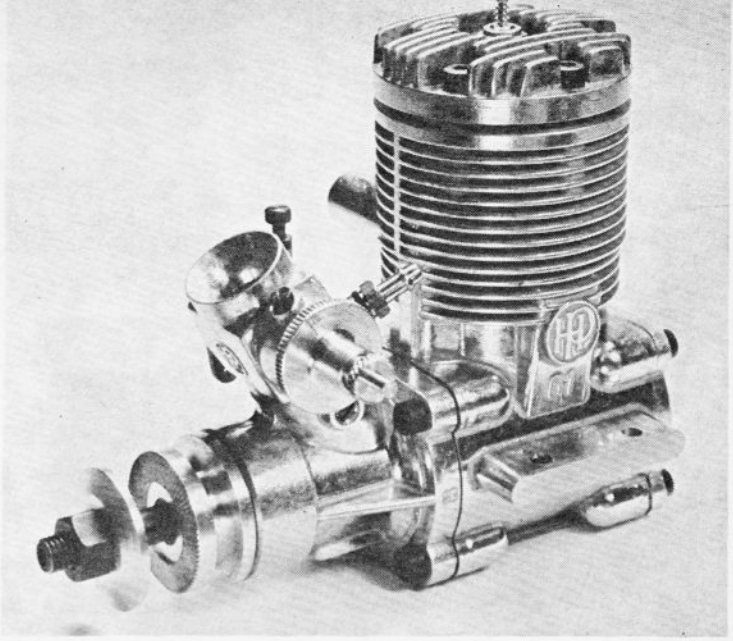
Peter Chinn tests the HP 61 — FS —

"... 15-20% greater power than the 61F"



THE Austrian Hirtenberger HP 61-FS has now been on the UK market for approximately eighteen months, during which time several minor modifications have been made to it. Our tests were carried out on one of the more recent versions.

This engine is, of course, an entirely different design from the earlier HP 61 motor which dates back to 1967. The 61-FS remains a twin ball-bearing front induction, Schneurle scavenged engine with a 24.5 x 21 mm bore and stroke, but has a unit crankcase/cylinder-case with drop-in sleeve, instead of the short crankcase and separate steel cylinder with machined finned aluminium jacket of the original design.

Since our tests were carried out on the 61-FS, HP have announced a number of optional extras for the engine. These include a special needle-valve assembly enabling the fuel/air mixture to be adjusted in flight by means of an extra radio channel and a tuned exhaust system. The latter includes a tuned-pipe silencer and a choice of five exhaust elbows, three in light alloy and two in steel.

Design and construction

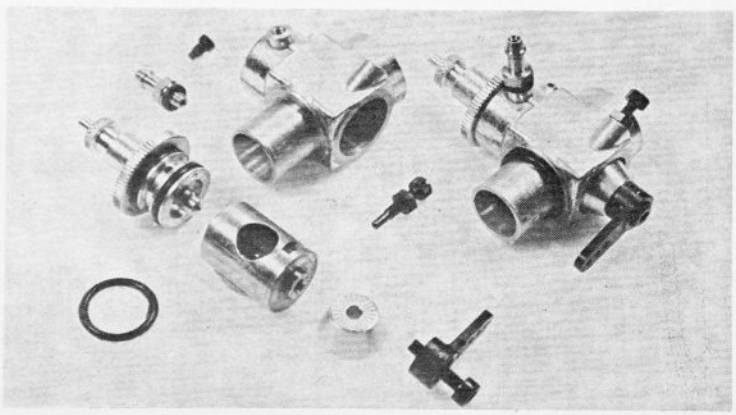
Main casting. This consists of the crankcase barrel and full length finned cylinder casing in pressure die cast aluminium alloy. It incorporates cast-in transfer channels, an exhaust duct on the right side and the usual beam mounting lugs.

Cylinder liner. The steel cylinder liner has a wall thickness of 1.75 mm and is closely fitted to the main casting in which it is located by the usual top flange. Centrally bridged exhaust port on right side. timed to open and close at 73 deg. each side of BDC. Two main transfer ports located fore and aft, angled to direct gas flow to left side of cylinder and timed to open and close at 60 deg. each side of BDC. Third port diametrically opposite exhaust port, angled to sweep gas upward and timed to open and close at 55 deg. each side of BDC.

