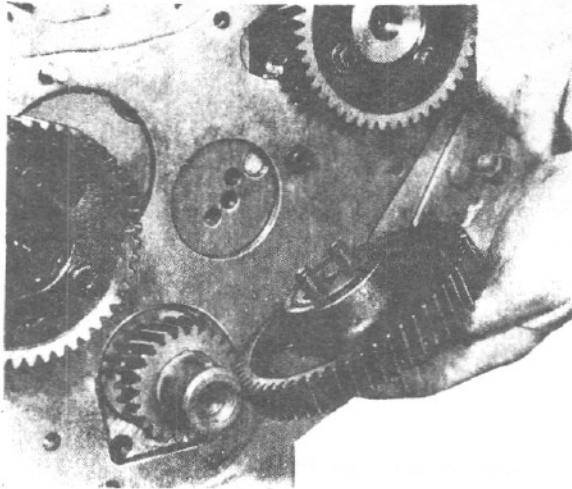


SECTION K

Timing Case and Drive



K1

To carry out the following procedure it is assumed that either working space exists with the engine 'in situ' or it is removed from the vehicle or application.

To Remove the Timing Case Cover

1. Slacken the generator mounting bolts, release the adjusting arm setscrew and remove the generator drive belt.
2. Remove the crankshaft pulley retaining setscrew or dognut and withdraw the pulley which is a keyed fit on the crankshaft.
3. Remove the securing setscrews and nuts from the timing case and carefully remove the cover, taking care not to catch the rubber lip of the oil seal on the crankshaft pulley locating key.

To Renew the Crankshaft Front Oil Seal

1. Using a suitable dolly and press, remove the oil seal from the timing case cover by pushing out through the front.
2. Locate the new seal in position so that the lip faces inwards.
3. Press in the new seal from the front until it just butts against the seal retaining lip, giving local support to the cover as the seal is pressed home.

To Refit the Timing Case Cover

1. Using a new joint, lightly coated with a suitable jointing compound, place the front cover in posi-

tion taking care not to damage the rubber lip of the oil seal on the crankshaft pulley key.

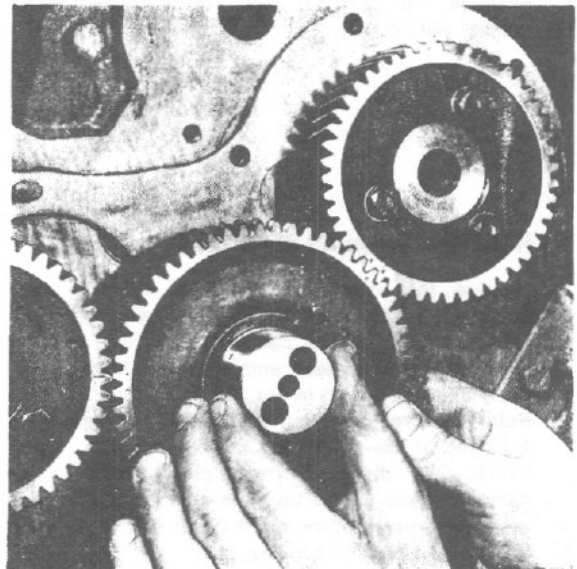
2. Loosely fit the front cover securing setscrews and nuts.
3. Fit the crankshaft pulley to centralise the seal, then tighten the securing setscrews and nuts.
4. Fit the crankshaft pulley retaining setscrew or dognut and tighten to the torque given on Page B.2.
5. Refit the fan belt and tension as described on Page N.1.

To Remove the Idler Gear and Hub

1. Remove the timing case front cover as previously described in this section.
2. Tap back the locking lugs and unscrew the two idler hub securing setscrews.
3. The setscrews, idler gear and hub may now be removed together as shown in Fig. K.1.
4. Clean and thoroughly examine the gear and hub for signs of excessive wear, cracks, pitting, etc.

