The MG 1¼-litre Series 'YB' Saloon Engine

by Eric Blower

WE now approach the final phase of the 1¼-litre Saloon, the cylinder block and its components. There are several operations which may be carried out with the engine in the frame, and these I propose to deal with first. As the removal of the radiator may facilitate these operations, details of that are given first.

After draining the water system, remove the two screws securing the rear bonnet clip and lift off the bonnet complete.

Remove the headlamps, pull the wiring through the bracket and disconnect the left-hand lamp bracket from the wing by removing the two securing bolts. Remove the pinch-bolt and slide the bracket along the headlamp tube; remove the right-hand pinch-bolt and pull the tube from the right-hand bracket.

Take off the two bolts connecting the stay rods to the radiator and slacken off the clips on the top and bottom water hoses.

Under the chassis front cross-member are four nuts, two of them locking, which secure the radiator on its mounting. These must be removed before the radiator can be lifted clear of the car.

Replacement is carried out in the reverse manner to that detailed for removal. It is always important to store radiators in an upright position, to prevent the accumulated sediment in the bottom tank from passing into the cooling spaces.

With the radiator removed it is possible to deal with the timing chain case. Remove the fan belt by slackening off the adjustment bolt and two securing bolts, pushing the dynamo towards the engine and slipping the belt from the pulleys.

Remove the engine control link, marking the position of the adjuster so that this may be refitted at the same setting. The fan blades can be removed by withdrawing the four set screws securing them to the fan centre, after which the set bolts and nuts securing the pump to the front of the block should be taken out to remove the water pump.

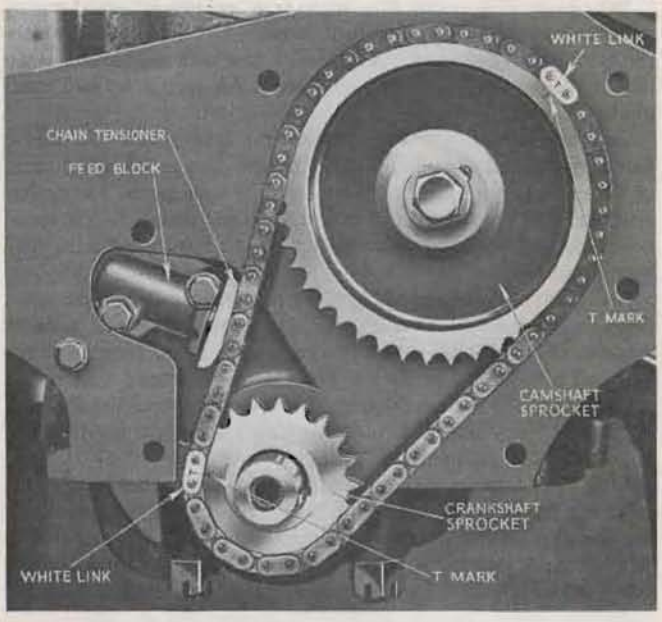

Fig. 1. Timing chain.

Then remove the starting handle dog nut. This can be started if the spanner is struck a sharp blow with a hammer. Remove the crankshaft fan pulley and then the nine set screws securing the timing cover to the crankcase and lift the cover clear of the car.

Replacement is carried out in the reverse manner to that detailed for removal, with particular attention being given to the following points:—

The cork washer must be in good condition to ensure an oiltight joint. The face of the engine bearer plate must be smooth and flat, as any imperfection will prevent the chain cover seating tightly.

Check that the oil thrower is in position on the crankshaft and check the asbestos seal for the crankshaft pulley. The ends of the seal must not be below the mating faces of the cover. Coat the mating faces with jointing compound.

Removal of Timing Chain

Remove the radiator and timing chain case as detailed. Break the lock wire at the two set screws securing the chain tensioner feed block to the cylinder block and unbolt, holding the assembly to overcome the tension of the spring.

Remove the bolt securing the camshaft sprocket to the camshaft and lever off both chain sprockets, complete with chain, using short flat levers or drawing tool No. T.123, taking care not to damage the crankshaft and camshaft front bearings.

Replacement of the Timing Chain

Single keys secure the crankshaft and camshaft sprockets so there is, therefore, only one position in which the sprockets can be fitted to the shafts.