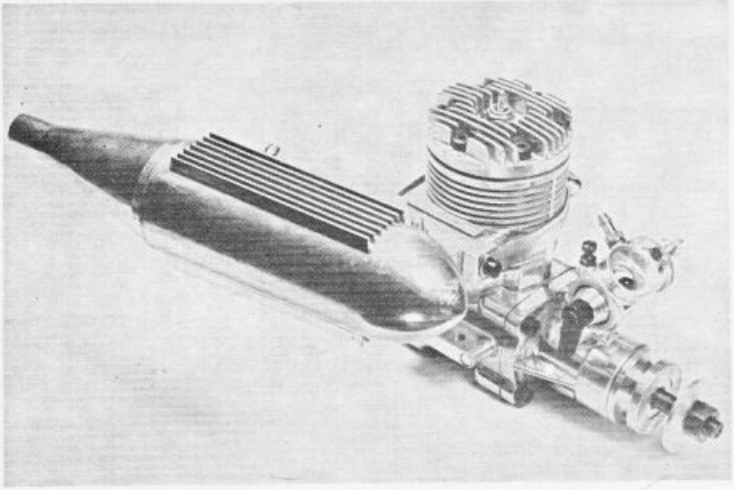
Crankshaft and front end assembly. Counterbalanced hardened steel crankshaft with 15 mm o.d. main journal and 8 mm.dia. front journal. Integral 7 mm o.d. hollow crankpin. Rectangular valve port, 15 mm long, timed to open at 37 deg. ABDC and close at 68 deg. ATDC and admitting gas to 11.2mm i.d. gas passage which widens to 11.5 mm at exit. Shaft supported in one 15 x 28 mm 9-ball steel caged ball journal bearing at the rear and one 8 x 22 mm 7-ball brass caged ball journal bearing at the front. Pressure die cast aluminium alloy bearing housing with 13 mm i.d. intake boss secured to crankcase barrel with four Allen cap screws. Paper gasket. Machined aluminium alloy prop driver mounted on brass split taper collet. The shaft terminates in a ¼-28 UNF thread for the prop nut.

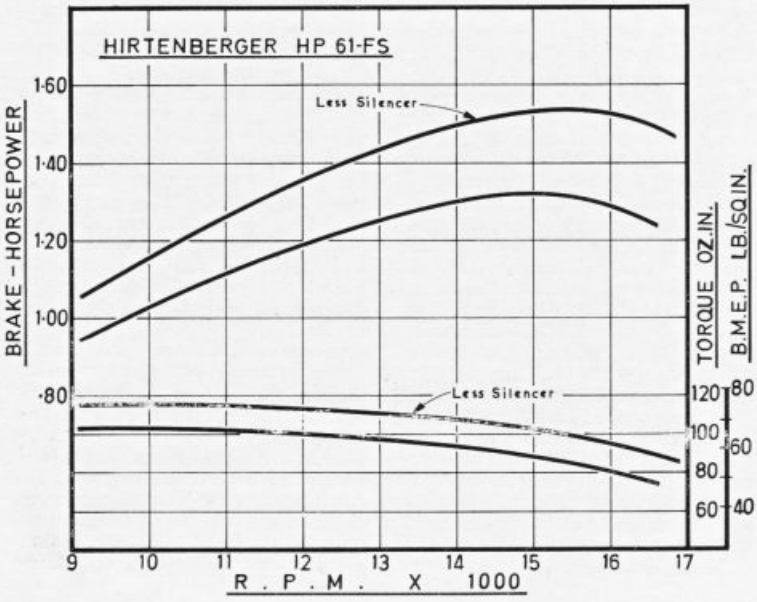
Piston and connecting-rod assembly. Flat crown, deflectorless aluminium alloy piston with single compression ring, pinned to prevent rotation. Piston has rectangular skirt cutaways fore and aft. Forged aluminium alloy connecting-rod, 39 mm between centres, with bronze bushes and lubrication slits at both ends. Tubular 6 mm o.d. gudgeon-pin retained by wire circlips in piston bosses.

Cylinder-head. Finned, pressure die cast aluminium with shallow bowl-shaped combustion chamber surrounded by 4.2 mm wide sloped squish band. Centrally located glow-plug hole for long-reach plug. Head secured to cylinder casting with six Allen cap screws. Two .06 mm steel shims in lieu of usual soft aluminium or copper head gaskets. (Other examples may have different thick-



Auto-carb—complete and dismantled.





ness shims to correct nominal compression ratio.)

Backplate Deeply recessed pressure die cast aluminium backplate, machine finished to fit 33.5 mm i.d. crankcase barrel and secured with four Allen screws. Paper gasket.

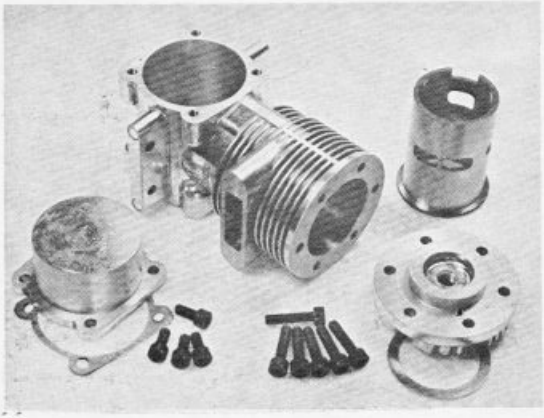
Carburettor. New HP automatic fuel metering type exclusive to HP 61-FS. Pressure die cast aluminium alloy carburettor body containing ground brass throttle barrel and machined aluminium alloy metering valve.