To Refit the Idler Gear and Hub

1. After ensuring that the oilways in the hub and gear are clear, hold the gear in position with the timing marks correctly aligned.



K2

TIMING CASE AND DRIVE—K.2

NOTE: If the cylinder head assembly has not been disturbed, then the cylinder head cover and rocker shaft should be removed in order to allow the camshaft to be turned to facilitate the aligning of the timing marks.

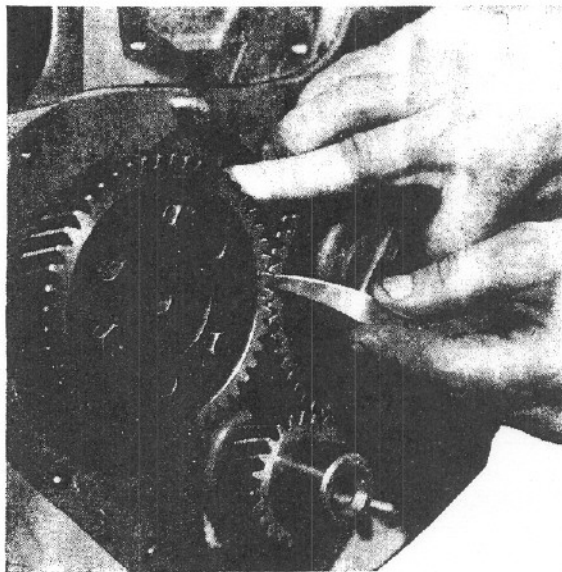
2. Insert the hub as shown in Fig. K.2 so that the holes in the hub and the cylinder block are in alignment and secure with the two setscrews.

NOTE: Clearance is provided in the setscrew holes of the idler gear hub, to provide the necessary backlash adjustment for the timing gears.

3. Using the adjustable idler gear, backlash between both crankshaft gear/idler gear and camshaft gear/idler gear should be set within the range given on Page B.9 with the gears held together in order to take up the effect of bearing clearance. Backlash may be checked by the use of feeler gauges as shown in Fig. K.3.
4. When the backlash has been correctly set, finally tighten the idler gear hub securing setscrews to the torque given on Page B.2.
5. Check the idler gear end float as shown in Fig. K.4 the limits are given on Page B.9.
6. Lock the idler gear hub securing setscrews with the tabwashers.

NOTE: The timing gears when correctly set should appear as shown in Fig. L.1.

7. Refit the timing case front cover, etc., as previously detailed in this section.



K3

To Remove the Fuel Pump Gear

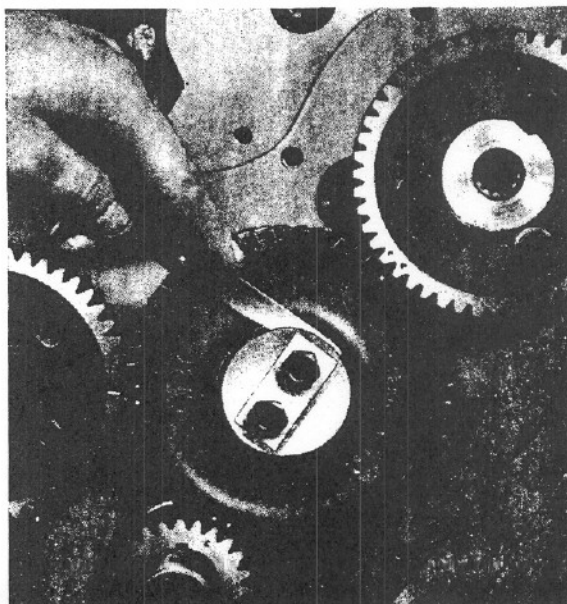
1. Remove the timing case front cover.
2. Remove the idler gear and hub.
3. Remove the three securing setscrews and ease the gear from its location on the fuel pump driving hub.
4. Examine the gear for signs of excessive wear, cracks, pitting, etc.

