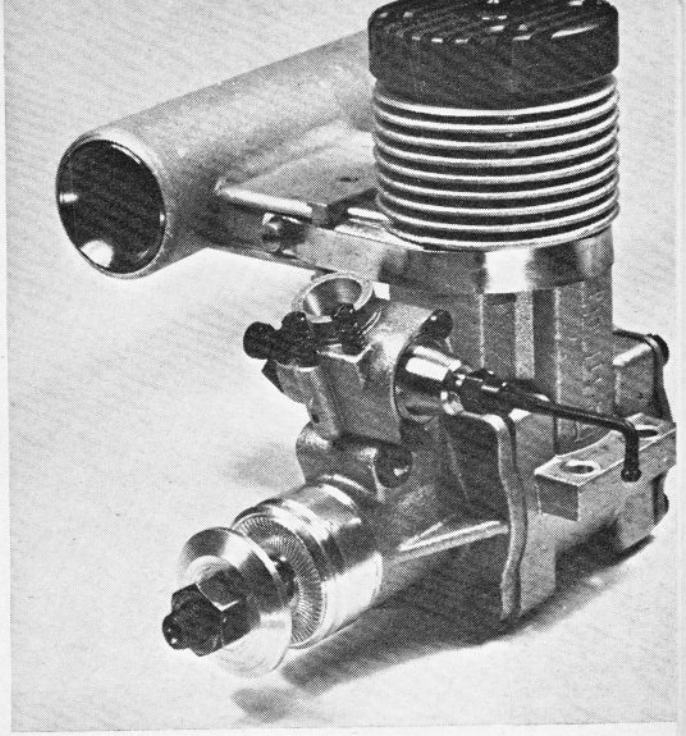
PETER CHINN *tests the*

O.P.S. URSUS 60

"One of the most impressive engines tested to date"



THE INITIALS OPS stand for *Officine Picco e Saoner* which, translated, means the workshops of Picco and Saoner, the original partners in this Italian model engine manufacturing enterprise that was established in 1968. The company is still headed by Gualtiero Picco, who is mainly responsible for design and production, but Signor Saoner left several years ago and, now in charge of the business side, is the former Italian C/L speed champion, Piero Muzio.

The OPS Ursus 60 was the company's first attempt at an R/C aircraft engine and first appeared in 1972. We tested an ex-factory sample shortly afterwards, but found it to be well below expected levels of performance. The Ursus was completely redesigned during 1973 and re-emerged just over a year ago as the Ursus "Series 74." It is with this model, which has vastly improved performmance, that our present report deals.

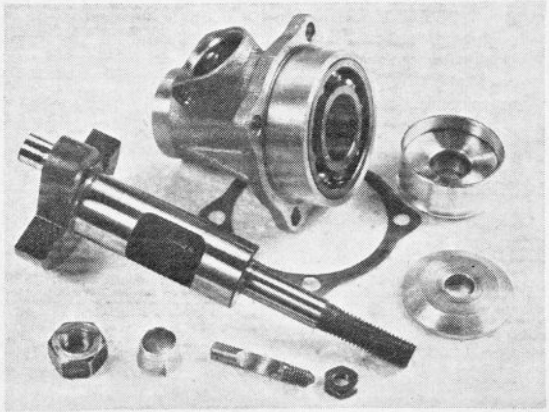
In this connection, we would suggest that any prospective purchaser of an Ursus 60, particularly if buying secondhand and always assuming that he is looking for high power output, should make sure that he acquires a Series 74 model, rather than an earlier Ursus. The Series 74 can be readily identified, externally, by its new main casting with cast (instead of machined) cylinder fins and its differently shaped exhaust duct. It also has four cylinder head screws, instead of eight. Internally, there are innumerable significant modifications, including a bigger and better shaped shaft port and a much longer induction period, terminating at 55 deg. ATDC instead of the curiously premature 23 deg. ATDC of the original model. The transfer channels are much wider and the cylinder ports are both very much larger and remain open for longer periods. Finally, the carburettor choke area has been increased approximately 30 per cent.

