cylinder head RE.16876 or to the Bentley 'R' Type with the new cylinder head RE.19451 as detonation at high speeds and distortion of the cylinder head may result.

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MODEL: BENTLEY MARK VI

FOR INFORMATIONOVERSIZE PISTONS.

Although the Schedule of Spare Parts gives a range of oversize pistons from 0.005" to 0.045" in steps of 0.005" oversizes, it has been decided to delete certain of these, and in future, only the following oversize pistons will be available:-

0.005" (0.13 m/m)	oversize piston.		
0.010" (0.25 m/m)	"	"	
0.015" (0.38 m/m)	"	"	
0.025" (0.63 m/m)	"	"	
0.035" (0.89 m/m)	"	"	

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MODEL BENTLEY MARK VI

FOR INFORMATION.PISTONS.GRADING AND FITTING

In order to maintain the specified piston to bore clearance while permitting normal manufacturing tolerance on each component, a system of piston and bore grading was introduced early in Bentley, Mark VI production for standard size bores.

The larger sizes of piston in the range, primarily intended for new engines, can be used as replacements to eliminate piston knocks, on cars with moderate mileage, provided that the bore wear does not exceed a certain limit. In such cases a piston can be selected in relation to the actual measured bore size to give a specified running clearance.

MAXIMUM PERMISSIBLE WEAR.

The maximum wear in this context relates to the largest worn bore size for which a graded standard size piston is available.

Chromium plated bores. (used up to Chassis No.B.142.DA).

The plating extends approximately $2\frac{1}{2}$ " down from the top of the bore and has a maximum thickness of .0005" tapering to zero at the bottom. The bore was plated after finishing to nominal size and is therefore .001" below nominal size at the top.

Brown patches in the plating indicate that it is worn through and under these conditions the fitting of graded pistons is not recommended nor should they be fitted when the wear exceeds .0035" immediately below the chrome. In either of these conditions boring and sleeving are necessary.

Engines with short inserts (from chassis No.B.144.DA. onwards).

The limit of wear at which the largest size of graded pistons can be fitted is .0035" above nominal, $2\frac{1}{2}$ " down the bore. In excess of this figure it is necessary to rebore and fit oversize pistons in the normal way.

Measurement of bores.

Dimensions should be taken across the thrust diameter.

- A. 1" down from the top of the bore.
- B. Just below the chrome or insert portion.
- C. At the bottom of the bore.
- D. Just below the chrome or insert portion in line with the crankshaft if this dimension exceeds .004" above nominal a larger grade of standard size piston cannot be fitted and reboring is necessary.

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MODEL BENTLEY MARK VI

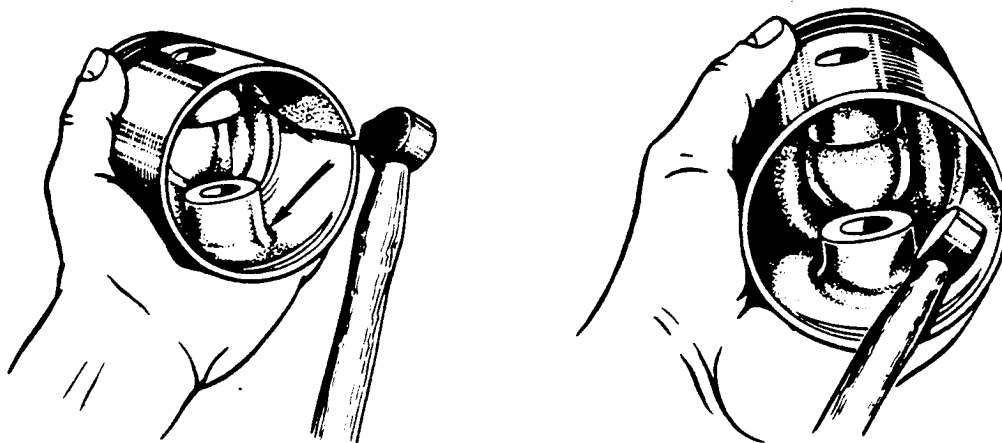
Selection of suitable pistons.

Pistons should be selected from the chart to give .0032" - .0035" clearance between the top of skirt dimension and the dimension obtained 1" down from the top of the bore (Dimension A).