Fuel supply enters carburettor body through brass inlet nipple and is contained in annular chamber formed between two large diameter O-rings on reel-shaped fuel metering valve. From here fuel is fed through hole in middle of metering valve and passes into a 4 mm o.d. central spigot. Spigot is co-axial with throttle barrel and fits into it, allowing fuel to be transferred to thottle barrel via tapered slot in side of spigot and a small transfer channel in barrel. From here, fuel passes into a brass jet tube fitted to barrel. Amount of fuel released by jet at part-throttle and idling settings controlled automatically by rotation of throttle barrel, the transfer channel in barrel progressively uncovering more of slot in metering-valve spigot as throttle moves from closed to open position. Manual adjustment of metering-valve to establish best idle mixture is effected by rotating metering-valve (which incorporates a large diameter knurled disc for the purpose) a few degrees within carburettor body—clockwise to weaken, anti-clockwise to enrich.

Amount of fuel admitted at full throttle is adjustable by a needle-valve installed in outer end of metering valve.

Carburettor choke bore 8 mm. Effective choke area (after allowing for jet tube which projects just over half-way across choke) approximately 37 sq.mm.

Silencer. New HP expansion type



exclusive to HP 61-FS. Pressure die cast aluminium alloy with plain, non-baffled expansion chamber, externally finned, with brass priming nozzle and brass pressurization nipple. "Ideal" worm-drive hose-clip type fitting. Outlet bore 10.5 mm. Outlet area 86.6 sq.mm.

Test performance

Our test sample was run-in using our normal procedure of a series of short runs on ordinary 75/25 methanol/castor-oil fuel. After approximately one hour of accumulated running time, we switched to our standard R/C test fuel of 5 percent nitromethane, 20 percent caster-oil and 75 percent methanol.

Glowplugs are not supplied with HP motors but 2-volt long-reach plugs are recommended. For our tests, we used Fox long-reach 2 volt R/C plugs which appear to suit the 61-FS very well. Atmospheric temperature at the time of testing was 20°C (68°F) and barometric pressure was 1020 mb (30.12 in.Hg.).

Starting and running. No starting problems were encountered with the 61-FS. The engine was hand started easily from cold when new and, by the end of the running-in period, piston seal was excellent and an instant hand-start was obtained with the engine hot or cold.

The needle-valve needed to be set fairly precisely for maximum power under very light loads (i.e. when the engine was propped for speeds in 15,000-17,000 rpm range) but the general running qualities were good, the engine holding even, full-throttle rpm over a wide range of loads.

Power—less silencer. A maximum torque of 116 oz.in. was recorded at 10,000 rpm and a peak output of 1.54 bhp at approximately 15,500 rpm was determined on the standard test fuel.

Among the prop speeds recorded were 9,150 on a 14 x 6 Top-Flite maple, 11,700 on 14 x 4 Top-Flite standard and 12 x 6 Top-Flite maple, 11,850 on an 11 x 7¾ Power-Prop maple, 12,500 on an 11 x 7 Top-Flite maple, 12,800 on an 11 x 7½ Power-Prop maple, 13,400 on an 11 x 8 Robbe glassfibre-nylon, 13,00 on an 11 x 6 Top-Flite maple and 14,600 on an 11 x 6 Power-Prop maple.

Power—with silencer. Some engine/silencer combinations indicate a loss of top-end power but with little effect on maximum torque compared with gross output figures. Others show a more even performance reduction irrespective of load. The HP 61-FS equipped with its