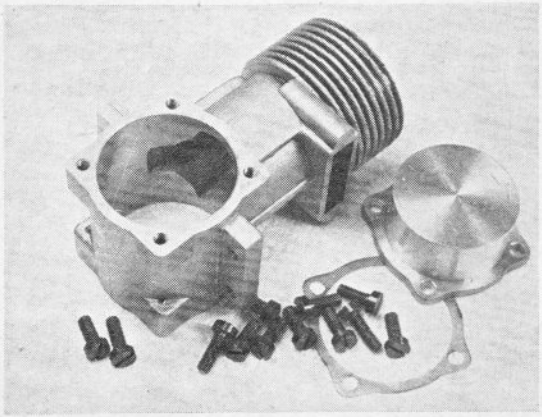
The Ursus Series 74 is heavy for a 10 cc engine at nearly 18 oz. less silencer, but makes up for this in higher than average performance. Unlike other engines tested in this series, it uses an ABC type cylinder/piston assembly, i.e. a ringless aluminium piston running in a brass cylinder liner with chromed bore.

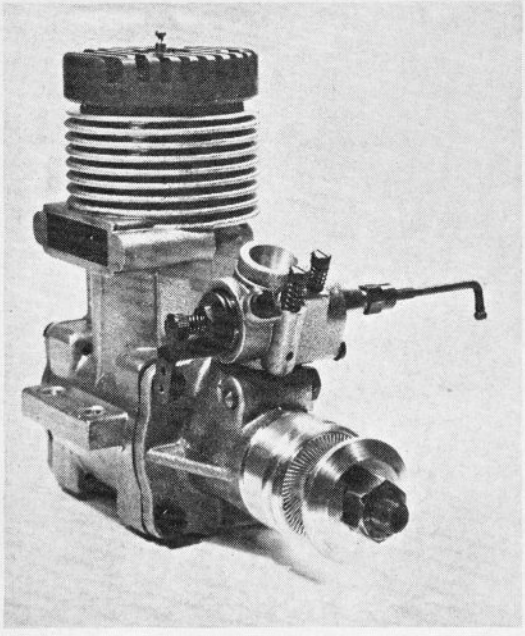
Design and Construction Summary

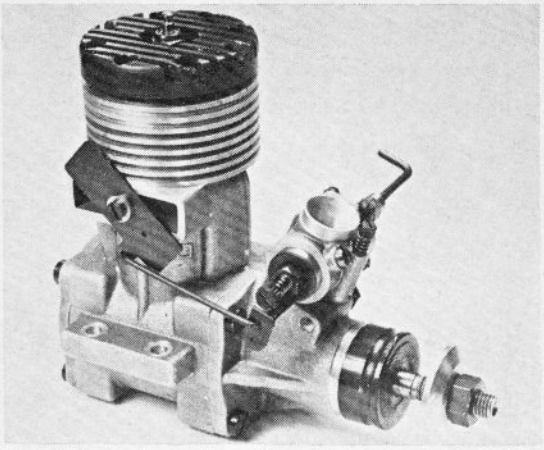
Main Casting. This comprises the crankcase barrel and full length cylinder casing with cast-in transfer channels, substantial beam mounting lugs and a short exhaust duct.

Cylinder. Thick-walled (2mm) brass cylinder liner with chromium plated bore, located in cylinder casing by wide top flange, notched to clear head screws. Single unbridged exhaust port on right side, timed to open and close 71 deg. each side of BDC. Two main transfer ports angled to direct gas to left side of cylinder and timed to open and close 63 deg. each side of BDC. Rectangular third port diametrically opposite exhaust port, chamfered









We include the above photo of the original Ursus only as an aid to recognition (see text). This model is considerably less powerful than the redesigned Series 74 featured in this test report, shown left

on upper and lower edges to sweep gas upward and timed to open and close 60 deg. each side of BDC.

Crankshaft and front end assembly. Counterbalanced hardened steel crankshaft with 15mm. dia. main journal, 7mm. dia. front journal and integral 7mm. dia. crankpin. Rectangular valve port timed to open at 43 deg. ABDC and close at 55 deg. ATDC and admitting gas to 11.1mm. bore gas passage. Shaft supported in one 15 × 32mm. 9-ball steel-caged ball journal bearing at rear and one 7 × 19mm. 7-ball brass-caged ball journal bearing at front, in cast aluminium alloy detachable front housing with 14mm. i.d. intake boss, Housing secured to crankcase barrel with four 4mm. cheese-head screws. Paper gasket. Machined aluminium alloy prop driver on aluminium split taper collet. ¼UNF thread for prop nut.

