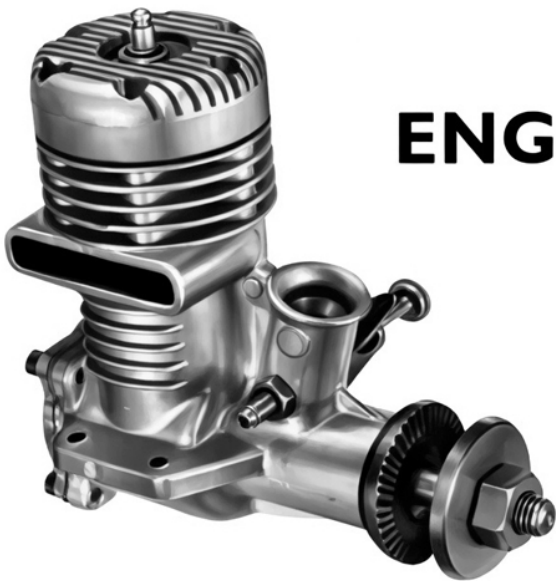


Fox 29X STD - 1958



ENGINE ANALYSIS No. 47

The latest engine from one of America's leading manufacturers for Team racing, stunt or combat flying

FOX 29X

by R. H. WARRING

BASICALLY THE FOX 29X has been evolved from the 29R and the Combat 35 engines, all parts being inter* changeable with one or other of these models, with the exception of the cylinder head. Unlike the 29R, however, the 29X adopts a conventional layout with normal induction.

The 29X is a sturdy, rugged engine with excellent smooth running characteristics and plenty of power. Despite its high output it is an easy engine to handle, is free from marked vibration except at very high speeds, and is also easy to start,

The compression ratio appears fairly high and using a doped fuel there is a marked tendency for the engine to kick back when hand starting, with increasing nitromethane content. With 20 per cent, nitromethane the kick back is quite noticeable, demanding a powerful flick for starting. A maximum of 10 per cent, nitromethane would appear about the limit for normal operation with easy hand-starting without decreasing the compression ratio.

Starting characteristics are exceptionally good, there being no tendency to falter once running. Starting when hot deteriorates with straight fuel, but is again easy with a doped fuel. Due to the good suction, little or no choking is required for starting except for an initial choke when cold, if only to "degum" and free the engine. All the handling tests were conducted in particularly cold .March weather and may not be typical because of this. It is a flattering point, however, that despite near- freezing temperature no trouble at all was experienced in getting the Fox 29X to hand-start on any size of propeller.

Good torque is developed at low speeds, without the engine showing any signs of exceptional power output. Running is quite steady and consistent but the Fox sounds happier at higher speeds (10.000 r.p.m. and above). At speeds above 16.000 r.p.m. the performance was very steady, although there was a noticeable tendency to vibration. At all speeds the needle valve control is exceptionally non-sensitive, allowing plenty of time for adjustment.

Useful power peak.

Maximum power output on test was developed at 14.000 r.p.m., and maximum torque at 10.000 r.p.m. The 29X tends to run quite hot and unless properly cooled with an airstream performance is affected,

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by overheating (c.g. as could occur in a close cowl without adequate venting for airflow through). Fuel consumption is quite high, without being excessively so for an engine of this size.

