

PRODUCTION POWER PACKET

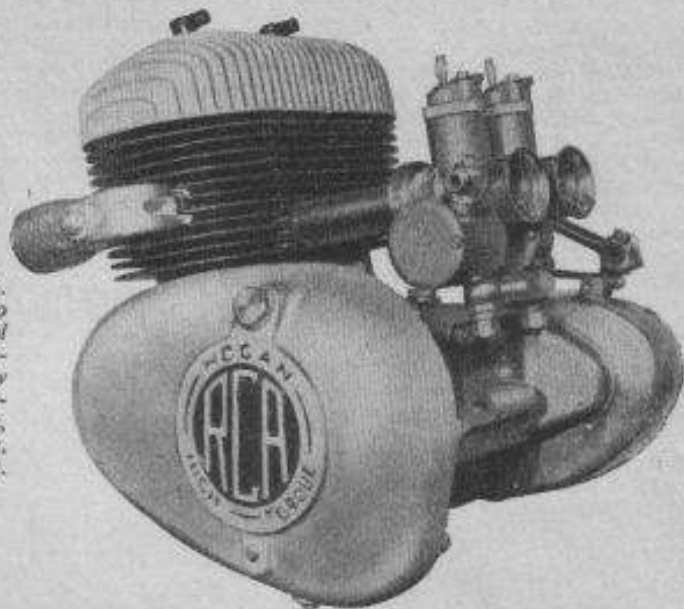
The Peter Hogan-designed
350 c.c. Two-stroke Twin
R.C.A. Engine Unit

AS exclusively announced in the July 10 issue of *Motor Cycling*, the 349 c.c. R.C.A. twin-cylinder two-stroke engine is now in production. Of basically conventional design, the unit nevertheless embodies several ingenious features suggested by the wide experience of its designer, Peter Hogan, whom readers will know for his work on two-stroke cylinder heads and ports (nearly 3,000 of the Hogan "High Torque" heads for B.S.A. "Bantams" were sold, following their introduction in 1953). With the R.C.A., Hogan has approached the drawing-board stage from the viewpoint of an engine tuner, as well as that of a designer, so that various little items which would normally call for attention in the "hotting-up" of a standard production motor are already dealt with in the "off-the-line" version of the R.C.A.

Characteristic of this attention to detail—which costs little, if anything, extra in actual production—are the small clearances between the flywheel and the crankcase walls; 0.025 in. is the figure and, to keep the crankcase volume to the absolute minimum, the flywheel balance holes are plugged with corks and the amply-wide $\frac{1}{4}$ -in.-roller big-end bearings are recessed into the flywheels, which have

The new R.C.A. engine with its two close-coupled Amal "Monobloc" carburetters and very compact design, presents an imposing, but neat appearance, for a 350 c.c. unit.

General arrangement of the R.C.A. Points to note include the "four-piece," rigid crankshaft assembly, located in the centre, the side-mounted exhaust ports and the minimal crankcase volume, achieved by the small-clearance flywheels.



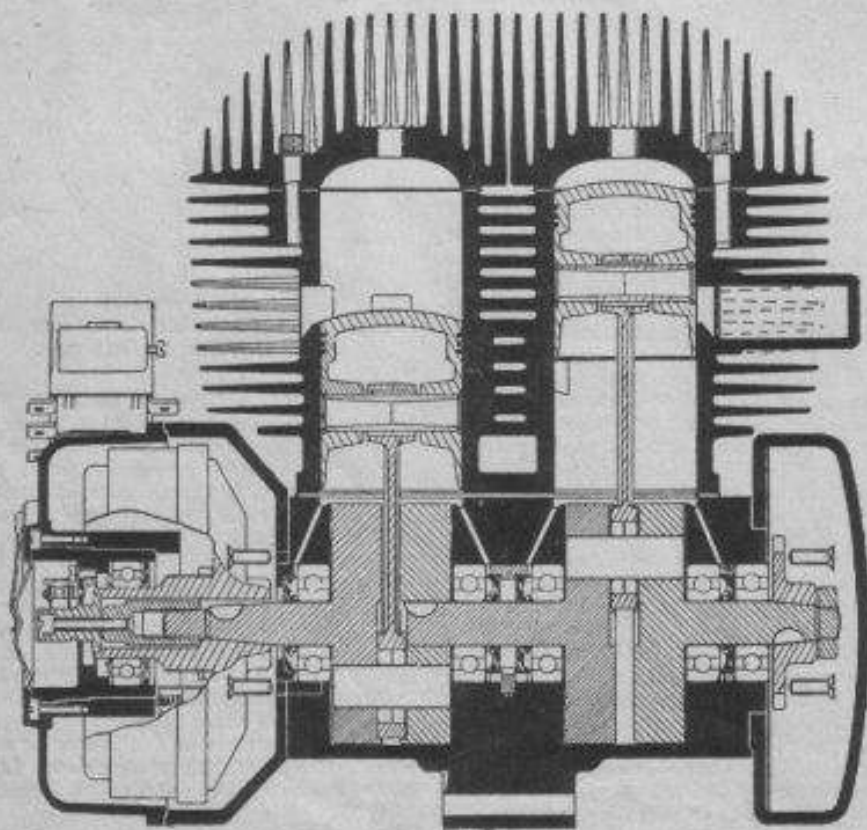
little more than the thickness of the connecting rods between them. This last point helps to ensure, too, that the crankshaft is as short and as rigid as possible—a feature which is implicit in the whole "bottom-end" design. Three of the flywheels are made each in one piece with a section of the shaft. Thus there are three major flywheel/shaft units, plus one single wheel and the two crankpins. The assembly is pressed together, with keys on the shafts, and supported on six main bearings—five in the crankcase and one outrigger.

