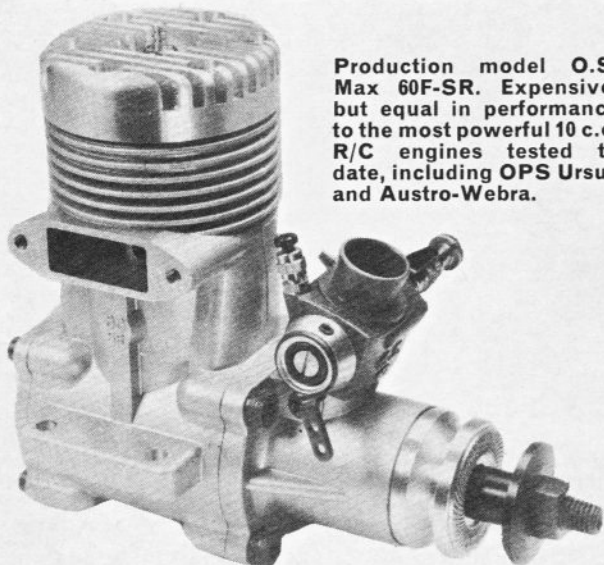


Peter Chinn's

RADIO MOTOR

COMMENTARY



Production model O.S. Max 60F-SR. Expensive, but equal in performance to the most powerful 10 c.c. R/C engines tested to date, including OPS Ursus and Austro-Webra.

A COUPLE of nasty accidents in the local club, involving badly lacerated hands and hospital treatment, prompts one to comment on something that has become all too common recently.

At some time, each of us has earned a painful whack from starting an engine, or skinned a knuckle when adjusting the needle-valve, but what we ought to be worrying about are injuries that can result when a modeller—often a newcomer to the hobby—unthinkingly puts his hand straight through the whirling prop blades.

Once upon a time, a modeller's first power model was invariably free-flight or control-line and the most popular engines were small ones of around 1 c.c., so when our beginner unwittingly got his fingers in the way, he instantly acquired, at the expense of no more than a few cuts or bruises, a miraculous new intelligence which thereafter steered his hand around the prop rather than through it.

Nowadays, however, it is obvious that the beginner in R/C is at very much greater risk. Consider. No longer does he start with a light-weight, low-powered single-channel model. Instead, he is encouraged to buy a foam-and-block bomb, three or four channel radio and, as often as not, a .40 to haul it aloft. Add a 10 x 6 nylon prop and what have we got? A mobile, ultra high-speed bacon-slicer. Now put yourself in his shoes. You are a novice . . . The moment has come . . . You start the engine . . . Are you going to manage to control this howling beast or will you make a complete hash of it? Not to put too fine a point on it, you are distinctly nervous. *Not* a nervous type? Inexperienced but confident? Over-confident, probably. Either way you are ripe for an accident.

Clearly, it is up to all of us to try to prevent these and similar occurrences and a word of tactful advice from more experienced fellow club members is probably the best way of approaching the problem.

First and foremost, let us press home the point that a prop turning at ten or twelve thousand r.p.m. and absorbing upwards of half a horsepower is a pretty dangerous instrument and needs to be treated with the utmost caution. Nylon props are considerably worse than wooden ones in this respect and there is the added risk, with nylon, of blade-shedding if such props are used on more powerful engines—a practice that is to be discouraged. Here, we make no excuse for repeating a warning we have voiced before, which is never to crouch over



Standard OS-704 silencer is included with Max 60F-SR. It muffles effectively but at cost of 1000 r.p.m. and some deterioration in running qualities.

an engine running at full bore and to keep spectators, especially small children, well away from the front of the model. An 11-inch prop running at 12,000 r.p.m. on a .60 size engine, for example, has a tip speed of 576 feet per second or 393 m.p.h., which doesn't give much time to dodge out of the way if the prop throws a blade. You'd be more safely occupied as a knife-thrower's assistant.

