

Timing Case and Drive

TIMING CASE AND DRIVE**To Remove the Timing Case Cover**

1. Slacken the dynamo or alternator mounting bolts, remove the adjusting arm and drive belt.
2. Where necessary, remove water pump.
3. Remove the crankshaft pulley.
4. Remove the timing case cover taking care not to damage the crankshaft front oil seal which is located in the cover.

To Refit the Timing Case Cover

1. Refit the cover and slide the crankshaft pulley into position, centralising the cover. Tighten some of the setscrews and then remove the pulley to gain access to the nuts at the bottom of the cover.
2. Refit the crankshaft pulley with the centre punch mark on the pulley aligned with the line on the front face of the crankshaft (Fig. 2). Fit the retaining setscrew and washer and tighten to the torque given in 'Data'.
3. Bolt the dynamo or alternator adjusting arm to the timing case and fit the fan belt.

To Renew the Crankshaft Front Oil Seal

1. Using a press, remove the oil seal from the timing case cover.
2. Press the new seal into position from the front, until the front face is 3,17 mm (1/8 in) below the front face of the cover.

The seal is designed to function correctly with the direction of rotation of the engine and for identification purposes the seal is marked with an arrow.

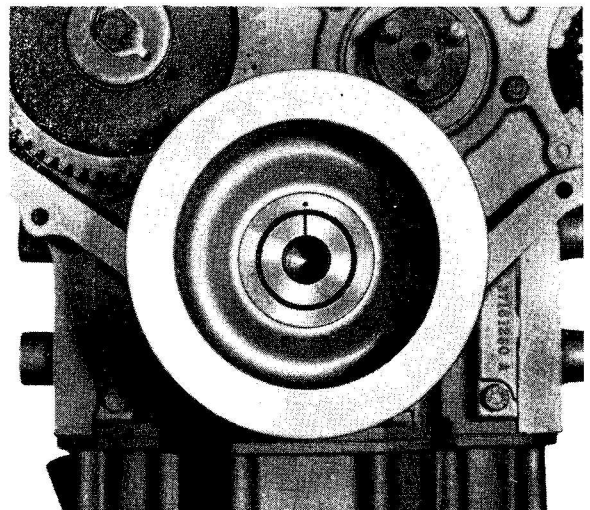


Fig. 2

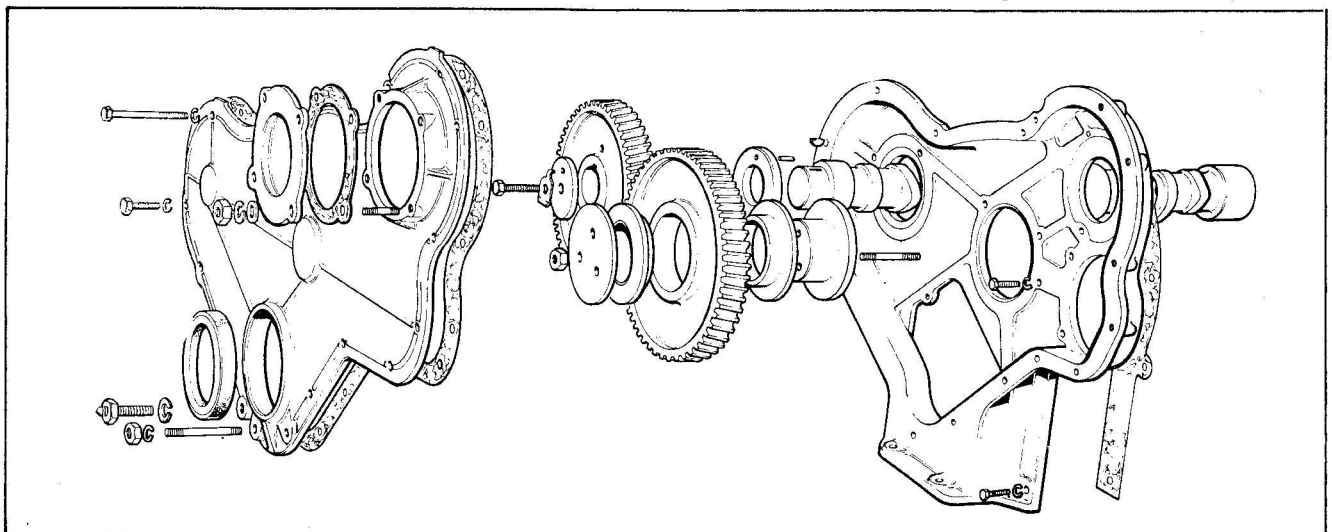


Fig. 1

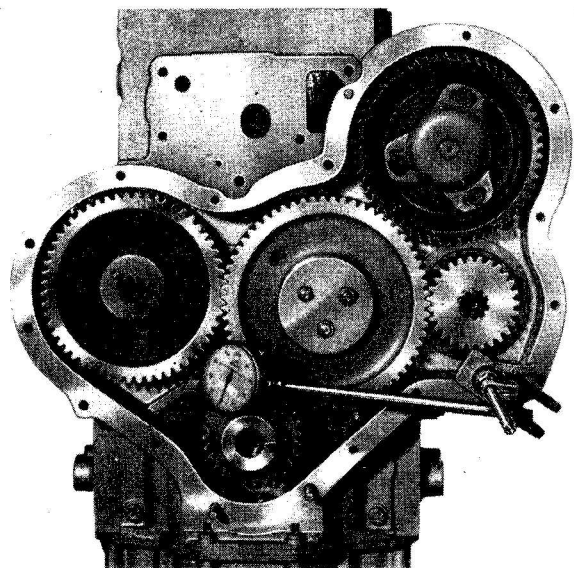


Fig. 3

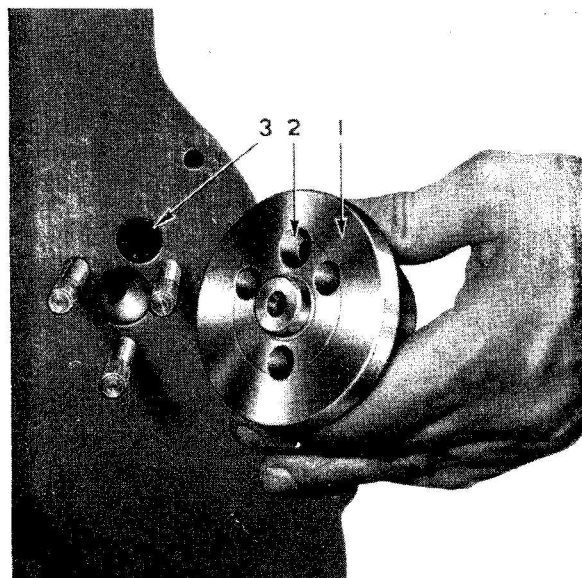


Fig. 4 1. IDLER GEAR HUB
2. OIL PASSAGE
3. OIL PRESSURE RAIL

Checking the Timing Gear Backlash

1. Remove the timing case cover as detailed previously.
2. Check the timing gear backlash (Fig. 3) using a clock gauge or feeler gauges. This should be 0,08 mm (0.003 in) minimum.

To Remove the Idler Gear and Hub

1. Remove the timing case front cover
2. Remove idler gear retaining plate.

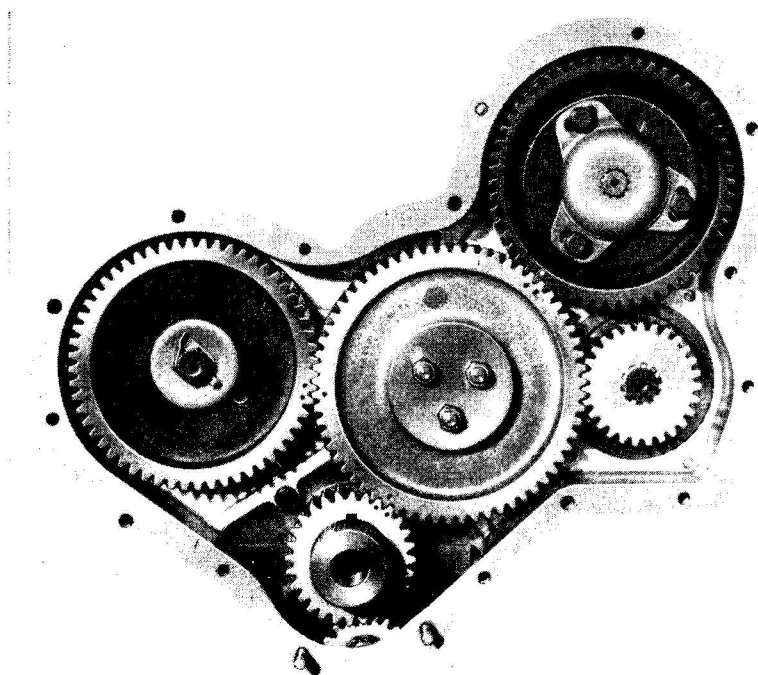


Fig. 5

Timing Case and Drive

3. Remove the idler gear from the hub which can now be withdrawn from the timing case (Fig. 4).
4. Examine the gear and hub for wear, cracks, and pitting, etc.
5. Where necessary, replace idler gear bushes. These require boring to finished size after fitting.

Note: Where a full load is taken through the timing gear train, certain idler gears are fitted with needle bearings.

To Refit the Idler Gear and Hub

1. Refit the hub to its location in the timing case.
2. Remove the top cover and slacken off the rocker assembly securing nuts.
3. Turn the crankshaft to T.D.C. No. 1 and 4 cylinders, i.e. with the crankshaft gear keyway at the top of its periphery.

