

## MULTI-CYLINDER IGNITION

By GEOMETER

To sort out mixed-up sparking plug leads, to remove and fit a distributor, to time an engine, or to discover its firing order, are all straightforward enough when the quite simple principles of multi-cylinder engine layout and ignition are understood.

The four-stroke cycle requires two revolutions of the crankshaft for one firing stroke—and in these two revolutions, the camshaft operating the valves and the contact breaker cam initiating the spark for each firing stroke, each make one revolution.

In a multi-cylinder engine all cylinders fire once in two revolutions, and in the popular four-cylinder and six-cylinder engines the crankshafts are arranged for firing strokes to occur at uniform intervals. Thus to produce the number of sparks required the contact breaker cam of a four-cylinder engine has four "lifts" or

The metal segment on the rotor is fed with sparks from the central lead in the cap, supplied from the coil.

Cylinders of in-line engines, as at

Nicks should not be cut in the leads or shorts may occur.

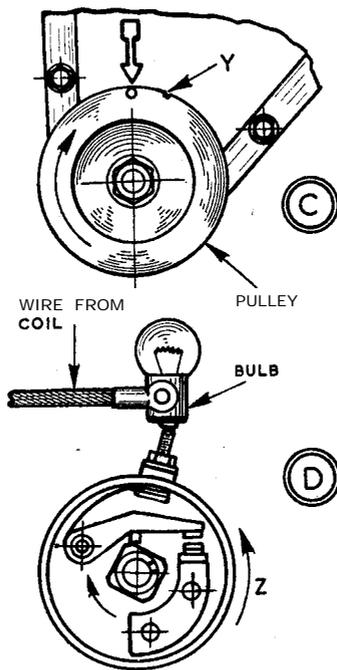
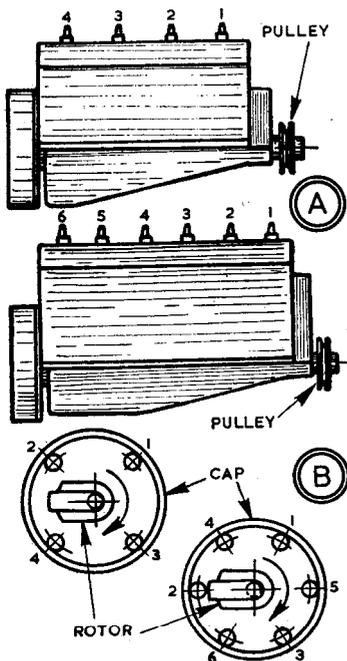
When leads cannot be identified, t.d.c. No 1 firing stroke should be found. Next remove the sparking plug, place a thumb in the hole and rotate the engine until compression is felt, then the piston is brought to t.d.c.—watching with a flashlight, feeling with a wire, or checking on the crankshaft pulley, as at C. The rotor is then feeding No 1 plug wire, and the others round the cap go to the cylinders in the firing order of the engine.

This principle is adopted in timing when a gear on the distributor engages the camshaft. No 1 firing stroke t.d.c. is found? and the distributor engaged (allowing for twist of the helical teeth) with points just opening and the rotor feeding No 1 plug wire. A tongue-and-groove, or dog drive, involves no problem, however, as both are off-set, and the distributor can only be fitted one way.

Lacking the firing order the valves must be checked, as all inlets or exhausts move in that order. Observing adjacent pairs of valves the exhaust closes as the inlet immediately opens. Wiping off oil, all inlet springs can be marked with chalk, then, starting at No 1, the order of inlet opening can be verified.

Usually a distributor is mounted by a plate with a clamp fixed by a set-screw. If this is removed the fine setting is preserved. The setscrew hole may be slotted for fine adjustment or the distributor may have micrometer screw adjustment. If not, the clamp screw can be slackened for fine setting.

At No 1 t.d.c. or the advance position, as at C-Y, with the ignition switched on, the wire is removed at the distributor. A bulb is held in circuit, as at D, and the distributor is moved back then forward, as Z, until the light goes out.



corners like a square nut—while the cam of a six-cylinder engine has six lifts or corners, like a hexagon nut.

On each lift of the cam operating the contact breaker, a spark is produced at the coil. It must then be directed towards the cylinder on the firing stroke. This is effected by an insulated rotor with a metal segment, turning at the same speed as the cam, inside a cap round whose periphery at appropriate intervals are electrodes from which wires go to the sparking plugs.

A, are usually numbered front to back, and fire in a certain order, beginning with No 1. For four-cylinder engines, the common firing order is 1, 3, 4, 2, and for six-cylinder engines 1, 5, 3, 6, 2, 4. These are at B on the distributor caps.

Some engines, however, have the reverse firing order of 1, 2, 4, 3, and 1, 4, 2, 6, 3, 5—seen to be the reverse way round the caps.

To avoid mixing leads, each terminal end should be nicked with a file or scratches can be made on the cap.