Secondly, it isn't sissy to use a finger protection for starting a model aeroplane engine. For about twenty years, E.D. have made an excellent finger-stall which we can thoroughly recommend. It is of moulded rubber with thick ribs on the back to protect the wearer from the thwack of the following blade if the engine fires prematurely.

Thirdly, it is not necessary to start an engine, as so many modellers do, on full throttle. Any R/C engine worth its salt should start perfectly satisfactorily with the throttle in the closed position and can then be left to idle, while the owner repositions himself rearward where he can make any final full-throttle needle-valve readjustment safely from behind, just before take-off.

None of this, of course, will actually prevent anyone from getting tangled with the prop in a thoughtless moment, but it will help to cultivate a wariness of the front end of the model that should reduce the risk of such a mishap.

O.S. Max 60F-SR

The impending appearance of this motor was first mentioned in the September 1974 'Commentary', when a photograph of the sand-cast prototype 60SR was published, and an illustration of one of the pre-production test batch with black cylinder-head and now renamed 60F-SR followed in the February issue. Actual production models, however, have now been available in the U.K. for three or four months, so it is high time that this, the most powerful O.S. engine manufactured to date, was reported upon in more detail in this column.

With this new motor, O.S. have joined the ever-growing movement towards Schnuerle scavenging for 10 c.c. class R/C motors. We have now reached the point where Schnuerle-type engines (HP, OPS-Ursus, Austro-Webra, Ross RC-61, Fox Hawk, O.S. 60F-SR, plus the new Kraft 61 and Enya 60XF) are just about as numerous as crossflow or open loop scavenged examples, such as the Merco, Super-Tigre, HB, K&B-Veco, Rossi, Berlin-Webra, Meteor, etc.

In general design and appearance, the 60F-SR closely follows the first O.S. Schnuerle-port motor, the Max 40-SR racing unit except, of course, for its use of shaft-valve induction in place of the 40-SR's rear rotary drum valve. Construction and finish are to high standards and, as one is entitled to expect of an engine costing nearly £55 including silencer, its overall quality and performance place it in the very top bracket of 10 c.c. R/C motors.

The engine is built around a nicely proportioned pressure-diecast one-piece crankcase-barrel/cylinder-casing incorporating the three transfer channels. The closely fitted cylinder-liner (with hard-chromed bore in the latest engine) has a centrally bridged exhaust port, timed to remain open for 142 degrees of crank angle and the usual Schnuerle arrangement of flanking angled main transfers and an upwardly inclined third port. The main transfers open at 60 deg. before bottom dead centre and the third port opens 5 deg. later.

The flat crown piston is fitted with a single, pinned compression-ring and has rectangular skirt cutaways fore and aft to avoid masking the main transfer entries. The conrod is of machined bar-stock with bronze bushes at both ends, an oil slit at the small-end and two oil holes at the big-end. The hardened tubular 6mm o.d. gudgeon-pin is retained by clips.

The crankshaft has the usual 15mm o.d. main journal, a 6.5mm o.d. integral crankpin and an 11mm i.d. gas passage fed from a large rectangular valve port. This uncovers the intake port for approximately 207 degrees of crank angle, opening quite early at 28 deg. ABDC and closing at 55 deg. ATDC.

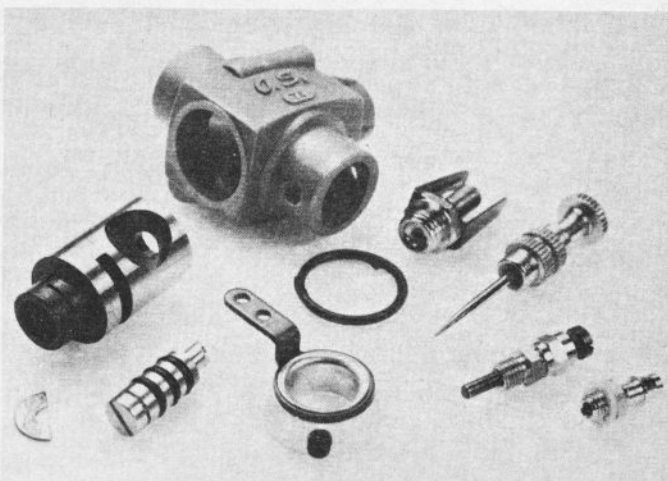
The shaft runs in a 15 x 28mm. NTN 11-ball steel-caged ball journal