To Remove the Camshaft Gear

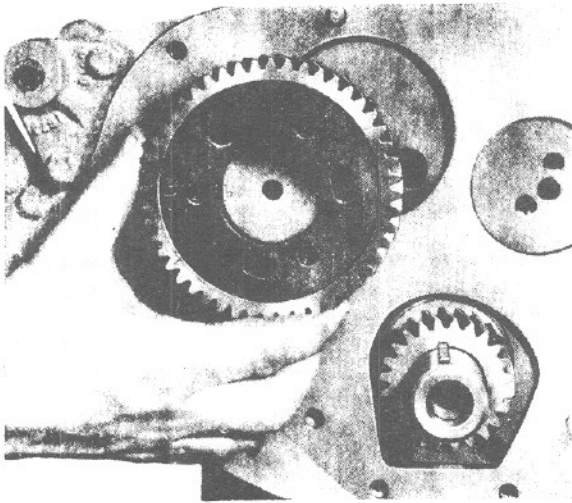
1. Remove the timing case front cover.
2. Remove the three securing setscrews and ease the gear away from its location.
3. Examine the gear for signs of excessive wear, cracks, pitting, etc.

To Refit the Camshaft Gear

1. Remove the idler gear and hub, cylinder head cover and rocker shaft (if not previously removed).
2. Refit the gear to the camshaft ensuring that the 'D' marks on the gear and camshaft hub respectively align as shown in Fig. K.5.
3. Refit the three securing setscrews and tighten to a torque of 19—21 lbf ft (2.6—2.9 kgf m).
NOTE: Only the plain (non-slotted) holes in the camshaft gear are to be used and these will align with the tapped holes on the camshaft hub when the 'D' marks are in alignment.
4. Refit the idler hub and gear, timing case front cover, etc., as previously detailed in this section.



K4



K5

To Refit the Fuel Pump Gear

1. Refit the fuel pump gear so that the timing marks on the gear and hub respectively are in alignment as shown in Fig. K.6.
2. Refit the three securing setscrews and tighten to a torque of 19—21 lbf ft (2,6—2,9 kgf m).
3. Refit the idler gear and hub, timing case front cover, etc.

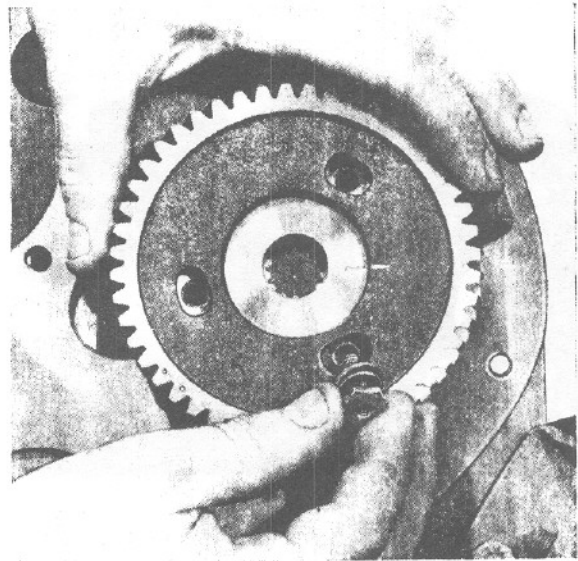
To Remove the Fuel Pump Drive Hub

1. Remove the timing case front cover and fuel pump gear.
2. Remove the low and high pressure fuel pipes from the fuel (injection) pump.
3. Remove the fuel pump securing setscrews and withdraw the pump.
4. Remove the drive hub locating circlip and withdraw the drive hub from its bearing (Refer Fig. K.7).
5. Examine the drive hub also the bearing in which it runs for signs of excessive wear, surface cracks, pitting etc.

NOTE: The bearing is an interference fit in the cylinder block and replacement is carried out by means of a suitable dolly and puller or press if the block is completely stripped, the new one being fitted in the reverse manner.

