Cox Olympic .15

Starter on this ball-bearing .I5 not essential, but nice to use.

Parts are typically Cox and no castings utilized in its design.

► Maybe the new AMA rules are not everybody's meat: rule changes never are, anywhere, but, in reducing the class A displacement limit to .1525 cu. in., the AMA has gone a long way towards raising the world status of American contest modeling.

The reason for this is easy to see. The .1525 cubic inch (2.5 cubic centimeters) displacement is the limit that is internationally recognized for world championship model flying. For several years now, the two FAI world championship events for gas-engined models, free flight and speed, have been restricted to 2.5 c.c., and, in Europe, individual nations have adopted FAI rules for most, if not all, of their own internal contests. As a result, engine designers have been encouraged to concentrate their efforts on the development of high performance motors of this size, whereas American designers and manufacturers have, hitherto, devoted most of their resources to an entirely different set of requirements. Small wonder that no American modeler, or American engine, has won an FAI international contest for five years.

The U.S. can produce engines capable of winning such events and there is no doubt about this in the minds of contest men all over Europe. Ever since it was first known, two or three years ago, that the Cox company had a .15 on the way, engine enthusiasts in Britain and continental Europe have awaited its appearance with bated breath. They are not going to be disappointed. There is no shadow of doubt that the new Cox Olympic .15 can better the performance of any stock 2.5 c.c. engine made in Europe at the present time. There is little doubt, either, that Western Europe will use this engine wherever its potential can be exploited: the challenge of East European state sponsored contest engines makes this inevitable.

The Olympic follows the usual Cox layout, of reed valve induction and reverse-flow scavenged twin-opposed port cylinder. Such notable Thermal Hopper features as the multijet carburetor and clean, hemispherical cylinder head with built-in glow filament, are retained. The main visible changes are the beam (a recent departure and also seen on the new Space-Hopper .049) and the twin ball-bearing mounted crankshaft.

Construction wise, the new Cox is typical of this manufacturer's products. No castings are used. Crankcases are turned on screw machines from extruded bar stock, afterwards passing, in turn, through two other machines which do all the remaining operations i.e. those non-concentric to the shaft. Pistons arc machined from bar steel and are hardened on the wearing surface only, in order to leave the socket for the conrod ball-joint sufficiently ductile for subsequent working. Connecting rods, which are of steel, are assembled to the pistons by a special machine, built in the Cox company tool shop.

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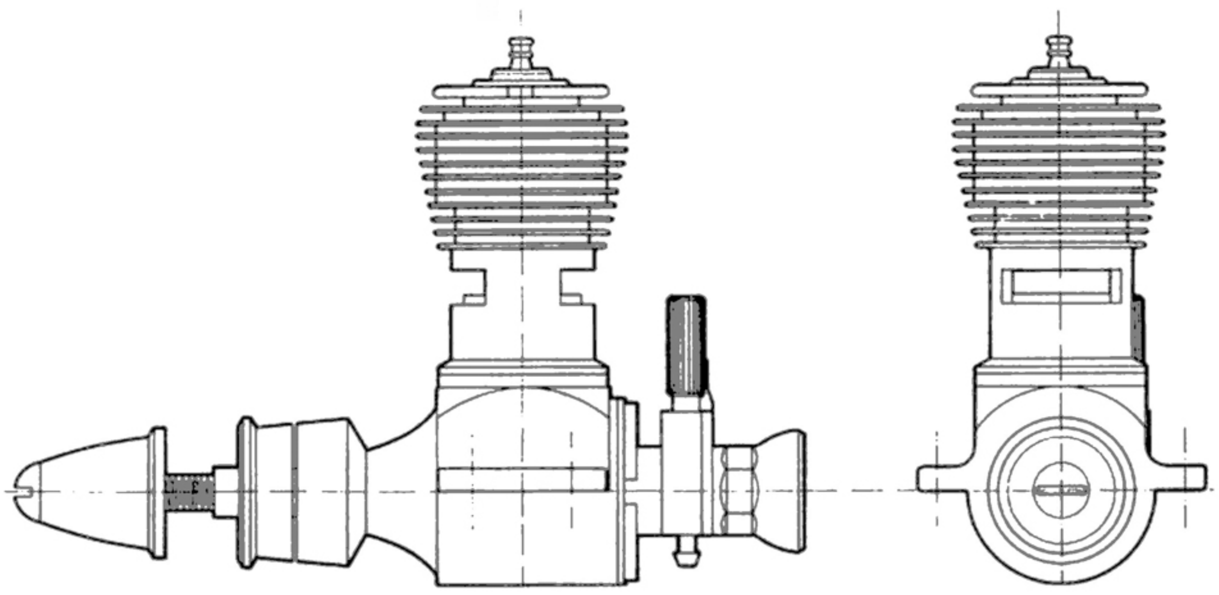

Full size drawings here an aid to installation. New feature is lug mounting which should ease conversion problems for these who would install the .15 in bigger, old rules ships. Reed valve used as on other Cox engines but is simplified.

