

NUMBER  
SIXTEEN

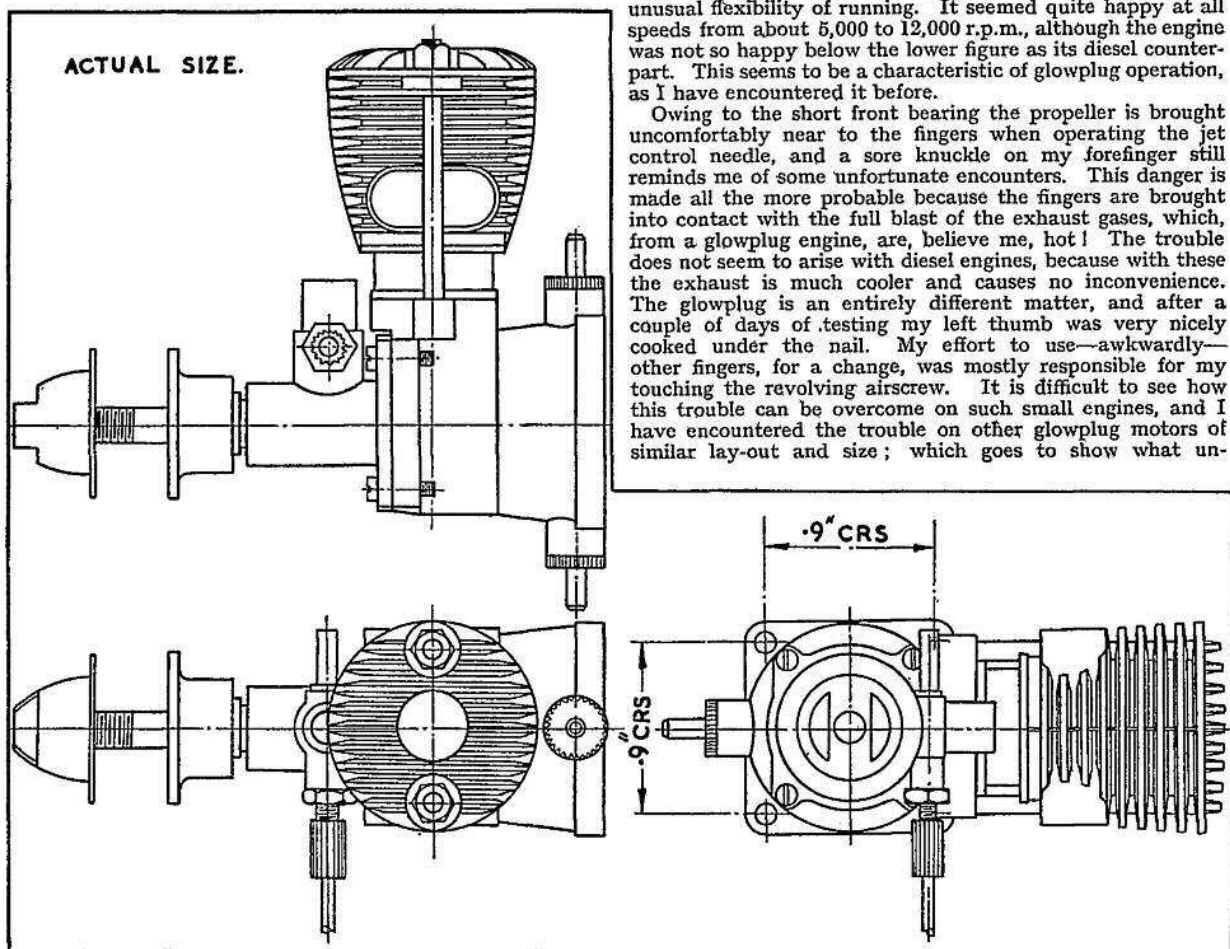


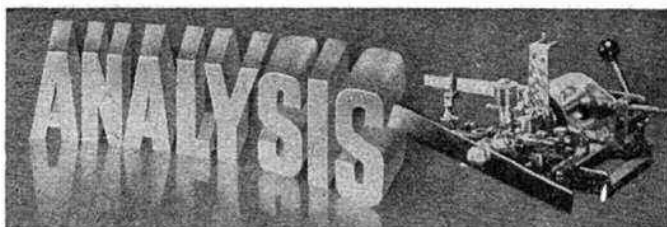
THE Frog "160" glowplug engine follows the external appearance of this well-known range, with the fuel tank integral with the crankcase and forming the engine mount. The rotary-shaft inlet valve is also retained, although I understand that a new type of jet—claimed to give greater sensitivity of control—is now being fitted. During this engine test the old type of jet was used, but it is not felt that the new jet would have had any effect upon the actual power developed by the engine.

Some preliminary trouble was experienced in starting the engine, due to a mysterious and persistent blockage of the jet. Careful investigation disclosed that this was caused by small particles of the plastic fuel tube, which were cut from the bore of the tube each time it was pushed on to the spigot of the jet. The type of tubing used seems very prone to this, and the difficulty was overcome by substituting a different kind.