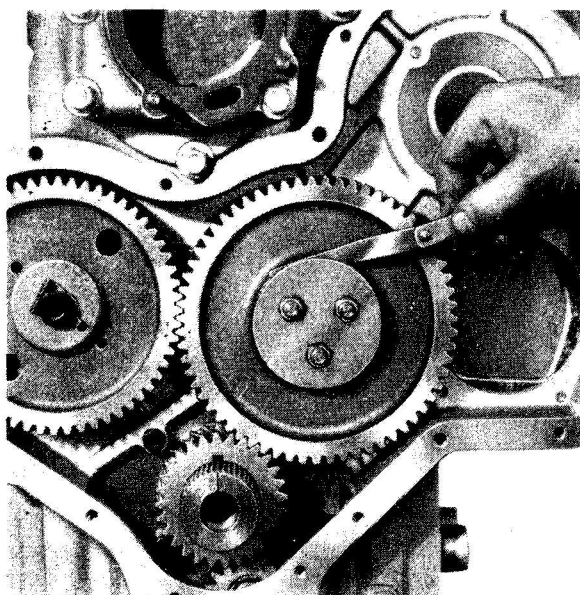


Fig. 6

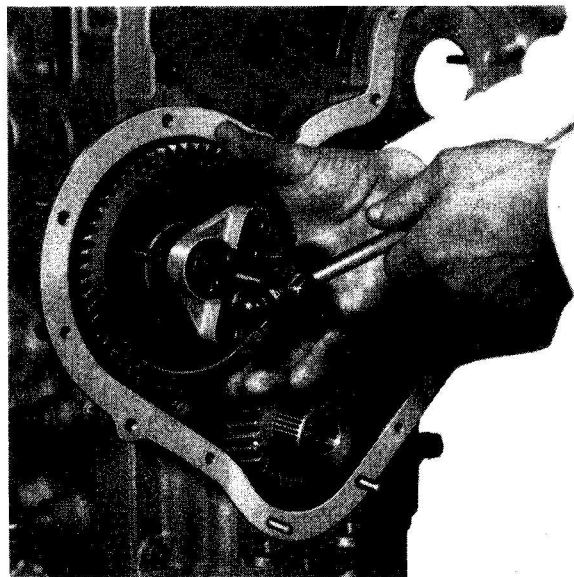


Fig. 7

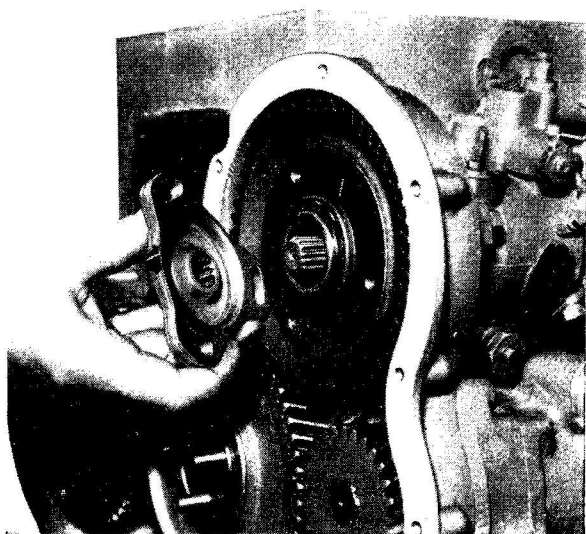
4. Refit the idler gear to its hub with the timing marks on the crankshaft, camshaft, fuel pump and idler gears aligned (Fig. 5).
5. Refit the idler gear retaining plate and secure with the three setscrews tightened to a torque of 41 Nm (30 lbf ft). Check idler gear end float (Fig. 6).
6. Tighten down the rocker assembly and adjust the valve clearance to 0,30 mm (0.012 in) cold.
7. Refit the timing case front cover.

To Remove the Camshaft Gear

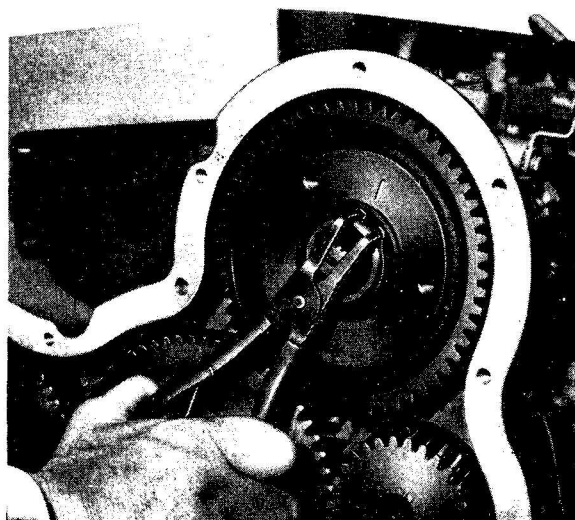
1. Remove the timing case front cover.
2. Remove the camshaft gear retaining setscrew, locking washer and retaining plate.
3. Using a suitable extractor, remove the camshaft gear (Fig. 7).
4. Examine the gear for wear, cracks and pitting, etc.