At the bottom of the skirt the fit should be zero to .0002" interference. It may not be possible to select a piston which gives both these conditions precisely, in which case the top of skirt dimension should be the determining factor, the bottom of the piston skirt being spread subsequently as shown below.

Expansion of skirt diameter.

To spread the skirt the gudgeon pin boss should be peened as shown in the illustrations, measurements being taken at intervals until the required diameter is obtained.



PISTON GRADES.

3 1/2" BORE ENGINE.

<u>Grade.</u>	<u>Diameter across pressure faces</u>	
	<u>Top of Skirt.</u>	<u>Bottom of Skirt.</u>
F.	3.49685-3.49715.	3.4995-3.5005.
G.	3.49725-3.49755.	3.4999-3.5009.
H.	3.49765-3.49795.	3.5003-3.5013.
J.	3.49805-3.49835.	3.5007-3.5017.
K.	3.49845-3.49875.	3.5011-3.5021.
L.	3.49885-3.49915.	3.5015-3.5025.

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MODEL BENTLEY MARK VI

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3⁵/₈" BORE ENGINE.

Diameter across pressure faces.

<u>Grade</u>	<u>Top of Skirt.</u>	<u>Bottom of Skirt.</u>
F.	3.62135-3.62165.	3.6240-3.6250.
G.	3.62175-3.62205	3.6244-3.6254.
H.	3.62215-3.62245.	3.6248-3.6258.
J.	3.62255-3.62285.	3.6252-3.6262.
K.	3.62295-3.62325.	3.6256-3.6266.
L.	3.62335-3.62365.	3.6260-3.6270.

POLICY.

The course of action described in this bulletin should only be taken in cases of complaint and not merely on observed condition such as one might find during decarbonization. It will be appreciated that a car which is running quite satisfactorily should not be disturbed. It should also be noted that high oil consumption may be rectified by fitting new piston rings in most cases and only rarely should new pistons be necessary.

In cases where no stock of graded standard size pistons is held, replacements may be ordered from this service department, ready to fit, if bore dimensions are supplied. It is also important that new gudgeon pins and bushes should be fitted with the replacement pistons in every case.

FOR INFORMATIONE.62 FULL FLOW FILTERS.

Cases have occurred of the filter casing being fractured by over-tightening of the centre bolt.

When re-tightening after cleaning and re-fitting a new "Element", the centre bolt should be nipped up gently using a 6" spanner to an approximate load of 5 lb - Ft which is all that is required to make a leak proof joint. On test, it has been found that a load of 20 - 25 lbs - Ft will fracture the filter head.

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MODEL: BENTLEY MARK VI

FOR INFORMATION:FULL-FLOW OIL FILTER SERVICING

On Bentley "R" type cars fitted with the latest Hot an Cold (Continental) demisting system, it has been found that the previous method of lifting out the detached filter element and bowl, past the dynamo, is no longer possible, due to the positioning of the heater pipes.

The following method is now recommended. Disconnect the air pipe from the matrix under the wing, and also from the blower motor on the dash. Disconnect the windscreen washer reservoir and remove the "bottle". Loosen the strap holding the air pipe and withdraw pipe.

The filter bowl can now be withdrawn without difficulty.

TOP DECARBONISATION MATERIAL.

When the earlier engines are reconditioned at the Works, Full-Flow Filter equipment is invariably installed. At the same time, minor modifications affecting the scale of decarbonisation material, may be embodied. As it is not practicable to keep record of these retrospective modifications, Retailers are asked to bear in mind the following points when ordering decarbonisation material.

- a) Where the rocker cover breather has been fitted, a replacement washer, KB-1092 will be required.
- b) Where aluminium tappet doors have been fitted, washers RE-5427, 2-Off, will be required in place of EB-4059 2-Off.
- c) The corrugated hose, RE-18218, may be fitted to any chassis fitted with the deep-type radiator, and the existing three-piece lower connection discarded.
- d) The presence of a Full-Flow Filter will be recognised immediately, and in such cases, the By-pass Filter will not be required.

Upon reference to the schedules, the material required for a particular chassis may be readily ascertained.

Appendix "A" refers to B-VI cars and Appendix "B" to 'R' type and Continental.

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MODEL BENTLEY MARK VI

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Appendix "A".