Once the control settings had been mastered the engine started quite readily, and, as I discovered during my previous tests with the "100" diesel type, the engine displayed unusual flexibility of running. It seemed quite happy at all speeds from about 5,000 to 12,000 r.p.m., although the engine was not so happy below the lower figure as its diesel counterpart. This seems to be a characteristic of glowplug operation, as I have encountered it before.

Owing to the short front bearing the propeller is brought uncomfortably near to the fingers when operating the jet control needle, and a sore knuckle on my forefinger still reminds me of some unfortunate encounters. This danger is made all the more probable because the fingers are brought into contact with the full blast of the exhaust gases, which, from a glowplug engine, are, believe me, hot! The trouble does not seem to arise with diesel engines, because with these the exhaust is much cooler and causes no inconvenience. The glowplug is an entirely different matter, and after a couple of days of testing my left thumb was very nicely cooked under the nail. My effort to use—awkwardly—other fingers, for a change, was mostly responsible for my touching the revolving airscrew. It is difficult to see how this trouble can be overcome on such small engines, and I have encountered the trouble on other glowplug motors of similar lay-out and size; which goes to show what un-





expected things can happen, even when only changing over from diesel to glowplug operation.

#### TEST

**Engine:** Frog "160" 1.66 c.c. Glowplug.

**Fuel:** Frog "Red Glow" Glowplug Fuel.

**Starting:** Pulley-and-cord starting was mostly used for convenience, but the engine started easily by hand when tried experimentally from time to time.

**Running:** This was particularly even at all speeds, and made testing very pleasant, owing to the absence of "hunting" and general fussiness. No cut-out is fitted.

**B.H.P.:** Although the Frog "160" is a general purpose engine, with no claims to being a hot-stuff, racing job, the power output is very creditable, with the maximum power occurring at a nice turn of speed. As will be seen from the graph, a maximum of .083 b.h.p. is found at a speed of 10,850 r.p.m. The rise and fall from this point is gradual; in fact, the curve is remarkably flat. Thus, a drop of only .003 b.h.p. from maximum occurs over a range of 2,000 r.p.m.; that is, between 9,500 and 11,500, so that a slight maladjustment in throttle setting should not have serious results.

After 11,500 r.p.m. power drops fairly rapidly until, at 12,200 further test readings served no useful purposes. So, also, at the lower end of the scale, where, after a reading of .053 b.h.p. at 5,400 r.p.m., tests were discontinued.

**Power/Weight Ratio:** .379 b.h.p./lb.

**Remarks:** No mechanical failures of any kind were encountered throughout the tests, and the engine ran well and consistently at all times.

#### GENERAL CONSTRUCTION DATA

**Name:** "Frog 160"

**Manufacturers:** International Model Aircraft Ltd., Morden Road, Merton.

**Retail Price:** 48/- (including purchase tax).

**Delivery:** Ex Stock.

**Spares:** Ex Stock.

**Type:** Glowplug.

**Specified Fuel:** Frog "Red Glow"

**Capacity:** 1.66 c.c.

**Weight:** 3.25 ozs.

**Compression Ratio:** 10:1

**Mounting:** Radial, Upright or Inverted.

**Recommended Airscrew:** 8 in. dia. by 6 in. pitch

**Recommended Flywheel:** 1½ in. dia. Weight: 3 ozs.

**Tank:** Integral with crankcase.

**Bore:** .485 in.

**Stroke:** .55 ins.

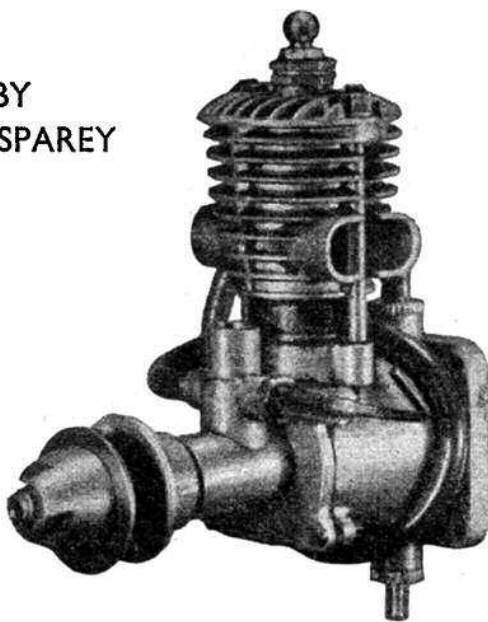
**Cylinder:** Hardened steel, 4 exhaust ports and 4 transfer ports. Attached by spigot and two holding down bolts.

**Cylinder Head:** 2 holding down bolts, Simmonds' lock nuts.

**Contra Piston:** Cast Iron.

**Crankcase:** Aluminium die cast.

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**Piston:** Cast Iron Flat top.

**Connecting Rod:** Hiduminium R.R. 56.

**Crankpin Bearing:** Plain.

**Crankshaft:** Steel, heat treated.

**Crankshaft Valve:** Rotary.

**Plug:** ¼ in. K.L.G. "Miniglow" plug.

**Main Bearing:** Plain (Meehanite).

**Little End Bearing:** Plain.

**Special Features:** Transfer ports are internal with bevelled tops to give direction to the mixture. The combined crankcase and fuel tank facilitate mounting as a "sidewinder" for control line flying.