To Refit the Camshaft Gear

1. Remove the idler gear.
2. Slacken off the rocker assembly securing nuts.
3. Refit the gear to the camshaft by drawing it onto the shaft with the retaining plate, new tabwasher and setscrew.
4. Turn the engine until No. 1 piston is at T.D.C. with the crankshaft gear keyway at the top of its periphery.
5. Refit the idler gear to its hub ensuring all timing marks are aligned (Fig. 5). Fit the idler gear retaining plate and secure to a torque of 33 Nm (24 lbf ft).
6. Tighten the camshaft setscrew to a torque of 68 Nm (50 lbf ft) and lock the tabwasher.
7. Refit the timing case front cover.
8. Tighten down the rocker assembly and adjust the valve clearances to 0,30 mm (0.012 in) cold.

**Fig. 8****To Remove the Fuel Pump Gear (Hydraulic Governor)**

1. Remove the timing case front cover.
2. Remove idler gear and refit so that the timing marks are aligned (Fig. 5).
3. Remove the fuel pump drive plate from the quill shaft (Fig. 8).
4. Remove the fuel pump gear retaining circlip from the gear carrier (Fig. 9) and withdraw the gear (Fig. 10).
5. Examine the gear for wear, cracks and pitting, etc.

**Fig. 9****To Refit the Fuel Pump Gear (Hydraulic Governor)**

If original fuel pump gear is being refitted:

1. Fit the fuel pump gear to its carrier ensuring that the tooth with the punch mark coincides with double punch marks on the idler gear (Fig. 5). Ensure all timing gear markings are correctly aligned.

Timing Case and Drive

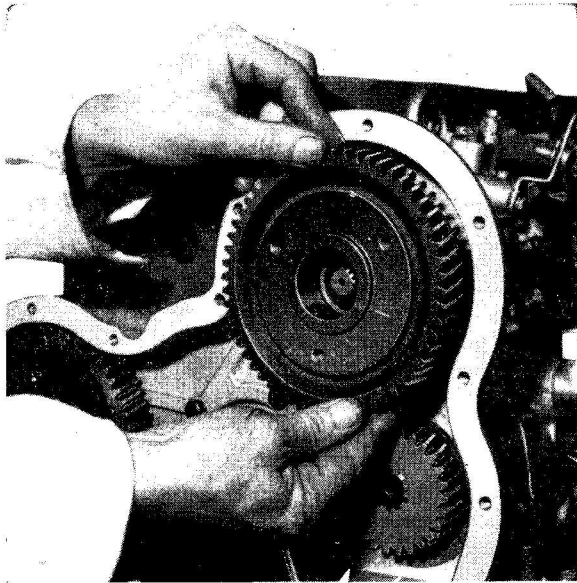


Fig. 10

2. Secure the fuel pump gear to the carrier with the circlip (Fig. 9).
3. Fit the fuel pump drive plate to the quill shaft and, after aligning the timing mark on the plate with the chisel mark on the gear (Fig. 11), secure the plate to the gear.
4. Refit the timing case.

To replace fuel pump gear:

The new fuel pump gear will be pre-marked with the punch mark which will align with the double punch marks on the idler gear, but as there are no markings showing the relative position of the gear and drive plate, it will be necessary to reset the fuel pump timing using the timing marks inside the fuel pump. Proceed as follows:—

Ensure fuel pump circlip is correctly positioned as described in A450.

1. Re-align all timing marks.
2. Fit the fuel pump gear to its carrier with the punch mark aligning with the double punch marks on the idler gear (Fig. 5).
3. Fit the circlip (Fig. 9).

4. Remove the plate on the top of the pump which also embodies the fuel pump return connection to the fuel filter (Fig. 12).
5. Check that the scribed line on the fuel pump mounting flange aligns with the scribed line on the fuel pump gear carrier adaptor between pump and timing case.