(A-P Series)

Part No.	Description.	1	2	3	4	5	6	7
EB-1866	Packing, inlet valve.	6	6	6	6	6	6	6
EB-1747	Ring, valve retaining.	6	6	6	6	6	6	6
EB-3998	Bush, rocker cover stud.	3	3	3	3	3	3	3
KB-1092	Washer, breather connection.		1	1	1	1	1	1
EB-4042	Washer, distributor housing joint.	1	1	1	1	1	1	1
EB-4039	Washer, exh. manifold to crankcase joint.	6	6	6	6	6	6	6
EB-4468	Washer, manifold to pipe flange joint.	2	2	2	2	2	2	2
EB-3581	Washer, hotspot to cylinder joint.	1	1	1	1	1	1	1
EB-4003	Washer, inlet manifold to cyl.head joint.	4	4	4	4	4	4	4
RE-10477	Washer, rocker cover joint.	1	1	1	1	1	1	1
RE-3523	Washer, rocker oil feed connection joint.	2	2	2	2	2	2	2
CD- 151	Washer, sparking plug.	6	6	6	6	6	6	6
EB-4059	Washer, tappet cover joint.	2	2					
RE-5427	Washer, tappet cover joint.			2	2	2	2	2
EB-4232	Joint, carburettor to manifold.	2	2	2	2x	2x		
RE-10611	Joint, carburettor to manifold.						2x	2x
RE-19719	Gasket, cylinder head.	1	1	1	1	1	1	
RE-14764	Gasket, cylinder head.							1
RE- 51	Washer, coolant elbow joint.				1+	1+	1+	1+
EB-3580	Washer, water conn.inlet pipe joint.	4	4	4	4x	4x	4x	4x
RE-16572	Packing piece, carburettor				2+	2+	2+	2+
EB-5015	Hose, by-pass.	1	1	1	1			
RE-12659	Hose, by pass.					1	1	1
RE-3589	Hose.	4	4	4	2	2	2	2
RE-20597	Washer, float chamber joint.	4	4	4	4x	4x	4x	4x
RF-3274	Washer, alpm. tappet cover.	4	4	4	4	4	4	4
F-89195	Washer, cork petrol filter.	1	1	1	1	1	1	1
RE-18218	Hose, corrugated.				1	1	1	1
Y- 264	Element.	1	1	1	1	1	1	
RE-9830	washer, cork.	1	1	1	1	1	1	
RE-15063	Element.							1
RE-15062	Felt.							2
RE-16060	Rubber joint.							1
E- 75034	Washer, sealing)							1

x Not used on L.H. cars E - P Series.
 + Used only on L.H.cars E - P Series.
 NOTE: E-7503+ is required for single stud fitting only.

- Column 1. B-2-AK to B-196-BH.
 2. B-198-BH to B-401-BG.
 3. B-2-CF to B-268-DA.
 4. B-270-DA to B-133-GT and B-141 to 205 and 209-229-GT.
 5. B-135-GT to B-55-HP and B-71 to 81-HP, except B-141 to 205 and B-209-229-GT.
 6. B-57-HP to B-401-LH except B-71 to B-81-HP.
 7. B-2-MD to B-301-PU.

Chassis Series:

AK, AJ, BH, BG, CF, CD, DA, DZ, EY, EW, FV, FU, GT, HR, HP, JO, JN, KM, KL, LJ, LH, MD, MB, NZ, NY, FV, FU.

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MODEL BENTLEY MARK VI

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Appendix "B".

TOP DECARBONISATION MATERIAL.