To Refit the Fuel Pump Drive Hub

1. Replace the drive hub in the bearing and locate with the circlip as shown in Fig. K.8.
2. Check the drive hub end float by means of feeler gauges placed between the front face of the bearing and the rear face of the drive hub. The end float limits are given on Page B.9.
3. Refit the fuel pump as detailed on Page P.6.

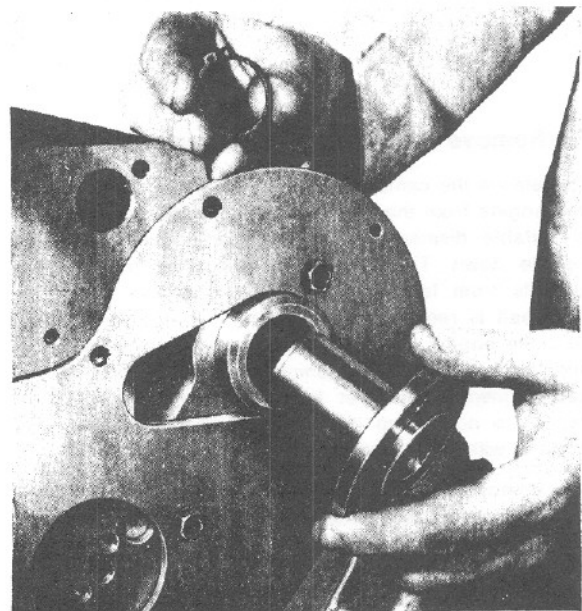


K6

4. Refit the low and high pressure fuel pipes to the fuel pump.
5. Refit the fuel pump drive gear, idler gear and hub, timing case front cover etc.

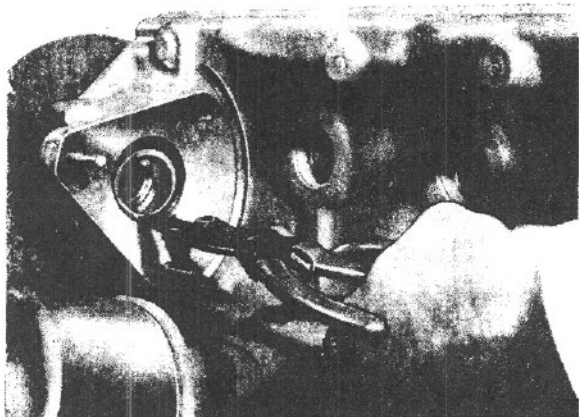
To Remove the Timing Case Back Plate

1. Remove the timing case front cover and timing gears.
2. Remove the fuel pump and drive hub.
3. Remove the securing setscrews and studs (where fitted).



K7

TIMING CASE AND DRIVE—K.4



K8

4. Lift the timing case back plate clear from the camshaft hub and crankshaft gear.

NOTE: The crankshaft gear is an interference fit on the crankshaft. Should its removal become necessary, then this can be accomplished by the use of a suitable puller.

To Refit the Timing Case Back Plate

1. Fit the timing case back plate to the cylinder block using a new joint and suitable jointing compound.
2. Refit any studs removed and secure with the set-screws.
3. Refit the fuel pump drive hub and fuel pump.
4. Refit the timing gears, timing case front cover etc.

To Remove the Camshaft and Tappets

To remove the camshaft it may be necessary to remove the engine from the vehicle or application and place in a suitable dismantling stand where it can be turned upside down. The purpose of this is to prevent the tappets from falling out of their locations when the camshaft is removed. If, however, it is not possible to turn the engine over in this manner, then this problem may be overcome by attaching suitable clips (when the tappet inspection cover has been removed) to each tappet to hold them in their locations when the camshaft is withdrawn from the block.

1. Remove the engine from the vehicle or application and mount in a suitable dismantling stand (where available) correct way up.
2. Remove the cylinder head cover, rocker shaft and push rods.
3. Remove the timing case front cover and timing gears.

