SERVICE Bulletin No. BB-143

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"(76m/m) 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.

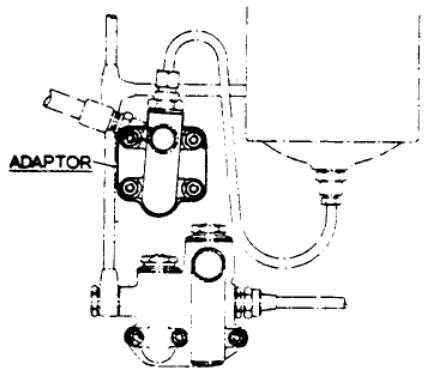

FIG.1.-ADAPTOR-OIL FEED(EARLIER TYPE)

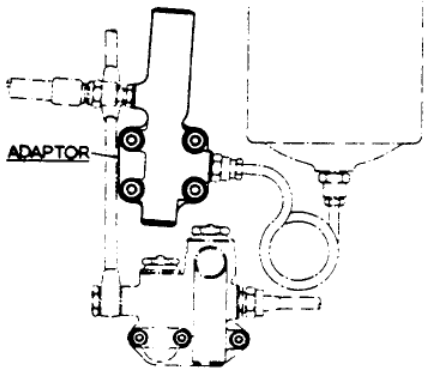

FIG.2.ADAPTOR-OIL FEED(LATER TYPE)

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) These tools are
Taper Tap, .250" dia. 26 T.P.I.-R.H.	1) also included in
Plug Tap, .250" dia 26 T.P.I.-R.H.	1) 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:-

(i) 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.

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(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:-

a) 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.

b) 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/Z. 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).

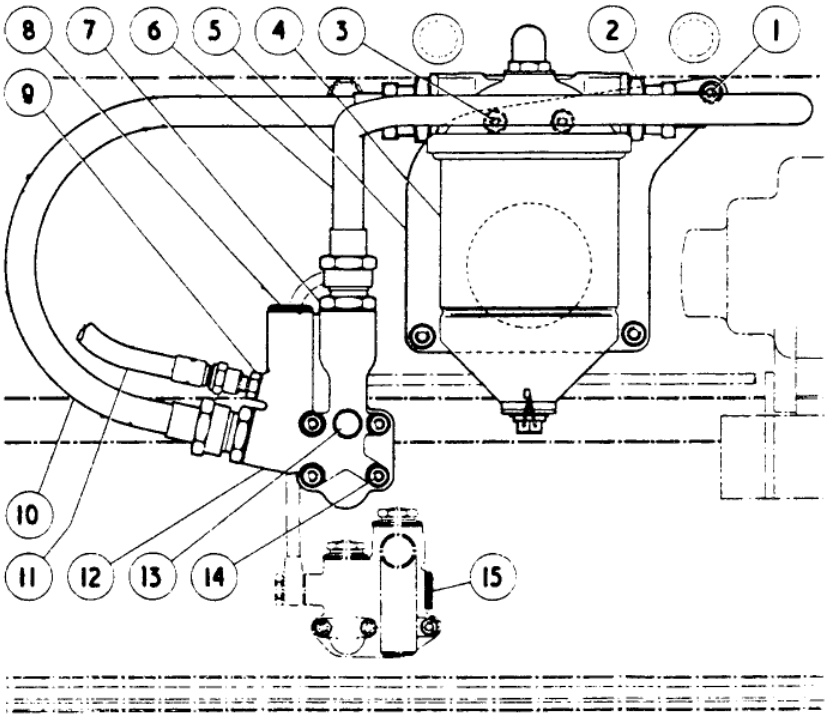

FIG. 3. FRONT ELEVATION - FULL FLOW OIL FILTER.

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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		-

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 for oil feed stand pipe.
	Plug tap .750"dia 20 T.P.I.(RH)	1	
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. oil relief valve facing and stud hole in crankcase lug.
	Plug tap, .250"dia 26 T.P.I.(RH)	1	

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-4671 (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.)