Part No.	Description.	'R' Type	Continental.			
			A	B	C	D
RE-14764	Gasket, cylinder head (clay)	1	1	1	*	
RE-16320	Gasket, cylinder head (steel)				*	
UE-418	Gasket cylinder head.					1
CD-151	Washer, sparking plug.	6	6	6	6	6
EB-1747	Ring, valve retaining.	6	6	6	6	6
EB-1886	Packing inlet valve.	6	6	6	6	6
EB-3580	Joint, inlet manifold water connections.	4	4	4	4	4
EB-3581	Joint, hotspot to cylinder head.	1	1	1	1	1
EB-3998	Bush, rocker cover stud.	3	3	3	3	3
EB-4003	Joint, inlet manifold to cylinder head.	4	4	4	4	4
EB-4039	Washer, exhaust manifold	6	6	6	6	6
EB-4042	Joint, distributor housing.	1	1	1	1	1
EB-4468	Washer, manifold to pipe flange joint.	2	2	2	2	2
F-89195	Washer, petrol filter.	1	1	1	1	1
KB-1092	Washer, breather connection.	1	1	1	1	1
RE-3523	Washer, rocker oil feed.	2	2	2	2	2
RE 3589	Hose, radiator bottom/top.	2	1	1	1	1
RE-2427	Joint, tappet cover.	2	2	2	2	2
RE-10620	Joint air intake to carburettor.	2	2	2	2	2
RE-10477	Joint rocker cover.	1	1	1	1	1
RE-10611	Joint carburettor to manifold.	2	2	2	2	2
RE-12659	Hose by-pass.	1	1	1	1	1
RE-13241	Joint, air intake to silencer.	1	1	1	1	1
RE-18218	Hose, corrugated.	1				
RE-18328	Hose, radiator top.		1	1	1	1
RE-18327	Hose, radiator bottom.		1	1	1	1
RE-20597	Washer, float chamber.	4	4	4	4	4
RF-3274	Washer, aluminium tappet cover.	4	4	4	4	4
RE-15063	Element, oil filter.	1	1	1	1	1
RE-15062	Washer, Felt.	2	2	2	2	2
RE-16060	Joint, oil filter.	1	1	1	1	1
E-75034	Washer, aluminium, oil filter.	1	1	1	1	1

* Use RE-14764 up to Chassis No. BC-3-C and RE-16320 from BC-4-C to BC-101-C except where a $3\frac{3}{4}$ " bore engine has been installed retrospectively when a UE-418 is required. If the question of fitting a steel gasket arises other than above, refer to Bulletin EB-170.

NOTE: E-75034 is required only where the single stud fitting is employed.

Chassis Series:

'R' Type: RT, RS, SR, SP, TO, TN, UM, UL, WH, WG, XF, YD, YA, ZX.

Continental: BC-A, BC-B, BC-C, BC-D.



MODEL BENTLEY MARK VI

Category 2.

MODIFICATIONS TO CHASSIS FITTED WITH
AUTOMATIC GEARBOX AND ALUMINIUM BELL-HOUSING.

In order to prevent the possibility of accelerated wear of the flywheel ring gear teeth on cars fitted with an Automatic Gearbox and an aluminium bell-housing the following modifications are to be carried out retrospectively on a Category 2 basis:

- a. Fitting a new starter drive assembly and rading the flywheel teeth.
- b. Fitting an oil pressure operated switch in the solenoid circuit of the Automatic Twin S.U. Induction System.

This Bulletin gives details of both modifications and Retailers are asked to carry them out on the affected cars in their area as they come in for service.

1. CHASSIS NUMBERS AFFECTED:

These modifications apply to all cars fitted with an Automatic Gearbox and aluminium bell-housing. Early left hand drive cars with Automatic Gearbox had a cast-iron bell-housing and are not affected.

Chassis numbers to be modified are as follows:-

Bentley Sports Saloon:

- R.H.D. All Automatic Gearbox cars in Series S, T, U, W and X and in Y Series up to and including Chassis Number B-156-YD except B-2-YD, 4, 6, 18, 24, 62, 74, 80, 88, 90, 92 and B-94-YD.
- L.H.D. B-35-LUL, B-37-LUL and from B-200-LUM and onwards in U Series. All Automatic Gearbox cars in W and X Series and in Y Series up to and including B-152-LYD.

Bentley Continental:

- R.H.D. and L.H.D. All Automatic Gearbox cars up to and including BC-36-D.

The new starter drive assembly has been fitted on production from B-158-YD and BC-37-D and onwards and on those chassis excepted above. Other chassis may have been modified in service.

Continued/-...



MODEL BENTLEY MARK VI

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2. PARTS REQUIRED:Modification A.

R.5300 Starter Drive Assembly R.H. - Eccentric Housing } 1 Off as
 R.5301 Starter Drive Assembly L.H. - Eccentric Housing } required.

A starter drive assembly with an eccentric housing is specified to ensure that the backlash between the starter pinion and the flywheel teeth is a minimum of .015".

Modification B.