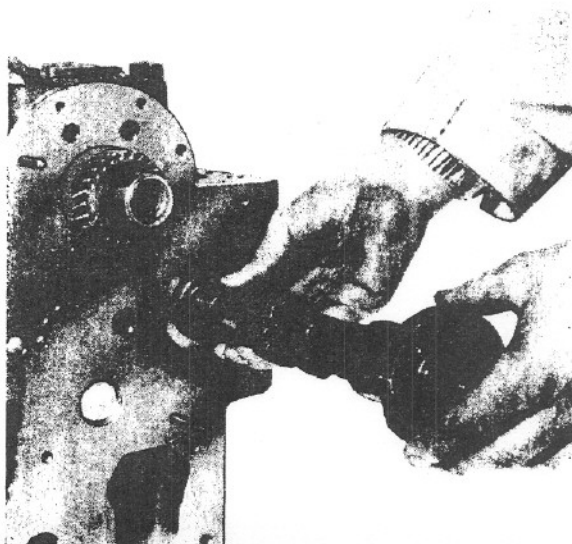
4. Remove the fuel lift pump, tappet inspection cover and fuel lift pump operating push rod.
5. Turn the engine over so that the sump is now uppermost.

NOTE: At this stage if it is not possible to turn the engine over then the tappets should be lifted to the top of their locations and secured with suitable clips.

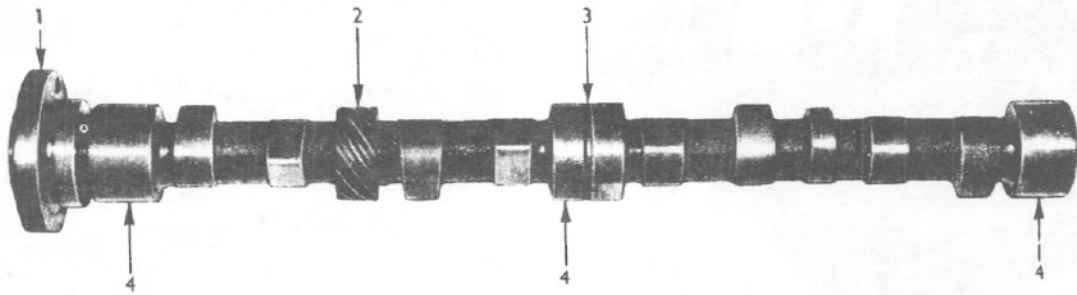
6. Remove the sump and lubricating oil pump assembly. (Refer to Page M.1 for details of their removal).
7. Remove the timing cover back plate as previously detailed, this will show the camshaft and thrust plates as illustrated in Fig. K.13.
8. Ease the camshaft out from the block and catch the two thrust plates as they come out of their recess in the cylinder block.
9. Withdraw the camshaft as shown in Fig. K.9 taking care to ensure that the cams and journals are not damaged during this operation.
10. The tappets may now be removed by lifting them out of their locations (Refer to Fig. K.11) or by removal of the retaining clips if the engine is still the normal way up.
11. Examine camshaft and tappets for signs of excessive wear, surface cracks, pitting etc.

To Refit the Tappets and Camshaft

1. If the tappets have been removed liberally lubricate them with clean engine oil and return to their respective locations. Secure with clips (if applicable).
2. Carefully refit the camshaft into the cylinder block exercising the same care as used during its removal.



K9

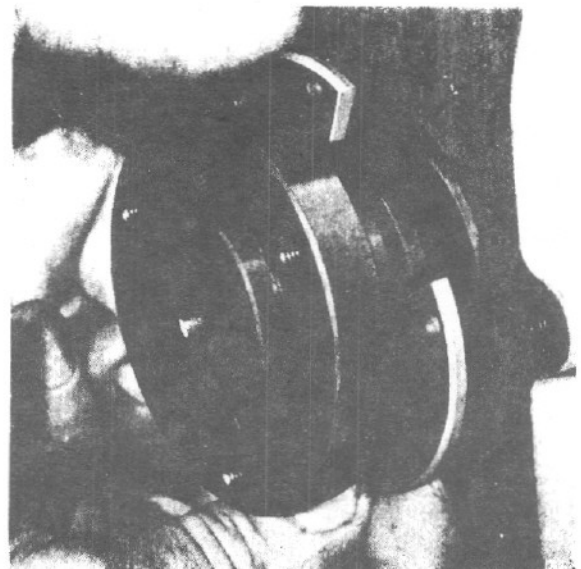


K10

1. Drive Hub
2. Lubricating Oil Pump Drive Gear
3. Groove for reduced oil pressure feed to Rocker Shaft
4. Bearing Journals