The operator merely places rods and pistons in two hoppers feeding the machine, which assembles them entirely automatically.

In the finishing of such items us cylinder bores, much emphasis is placed on temperature control, as an aid to accurate working. All grinding, cylinder boring, honing, etc., are therefore done in a temperature controlled room, in which the temperature is maintained constantly within .one degree, after being preset at a comfortable working level.

The Olympic uses a ball bearing mounted crankshaft, because, all other things being equal, a ball bearing engine must achieve higher mechanical efficiency than a plain bearing motor. Agreed some highly impressive performances have been put up by plain bearing motors, but these have been in spite of, not because of, having plain hearings. Frictional losses in the Olympic are obviously very low indeed.

The crankshaft journal itself is of smaller diameter (1/4 in.) than is usually employed in 15's. This is practical because it does not have the stress raising intake port of a shaft valve, and. being supported in ball bearings, does not need the added bearing area of a large diameter journal. The shaft has a chamfered circular web and a machined in crescent counterbalance. The connecting rod is rather longer than average and piston side thrust is thereby held to a minimum. The piston is flat crowned and uncovers the large exhaust ports at 70 degrees BBDC, a normal timing. Bypass timing, on the other hand, is very advanced, the tops of the two internal bypass flutes being almost flush with the upper edges of the exhaust ports. The cylinder, as in other Cox motors is machined in one piece, with integral cooling fins, and screws into the crankcase. The combined glow head unit screws into the top of the cylinder and seats on a soft copper gasket.

Cox reed valves have been simplified, compared with the assemblies used on the Space Bug and Thermal Hopper. On the Olympic, a single copper reed, retained by a wire snap ring, is used.
Reed valve housing, crankcase back plate and carburetor venturi are combined in a single machined unit.

Model Airplane News Magazine August 1959 by Hlsat

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The familiar and highly effective Cox triple jet carburetor is featured, whereby fuel is supplied, finely atomised, via three small jets bored equidistantly around the venturi. Actual metering takes place before the fuel reaches the jets, by means of a separate needle valve. The complete needle valve unit is secured to the venturi by means of a nut with a large screened intake, and can be rotated through 360 degrees, for the most convenient location for individual installations.

Surprise item with the Olympic is the provision of a starter spring. Incongruous on an "expert's" engine? You will doubtless think so until you have tried it a few times. There may be a few diehards who will insist on finger flipping rather than resort to such a sissy" item as a spring starter. And they won't have any trouble because the Olympic is an easy starting motor. But reed valve motors have a tendency to occasionally start backwards, especially on small, light props. The starter definitely does a better job of starting: we were convinced of this after trying it against normal hand flipping. No reverse starts and the thing works like a charm, first time, every time. Starting from cold needs a cylinder prime, plus a couple of turns of the prop with the intake choked to draw fuel to the carburetor. The engine will then start within two or three attempts, provided it has been adequately primed. Restarts with a hot engine arc instantaneous. If there is fuel in the delivery line, no priming, no choking and no needle readjustments are necessary: just wind fix' prop back one turn against the spring, energize the plug, release the prop and she's away.

As on other Cox engines, no lengthy break in is needed and it is normally quite safe to let the motor have its head after a preliminary rich mixture break-in of only one minute. However, as a courtesy, our test engine was given 30 minutes running before any performance (gores were taken. Tests were carried out with the aid of our reaction dynamometer, on which, incidentally, some 40 different types of .15 engines, both diesel and glow, have been evaluated to date.

The first thing that became apparent with the Olympic, was its high torque. This reached a maximum of 23 oz. inches at between 11.000 and 12.000 rpm, which is equivalent to a brake mean effective pressure of 60 Ib/sq. in.. Is better than any glow .15 previously tested and closely approaches die very high torque of top diesel 15's like the Oliver Tiger. As rpm are increased, however, the normal decline of the torque curve is less abrupt than with the diesels and, in consequence, die Olympic readies a higher bhp peaking speed. Actual bhp figures, obtained with a fuel containing 30 percent nitromethane, were as follows:

At rpm	bhp
10.000	.218
11.000	.248
12.000	.270
13.000	.288
14.000	.300
15.000	.310
16.000	.316
17.000	.318
18.000	.317

Running qualities throughout die tests were excellent, the motor running smoothly and consistently, and the response to the needle valve was just right. Suggested prop for achieving maximum free flight performance would be around 8 x 4 or 8 1/2 x 3 1/2

Summary of Data

Type: Reverse flow scavenged two cycle with reed valve intake.

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Weight: 4 ½ oz. including starter spring.
Displacement: 0.1495 cu. in. or 2.45 c.c.
Bore: 0.585 in.
Stroke: 0.556 in.
Stroke/Bore Ratio: 0.95:1.
Specific Output: 2.13 bhp/cu. in.
Power/Weight Ratio: 1.24 bhp/1 lb.
Price: $12.98 including starter and special wrench.
Manufacturer: L. M. Cox Manufacturing Company Inc., 730 Poinsettia Street, Santa Ana, California.

Cox Olympic .15
Review
by P.G.F. Chinn

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