There are two white links in the chain and each of the sprockets has a tooth marked with a 'T'. Between the white links are 13 black ones on one side of the chain and 15 black links on the other. These can easily be seen in Fig. 1.

With the shorter portion of the chain to the left, the white links forward, engage the camshaft sprocket tooth marked 'T' with the top white link and the crankshaft tooth marked 'T' with the other white link.

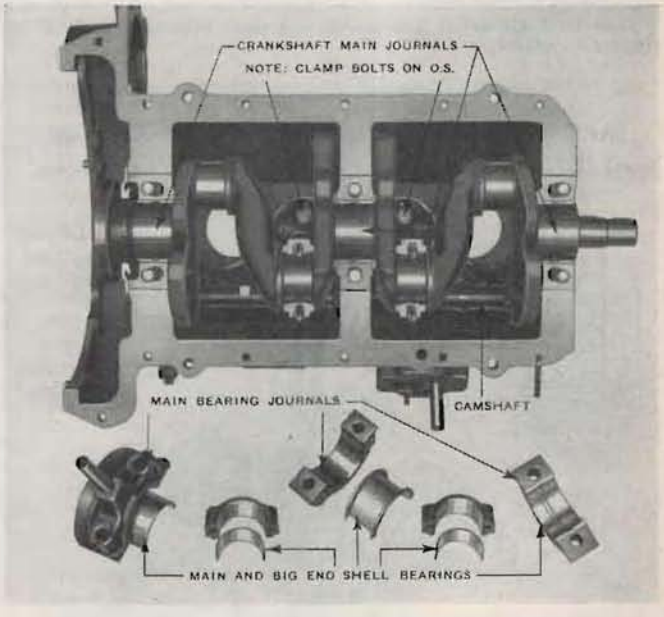

Fig. 2. Interior view of the engine partially dismantled.

Place the keyways of the crankshaft and camshaft in a suitable position and push home the sprockets complete with the chain.

Replace the chain tensioner, checking the paper gasket; replace the bolt securing the camshaft sprocket to the camshaft, and knock over the lock washer. Replace the timing chain case as detailed; replace the radiator and fill the system with water and replace the bonnet and rear hinge clip.

Removal and Replacement of Piston and Connecting Rod

Place the car over a pit or on a hoist, and drain the engine oil from the sump. Remove the exhaust system and sump. Remove the nuts and split pins from the big-end bolts and withdraw the connecting rod caps.

Remove the connecting rod from the crankshaft and draw the connecting rod down the right-hand side of the engine, rotating the crankshaft slightly to give the required clearance for the piston. The big-end caps and nuts should at once be replaced on their own connecting rods, and, as the white metal bearing is held in a very thin steel removable shell, this also must be replaced in the correct position.

Replacement is carried out in the reverse manner to that detailed for removal.

One important point to note is the necessity for replacing the pistons in the same bores and the same way round, with the gudgeon pin bolt towards the right-hand side of the engine, with the connecting rod fitted to the same crank journal from which it was removed.

Dismantling and Reassembling Piston and Connecting Rod

The gudgeon pin is a two-thumb push fit in the piston and is locked in position by the small-end clamp screw, the diameter of which picks up the small groove in the gudgeon pin.

To remove piston from connecting rod, extract the clamp bolt, inserting in each end of the hollow pin a suitable plug which will enable the piston to be held in a soft-jawed vice. After removing the clamp bolt, push out the gudgeon pin.

Reassembly is carried out in the reverse manner to that detailed for dismantling, giving very careful attention to the following points:—

1. That the clamp bolt will screw down readily into its threaded hole in the small-end.
2. That the spring washer has sufficient tension to make it effective.
3. That the gudgeon pin is positioned in the piston and rod so that the groove formed in it is in line with the threaded hole for the clamp bolt in the connecting rod.
4. That the clamp bolt, which is screwed in with the same ease as in (1), is tightened firmly with a box spanner.

Fitting Gudgeon Pins

A certain amount of selective assembly may be required here and it should be observed that with aluminium alloy pistons the gudgeon pins must be a double-thumb push fit into the pistons and, as oversize gudgeon pins are not permissible, no attempt should be made to ream a gudgeon pin boss.

Attention to Big-end Bearings

Loose thin steel-backed white-metal bearings are employed and when these are renewed they do not require any special fitting, other than the care to see that the register on each half locates properly in its groove in the rod and cap.