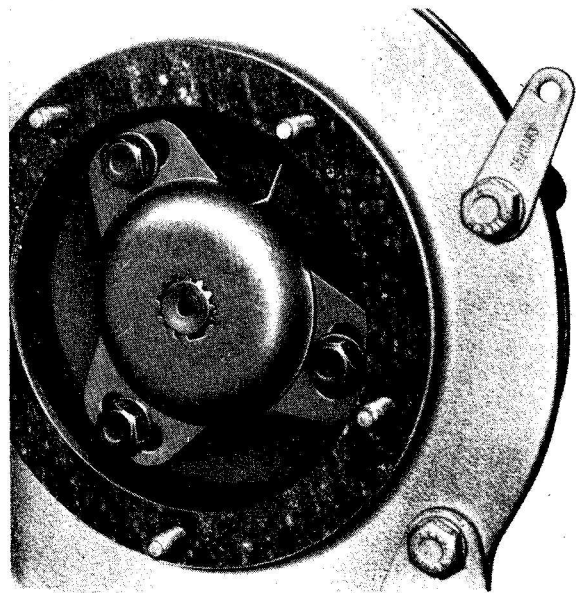


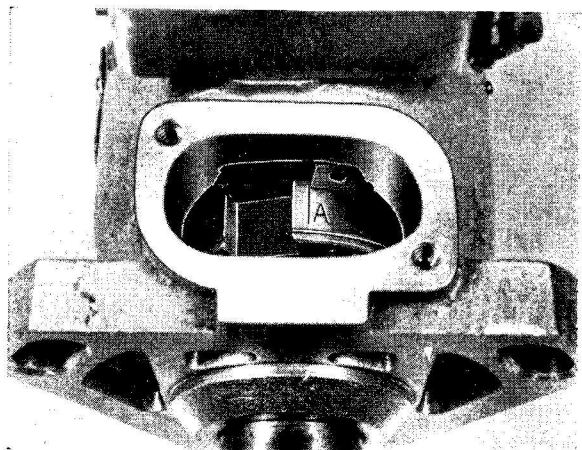
Fig. 11

6. Position the crankshaft so that No. 1 piston is at T.D.C. on compression stroke.
7. Remove the collets, spring cap and springs from the inlet valve of No. 1 cylinder and allow the valve to rest on the top of the piston.
8. Mount a dial indicator so that the stylus is on the tip of the valve resting on top of No. 1 piston. Zero the dial indicator with No. 1 piston at T.D.C. Turn the crankshaft in the opposite direction to normal rotation (approximately an eighth of a turn) and then forward until the required position for the particular fuel pump or application is registered on the clock gauge; see 'Data' for static timing position and relative piston displacement.
9. Fit the fuel pump drive plate in position on the quill shaft and fit the three securing set-screws but do not tighten.

10. Turn the drive plate until the scribed line on the rotor marked "A" aligns with the squared end of the later type timing circlip. The earlier circlip has a curved end and a scribed line (Fig. 12 and 13). Tighten the securing setscrews.
11. Mark the fuel pump drive gear to correspond with the mark on the fuel pump drive plate (Fig. 11).
12. Refit the springs, spring cap and collets to the No. 1 inlet valve.
13. Refit the cover to the fuel pump and reconnect the fuel return pipe. Reseal the plate and bleed air from the fuel system.
14. Re-assemble the timing case front cover.
4. Ensure that slotted pointer (2) is positioned with slot to front of tool and chamfered sides of slot outwards. At this stage, slotted end of pointer should be kept well back from front of body. Ensure that flat in washer fitted behind pointer securing screw (3) is located over pointer.
5. Release bracket screw (4) and set bracket so that the chamfered edge is in line with the relevant engine checking angle (see 'Data').
6. Fit timing tool to engine in fuel pump position ensuring firstly that splined shaft with master spline engaged is fully located in pump drive shaft and then that register of tool is seated in fuel pump locating aperture. Lock splined shaft in tool. If pointer is 180° from timing mark on rear of timing case, engine is probably on wrong stroke, in which case remove tool and set engine on correct stroke.

To Replace Fuel Pump Gear using Fuel Pump Timing Tool MS.67B

1. Turning engine in normal direction of rotation, position No. 1 piston to T.D.C. compression stroke by means of timing pin or pointer.
2. Remove fuel injection pump.
3. Using fuel pump timing tool MS.67B (see Fig. 15), release screw (5) and position splined shaft (6) in tool so that relevant spline is to front of tool.
7. Slide slotted pointer forwards so the slot is half way over adaptor plate flange.
8. Turn timing tool by hand in opposite direction to pump rotation (shown on pump nameplate) to take up backlash and check that timing mark on pump adaptor flange is central in slot of pointer.

**Fig. 12****Fig. 13**

Timing Case and Drive

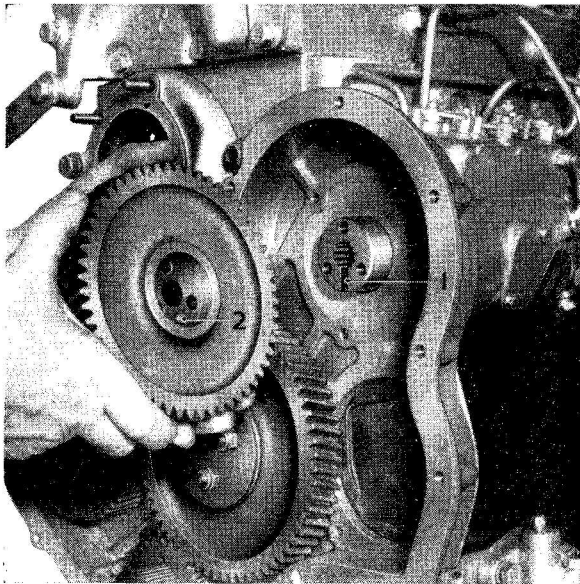


Fig. 14 1. SLOT IN FUEL PUMP HUB
2. DOWEL

9. Fit fuel pump drive plate in position on quill shaft and secure by three setscrews.
10. Mark fuel pump drive gear to correspond with the mark on the fuel pump drive plate (Fig. 11).
11. Remove timing tool and refit fuel pump as described in A450.
12. Re-assemble timing case front cover.

To Remove the Fuel Pump Gear (Mechanical Governor)

1. Remove the timing case cover.
2. Re-align all timing marks (Fig. 5) by removing and replacing idler gear.
3. Remove the three setscrews and spring washers which secure the gear to the fuel pump.
4. Withdraw the gear from its dowelled location on the fuel pump (Fig. 14).