R. 5304	Assembly Automatic Choke	1 Off.
RE.21918	Assembly Bracket - Support Fast Idle Cam	1 Off.
RE.21908	Assembly Link - Fast Idle Cam	1 Off.
RE.21735	Fast Idle Cam	1 Off.
UE. 514	Fulcrum Pin - Fast Idle Cam	1 Off.
RE.21917	Oil Pressure Switch	1 Off.
RE.21688	Adaptor - Oil Pressure Switch	1 Off.
16/.012	P.V.C. Cable - Light Blue	2 Feet.
RD. 3690	Cable Eye 3.B.A.	2 Off.
RD. 3106	Rubber Elbow Sleeving	1 Off.
RD. 7589	Rubber Sleeve	1 Off.
	Sleeving P.V.C. 5 m/m - Black	2 Feet.

The Automatic Choke Assembly will have the spring tensioner on the spindle, the solenoid air gap and the kick diaphragm travel correctly set.

Supplies of parts required for both modifications are being despatched to Retailers concerned.

3. MODIFICATION A - STARTER DRIVE ASSEMBLY:

A new starter drive assembly with a longer pinion and longer engaging stroke is to be fitted to prevent edge-to-edge engagement of the pinion, or possible disengagement, immediately after the completion of a compression stroke and to increase the backlash between the pinion and the ring gear teeth. The new assembly may be recognised by the moulded rubber rear end cover which replaces the steel cover on the earlier type.

The flywheel ring gear teeth are also to be radiused .100" (2.54 mm) to remove the sharp corner on the engaging face.

Continued/...



MODEL BENTLEY MARK VI

- 3 -

Procedure:

- (i) Remove the starter motor complete. Remove the starter drive assembly from the motor and refit the new drive assembly.
- (ii) Remove the flywheel lower cover and radius the flywheel teeth with a medium file as shown in Fig.1.
- (iii) Refit the starter motor and flywheel lower cover.

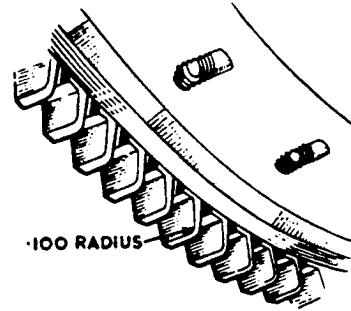


FIG.1.
RADIUS ON FLYWHEEL TEETH.

4. MODIFICATION B - OIL PRESSURE SWITCH:

An oil pressure operated switch is to be incorporated in the solenoid circuit of the Automatic Choke of the twin S.U. Induction System to ensure positive cold starting. The operation of this switch, and of the new Automatic Choke Assembly that is required with it, is described in Bulletin BB-188.

It is not required to fit the bi-metallic switch that is now fitted on current production and is described in Bulletin BB-188A.

Procedure:

The procedure for modification of the Automatic Induction System is fully detailed in Bulletin BB-208 Section M. However, for this shorter modification, the bi-metallic switch is not to be fitted and the following points should be noted when following the text:

- (i) Para (vi) and Fig.3 do not apply.
- (ii) Para (viii) does not apply. The following should be substituted:-

"Remove the existing beige feed wire to the solenoid from the triangular 12 way junction box on the dashboard. The wire leaves the junction box and passes down the dash in the main loom under the conduit leaving the main loom at the valance to lead to the solenoid switch. Remove the conduit elbow from the dash and pull the beige wire down to the top of the conduit. Reconnect it to the main ignition fuse in the distribution board as shown in Fig.5. with a J.B.A. cable eye and rubber sleeve, cutting to length as necessary. Replace the conduit elbow.

Continued/-...



MODEL BENTLEY MARK V

- 4 -

(iii) Fig. 5. Delete the bi-metallic switch and consider the beige cable as one length.

5. CHARGES:

A time of 6 hours is allowed for both modifications and charges should be submitted on a Guarantee Form in the usual way.



MODEL BENTLEY MARK VI

FOR INFORMATION.EXHAUST VALVE SPRINGS. $\frac{3}{8}$ " BORE ENGINES.

On $\frac{3}{8}$ " bore engines, commencing at Chassis No. B-2-MD, and BC-1-A (Continental) the undermentioned exhaust valve springs and bottom washers were fitted :-

- (RE.3954, Spring, (approximate free length when new is 2.040")
- (RE. 976, Bottom washer.

Subsequently the above were superseded by an improved spring of constant rate and lower stress :-

- (RE.15959, Spring (approximate free length when new is 1.860")
- (RE.15960, Bottom washer.