The halves make contact with each other at their butting joints without leaving a gap and without packing shims. **The bearings must not be closed together by fitting the butting faces or those of the caps.**

The rods can be checked for alignment or twist by using a proprietary universal connecting rod or alignment jig or on two shafts 6 in. long, one an exact fit in the small-end and the other an exact fit in the big-end bore; supporting the shafts on suitable ' V ' blocks. Set the rod centrally on the shaft and measure on either side of the rod the distances between the extremities of the two shafts. The measurements must be the same. The shafts should also be in line with each other looking down the rod and can be checked with a height gauge, with the rod lying flat.

A set square or straight-edge may also be applied to each side of the rod big-end, with bottom cap tightened, to check that the small-end is also centrally disposed.

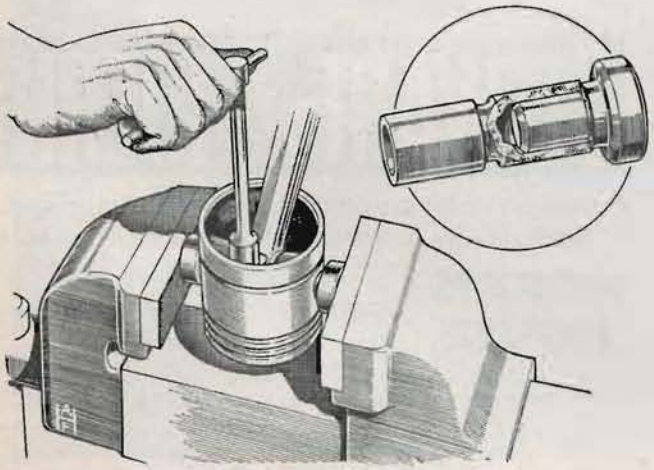

Fig. 3. Method of holding the gudgeon pin.

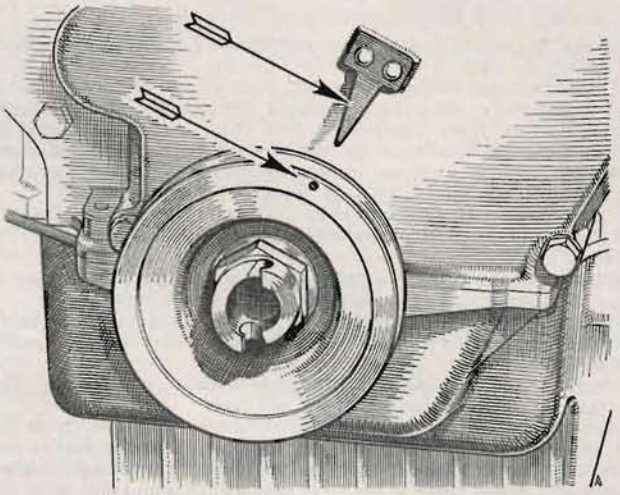

Fig. 4. Showing method of locating T.D.C.

Removal and Replacement of Cam Followers

Remove the air cleaner and branch pipe, and the cylinder head cover, and unbolt the fume pipe and remove engine side inspection cover.

Remove the rocker gear complete and then tap each push-rod, at the bottom end, to ensure it is free from its follower, and remove push-rods. Lift the tappets from the drillings in the cylinder block.

Replacement is carried out in the reverse manner to that detailed for removal.

Removal and Replacement of Camshaft

Remove tappets, bonnet, radiator, sump and timing chain cover and timing chain as already detailed. Remove the oil pump and take off the distributor. Remove the dowel screws securing the intermediate and rear bearings in the cylinder block.

Remove the front thrust plate and remove the camshaft by drawing it forward from its rear bearing through the front bearing, carrying the centre bearing with it, which should be removed from the camshaft when the camshaft has been withdrawn far enough to bring the centre bearing free from its housing.

Replacement is carried out in the reverse manner to that detailed for removal, not forgetting to rewire the two dowel screws.

When replacing the distributor it will need retiming. The ignition timing should be set with the points just breaking at T.D.C.

Set the engine with Nos. 1 and 4 pistons on T.D.C., as shown in Fig. 4.

Examine the valves to see which of the cylinders mentioned is starting its firing stroke, and turn the distributor until the rotor is facing the appropriate segment, and insert the distributor in its housing, ' feeling ' it in so that the nearest tooth is engaged. Turn the body until the locking screw will enter and lock it.