Some of the parts of the O.S. 60F-SR. Cylinder porting follows 40-SR design. Ring is pinned and liner has chromed bore. All assembly screws are hardened Allen cap head type. Three Allen keys are provided.



60F-SR equipped with O.S. Type carb with automatic fuel metering adjustable while engine is idling by means of screw-driver slot. Idle-stop (seen removed) is fitted with gland-nut.



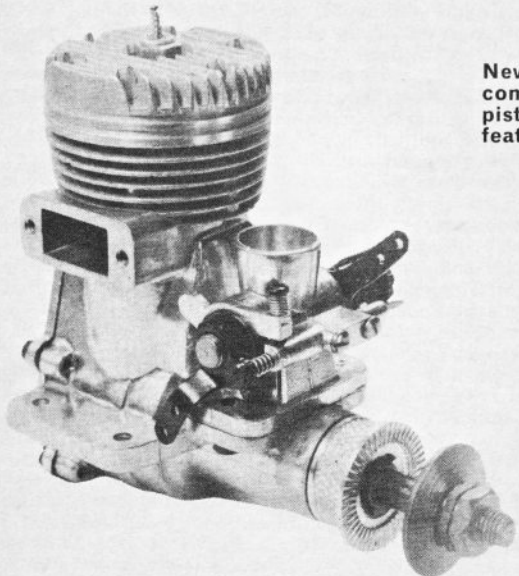
Parts of the O.S. Type 74 carburettor showing mixture control valve in left foreground. Carb gave extremely good control on test and proved not at all critical to adjust.

bearing at the rear and an 8×22 mm NTN 7-ball steel-caged ball journal bearing at the front. The latter is of the shielded type and further protection is provided by the turned aluminium prop-driver which is recessed to fit over the machined nose of the robustly proportioned front housing.

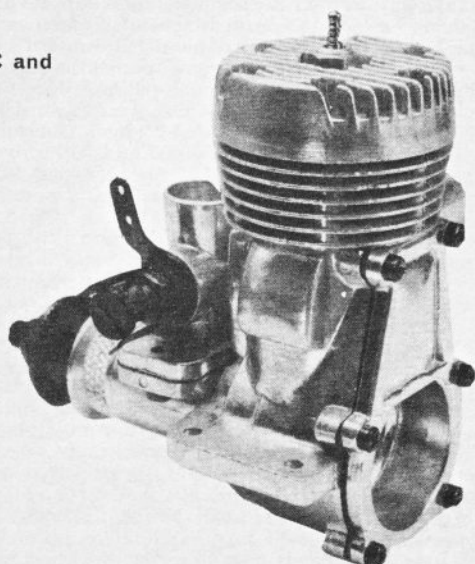
The machined bar-stock, finned cylinder-head has a bowl-shaped combustion chamber surrounded by a 4.2mm wide squish band. A soft aluminium gasket, 0.4mm thick, is used to make the joint between the head and cylinder liner top flange and the measured combustion chamber volume with this in place checked out at 0.92ml, giving a nominal compression ratio of 11.8:1.

The carburettor fitted to the Max 60F-SR is the OS Type 74 with adjustable automatic mixture control as fitted to the current Max-H60F-GR model. It has provision for easy adjustment of the idling mixture while the engine is running and has a generous 38 sq. mm effective choke area. The Type 74 carb is intended for operation in conjunction with a silencer-pressurised fuel system, but for those who may wish to use suction feed, an optional choke restrictor is supplied with the engine which reduces effective choke area to 29 sq. mm.