To Refit the Fuel Pump Gear (Mechanical Governor)

1. Fit the fuel pump gear to the shaft, locating the dowel of the gear into the slot on the fuel pump shaft and align the punch mark with the double punch marks on the idler gear (Figs. 5 and 14).
2. Secure the gear with the three setscrews and spring washers.
3. Refit the timing case front cover.

To Remove the Timing Case

1. Remove the timing case front cover and timing gears.
2. Remove the fuel pump and exhaustor or compressor and compressor drive (where fitted).
3. Remove the nine setscrews and spring washers securing the timing case to the cylinder block.
4. Remove the four setscrews and washers securing the sump to the timing case.
5. Withdraw the timing case from the cylinder block.

To Refit the Timing Case

1. Refit the timing case to the cylinder block.
2. Secure the sump to the timing case.
3. Refit the fuel pump and exhaustor (where fitted).
4. Refit the timing gears and front cover.

Fitting New Timing Case or Fuel Pump Adaptor Plate

In the event of a new timing case (mechanically governed engines) or fuel pump adaptor plate (hydraulically governed engines) being required, these will not be marked with the scribed line for the correct alignment of the fuel injection pump.

To arrange these necessary markings, with the fuel pump removed, proceed as follows:—

New Timing Case (mechanically governed engines)

1. Turn engine to T.D.C. on compression stroke by means of timing pin or timing pointer.
2. Fit adaptor PD.76B-1 (see Fig. 15) to fuel pump gear so that the dowel of gear locates in slot of adaptor and shaft of adaptor is towards rear of engine. Secure adaptor to gear using setscrews.
3. Release screw (5) of timing tool MS.67B (see Fig. 15) and remove splined shaft.
4. Ensure slotted pointer (2) of timing tool is positioned with slot to front of tool and chamfered sides of slot outwards. At this stage, slotted end of pointer should be kept well back from front of body. Ensure that flat of washer fitted behind pointer securing screw (3) is located over pointer.

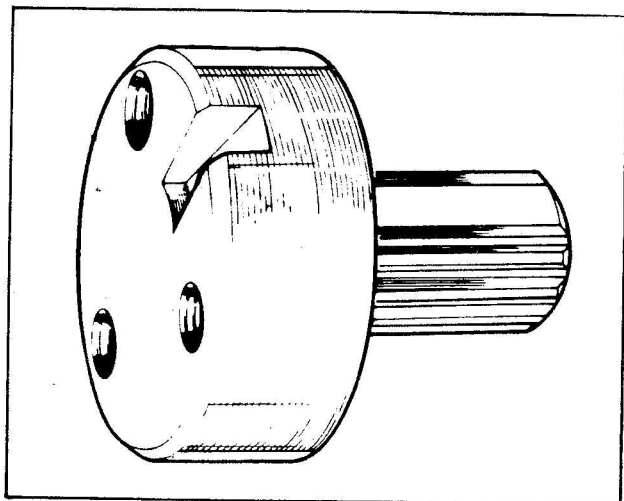


Fig. 15

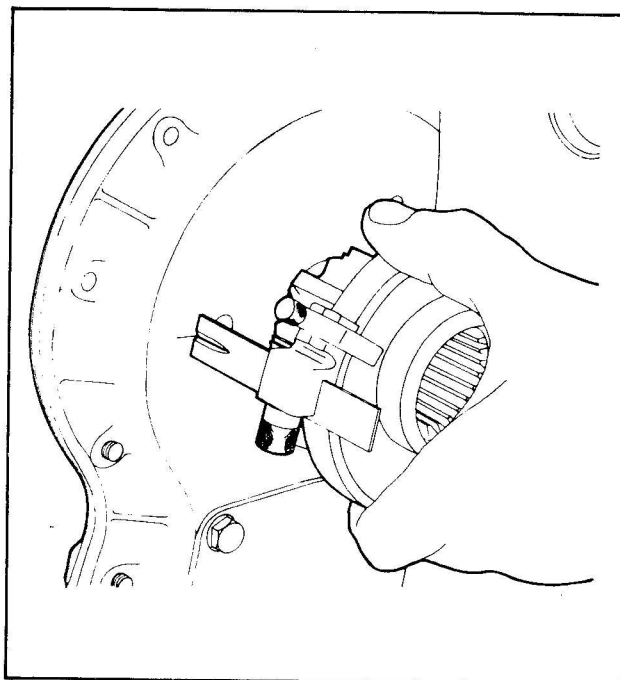


Fig. 16

5. Release the bracket locking screw (4) and set bracket so that the chamfered edge is in line with the relevant engine checking angle.
6. Pressing fuel pump gear and adaptor towards rear, locate splined shaft of adaptor into timing tool with master spline engaged and adaptor shaft in timing tool with rear face of adaptor abutting front face of timing tool.
7. Move tool forward, complete with gear, so that register of tool locates in pump aperture of timing case. If pointer is 180° out, engine is on wrong stroke and tool should be removed and engine set on correct stroke.
8. Slide slotted pointer forward to rear face of timing case and lock into position.
9. Take up backlash by turning tool against normal direction of rotation (shown on pump nameplate) and mark the scribed line on the rear of the timing case to coincide with the centre of the slot in the pointer (see Fig. 16).
10. Remove tool and adaptor from fuel pump gear and fit fuel pump to engine as detailed in A450.

