SECTION E

ENGINE

All running clearances, fitting tolerances and dimensions are given in 'Technical Data'.

E.1. - GENERAL DESCRIPTION

The engine is a four cylinder, four stroke, twin overhead camshaft unit having a cast aluminium cylinder head which has fully machined hemispherical combustion chambers and separate ports for each valve. The valves, of which the inlets are longer than the exhaust, have replaceable guides and seat inserts and are at an angle of 27° to the vertical. They are operated by the camshafts acting directly on piston type cam followers (tappets). A spring tensioned single row chain drives the camshafts at half engine speed. The camshaft end float and location depends on a shoulder at the front of each shaft bearing in the head. The timing chain also drives the jackshaft which is situated in the right-hand wall of the cast-iron cylinder block and which drives the oil pump, distributor and fuel pump. The jackshaft is located by a thrust plate bolted to the cylinder block front face and runs in three steel-backed white metal bearings, while the camshafts each run in five bearings of this type. The oil pump, distributor and fuel pump are mounted on the right-hand side of the engine, the oil pump and distributor being driven by a single skew gear on the jackshaft and the fuel pump by a cam also on the same shaft.

The crankshaft, of cast iron construction and dynamically balanced, runs in five steel-backed lead bronze lined bearings, end float being controlled by split thrust washers located in the cylinder block on either side of the centre main bearing.

The connecting rods of 'H' section forgings have steel-backed bronze little end bushes and steel-backed copper lead big end liners, the big end bearing caps being located by two dowels and retained by two bolts. Solid skirt aluminium alloy pistons with two compression and one oil control ring situated above the gudgeon pin are used. The gudgeon pins are retained in position by circlips installed in grooves at each end of the gudgeon pin bore.

A cast-iron flywheel incorporating a steel ring gear drive for the starter, is located on the crankshaft flange and retained by six bolts fitted without lockwashers.

E.2. - LUBRICATION

General

The lubrication system is of the forced feed type, the oil being circulated by a mechanically driven oil pump bolted to the right-hand side of the cylinder block. The pump is driven by a skew gear on the jackshaft, and is of the eccentric bi-rotor type which

incorporates a non-adjustable plunger type relief valve.

Oil is drawn from the sump up an inlet pipe attached to the cylinder block and into the pump. When the relief valve opens, oil is passed back into the sump, returning via the base of the sump to prevent aeration. From the pump the pressurised oil flows through the integral full flow filter to a short oil gallery on the right-hand side of the engine. At the forward end of the gallery is a tapped take-off for the oil pressure transmitter. A cross drilling at the rear of this gallery takes the oil to the other side of the engine where the main oil gallery is situated from which all the main bearings are fed. A notch cut in the centre main bearing liner feeds oil to the crankshaft rear thrust washer. Oil is fed to the big end bearings through drillings in the camshaft front, centre and rear journals. Lubrication of the little end bushes, the gudgeon pins and the non-thrust sides of the cylinders is by oil mist and an oil jet forced through a small drilling in each connecting rod web, every revolution of the crankshaft.

The jackshaft bearings are fed from the front, centre and rear main bearings via drillings in the block and a metered jet of oil from a front drilling lubricates the chain and sprockets. Oil fed to the overhead camshafts is controlled by flats machined on the jackshaft front journal, and each camshaft bearing is then fed by a central drilling, blocked at the rear end by a tapered Allen screw. Surplus oil from these bearings then drains back into the sump by way of passages in the head.

Oil Level

The correct level is to the 'FULL' mark on the dipstick, which is located to the left-hand side of the timing cover. When checking the oil level the car must be standing on a level surface and the dipstick withdrawn, wiped, replaced and finally withdrawn and read, the depth of the oil on the end of the dipstick indicating the level of the oil in the sump. If oil needs to be added, remove the oil filler cap on the camshafts cover and pour in clean engine oil of the correct grade (see Section 'O') until the dipstick indicates that the sump is full. Do NOT overfill. Replace the oil filler cap securely (double notch) otherwise an oil loss could occur, with the resultant failure of the entire engine lubrication system. From new the oil should be changed after 500 miles (800 km.) and then after every 3,000 miles (5,000 km.). If the oil appears to be excessively dirty before this distance, it should be changed and a new filter element fitted.

The sump capacity is given in 'Technical Data'. Where possible it is better to drain the oil when the engine is warm (after having just completed a run) and has a lower viscosity to carry away any sediment.