To date, the manufacturers of the more powerful types of 10 c.c. R/C motors have been reluctant to supply them with effective silencers



New from America. Latest Fox 40 R/C and companion 45 R/C model have lapped piston and bushed main bearing, but feature Schnuerle scavenging.



due to the fact that hard-won extra performance can quickly disappear again when anything other than a noisy low-loss 'silencer' is used. Initially, the O.S. company intended to offer the 60SF-SR without a silencer and to leave it to their customers, in various parts of the world, to decide the level of power loss to be tolerated in their respective areas by choosing from the many proprietary silencers now obtainable.

However, with the recent and somewhat belated recognition of the fact that existing low-power-loss silencers fall lamentably short of acceptable standards of muffling, O.S. are, after all, supplying the 60F-SR with a standard OS-704 expansion type silencer suitably adapted. This is basically the same as that supplied with all O.S.60 and 80 engines over the past four years, but has an adaptor to fit the 60F-SR exhaust stub. It has a 7.5mm i.d. tailpipe giving a cross-sectional area of only 44 sq. mm (about one-fifth to one-quarter of the area of some of the vented front type mufflers) and does a tolerable job of suppressing the 60F-SR's lusty voice, though not without knocking up to 1200 r.p.m. off prop speeds.

We also found that this silencer resulted in a slight but definite deterioration in the engine's smooth and even running qualities. This is not unusual when a high performance free-breathing motor has its exhaust restricted by a silencer with a small outlet area. One feels that, in view of the 704's better than average muffling qualities, owners may be pardoned for opening up the tailpipe to restore a little of the 60F-SR's power and smoothness. There is sufficient material to allow the outlet to be reamed out to 10mm for a cross-sectional area of 78 sq. mm. This, by the way, is still well under half the outlet area (177 sq. mm) permitted by the FAI pylon-racer silencer rules.

Tests so far carried out on the Max 60F-SR have shown it to be easy to handle and very powerful. After a short running-in period, the following prop r.p.m. figures were recorded (less silencer) on 5 per cent nitromethane fuel:

- 9,500 r.p.m. on a 14x6 Top-Flite maple
- 11,700 r.p.m. on a 11x7½ Bartels glassfibre-epoxy
- 12,000 r.p.m. on a 12x6 Top-Flite maple
- 13,200 r.p.m. on a 11x7½ Power-Prop maple
- 13,500 r.p.m. on a 11x8 Robbe glassfibre-nylon
- 14,000 r.p.m. on a 11x6 Top-Flite maple
- 14,500 r.p.m. on a 11x6 Power-Prop maple
- 15,900 r.p.m. on a 10x6 Top-Flite maple

Starting qualities were excellent and we were able to hand-start the engine without difficulty on all props - even a 9 x 6 (which was turned at 18,100 r.p.m.). Throttle response was faultless with safe idling on the bench down to only 2,000 r.p.m. on 11-inch props. Nor was the engine at all hard on plugs. A single O.S. No. 7 plug survived the running-in and all the tests.

Like the still current (and less expensive) Max H60F-GR, the 60F-SR has a bore and stroke of 24 x 22mm (displacement 9.953 c.c. or 0.6073 cu. in.) but is more heftily proportioned externally and is 1.9 oz. heavier at 16.6 oz. bare, or 19.7 oz. with silencer.

New Fox R/C Engines

We have just received samples of two additions to the extensive range of Fox engines. These are the entirely new Fox 40 and 45 models, featuring Schnuerle-type porting and a very unusual crankcase design. The latter has been adopted to facilitate coring of the main casting to form the forward transfer bulge. The rear transfer passage is formed in the special backplate which, when removed, uncovers the lower part of the cylinder as well as the crankcase. This configuration is, incidentally, the subject of a patent application by the Fox company.