DESCRIPTION AND MODIFICATIONS

This may seem a little out of place but I have heard about problems with people stealing work and selling it - for example on eBay.

If you're reading this and you bought this manual anywhere then you have been ripped off.

Please contact me via my email mikejamson@hotmail.com Otherwise I can be found on the dodge50 facebook page, if not then get in contact with Greg and he can pass the message on to me.

I have not done this pdf manual for my own personal gain and wish to see the community of 50 series owners benefit from the information here, and I do not want to see the community get taken advantage of and somebody else gain from it unfairly.

The information in pdf format will hopefully allow more of these wonderful trucks to stay on the road by providing information to everybody.

This has been quite a long and involved process to scan the manual and to convert it into a pdf format. I do apologise as I have used several different scanners and several different computers to do it, so there are no doubt some errors hidden throughout, as well as some editing errors.

I have aimed to balance quality and file size and hope that this balance meets to everybody's approval.

If you see an error please let me know and I will fix it as soon as I can.

Timing Case and Drive

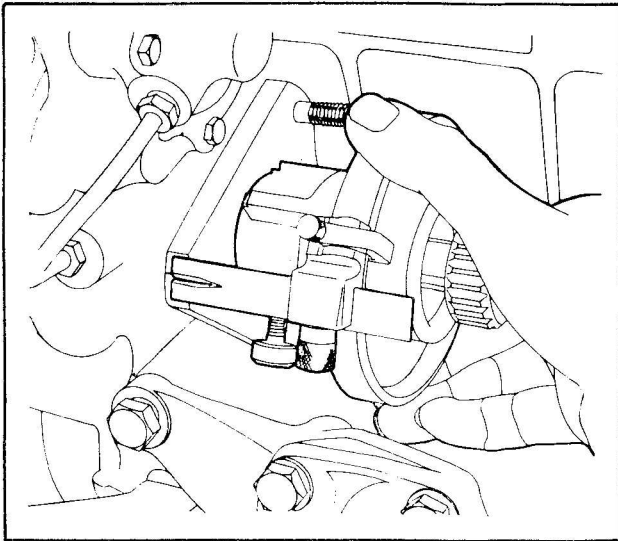


Fig. 17

**New Fuel Pump Adaptor Plate
(hydraulically governed engines)**

1. Turn engine to T.D.C. on compression stroke by means of timing pin or timing pointer.
2. Release screw (6) of timing tool MS.67B (see Fig. 15) and position splined shaft (6) in tool so that relevant spline is to front of tool.
3. Ensure that slotted pointer (2) is positioned with slot to front of tool and chamfered sides of slot outwards. At this stage, slotted end of pointer should be kept well back from front of body. Ensure that flat in washer fitted behind the pointer securing screw (3) is located over pointer.
4. Release bracket screw (4) and set bracket so the chamfered edge is in line with the relevant engine checking angle.
5. Fit timing tool to engine in fuel pump position ensuring firstly that splined shaft with master spline engaged is fully located in pump drive shaft and then that register of tool is seated in fuel pump locating aperture. Lock splined shaft in tool. If pointer is 180° out, engine is probably on wrong stroke, in which case remove tool and set engine on correct stroke.
6. Slide slotted pointer forward so that slot is half way over adaptor plate.
7. Turn timing tool by hand in opposite direction to pump rotation (shown on pump nameplate) to take up backlash and mark scribed line on adaptor plate to coincide with centre of slot in pointer (see Fig. 17).
8. Remove tool and fit fuel pump as detailed in A450.

