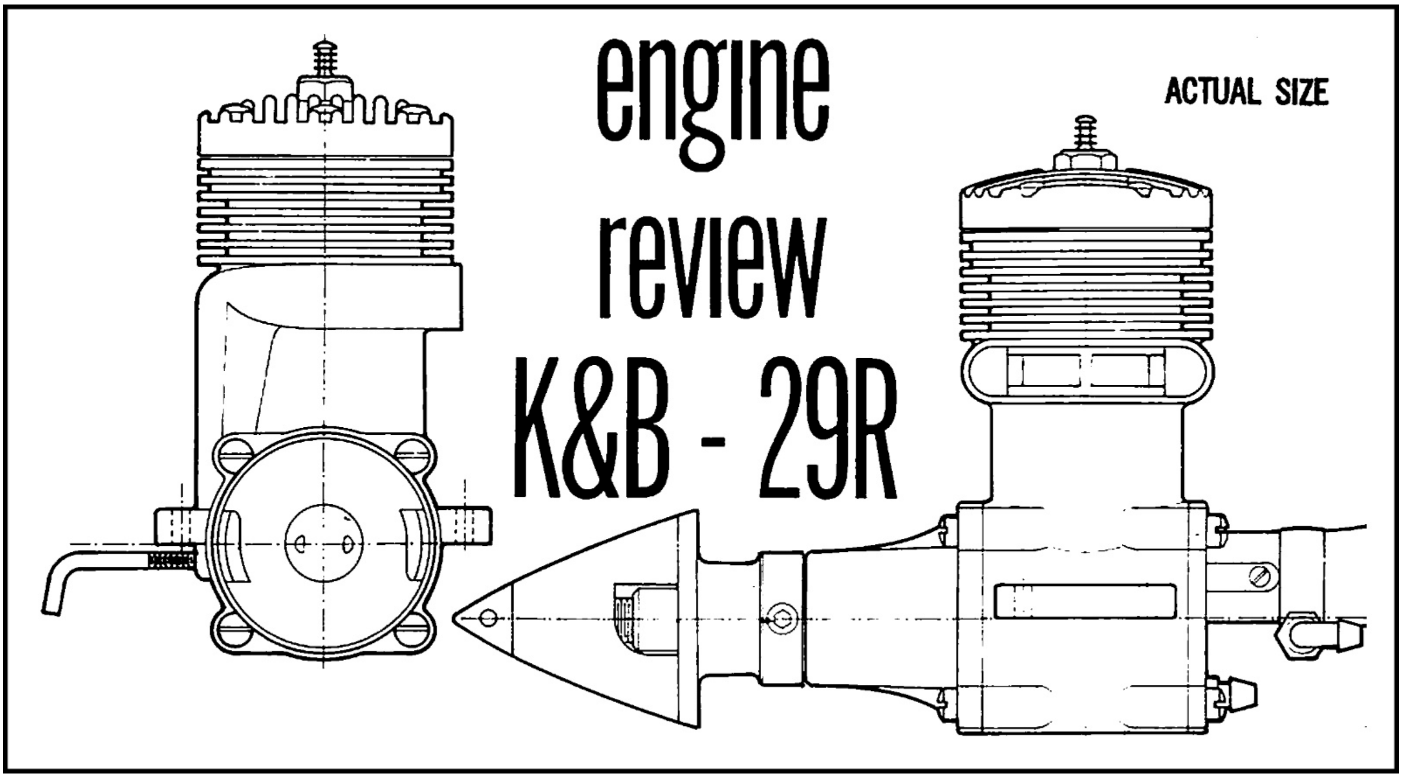
K&B 29R Torpedo Series 61



LAST OF THE K&B '61 SERIES TO BE REVIEWED IN M.A.N.'s ENGINE REVIEW SERIES-LIKE THE .15 AND 35R, OUR REPORT COVERS AN OUTSTANDING ENGINE. By P. G. F. CHINN

► The subject of our Engine Review this month is the Torpedo .29R Series 61. This is the third and last to be released of the current Series 61 K&B engines designed by Bill Wisniewski and first announced in April 1961.

The other two Series 61 engines are, of course, the ,15R (M.A.N. September 1961) and .35 (M.A.N. December 1961), the former a disk-valve racing motor, aimed at international class speed and free-flight, and the latter a shaft-intake contest motor for combat, rat-racing, free- flight, etc. The .29R is basically a scaled-up version of the .15R and its more obvious applications are to be found in speed, proto speed and. again, contest free-flight. Like its brother, it is a “quality” motor of classical design and fine construction.