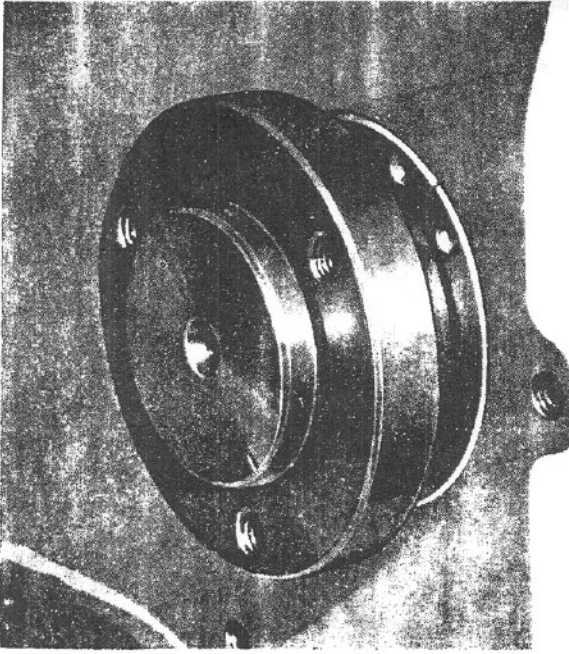


K11



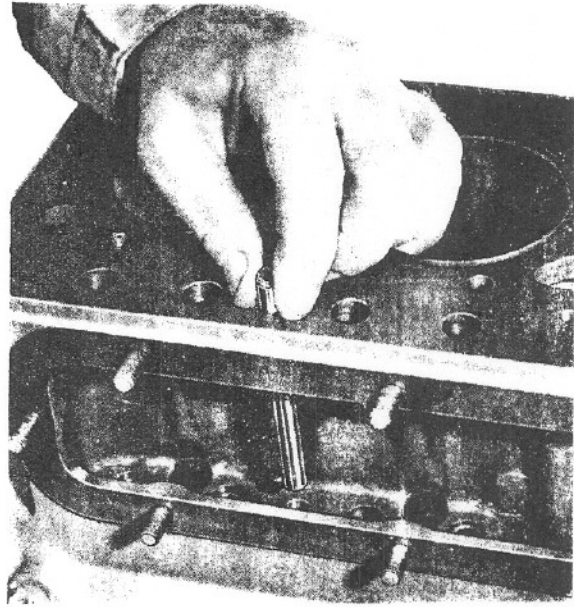
K12

TIMING CASE AND DRIVE—K.6



K13

3. Before the camshaft is pushed fully home locate the two thrust plates (Refer to Fig. K.12) (one of which locates on the dowel in the recess) in position, either side of the camshaft hub, when correctly located the camshaft can be pushed fully home and will appear as in Fig. K.13.
4. Refit the timing case back plate as previously described.
5. Refit the lubricating oil pump assembly and sump as described on Pages M.1 and M.4.



K14

6. Turn the engine over so that the cylinder block top face or cylinder head (if fitted) is uppermost.
7. Refit the timing gears, timing case front cover etc., as previously detailed.
8. Refit the fuel lift pump operating push rod (Refer to Fig. K.14), tappet inspection cover, (after removing any retaining clips) and fuel lift pump. Refer to Fig. P.9.
9. Re-assemble the remainder of the engine components in accordance with the instructions given for each in the relevant part of this section.