

line with the timing slot cut in the end of the crankshaft (see Fig. 32). Should the flywheel afterwards be removed, timing is carried out by placing the timing marks in line. On some engines the marking is done after fitting the fan, when, having tightened the flywheel centre nut (after correctly setting the breaker points in relation to position of piston), the crankshaft is turned clockwise to the top of the stroke. One mark is then stamped on one of the fan blades and another on the face of the cowling (see Fig. 33). Subsequent timing is then obtained by placing the marks in line, with the piston at the top of the stroke, before tightening the centre nut.

Cowling

Inside the bottom portion of the cowl is fitted a felt ring. This is fixed by cement into a groove, and by pressing lightly on the flywheel rim prevents dust, etc., entering the magneto. In some applications, such as chain saws, a considerable amount of dust enters the cowling, and it is therefore necessary to renew the felt occasionally to maintain the seal. If this is not done, the accumulation of dust will prevent the proper operation of the contact-breaker and also reduce the necessary air gap between the flywheel pole shoes and armature cheeks.

Fuel Tank and Tap

Lubrication of the engine is by "Petroil", which should always be made by mixing the oil with petrol before putting in tank. If oil is put into tank before the petrol there is the possibility of blocking the filter gauze attached to the fuel tap. Apart from this, it is necessary to keep clear the vent hole in the filler cap to prevent an air lock in the fuel pipe. Should the fuel tap leak, the cork seating can be made a closer fit in the tap body. First remove

the small slotted screw in the body of the tap; this will allow the plunger with cork seal to be withdrawn. To expand the cork, hold between the left thumb and finger and with the right hand turn the head of the plunger clockwise about one-quarter of a turn.

MARK 27B ENGINE

The Mark 27B engine is very similar in design and construction to the smaller Mark 25A model, but having a larger cylinder bore and longer piston stroke, is necessarily larger overall. The cylinder, however, cannot be turned 180° in order to place the carburetter on the drive side. The engine is, however, built with or without the maximum-speed governor, which operates a butterfly valve in the inlet manifold. The crankshaft assembly, with double-row ball bearings, compression seals and

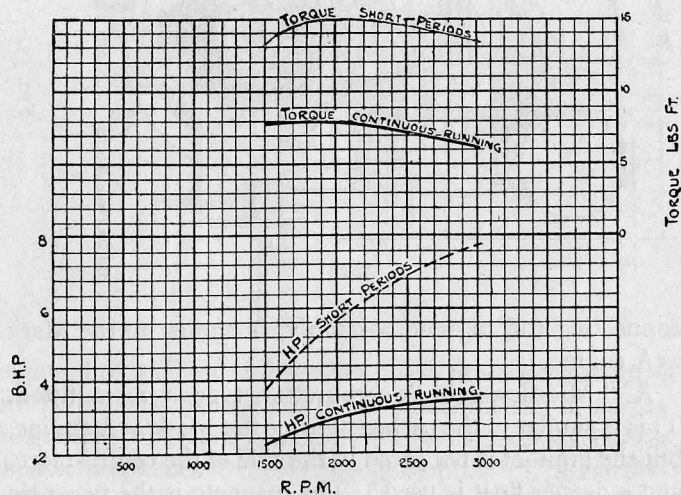


FIG. 34.—POWER CURVES FOR MARK 27B ENGINE.

GENERAL SPECIFICATION AND DATA—
MARK 27B ENGINE

Cylinder bore	70 mm. (2.7565 in.)
Piston stroke	90 mm.
Capacity	346 c.c. (21.1 cu. in.)
Piston-skirt clearance, maximum	0.0095 in. on diameter
Ignition timing, standard engine	$\frac{5}{16}$ in. before T.D.C.
Point gap, maximum	0.015 in.
Sparking-plug	Lodge CB3, 18 mm.
Point gap, maximum	0.025
Carburetter :	
Taper needle	No. 5
Centre-piece and jet	No. 3

as for the Mark 25A engine, the timing mark being stamped on the flywheel boss in line with the slot in the crankshaft (see Fig. 32). The amount of advance for the standard engine is $\frac{5}{16}$ in. before top dead centre.

CHAPTER VI

TRACING TROUBLES IN TWO-STROKE
ENGINES

THE procedure to be adopted when investigating the causes of trouble varies from that of the four-stroke or four-cycle engine in several respects. In the two-stroke engines previously described it is most essential in order to obtain the best results that there are no air leaks above and below the piston. This means that the joints between crankcase halves, cylinder base and crankcase, carburetter and cylinder, cylinder head and top of cylinder, and, of course, the main bearings, must be sealed against compression and suction leaks. In addition, of course, the piston-rings must contact the cylinder bore all round and for their full width.

Other factors to be taken into consideration are ignition and carburation, and whilst these affect both four-stroke and two-stroke engines, it is felt that the engines should be treated separately, and therefore a fault-finding chart for the range of four-stroke engines is included at the end of the section dealing with that type of engine.

For the satisfactory running of any Villiers engine it is essential that three main conditions are fulfilled, and by making a systematic and intelligent investigation the faults can usually be located and rectified. Usually when the engine stops, symptoms give a clue to the cause, but where this is not the case, the trouble can be more easily diagnosed by following a definite method of investigation.