In some respects, the .29R Series 61 revives memories of a past era in model engine manufacture, for it is the only new twin ball-bearing disk-valve racing .29 to be put into volume production in the U. S. for more than a decade the first, in fact, since the original McCoy Red-Head .29 and Dooling .29 engines which swept the board in .29 speed in the late forties and early fifties. Despite a tremendous improvement in the performance of less sophisticated types of motors over the years, it has yet to be shown that the classic racing engine layout, as typified by these McCoy and Dooling models, can be bettered and Bill Wisniew ski's adoption of it, as a vehicle for exploiting his own individual ideas, is good to see, as is K&B's acceptance, on the production side, of a task that would have been a lot easier with a simpler and more commonplace design.

The connecting-rod, prop stud, nut and washer on the .29R are common also to the Series 61 .35, while its needle-valve assembly and front ball-bearing are the same as fitted to the .15R. No other components are interchangeable, but the .29R crankcase/cylinder-block and cylinder head are related to those of the .35, in that the same castings, with slight machining differences, arc used. Cylinder bore of the .35 is .790 in. whereas the .29R‘s is .040 in. smaller. The .29 casting is bored cut only .010 in. smaller for the sleeve, however, the opportunity having been taken to use a thicker walled sleeve —.065 in. instead of .050 in.

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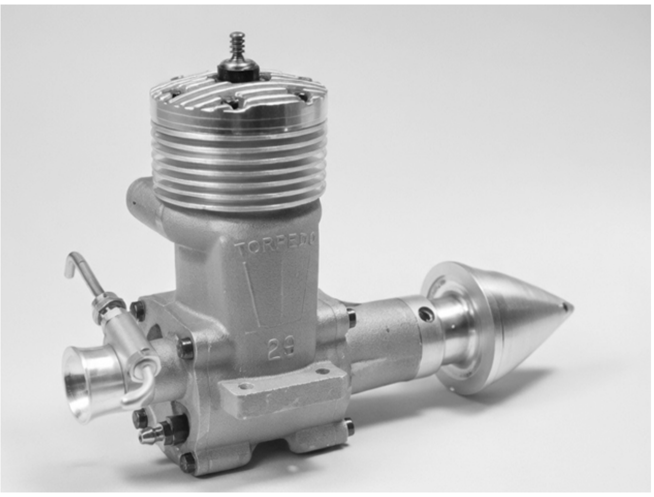


Except for absence of rings, Wisniewski designed K&B .29R motor has all traditional features of a hot racing engine plus a few new innovations.

No gaskets are used by the .29R. This finely engineered motor is assembled with metal to metal joints throughout note number of parts.

Since the ability to "breathe" freely is an essential characteristic of any racing engine, it is, perhaps, appropriate that we start our examination of the .29R via its aspiratory system.

Air enters the engine via a horizontal, venturi-sectioned carburetor intake, which has a choke diameter of .340 in. No spray-bar restricts this large carburetor throat; instead, fuel is admitted through six small peripheral surface jets, fed from a tightly fitted external collar carrying the needle-valve assembly. The complete carburetor unit plugs into a boss in the detachable crankcase back-plate and is secured by a set-crew. It can be rotated to permit the needle control to be positioned to suit individual installations. The needle itself is of 3/32 in. dia. stainless steel and a gland nut is provided to enable control stiffness to be adjusted. A right- angled elbow fitting is a welcome refinement to aid neat plumbing.

From the venturi, the gas entry widens into a 90 degree segment aperture in the back-plate face. Admission timing is controlled by a non-metallic valve rotor, bronze-bushed and freely mounted on a pin pressed into the back-plate. The rotor is molded from an undisclosed material, is recessed on its back face and is very light. It gives a measured timing of 35 deg. ABDC to 45 deg. ATDC.

Clearly, much attention has been given to achieving high primary, or crankcase, compression of the gas. This is aided, in the first instance, by the rear disk intake system which contributes appreciably less excess volume than an equivalent shaft valve set-up. Secondly, the space between the rear face of the crank-disk and valve rotor is reduced to the practical minimum approximately 3/16 in. or just sufficient to give clearance to the control. Thirdly, a unique design of counterbalanced crank-shaft is used which "packs" the crankcase more effectively than orthodox counter-balanced shafts. In this, the crank-disk is first machined in the form of a solid flywheel. 19/64 in. thick. On each side of the crankpin location, a wide slot is machined in the periphery of the fly wheel in order to provide the necessary counter-balance mass opposite the crankpin, but leaving full circular disks intact front and back. The periphery is then fitted with an aluminium rim covering the milled slots and scaling off the extra volume that these would otherwise add to the crankcase capacity.