Piston and connecting-rod assembly. Ringless, flat crown, deflectorless, cast high-silicon content aluminium alloy piston, with oil groove 1mm. below top edge. Plain piston skirt without port windows or cutaways. Forged aluminium alloy connecting-rod, 40.7mm. between centres, with bronze bushed big-end having two oil holes and plain unbushed small-end without oil holes. 6mm. o.d. hollow gudgeon-pin, closely fitted to piston and retained by wire circlips in piston bosses.

Cylinder-head. Finned, machined aluminium alloy with hemispherical combustion chamber surrounded by 4.9mm. wide squish-band. Centrally located glowplug. Head secured to cylinder casing with four 4mm. cheese-head screws. 0.3mm. composition gasket.

Backplate. Deeply recessed cast aluminium alloy backplate secured to crankcase with four 4mm. cheese-head screws. Paper gasket.

Carburettor. OPS barrel-throttle type with adjustable automatic fuel metering plus adjustable airbleed. Cast aluminium alloy body. Steel throttle barrel having 8mm. choke. Needle-valve assembly fitted in left side of body with fuel jet protruding approx. 3mm. into choke. Effective choke area approx. 34sq.mm. Part-throttle fuel metering via second needle mounted in throttle barrel which engages fuel jet as throttle closes.

Silencer. OPS do not at present offer silencers for their engines, but have approved the use of the Swiss Ko extractor type silencer with the Ursus.

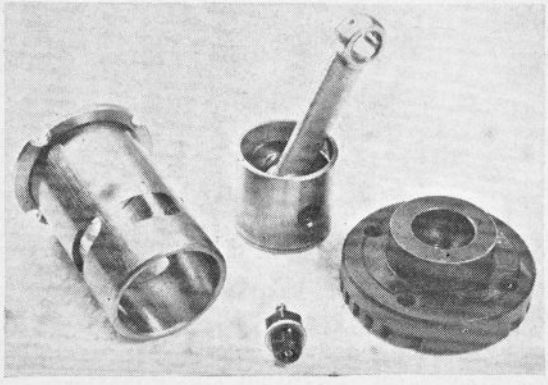
Test Performance

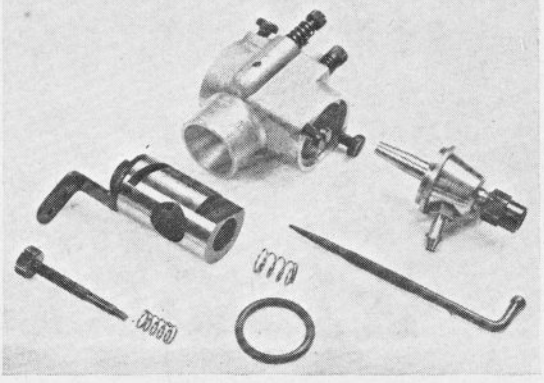
Our test sample Series 74 Ursus came direct from the factory in Italy and had been checked out prior to despatch. The ringless piston was found to be an excellent fit in the chromed cylinder bore: free-running, yet close enough towards the top of the stroke to ensure good compression. For running-in, we used a straight 3 to 1 mix of methanol and castor-oil, giving the engine a total of 60 minutes accumulated running time. The OPS showed no tendency to tighten and lose power.