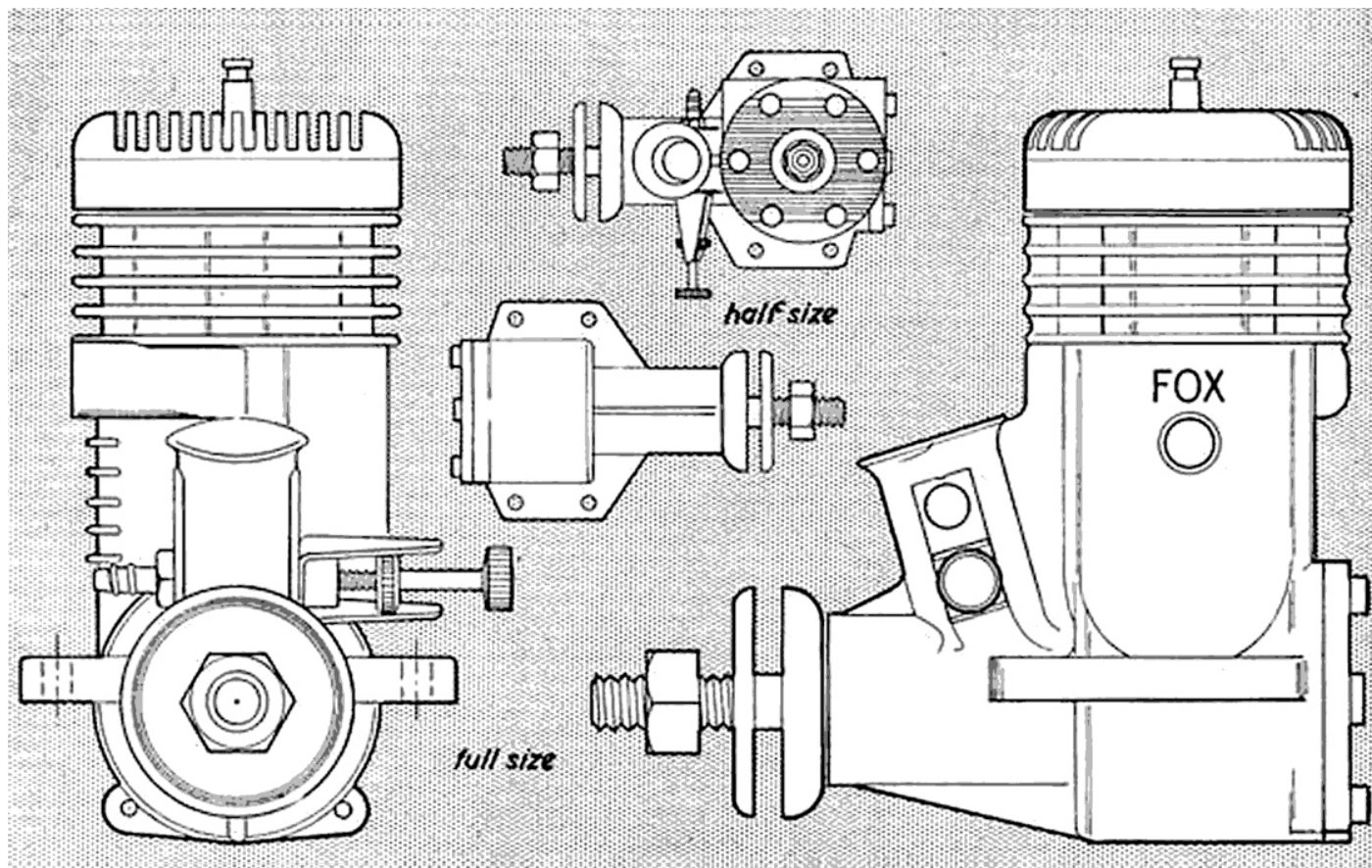
Constructionally the Fox 29X employs a light alloy crankcase casting incorporating the cylinder barrel, exhaust stub and induction tube, into which fits the liner capped by a light alloy head. The only machining operations on the casting are drilling through the induction tube (and inserted main bearing shell), reaming the main bearing for the bronze bearing shell, and the barrel reamed to fit the liner and the top faced, drilled and tapped for the head screws.

The liner is fully machined from leaded steel, turned, reamed and honed internally and ground externally to a plug fit in the crankcase casting. The top of the liner is flanged and seats on top of the cast barrel with a thin aluminum gasket under the flange. Ports are rectangular, of large area and depth, and milled in the liner walls, 'lite bottom of the liner is ground away in a half-moon shape on the transfer side, presumably for con. rod clearance since the cylinder is slightly de Saxe.

The piston is fully machined from a Meehanite billet, ground externally, and is a beautiful job lightened to logical limits. The gudgeon pin is 5/32 in. in diameter, drilled to take brass end pads.

To dismantle, the liner must first be withdrawn and the gudgeon pin "fiddled" out through the hole in the rear of the crankcase casting, when the piston falls free and the con rod can also be removed. The latter is machined from light alloy stock and is of substantial proportions.

The head has an annular recess to fit the liner flange, into which is fitted an aluminum gasket. Compression ratio can be adjusted by removing this gasket, or adding another, if required. The head is contoured with a cross slot to match the straight deflector on the top of the piston, and is of substantial proportions to eliminate warping or distortion.



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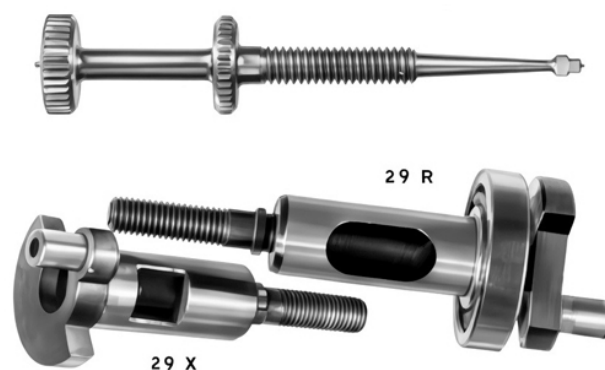
Basic components of the 29X show remarkably little out of the ordinary, yet the plain appearance belies the high performance obtainable. Piston and cylinder are interchangeable with the 29R, but connecting rod and crankshaft are longer on the racing engine.