From the crankcase, gas is transferred to the combustion chamber via a deep bypass passage and a centrally divided intake port. .182 in. deep and extending around 140 degrees of the cylinder bore. Two .290 in. dia. piston skirt ports aid the flow of the charge from crankcase to bypass passage but, in contrast to the original .15R and .35, corresponding ports are not cut in the cylinder sleeve. Instead, 5/16 in. has been cut off the bottom of the sleeve to expose the entire non-lapped section of the piston al bottom dead center. The cylinder bypass port opens at 62 degrees before bottom dead center, 8 degrees after the exhaust port has opened. The exhaust port, like the bypass port, has a central dividing bar and is .182 in. deep, but is wider, covering 160 degrees of the bore. The piston skirt clears the bottom edge of the exhaust port for a duration of approximately 30 degrees of shaft rotation at the top of the stroke. Combustion chamber shape is of a hemispherical type with head contour interrupted by a slot for the piston baffle.

Extremely free-running working parts, yet a complete absence of sloppy fits, distinguish the Series 61 engines. On the .29R, the crankshaft is supported in a 3/8 in. i.d. rear and ¼ in i.d. front Fafnir ball journal bearings. The shaft itself is machined from “Stressproof" steel and has a separate, pressed-in hollow crankpin which has an “Electrolized" plated surface of extreme hardness, lapped to a 4 micro-inch finish, for improved bearing life. The steel piston also features an Electrolized finish and runs in a Meehanite cylinder sleeve. The fit of the piston and cylinder, when properly broken in, are such that the piston will drop through the bore, dry, yet excellent compression is maintained hot or cold. The piston has an internal annular stiffening rib above the wrist-pin and is externally relieved .001 in. on the skirt below the wrist-pin center. The piston is coupled to the shaft by a forged Alcoa 2014 aluminum alloy conrod and a full-floating .180 in. dia. tubular wrist-pin with aluminum end-pads.

As on the .15R, a die-cast and machined spinner unit is included as an integral part of the prop drive assembly. The spinner - forms part of the drive hub which is locked onto the front of the shaft by an Allen set-screw and the prop retaining stud screws into the front of this component. Incidentally, if the drive hub should be removed at any time, it is advisable, when replacing it, to remove or loosen the prop stud, so as to be quite sure that the hub goes fully home on the shaft otherwise the set-screw, when tightened, may miss the flat provided on the shaft, with damaging results.

A pressurized fuel system is essential with the .29R, due to the extra large venturi throat. A pen bladder tank can be used, or alternatively, a sealed pressure tank can be connected to the pressure- tap fitting installed in the crankcase black-plate. For our tests, we used the latter and a Veco T-31 pressure-tank.

Break-in time required for the Series 61 .29R was quite modest. The one-hour recommended in the manufacturer’s leaflet was fully adequate to enable the engine to be leaned out to maximum rpm on most fuels. Despite the use of a rotary-valve timed pressurized fuel system, the needle-valve was not at all critical. If the needle-valve was closed down too far beyond the optimum setting, the engine did not cutout but began to “hunt” instead. Response to needle is somewhat delayed and adjustments should therefore be made slowly and progressively to obtain the best performance setting.

To gain a little extra break-in time before using hot racing fuels, we gave our .29R a preliminary test on straight FA1 3-to-l methanol and castor-oil fuel. Al though the .15R had performed very well on this mixture, however, it was clear that the .29R did not like it. Not only was torque reduced to a maximum of 39 oz. in. equivalent to a bmep or little more than 50 psi the top end power fell off to produce .53 bhp at no more than 15000 rpm. A replacement KB-1L plug was installed to check that the glow-plug was not a contributory case, but with no effect. A hotter plug or higher compression ratio might improve performance, but all this, of course, is mainly of academic interest only, since the use of such fuel is obligatory only in FA1 World Speed Championships class events with .15 cu. in. engines and, except in countries where nitromethane is unobtainable, the .29R will, of course, normally be run on nitro fuels.

