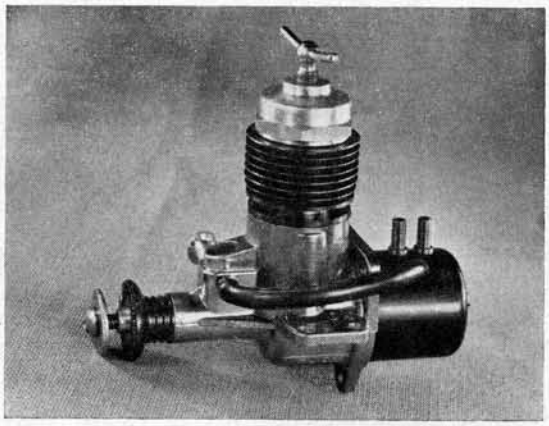
Engine Tests

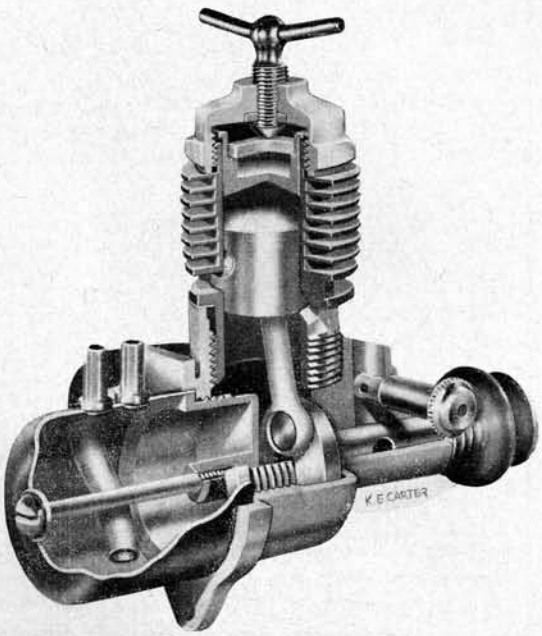


No. 61. The OK Cub .075 cu. in. diesel

ALTHOUGH the Cub .075 is an " in-between " so far as competition classes are concerned, testing it was most interesting for this engine has several innovations which raise it out of the common run of popular diesels.

The Cub .075 was the second engine of the new generation of American small diesels of which there are now four different models on the market. The first-announced—rather more than a year ago—was, of course, the McCoy .049 diesel, which has already been fully dealt with in MODEL AIRCRAFT, and, like the McCoy, the Herkimer diesel design embodies the use of a plastic seal, or " O-ring," on the contra-piston.

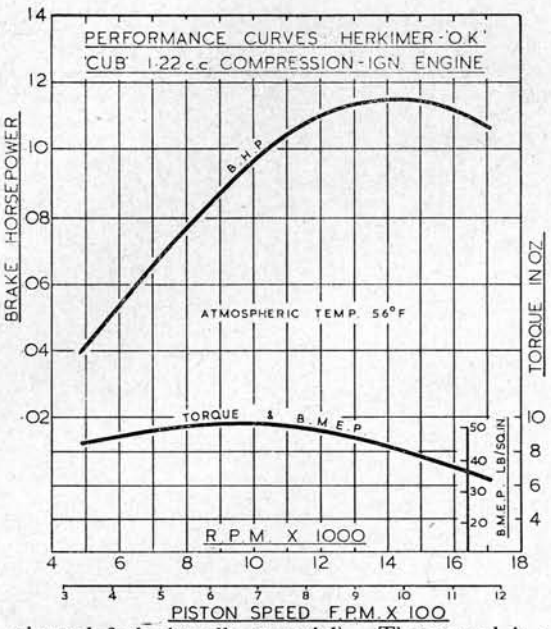
This feature has come in for some criticism—not in the U.S. where the vast majority of these engines are in use, but in other countries where, we feel, experience with it is yet far too limited to warrant such comment. From an otherwise respected source in Canada came a suggestion (following an adverse comparison with British lapped contra-pistons) that owners of these American diesels could send them to England to have a " proper " contra-piston fitted. This was subsequently quoted in a British contemporary publication.