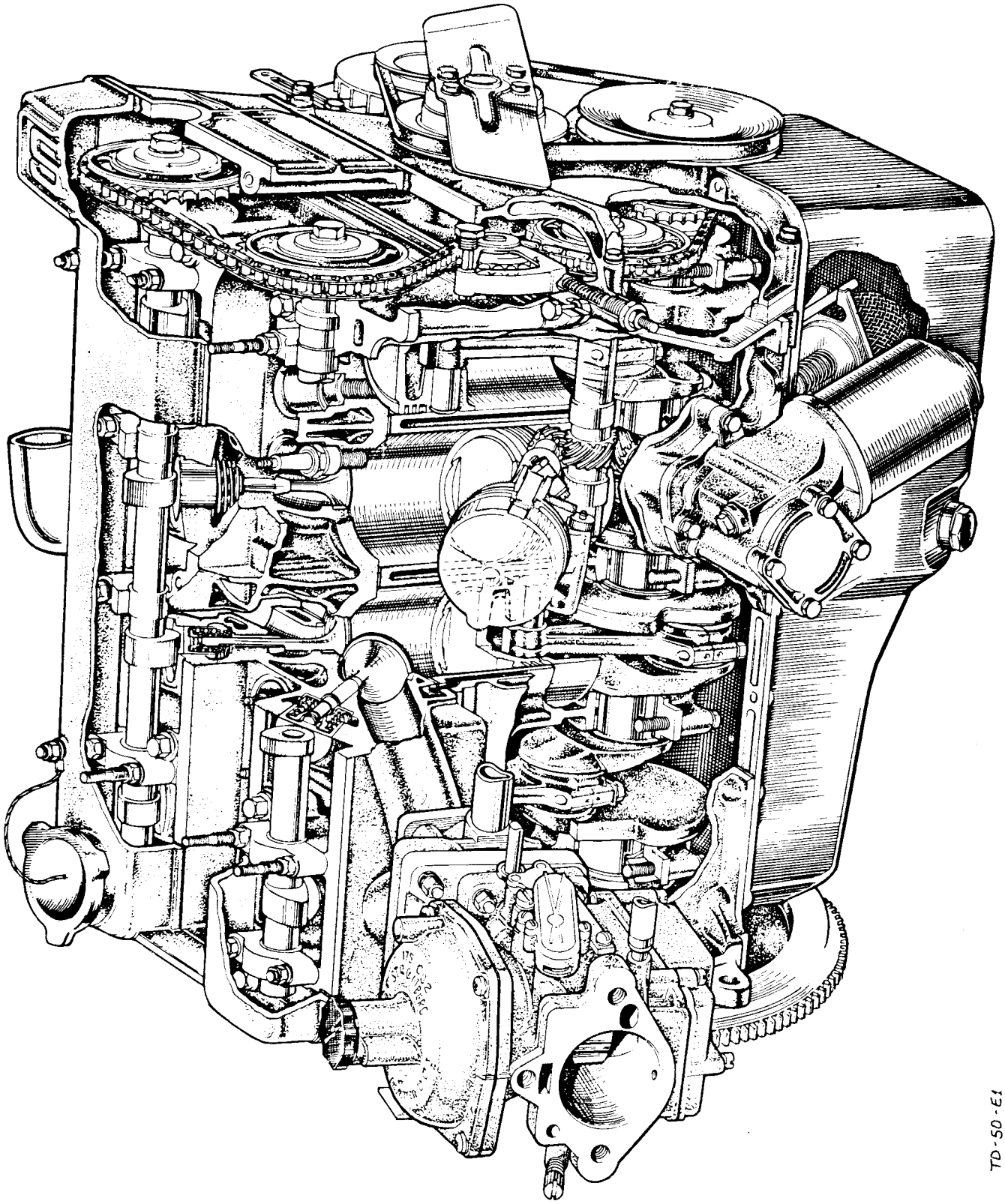

Fig. 1. ENGINE CUTAWAY

TD-50-E1

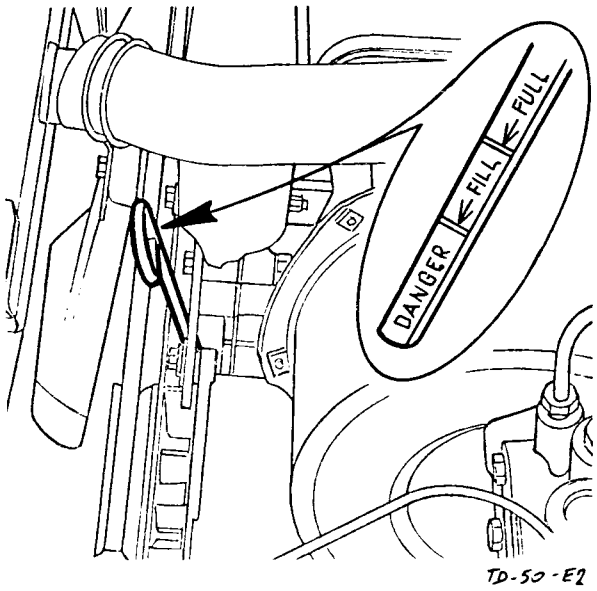

Fig. 2. DIPSTICK

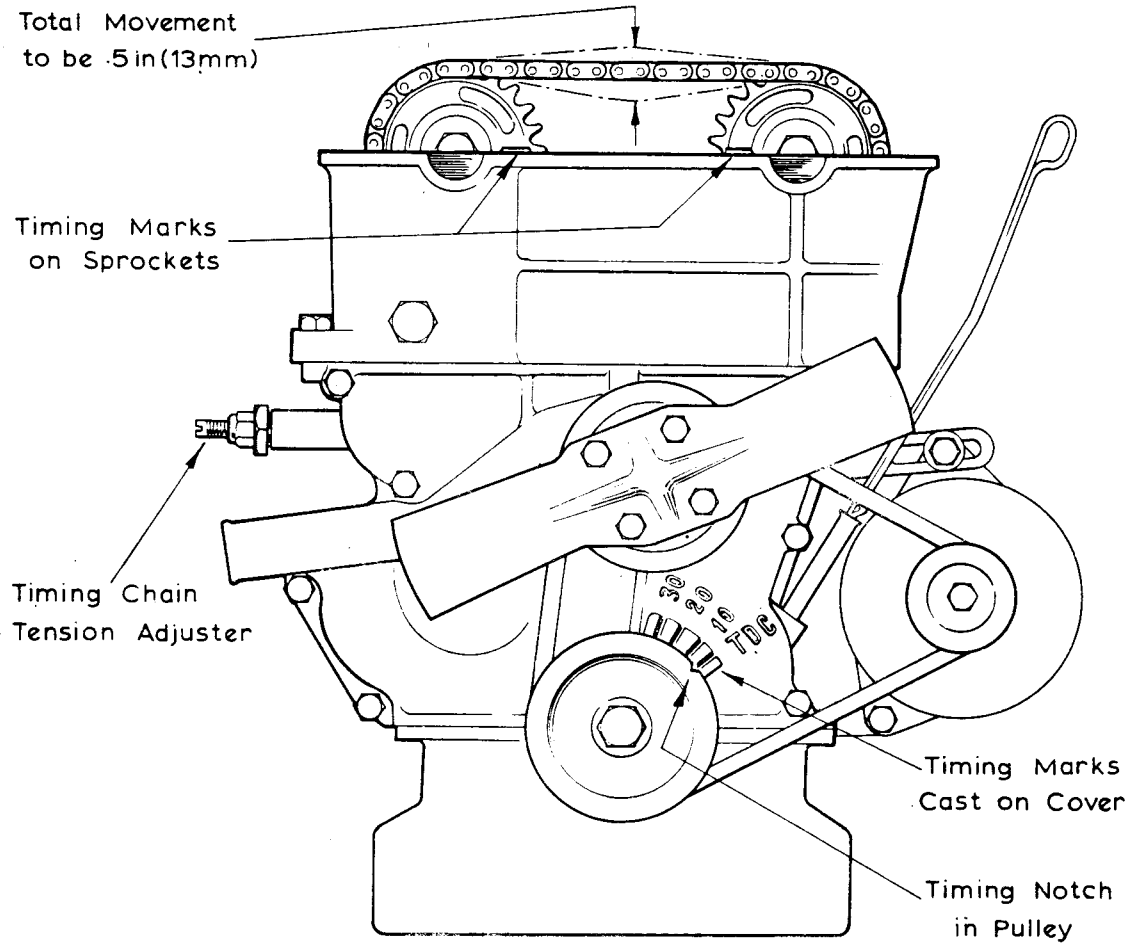

Fig. 3. TIMING MARKS & CHAIN TENSION TD-50-3E

Oil Filter

A full flow filter is bolted to the pump body to make an integral unit. The oil flows through the filter and passes to the galleries. To remove the filter unscrew the central retaining bolt and withdraw the filter body and element. The element should be replaced at intervals of every 6,000 miles (10,000 km.) or more frequently if there are signs of excessive fouling. Extract the sealing ring and fit the replacement ring supplied with the new element by forcing on at four diametrically opposed points simultaneously. Clean out the filter body and refit the new filter assembly to the pump body.

Oil Sump

The sump is pressed steel construction bolted to the block with 18 bolts, the rear-most pair of which are longer than the others. Spring and thick flat washers are used, the flat washers being of great importance as they distribute the load and prevent distortion.

E.3. - ENGINE TUNE

1. Pull off the sparking plug leads and remove the plugs. Clean the plugs and reset the gaps to the dimensions given in 'Technical Data', or if the electrodes are badly burned, fit new plugs, and reconnect the plug leads.
2. Remove the distributor cap and examine the contact-breaker points. Replace the points if badly burned or excessive metal transfer is evident. Adjust the points gap to the dimension given in 'Technical Data' and refit the distributor cap.
3. Remove the fuel pump sediment bowl and filter screen. Wash both in clean petrol, ensure the gasket is in good condition and refit screen and sediment bowl to the fuel pump.
4. Remove the air cleaner element and clean by shaking through. If very clogged with dust or dirt, replace. Clean filter body of all accumulated dirt, reassemble and refit air cleaner assembly to car.
5. Disconnect the fuel feed pipes at the carburetters.
6. Weber Carburetters - Remove float chamber cover. Withdraw the float arm pivot and remove float and gasket. Unscrew all the jets and blow them clear with an air gun. Do NOT use wire as this will enlarge the jet orifice. Remove the needle valve and the needle valve body, and blow it clean with an air line. Clean the float, float chamber and filter gauze using clean petrol. Replace all the jets, needle valve body and needle valve. Place the gasket on the