Crankshaft Location

The crankshaft assembly is located end-wise by its centre portion, between the two compartments of the horizontally-split crankcase, and is made from EN33 steel, as are the connecting rods.

The crankcase assembly which forms an extremely rigid structure, is made of Y-alloy and machined inside to achieve the small flywheel clearances. An Albion gearbox is bolted to the rear of the crankcase, and this can be had in various forms: four-speed (1 : 1, 1.22 : 1, 1.65 : 1 and 2.7 : 1 internal ratios in standard form) or three-speed and reverse for cars; or, if a wide-ratio four-speed unit is wanted for a three-wheeler, a reversing Siba "Dynastart" can be fitted. Various other ratios are available for competition work.

The cylinder block displays further examples of forethought and experience. Since the area between the cylinders of a vertical twin is bound to be warmer than the "outsides," and since the exhaust ports form another source of additional heat, the R.C.A. has the exhaust outlets on the outer sides of the cast-iron cylinder block; thus, the hotter areas of the cylinders are opposite each other, and balanced expansion is achieved with no risk of "banana-shaped" cylinders when the motor is hot. An incidental advantage for competition work is that there is nothing whatever against



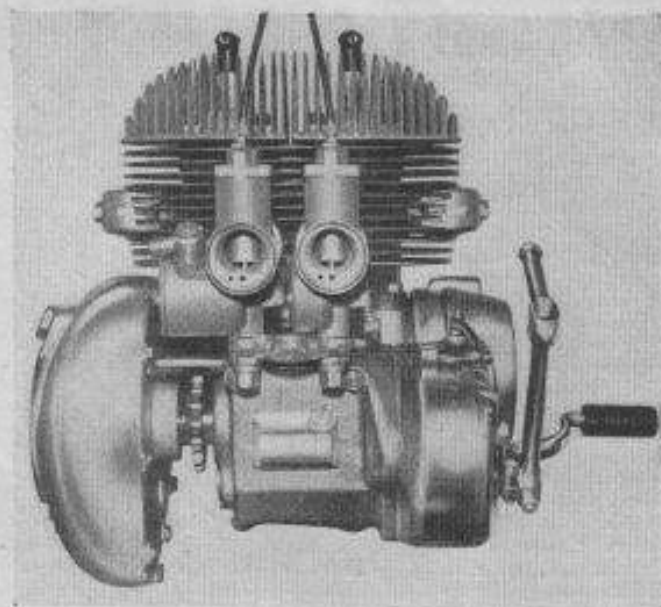
reversing the exhaust manifolds, so that short pipes and megaphones can be used with advantage. Megaphones are recommended for the competition versions.

This equalized cylinder expansion permits the use of extremely low piston clearances—particularly important with a two-stroke—and the figure is 0.002 in. at the skirts. With a bore and stroke of 63 mm. by 56 mm., the engine is decidedly over-square, giving a crankcase which is as compact as that of a normal 250 c.c. engine, and yet a further aid to maintaining high crankcase compression. The effect of this high compression is further boosted by very long, square-section transfer ports, situated fore and aft, which result in a high-velocity gas flow and, consequently, good filling.

