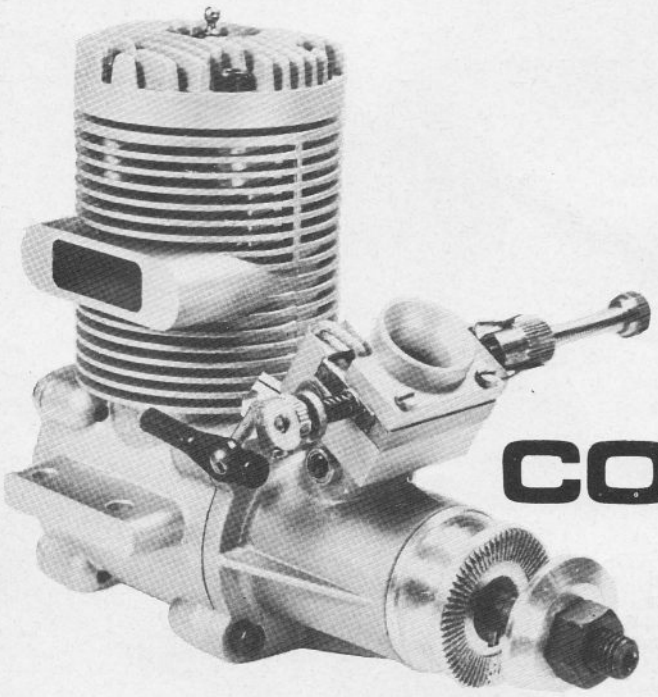
Peter Chinn's

RADIO MOTOR COMMENTARY



Left: latest Webra Speed 61F has several internal modifications. Engine shown here fitted with new Dynamix carb which is an optional extra.

Improved Webra Speed 61F

As was mentioned in the 'Sixty Survey' feature published in the December and January issues, the current Webra Speed 61F has undergone some development since the original model, tested and reported upon in RCM&E four years ago. Externally, the latest model does not look much different, although it is easily identified by its matt finished (instead of tumbled) castings. The significant changes are to be found *inside* and (when fitted) in the entirely new Webra 'Dynamix' carburettor. The latter is available as an alternative to the Webra TN carb that has been standard equipment on all Webra 10 c.c. R/C engines since the first Webra 61 of 1967.

With the increasing use of the Webra tuned-pipe silencer, originally intended for the Webra Speed 61R marine unit but now adopted by some aerobatics contest flyers, the Speed 61's exhaust timing has been extended to make better use of the pipe's supercharging effect. To achieve this, exhaust port depth has been increased, from the 5.8 mm – 6.0 mm found on earlier engines, to 6.9 mm, extending the exhaust period from around 142° of crank angle to 150°. Port width has also been slightly increased so that the total port area has been enlarged by about 20 per cent.

The transfer ports have also been modified. A comparison of our original test model Speed 61F and a current model indicated that the main transfer port period has been reduced approximately 4°, to 116° of crank angle, whereas the third port period has been very slightly extended to 112°. The main transfers are both a little longer and deeper and are also angled slightly *upwards* through the cylinder wall as well as away from the exhaust port.

At the cost of a 10 per cent increase in weight, the piston and conrod have also been modified. The piston has a thicker crown and the connecting-rod is substantially stronger with a much thicker shank, a wider small-end and a larger diameter big-end. As before, both ends of the rod are bronze bushed and have wide lubrication slits and the 6 mm tubular gudgeon-pin is retained by wire circlips. The single, radially-pinned compression ring is unchanged.