Set the points to ·012 in. and check that the hole in the pulley still coincides with the arrow on the timing cover, when the points should be on the point of opening. If not, release the clamping bolt, turn the distributor anti-clockwise until the points are fully closed and turn carefully clockwise until they just commence to open, and securely tighten the clamp bolt. Finally recheck the timing to make sure the setting has not altered during the tightening of the clamp bolt.

Camshaft Bearings

The centre and rear bearings can be fitted as straightforward replacements, but when pressing the front bearing into the housing it will need reaming in line with the centre and rear bearings, using tool No. T.111. The bearing must also have the locking nick knocked into the crankcase slot.

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THE MG 1¼-LITRE SERIES 'YB' ENGINE (CONTINUED)

Camshaft End Float

The end float is taken in both directions by the camshaft thrust plate, interposed between the back of the camshaft chain wheel and the shoulder of the camshaft front journal. Details of the end float have already been given.

Removal and Replacement of Engine

Drain the cooling system, remove the bonnet, radiator and tie-rods as already detailed.

Disconnect the battery leads and remove the distributor cover and high-tension leads to the plugs. Remove the seats, carpets, gearbox cover, front floorboards, foot lamp, and remove exhaust system complete. Uncouple the front end of the propeller shaft from the gearbox mounting flange, moving the car backwards and forwards to bring the coupling bolts into position for easy removal.

Remove the engine fume pipe by slackening the clip securing it to the inspection cover and unscrewing the bolt securing the pipe to the flywheel housing.

Disconnect the throttle control, mixture control and fuel hose at the fuel pump end. Disconnect the starter and dynamo cables.

Disconnect the oil-pressure gauge pipe by unscrewing the union attaching the pipe to the twin-necked banjo on the overhead mechanism oil-feed pipe.

Disconnect the dynamo, starter and distributor wires and disconnect the high-tension lead from the coil.

Remove the bolt securing the steering column in the clamp at the top end; remove the bolts securing the column to the pinion and move column to one side to give clearance when removing the engine. Disconnect clutch cable at the front end and remove cable from the stop bolted to the sump. Remove the engine control link from the bracket on the chassis. Remove air cleaner, branch pipe and carburetter. Place a lifting sling around the engine and jack up the front of the gearbox, using a piece of wood to spread the load.

Remove the bolts, nuts and washers securing the engine to the front engine mounting and the ring of bolts securing the clutch housing to the crankcase, and lift engine forward clear of the chassis.

Replacement is carried out in the reverse manner to that detailed for removal.

Removal and Replacement of Crankshaft (Engine out of Frame)

Remove the sump, fan driving pulley, timing chain case, timing chain, pistons and connecting rods as previously detailed.

Now remove the clutch. This operation is greatly facilitated by inserting 'L'-shaped spacers between the levers and the cover and, holding them firmly in position, slackening the securing bolts a turn at a time in rotation until the spacers are gripped firmly between the levers and the cover. This method relieves the spring pressure on the holding screws. Remove the screws completely and lift the clutch away from the flywheel.

Cut and remove the locking wire and remove the bolts securing the flywheel and remove the flywheel, pulling off square, taking care not to distort the locating dowels.

Remove the two nuts securing each main bearing cap and remove caps and bearings, marking each bearing cap to ensure the correct position for replacement.

Lift the crankshaft from the engine.

Replacement is carried out in the reverse manner to that detailed for removal.

If renewing the flywheel or crankshaft it must be borne in mind that the locating dowels are tapered. It is good practice to bolt the flywheel to the crankshaft and ream the dowel holes, using a tapered reamer.

Then back off the bolts a turn or two and drive the dowels home. Tighten the bolts and again drive the dowels home, and continue this operation until the bolts are quite tight and the dowels well home. Remember to wire the securing bolts.

It is also important to make sure the flywheel is running true. The maximum permissible error on the flywheel face is ·003 in. when rotated through one complete revolution.

Attention to Main Bearings

Full-ring butted non-adjustable bearings are employed and on no account must these bearings be closed together by filing their butting faces or those of their caps. This will render the bearing and caps useless.

If bearings are worn or scored they should be replaced by new ones of the correct size for the journals when these have been reground to one of the permissible sizes.

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