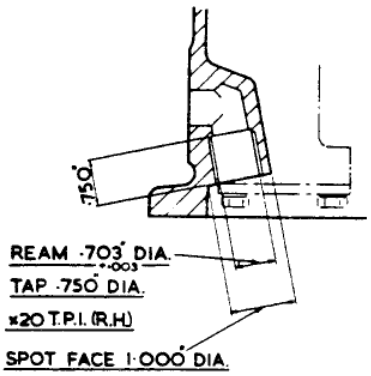

FIG.4. SECTION SHOWING MODIFICATION TO CRANKCASE FOR OIL FEED STANDPIPE.

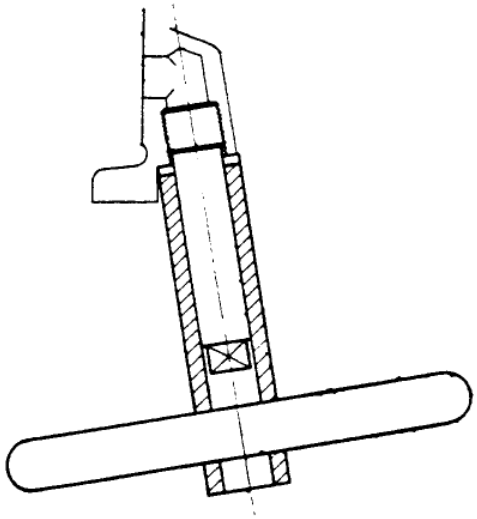

FIG.5. VIEW SHOWING SPOT-FACING TOOL IN POSITION ON CRANKCASE.

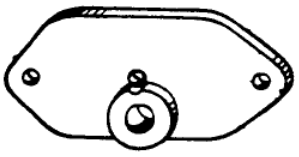

FIG.6. DRILLING TEMPLATE - CRANKCASE OIL RELIEF VALVE FACING.

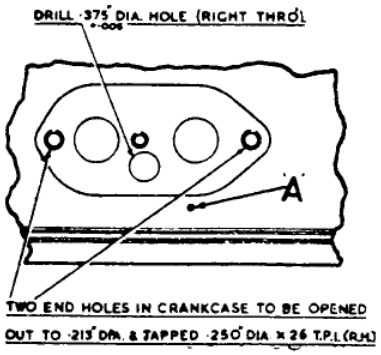

FIG. 7. SCRAP VIEW SHOWING DRILLING ETC. OF CRANKCASE OIL RELIEF VALVE FACING.

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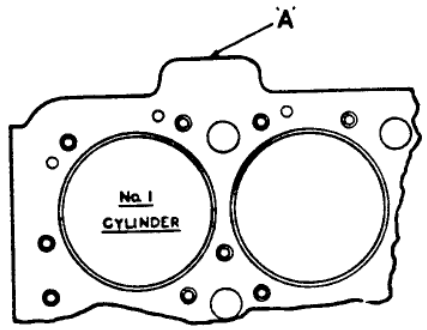

FIG.8. SCRAP VIEW SHOWING CRANKCASE LUG ('A').

(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.