Whenever it is necessary to renew one or more of the earlier type springs, RE.3954, a complete set of the improved type springs, RE.15959 should be fitted TOGETHER with the bottom washers, RE.15960.

Apart from the difference in the free length of the two types of springs, identification as to which type of spring is fitted to a particular engine, may be determined upon reference to the bottom washer (see Fig.1 and Fig.2) from which it will be observed that the base of the later type is not recessed.

In all cases the top washer, RE.975 is retained.



Fig.1 - Section
RE-976 - Washer



Fig.2 - Section
RE-15960-Washer

Bulletin

MODEL BENTLEY MARK VI

FOR INFORMATION.TOP DECARBONISATION MATERIALS

With reference to Service Bulletin BB-204 it is advised that the scale of material laid down for "R" type Chassis is also applicable to ZY Series Chassis.

Will Retailers please note that the Schedules set out in Service Bulletin BB-204 supersede all previous issues which should be destroyed.

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO

BENTLEY MOTOR CARS LTD. PYMS LANE, CREWE, ENGLAND

SB/VK/JSL 2/PR 29.4.55.

SECTION E

PRINTED IN ENGLAND

Bulletin

MODEL: BENTLEY MARK VI

FOR INFORMATIONDUAFLEX PISTON RINGS.

It has been the practise of the London Service Station for sometime now to fit Wellworthy Duaflex Oil Control Rings to engines where heavy oil consumption has been reported.

As this type of ring has proved very satisfactory, it has now been decided to discontinue the use of the standard Slotted Oil Control Ring, and all oversize pistons will now be supplied with a Duaflex Oil Control Ring.

There are still a few Bentley Mark VI $3\frac{1}{2}$ " bore cars in Service with chromium plated bores (at upper end), and as the normal Duaflex Ring is not suitable for fitting to such engines the Duaflex Gold Line Ring must be used. The Part Number of this ring is RH-411.

A complete list of Duaflex Rings, which are to supersede the original scraper ring are given overleaf.

It will be noted that one size Duaflex Ring is suitable for a small range of oversize bores. The actual size is as follows :-

Standard ring is suitable for :- Standard to .019" o/size bores.
 .020" o/size ring is suitable for :- .020" o/size to .039" o/size bores.
 .040" o/size ring is suitable for :- .040" o/size to .059" o/size bores.

The sizes quoted above are those to which the respective rings are capable of expanding i.e. .019" in each case.

The ring gaps are pre-sized and must therefore not be altered.

TO ASSEMBLE TO A PISTON

NOTE: On existing pistons all grooves and oil drain holes must be thoroughly clean and free from carbon.

- (i) Place the expander in the groove first, and then SPIRAL the rails on one by one, taking care to arrange the gaps all round the pistons. The top rail will need a little pressure to enter the groove, as the assembled ring is slightly wider than the groove.
- (ii) Check that the assembled ring, lightly oiled, can be moved round in the groove.
- (iii) Oil with light oil and install with fitting clamp.

NOTE: The three side rails are identical and may therefore be installed either way round. The assembled order on a piston is :-

Expander, two side rails uppermost, centre spring and one side rail at bottom.

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO

BENTLEY MOTORS (UK) LTD, PYMS LANE, CREWE, ENGLAND

Bulletin

MODEL: BENTLEY MARK VI

- 2 -

<u>MODEL.</u>	<u>PART NO. OF ORIGINAL OIL CONTROL RING.</u>	<u>SIZE.</u>	<u>SUPERSEDED BY.</u>
Bentley Mark VI 3½" bore	RE.12565.	Std.	RE.21327.
	RE.13841.	.005 o/s.	RE.21327.
	RE.13842.	.010 o/s.	RE.21327.
	RE.13843.	.015 o/s.	RE.21327.
	RE.13844.	.020 o/s.	RE.21329.
	RE.13845.	.025 o/s.	RE.21329.
	RE.13846.	.030 o/s.	RE.21329.
	RE.13847.	.035 o/s.	RE.21329.
	RE.13848.	.040 o/s.	RE.22039.
RE.13849.	.045 o/s.	RE.22039.	
Bentley Mark VI 3⅝" bore Bentley 'R' Type 3⅝" bore Bentley Continental 3⅝" bore	RE.13605.	Std.	R. 5207.
	RE.13766.	.005 o/s.	R. 5207.
	RE.13767.	.010 o/s.	R. 5207.
	RE.13768.	.015 o/s.	R. 5207.
	RE.13769.	.020 o/s.	RH. 354.
	RE.13770.	.025 o/s.	RH. 354.
	RE.13771.	.030 o/s.	RH. 354.
	RE.13772.	.035 o/s.	RH. 354.
	RE.13773.	.040 o/s.	RH. 355.
RE.13774.	.045 o/s.	RH. 355.	