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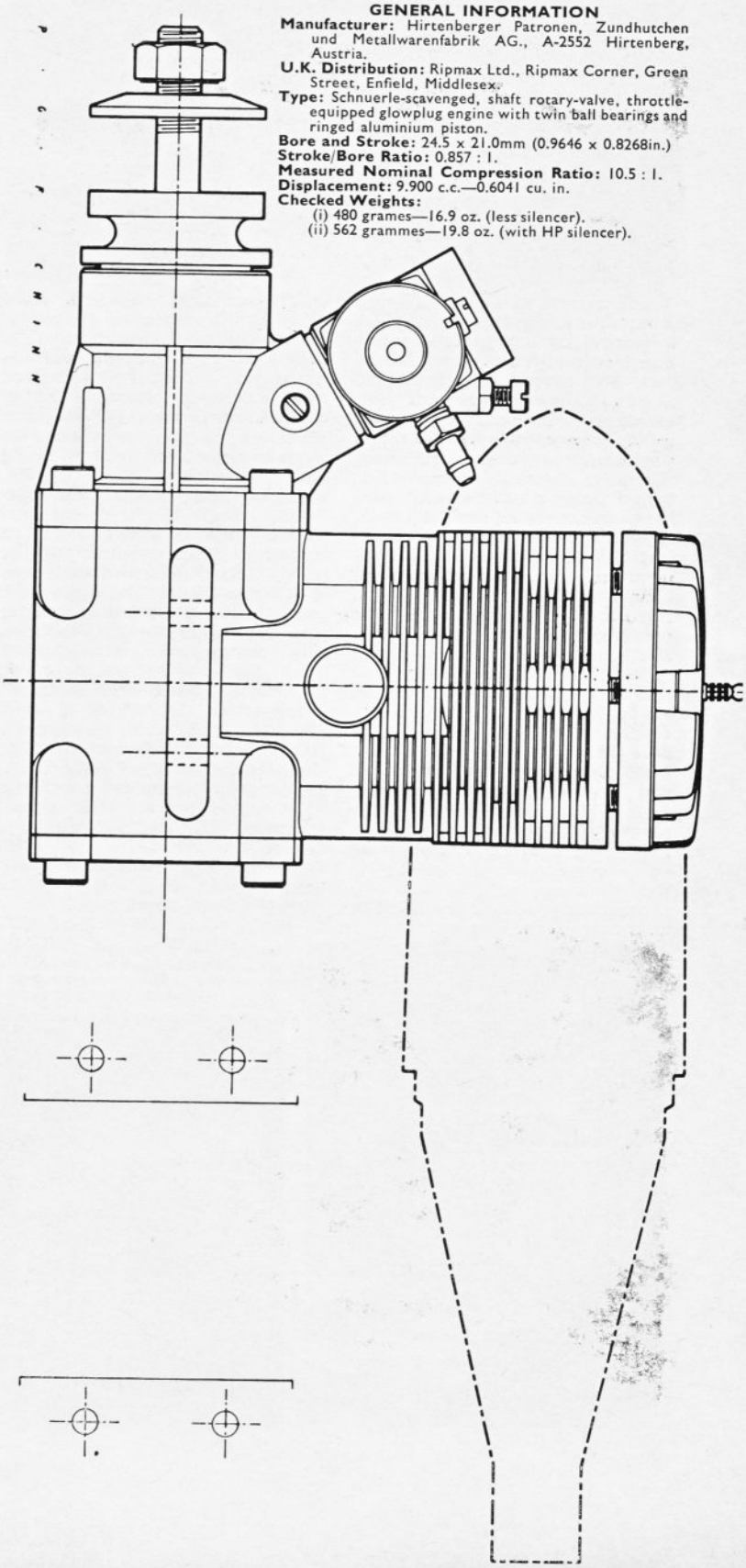
GENERAL INFORMATION

Manufacturer: Hirtenberger Patronen, Zundhutchen und Metallwarenfabrik AG., A-2552 Hirtenberg, Austria.
U.K. Distribution: Ripmax Ltd., Ripmax Corner, Green Street, Enfield, Middlesex.
Type: Schnuerle-scavenged, shaft rotary-valve, throttle-equipped glowplug engine with twin ball bearings and ringed aluminium piston.
Bore and Stroke: 24.5 x 21.0mm (0.9646 x 0.8268in.)
Stroke/Bore Ratio: 0.857 : 1.
Measured Nominal Compression Ratio: 10.5 : 1.
Displacement: 9.900 c.c.—0.6041 cu. in.
Checked Weights:
(i) 480 grames—16.9 oz. (less silencer).
(ii) 562 grammes—19.8 oz. (with HP silencer).



ENGINE TEST

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own silencer seems to belong to the latter category. Checked when loaded for full-throttle speeds in the 11,000 to 16,000 rpm range, loss due to the silencer was never below 600 rpm or above 800 rpm.

The silencer, as one might expect, does not attenuate high-frequency exhaust notes very effectively but it is not too bad in the up to 14,000 rpm speed range.

Throttling. The throttle worked well, giving a safe idling speed of around 2400 rpm on 11 inch diameter props and down to 2000 rpm on the 14 x 6. We found it best to set the reference slot in the idle disc a little on the rich side of the best idle position in order to overcome a tendency to run very slightly weak in the mid range. As with the Perry carburettors, which also use O-rings, the idle disc can become rather stiff to operate. This can be corrected by periodically smearing a little synthetic oil on the O-rings of the idle disc and also the needle-valve.

Comment

A worthy successor to the HP 61F, offering 15-20 percent greater power, allied to pleasant handling and good throttle response. A well built engine of attractive appearance.