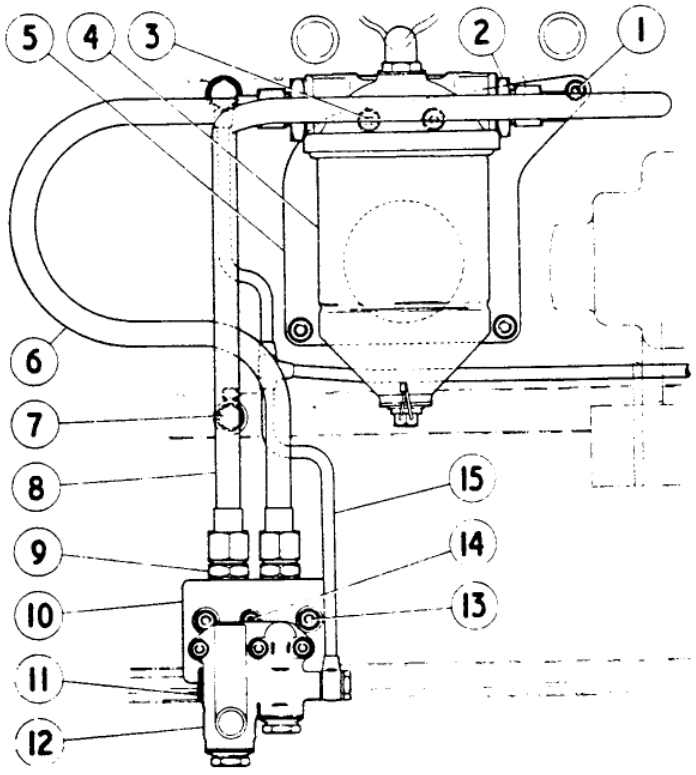

FIG.9. FRONT ELEVATION - FULL FLOW OIL FILTER.

(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 ANY STRAIN ON STANDPIPE WHEN UNION NUTS ARE TIGHTENED UP.

(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).

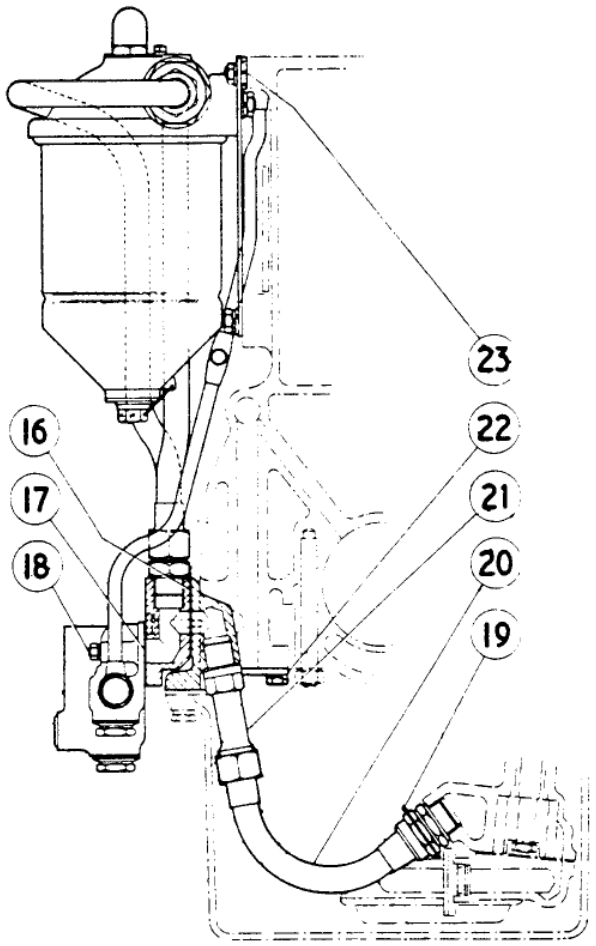

FIG.10. END ELEVATION - FULL FLOW OIL FILTER.

(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"(9.52m/m) 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.

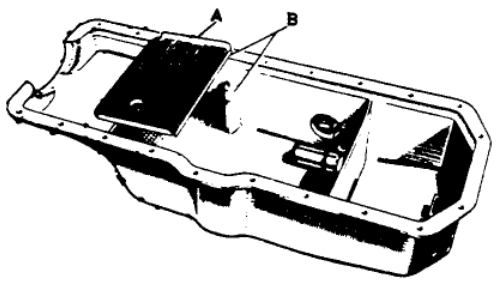

FIG. 11. CRANKCASE LOWER HALF.

(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.

(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 (21) 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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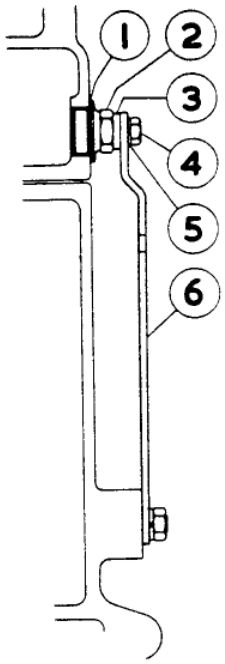

FIG.12. METHOD OF FIXING FILTER MOUNTING PLATE TO CYLINDER HEAD.

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

SERVICE Bulletin

No. BB-143a

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.