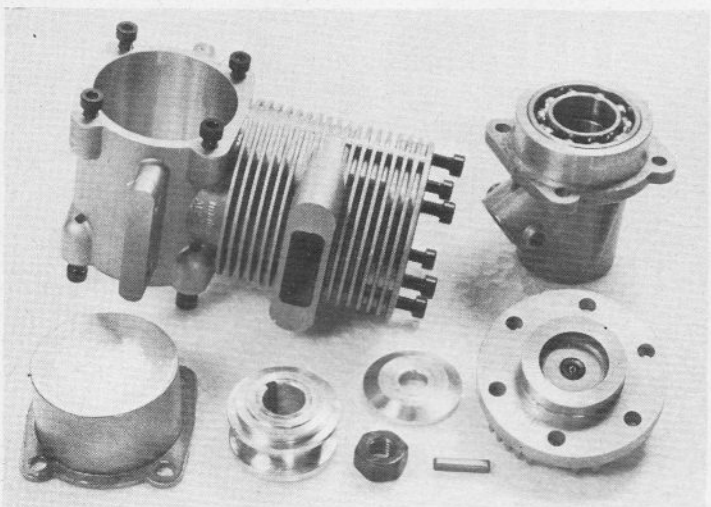
A new crankshaft is used. Instead of having a separate, pressed-in 6 mm dia. crankpin, the shaft is now machined in one piece, with an integral crankpin increased to 7 mm dia. It still has a 15 mm dia. main journal and 3/8 in. dia. front journal but, instead of an 11 mm bore (and in sharp contrast to the trend towards gas passages of larger i.d. as indicated by OS, Rossi and Redshift) the new shaft is reduced to 10 mm i.d. The reason for this is probably connected with the revised rotary-valve timing.

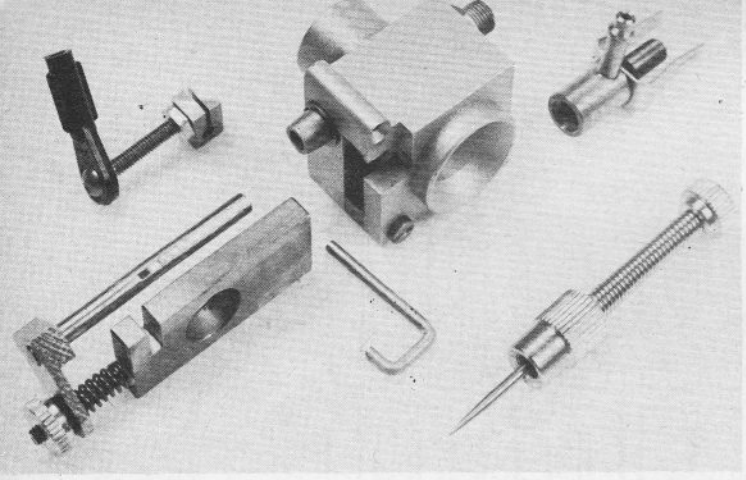
The induction period has, in fact, been quite drastically changed; valve closure having been extended from 45° ATDC to no less than 70° ATDC for a total induction period of 215° of crank angle. This has called for a much wider valve port which takes a 20 per cent bigger bite out of the shaft circumference and reduces the effective shaft depth below the valve port from 12 mm to 10.8 mm. In these circumstances, the manufacturer was probably wise, in the interests of maintaining shaft strength, to increase shaft wall thickness from 2 mm to 2.5 mm by reducing the bore of the induction hole. Presumably the increased top end power that one might reasonably expect from extending the induction period, more than adequately balances any loss due to the smaller gas passage through the shaft.

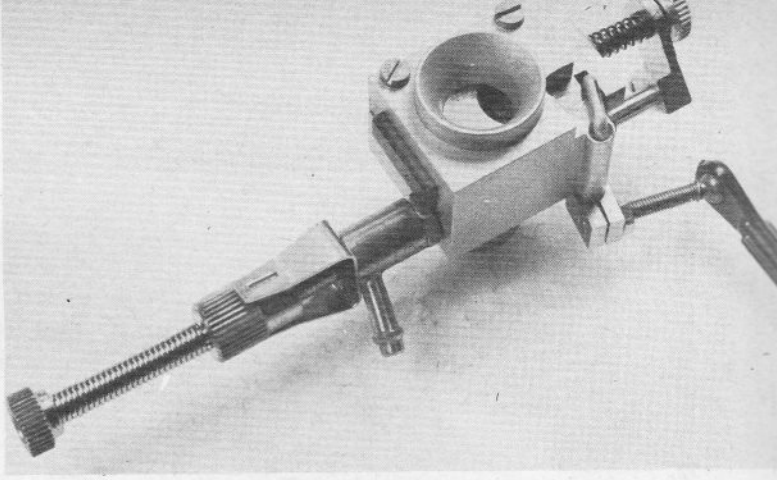
Compared with the Webra TN carburettor fitted to the earlier Webra 61F tested, the new Dynamix carb has approximately 25 per cent more effective choke area at 44 sq. mm. This is marginally the largest choke area currently used by any 10 c.c. R/C engine with the exception of Yamada and Perry pressure-regulated systems. For the Dynamix, a normal exhaust-gas pressurised fuel supply is adequate, although a pump may be used if preferred. Ordinary suction feed is not recommended.