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO

BENTLEY MOTORS (UK) LTD. FIMB LANE, NEWBURY, ENGLAND

SECTION

This Bulletin Cancels
Bulletin No. BB.243
dated 15. 7. 60.

CATEGORY 3

'VOKES' FULL-FLOW OIL FILTER

It has been established that on a small number of 'Vokes' Full-Flow Oil Filters it is possible for the oil to pass across the filter head without passing through the filter element. This condition is only possible when the outer lip of the filter head (see A Fig.1) stands proud of the inner sealing face.

Therefore when the bowl of the filter is removed to change the filter element and seals, on the 5,000 miles service schedule, Retailers should check the filter head with the aid of a straight edge as illustrated in Figures 1 and 2.

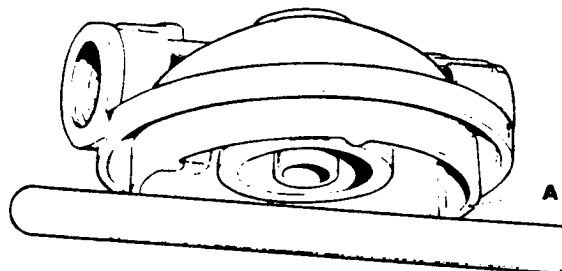


Fig.1 Outer Lip Proud of Inner Sealing Face.

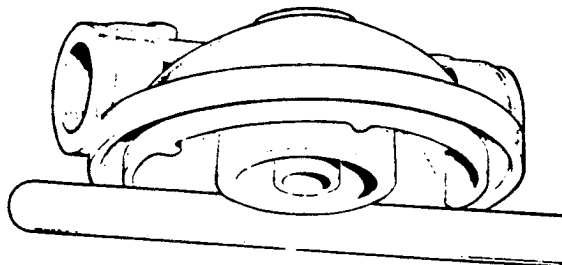


Fig.2 Inner Sealing Face Proud of Outer Lip.

Bulletin

MODEL: BENTLEY MARK VI

-2-

If the outer lip is found to stand proud of the inner sealing face (see Fig.1), a modified 'Top Cap' (see Fig.3) should be fitted and the original discarded.

If the inner sealing face stands proud of the outer lip (see Fig.2) the original 'Top Cap' (as shown in Fig.4) can be retained. For future replacements only the modified 'Top Cap' will be supplied.

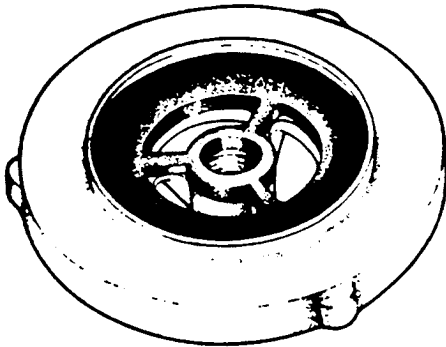


Fig.3. Modified 'Top Cap'

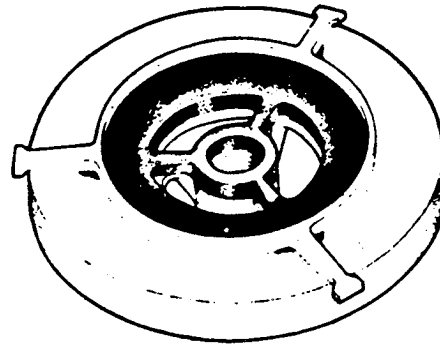


Fig.4. Original 'Top Cap'

The filter head should be painted with a green spot to serve as a means of identification after the above instructions have been carried out.

ALL COMMUNICATIONS SHOULD BE ADDRESSED TO

BENTLEY MOTORS (1931) LTD. BYN'S LANE, CREWE, ENGLAND

RS/JW/DB.

29. 9. 60.

SECTION E

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