The crankshaft is a massive unit, although relatively short in length. It is machined from alloy steel hardened and ground to $\frac{1}{2}$ in. diameter stepping down abruptly at the end of the bearing length to a $\frac{1}{4}$ in. diameter threaded length.

The port is rectangular, approx $\frac{3}{8}$ in. x $\frac{5}{16}$ in., drilled, milled and possibly finished by broaching. The central hole through the crankshaft is $\frac{11}{32}$ in. diameter. The crank web is machined away to provide counterbalance and the $\frac{7}{32}$ in. crankpin ground to finish (unusual in American engines). The crankpin is also drilled out .120 in. dia. The main bearing is a bronze sleeve force fitted into the crankcase casting.

All the running fits are exceptionally good. It is obvious, in fact, that considerable attention has been given to all the parts that really matter. There was also far less evidence of roughness on the other parts than in some other Fox engines examined.

The intake tube is fitted with a sleeve, considerably restricting the diameter, which would appear to indicate that this model is intended for "stunt", "combat", team race (or radio) application. A somewhat enhanced performance could probably be realised for racing work with the sleeve removed, although no tests were made.



Larger than life Fox needle shows the bearing end, also used to atomise fuel. Crankshaft comparison shows port differences between Stunt and Racing engines.

Provision is also made for the fitting of a second spray bar assembly for two-speed operation, by drilling through the casting at the appropriate point. The needle valve itself is ingenious in having a "spade" on flat near the end of the taper presumably to bear against the inner diameter of the spray bar and eliminate any possibility of the needle point vibrating and possibly upsetting the fuel mixture. In view of the extreme non sensitivity of the needle valve as a control, however, this refinement hardly appears necessary or may possibly be a major reason for the insensitivity.

Summarising we rate the Fox 29X as an easy engine to handle, one without any apparent vices, sturdy and with an above average performance for a plain bearing engine of this size. From the engineering point of view, too, it is exceptionally well fitted and a credit to the manufacturer's techniques.

Propeller R.P.M. Figures

Propeller	dia. x pitch	r.p.m.
Top Flite	10 x 6	12.500
Trucut	12 x 4	8.200
Trucut	11 x 4	9.800
Trucut	10 x 4	10.000
Trucut	9 x 4	13.700
Trucut	8 x 8	12.200
Trucut	8 x 6	14.500
Trucut	8 x 4	16.000

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Stant	10 x 4	12.500
Stant	9 x 4	13.300
Stant	9 x 9	10.400
Stant	8 x 4	16.100
Stant	8 x 8	13.500
Stant	7 x 4	17.500

Fuel used: 20% Nitromethane, 50% Methanol, 30% castor.

SPECIFICATION

Displacement: 4.896 c.c. (.2955 cu. in.)

Bore: .738 in.

Stroke: .697 in.

Bore/Stroke Ratio: 1.06

Bare weight: 7 ½ ounces

Max. B.H.P.: .465 B.H.P. at 14,000 r.p.m.

Max. torque: 39 ounce-inches at 10,000 r.p.m.

Power output: .095 B.H.P. per c.c.

Power/weight ratio: .062 B.H.P. per ounce

Material specification:

Crankcase unit: light alloy pressure die casting

Cylinder liner: alloy steel

Piston: Meehanite

Connecting rod: machined from 24 ST aluminum alloy

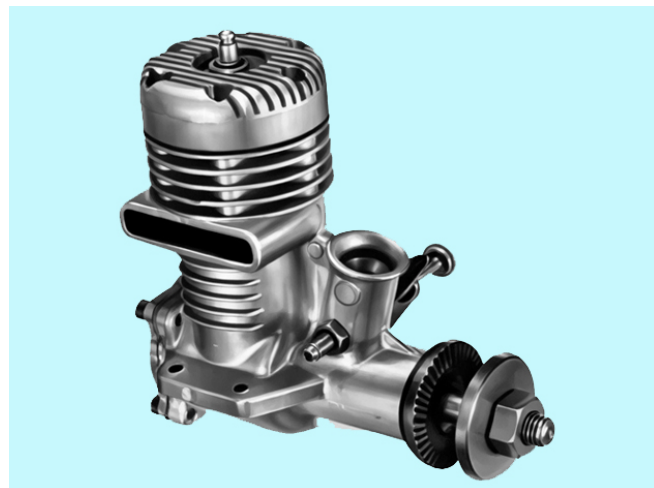
Main bearing: Bearing bronze

Crankshaft: alloy steel, surface hardened to Rockwell "C" '58

Head: light alloy

Spray-bar: brass

Manufacturers: Fox Mfg. Co. Inc., 5305 Towson Ave., Ft. Smith, Arkansas. U.S.A.



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