For our tests on nitro, we blended a mixture in accordance with the advice in the ’ manufacturer’s leaflet and.- containing 45 percent nitromethane, 10 percent Ucon polyoxide synthetic lubricant, 10 percent castor-oil, 10 percent nitrobenzene and 25 percent methanol. As our graph shows, the improvement on this was to the order of 52 percent greater maximum power with the peaking speed

K&B 29R Torpedo Series 61

raised by nearly 3,000 rpm to just on .81 bhp at 18,000 rpm. This, needless to say, is an exceptionally fine performance but one which might yet show a further slight improvement using, under suitable conditions, the upper limit (55 percent) nitromethane content recommended.

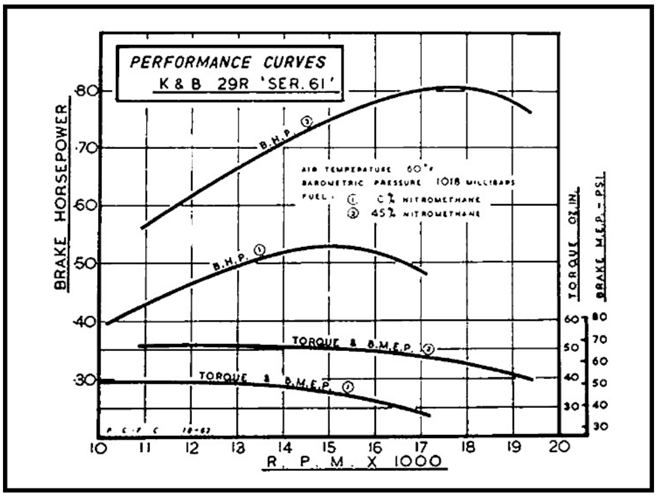
General handling and running qualities of the .29R were excellent. Starting was very good, irrespective of prop size. When loaded for speeds of 16,000 rpm and upward, the engine picked up 1,000-1,500 rpm during the first 20 seconds or so starting from Cold and thereafter ran very steadily and evenly.

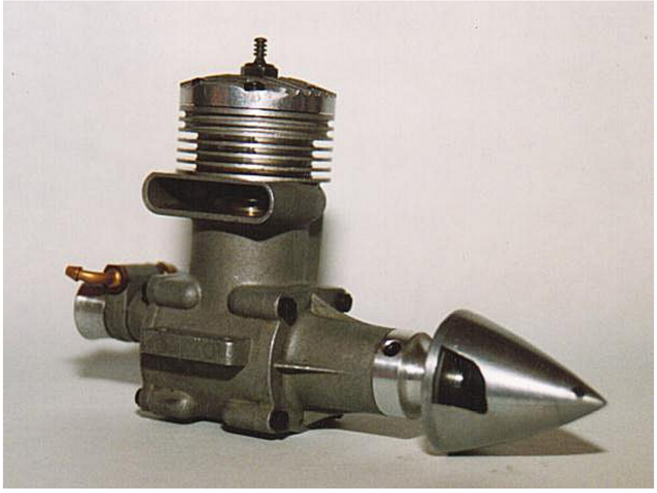
Summary of Data

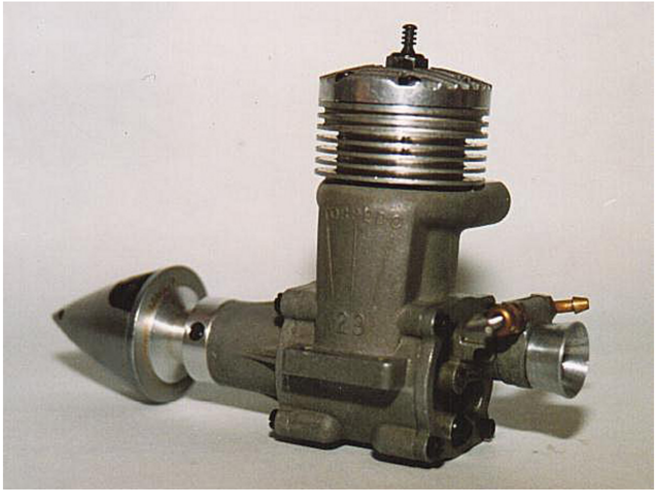
Type: Loop-scavenged two-cycle with disk rotary-valve induction.
Weight: 8.5 oz.
Displacement: 0.2982 cu. in. or 4.887 c.c.
Bore: 0.750 in.
Stroke: 0.675 in.
Stroke/Bore Ratio: 0.900: 1

Specific Output (as tested):
1.77 bhp/ cu. in. (straight methanol and castor-oil fuel). 2.70 bhp/cu, in. (45 percent nitromethane).

Power/Weight Ratio (as tested):
1.00 bhp/lb. (straight methanol and castor-oil)







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