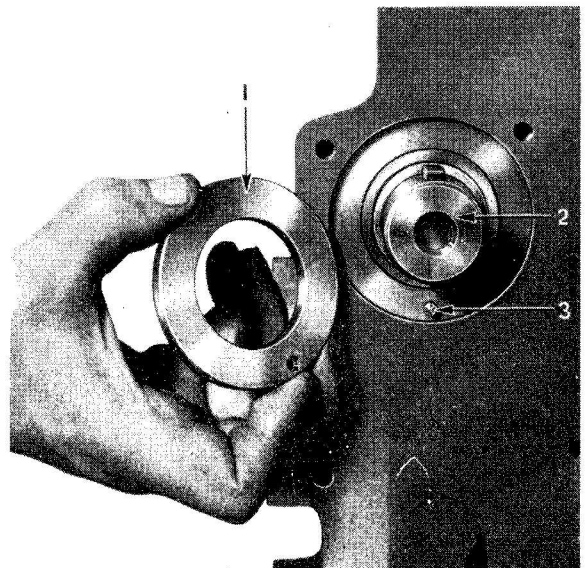


Fig. 18 1. CAMSHAFT THRUST WASHER
2. CAMSHAFT
3. THRUST WASHER DOWEL PIN

To Remove the Camshaft and Tappets

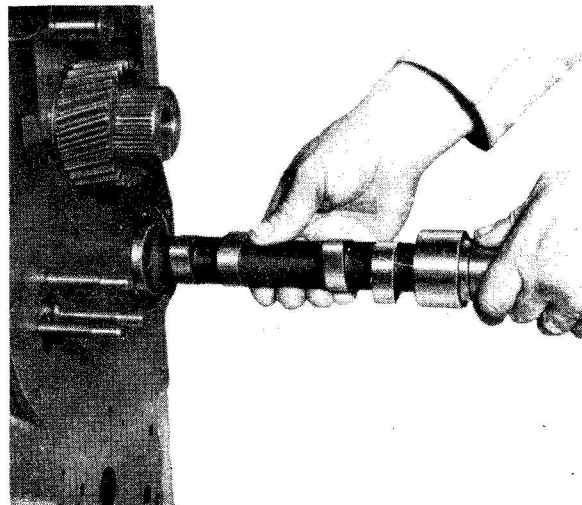
Camshaft end float is controlled by a thrust ring located in the front face of the cylinder block. The ring is dowelled and held in position by the timing case.

To remove the camshaft it is necessary to remove the engine from the application and mount it in a suitable dismantling stand so that it can be turned upside down.

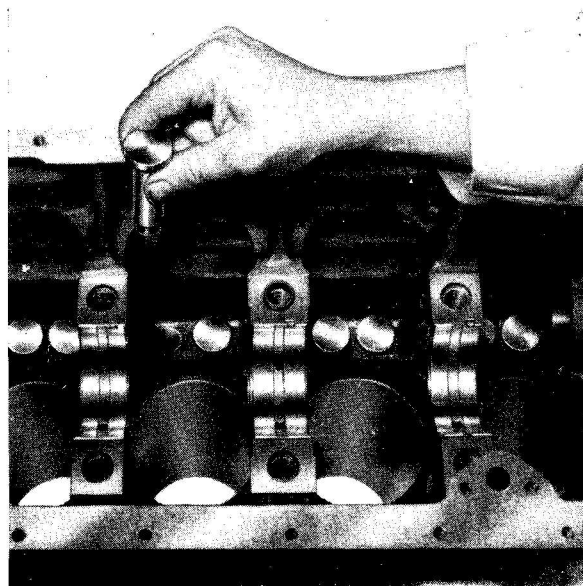
Proceed as follows:—

1. Remove the rocker cover, rocker assembly and push rods.
2. Remove the timing case front cover, timing gears and timing case.

3. Turn the engine over so that the sump is uppermost.
4. Remove the sump.
5. Remove the fuel lift pump.
6. Remove the camshaft thrust ring (Fig. 18).
7. Withdraw the camshaft (Fig. 19).
8. The tappets may now be withdrawn (Fig. 20).

**Fig. 19****To Refit the Tappets and Camshaft**

1. Refit the tappets.
2. Refit the camshaft.
3. Refit sump.
4. Fit the camshaft thrust ring on the dowel in the front face of the cylinder block (Fig. 18). Check the protrusion beyond the front face of the cylinder block. See 'Data'.
5. Refit the fuel lift pump.
6. Refit the timing case, timing gears, front cover and sump.
7. Refit the push rods and rocker assembly. Adjust the valve clearances to 0,30 mm (0.012 in) cold. Refit the rocker cover.

**Fig. 20**

This has necessitated a change in the valve clearance for No. 1 inlet valve for the purpose of checking the valve timing.

The valve clearance for the earlier type camshaft (Part No. 31415291) is 0,86 mm (0.034 in) whereas the clearance for the later type (Part No. 31415292) is 1,2 mm (0.047 in).

Valve Timing

From engine number 440 2089A a change in cam form was introduced.

These camshafts are completely interchangeable, their only difference being the cam form. If the camshaft is removed from the engine, the part number can be seen on the end opposite the one which carries the gear.

Timing Case and Drive

Engines, which are rated above 2,300 rev/min are fitted with a high speed camshaft (Part No. 31315292), the inlet valve clearance for the purpose of valve timing is 1,2 mm (0.047 in).

For engines rated at 2,300 rev/min and below a low speed camshaft is fitted (Part No. 31415321), the inlet valve clearance for the purpose of valve timing is 0,53 mm (0.021 in).

4. Check that Nos. 1 and 4 pistons are now at T.D.C. by means of the timing pin or pointer. Unscrew the pin until it locates in the hole machined in the rear face of the crankshaft pulley as shown in Fig. 21.

The valve timing tolerance is $\pm 2\frac{1}{2}^{\circ}$. When the timing is found to be correct, return the timing pin to its location and reset the valve clearance of No. 1 inlet valve to 0,30 mm (0.012 in) cold. The only error possible is in the fitting of the timing gears.

Checking Valve Timing

1. Turn the crankshaft until the valves on No. 4 cylinder are "on the rock".
2. Set the valve clearance of No. 1 inlet valve according to the cam form of the camshaft fitted.
3. Turn the engine in the normal direction of rotation until the valve clearance of No. 1 inlet valve is just taken up



Fig. 21 1. CRANKSHAFT PULLEY,
2. TIMING PEG