The 40 perpetuates the bore and stroke combination of the previous Fox 40 models at 0.800 x 0.790 in. for a displacement of 0.3971 cu. in. or 6.507 c.c. The 45, a new size for Fox, has the bore increased to 0.850 in., enlarging the swept volume to 0.4483 cu. in. or 7.346 c.c. Externally, the two engines are practically identical in appearance.

These present models of the Fox 40 and 45 have bronze bearings and lapped pistons, but plans are in hand to produce, also, ball-bearing, ringed-piston versions of them.

More detailed information will follow in this column in due course.

Enya 60XF

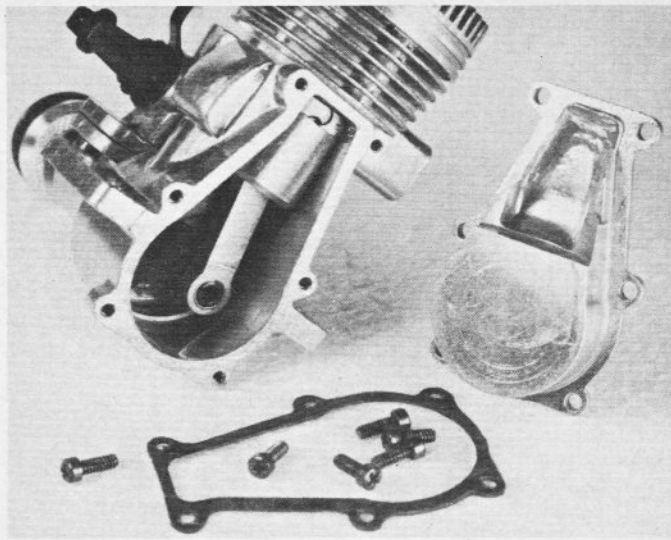
This engine, the first Enya to feature Schnuerle scavenging, has now been announced in Japan. Externally, it follows the traditional Enya appearance, with a detachable front end and machined fin edges, but has a number of interesting internal changes which will be dealt with in a later article. Claimed output is 1.7 b.h.p.

E.D. Multi-Carb

Mike Birch, British R/C aerobatics champion, is currently using this new British made carburettor (which was described and illustrated in the March "Radio Motor Commentary") and has sent along an account of his findings as a user. Here is his report (very slightly condensed):

"Last November, Ken Day of E.D. let me have a pre-production model of the new E.D. A.M.C. multi-carburettor to try out. When I first heard about it I was sceptical as I have seen so many new products that turn out to be no better than their counterparts that have been in production for years.

"However I was immediately impressed by its high quality, workmanship and accurate fits, with its barrel revolving very smoothly in the bore



Unique construction of new Fox 40/45 engine. Large crankcase rear opening and backplate were adopted to make for more convenient production.

and perfectly aligned in the venturi. The unusual but sensible position of the needle-valve also struck me as an advantage as it was now well away from the propeller and easily accessible. Also, when Ken explained just how it worked, I realised that to have the metering slot on the circumference of the barrel must give the most accurate control since it is the place where maximum movement occurs.

"As my competition 'Capricorn' was ready set up and tried out ready for America in December (where I was unfortunately shot down by the American Citizens Band which is also on 27 MHz) I decided to put the new carb on an HP 60F which was installed in another 'Capricorn'. As I was told that the carb was set up by gauge and had not been previously put on an engine, I was surprised that it was almost set right and only needed to be leaned out about one notch on the knurled wheel. At maximum power it gave at least 500 r.p.m. more than the standard carb and at slow speed, throttled very steadily at just over 2,000 r.p.m. on a 12 x 6 prop, which is as slow as, or slower than, is really needed. But the remarkable quality was that not only did it pick up immediately from anywhere in the range but two-stroked* evenly at all settings which proves the fuel metering slot must be extremely accurate. In general the E.D. A.M.C. carburettor gave very good all round performance and is certainly the best carburettor I have tried to date.

continued on page 528

Phil Kraft, noted U.S. R/C manufacturer is moving into the engine field with this new 61 engine. We hope to include a full description in these pages shortly.