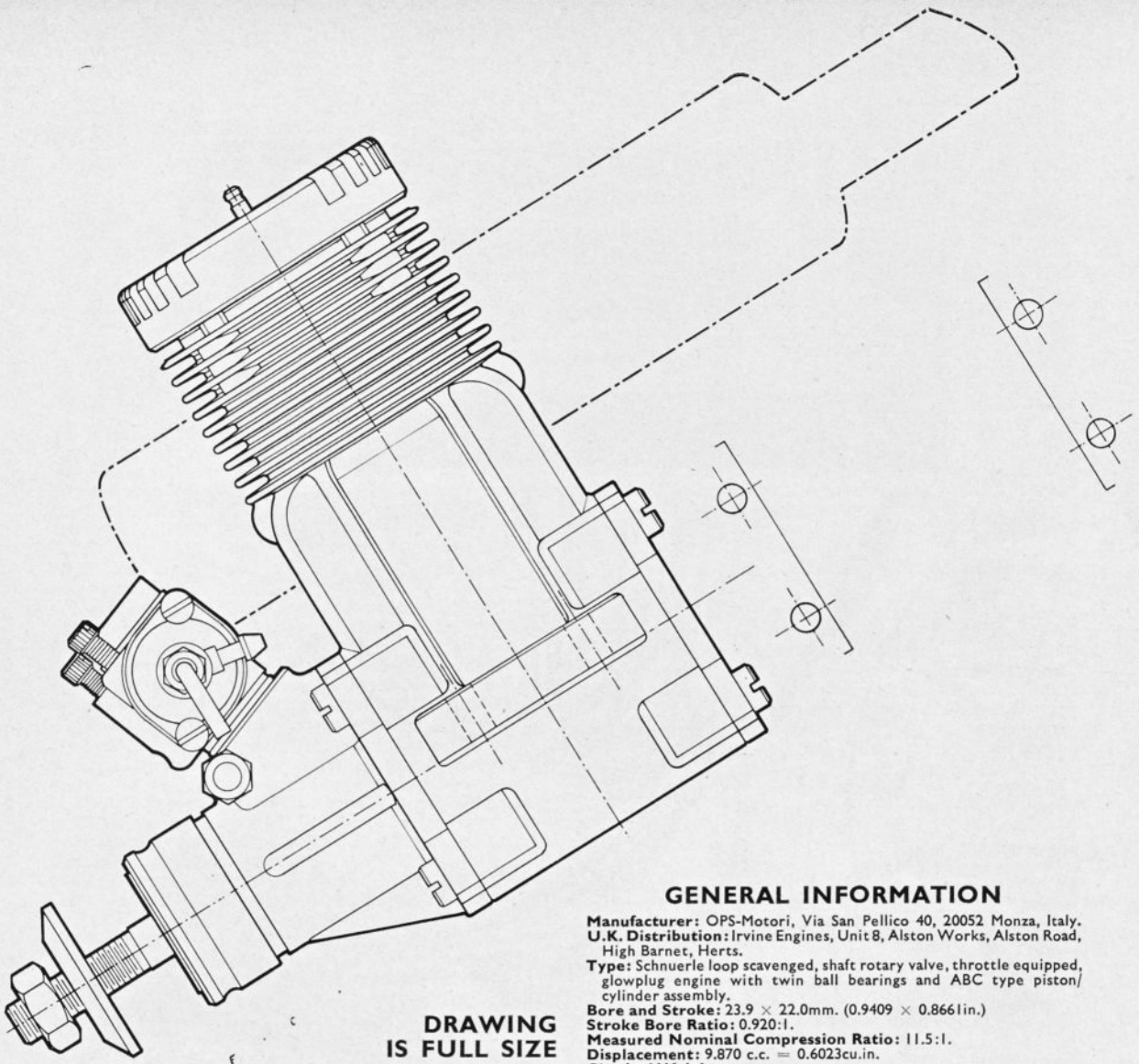
All performance tests were carried out on our standard test fuel containing 5 per cent. pure nitromethane and 20 per cent. castor-oil and with OPS glowplugs as supplied. Atmospheric temperature at the time of testing was 58 deg. F (14 deg. C) and barometric pressure was 30.27 in.Hg. (1025mb).

Starting and running. Apart from a tendency to run backwards when attempts were made to hand start it on the smaller diameter props (best dealt with by using an electric starter) our OPS would be hard to fault as regards its overall handling and running qualities.