Now, while we appreciate the writer's kind commentary on the British diesel, we feel that it would be a " head in the sand " policy for our manufacturers to take seriously this apparent dismissal of the U.S. diesel. If all our lapped contra-piston engines were beyond criticism, this might be justified, but, unfortunately, this is far from being the case. All too often we find that a lapped contra-piston cannot be moved once the engine is warmed up—or that it is so stiff that adjustment of the compression screw quickly ruins the soft aluminium threads in the cylinder-head. Alternatively, it is not unusual to find the contra-piston too easy a fit in the bore, with the result that it vibrates and often causes the compression adjustment to slacken off in flight, with annoying results, and also results in the space above the contra-piston being filled with residual oil.

The Cub and McCoy engines, with their special plastic sealing rings, have none of these disadvantages. In our experience, both makes provide an even better compression and oil seal than the best lapped contra-piston, are delightfully easy to adjust irrespective of temperature and hold adjustments firmly. The fact that these rings, after considerable use, need replacement and that this may be inconvenient to overseas users who may not have a local source of supply, is surely no valid objection to such a design feature. The same objection could have been named in the case of plugs for glowplug engines. As for cost, the price of a spare ring for a Cub ·075 is but 25 cents—1/9½d.

The Cub diesel has three other features not found among British model i.c. engines. The first is a flange on the contra-piston which automatically prevents the compression adjustment from exceeding a certain value (and, incidentally, makes the use of a



nitrated fuel virtually essential). The second is a unique "shock-absorber" contained in the cylinder-head. This latter takes the form of a flat steel spider interposed between the top of the contra-piston and compression-screw. The Cub uses a heat-treated steel connecting-rod and the rigidity of this is offset by the shock-absorber which relieves the crankpin, crankshaft and gudgeon-pin of undue stresses. The spring material is quite heavy and the pulsations of the contra-piston are therefore quite small. The third feature is a fibre friction pad fitted in the underside of the cylinder-head through which the compression screw passes and is thus held firmly to any set adjustment.

The Cub diesel displays the usual fine finish and pleasing general design common to the other Herkimer-O.K. Cub models: the crankcase is the same as that used on the 0.074 glowplug model (despite the different designation, the two models are of the same bore and stroke measurement) and the usual Brebeck patented system of radial cylinder porting is employed.

Specification

Type : Single-cylinder, air-cooled, two-stroke cycle, compression ignition. Crankshaft type rotary valve induction. Annular transfer and exhaust porting with domed crown piston. No supplementary induction. Swept Volume: 0.0745 cu. in. (1.22 c.c.).

Bore : 0.478 in. Stroke : 0.415 in.
Stroke/Bore Ratio : 0.87 : 1.
Compression Ratio : variable.
Weight : 2.1 oz.

General Structural Data : Crankcase and main bearing pressure diecast in aluminium alloy and polished. Machined one-piece steel cylinder with integral fins, three exhaust and three inclined transfer ports, screwed into crankcase and seating on copper gasket. Aluminium cylinder head with fibre compression screw thread insert. Flanged, steel contra-piston with plastic sealing ring and tempered steel shock spring. Balanced, hardened and ground crankshaft running in plain bearing. Extended propeller drive collet, splined to shaft with single screw and washer to secure prop. Hardened steel piston, connecting rod and gudgeon-pin. Machined aluminium crankcase cover. Detachable pressed aluminium fuel tank secured to rear cover with single screw. Spray-bar type needle-valve pressed into main casting. Combined beam and 3-point bulkhead type mounting lugs. Fuel tank and drive collet are anodised red, cylinder is blued and other main components are polished aluminium. Compression lever is nickel plated.

Test Engine Data

Time logged prior to test : 1 hour.

Fuel used : 30 per cent. ether, 40 per cent. Shell gas-oil, 30 per cent. Castrol "R," plus 2 per cent. amyl-nitrate.

Performance

The Cub engines do not require extensive running-in time and it was noted that there was little loss

(*Continued on page* 281)