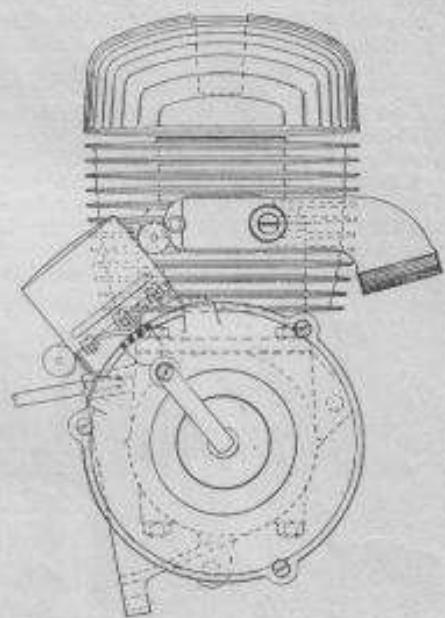
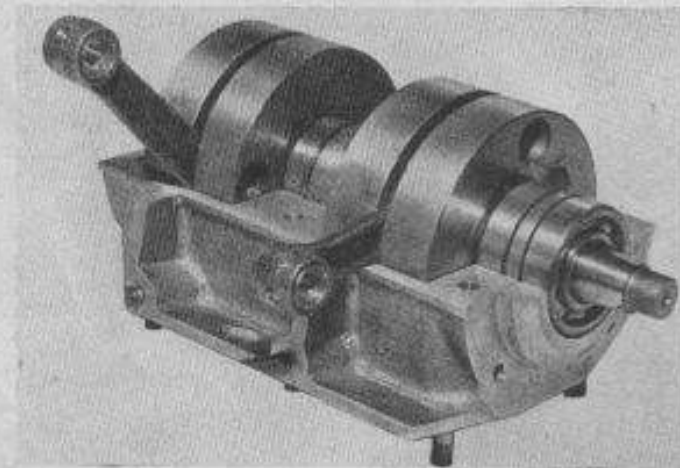
Insulating Gasket

The cylinder block is separated from the crankcase by a thick, fibre, heat-insulating gasket, so that there is practically no difference in the carburation required by the engine when hot and when cold. Careful design has resulted in the maximum possible

Rear view: The carburettors share a common float-chamber, the right-hand instrument being blanked-off by means of a distance-piece and the normal float-chamber end-cover. Although the exhaust ports are at the sides, it will be seen that they do not add to the width of the unit. The bolted-on gearbox is of Albion manufacture.



The flywheels are shown (left) mounted in one half of the horizontally-split crankcase. The small clearances (0.025 in.) will be observed, as well as the rigid construction of the crankcase and five bearings; an additional bearing is outriggered to support the generator shaft.

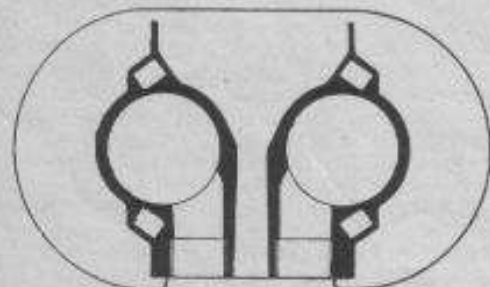


Side view: The exhaust stubs can be reversed, if desired, for racing.

area of finning, with no unnecessary cut-aways—a feature which applies also to the separate Y-alloy cylinder heads, which are retained with Allen screws for this reason. Two long induction stubs are threaded into the block to carry the twin Amal "Monobloc" carburettors.

Torroidal Heads

The combustion heads are of torroidal shape—flattened domes—with central sparking plugs, and it is largely to this form of combustion chamber that the engine owes its



The unusual location and shape of the fore-and-aft transfer ports. Note, too, the wide induction passages.

extremely high torque, lusty power being available from remarkably low revolutions. The pistons, of Specialloid manufacture, have slightly domed crowns. The standard engine has an 8 : 1 compression ratio.

On the bench, the standard motor, fitted with the recommended type of silencers, produces 21.6 b.h.p. at 5,200 r.p.m. An incidental advantage of the low-clearance crankcase chambers is that there is no risk of surplus petrol gathering in the sumps during prolonged periods of tick-over, so that pick-up is invariably clean and free from "suffing" after long traffic hold-ups. For activities such as scrambling there is a tuned version, delivering 25 b.h.p. at 5,700 r.p.m., and the characteristics of a high-torque two-stroke twin should be very well suited to this form of sport. A methanol engine is planned, and work which has already been done indicates that speeds of considerably over 100 m.p.h. should be possible with this unit.

Surveying the parts of a dismantled engine on the bench, one is immediately struck by the cleanness of the design, its simplicity, and the obvious attention given to details. At a retail price of £65, complete with gearbox, alternator and coil, this 350 c.c. power unit would seem to be excellent value, and

of considerable interest to the rider who wishes to construct a machine which is somewhat different from the usual run of "350s." Tested in prototype form, the standard R.C.A. has propelled a motorcycle at well over 75 m.p.h. and improvements to the power curve since then seem to indicate that 80 m.p.h. would be a reasonable figure to expect. An indication of the expected performance in a three-wheeler is that, two-up, a light car has done around 70 m.p.h. and returned 64.6 m.p.g. at a steady 50 m.p.h. (98.5 m.p.g. at 30 m.p.h.).

Complete with ancillary units, less gearbox, a typical engine scales 90 lb.

The manufacturers of this interesting unit are R. Christoforides and Associates, Ltd., 39-61 Palermo Road, Harlesden, London, N.W.10.