Cold starting (after priming the combustion chamber in







DRAWING IS FULL SIZE

GENERAL INFORMATION

Manufacturer: OPS-Motori, Via San Pellico 40, 20052 Monza, Italy.
U.K. Distribution: Irvine Engines, Unit 8, Alston Works, Alston Road, High Barnet, Herts.
Type: Schnuerle loop scavenged, shaft rotary valve, throttle equipped, glowplug engine with twin ball bearings and ABC type piston/cylinder assembly.
Bore and Stroke: 23.9 × 22.0mm. (0.9409 × 0.8661in.)
Stroke Bore Ratio: 0.920:1.
Measured Nominal Compression Ratio: 11.5:1.
Displacement: 9.870 c.c. = 0.6023cu.in.
Checked Weights:
(i) 508 grammes—17.9 oz. (less silencer).
(ii) 602 grammes—21.2 oz. (with Ko silencer).

the usual way) was practically instantaneous and hot restarts were only slightly less rapid. The engine had pleasantly docile handling characteristics in spite of its lively performance.

Running qualities were equally good. The Ursus held very steady speeds, did not lose power as it warmed up, even when loaded down with a 13 or 14in. dia. prop, and showed below average vibration levels.

Power. Curve plotted from torque v. rpm tests on the Ursus Series 74 indicated a gross output (i.e. less silencer) of 1.55 bhp at just over 16,000 rpm. This is outstandingly good. Adding the Ko extractor type silencer made very little difference to power output and the Ursus Series 74 still reached 1.5 bhp but at a 500 rpm lower peak.

Prop speeds obtained (with silencer fitted) included 9,400 rpm on a 14 × 6 Top Flite maple, 11,000 on a

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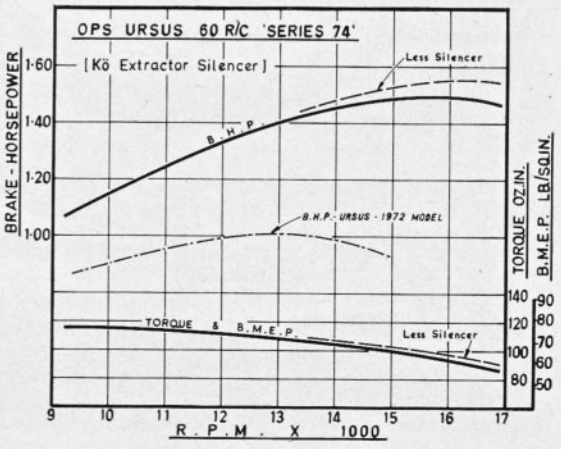

ENGINE TEST—

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13 × 5½ Top Flite, 11,800 on a 12 × 6 Top Flite maple, 11,500 on an 11 × 8 Top Flite maple, 12,500 on an 11 × 7 Top Flite maple, 13,600 on an 11 × 6 Top Flite maple and 14,400 on an 11 × 6 Power Prop maple.

As both the performance curves and the prop rpm indicate, the performance of the Ursus Series 74 was well above average over the whole full-throttle load speed range. So far as previous RADIO MODELLER test reports are concerned, its performance was matched only by the Webra Speed 61. The Ursus, in fact, reached a very slightly higher peak output than the Webra, although so far as higher static prop rpm are concerned, this was evident only when a small prop was used—i.e. no larger than an 11 × 6 of low power-absorption, such as an 11 × 6 Power-Prop. Here, the Ursus was just 100-200 rpm faster. The manufacturer actually suggests cropping the usual 11-in. diameter props to about 10½in. dia. to allow the engine to reach its peak output in the air. This might be worthwhile with a fast, not-too-large, well-streamlined model with retractable undercarriage, but one feels that, on the strength of the test results, the Ursus does well enough on commonly accepted prop sizes.

Fuel consumption, understandably, is fairly rapid: about 1.25 fl.oz./min. at full throttle on an 11 × 7 prop and, also as expected, the Ko extractor type silencer falls well short of acceptable standards of noise suppression.

Throttling. The OPS carburettor worked extremely well, providing idling speeds of around 2,400-2,500 rpm on 11-12in. props with excellent recovery and steady intermediate speed operation.

Comment

One of the most impressive engines tested to date. An enormous improvement on the original OPS Ursus. Powerful, easy to handle, smooth running and with a good throttle. Needs a much more effective silencer than the Ko to provide acceptable muffling but has sufficient performance to stand the power loss of such a silencer.