The Dynamix, pre-production models of which were in use experimentally late in 1976, is quite different from any other current R/C

Below right: revised parts of Webra 61F include new crankshaft, modified cylinder liner and piston and new conrod. Below: remaining Webra 61F parts are unchanged, except for matt casting finish.







carburettor and, to explain its design and operation, we can do no better than to repeat extracts from our description of it that appeared a few months ago in the American magazine *Model Airplane News*. If this is read in conjunction with reference to the accompanying three photos of the Dynamix carb and its parts, we may, perhaps, succeed in explaining its workings.

First, it should be noted that, instead of the usual semi-rotary throttle-valve, the Dynamix has a flat steel slide valve which moves horizontally across the intake venturi to close the throttle.

Below and parallel to the throttle-valve, but installed at a tangent to the rear of the venturi choke, is a brass tube through which fuel is fed from the needle-valve on the left side. Fuel is released into the choke through a slot in the tube, but the amount released is first metered by a brass rod within the tube. This rod has a channel on the outside through which fuel must flow to a cross-hole, which then releases it into the choke via a tapered slot on the opposite side of the rod.

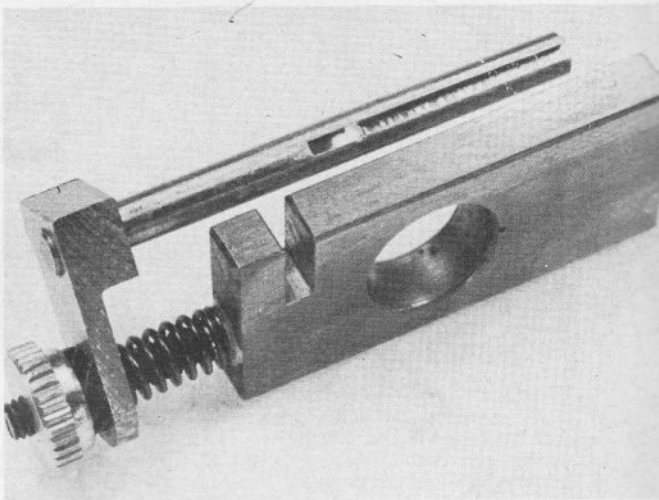
The brass rod, which therefore forms a metering valve, is coupled to the throttle so that it moves parallel to and simultaneously with it. Thus, as the throttle is moved towards the idling position (i.e. the throttle slide and rod partially withdrawn from the carb body), fuel flow, metered via the tapered slot in the rod, is reduced to maintain the correct air/fuel mixture strength. The correct balance of fuel and air admitted at low speeds is obtained, in the first instance, by a screw adjustment which alters the relative position of the throttle slide and fuel metering rod.

An advantage claimed for the Dynamix, compared with other carburettors, is the 'accelerator pump' effect gained with this particular type of fuel metering system. When the engine is throttled down, the quantity of fuel within the carburettor – i.e. in the fuel tube between the needle-valve and venturi jet – is increased by the extra volume created by the partial withdrawal of the metering-valve rod. When the throttle is in the idling position, this extra volume may be as much as 0.05 millilitres. Suddenly opening the throttle, therefore, has the effect of forcing part of the accumulated fuel through the jet, giving much the same effect as the various accelerating devices fitted to full size carburettors and ensuring a more rapid and positive pick-up.

The checked weight of the latest Speed 61F, complete with Dynamix carb, was slightly up on the older model at 475 grammes or 16.75 oz. With the newer, quieter Webra 1100/E-G6 silencer, this was increased to 599 g (21.1 oz.). Substituting a Webra tuned pipe silencer increases weight to 714 g (25.2 oz.).

The manufacturer is currently rating the Speed 61F at 1.65 metric horsepower (1.63 bhp) at 15,200 rpm (presumably on their recommended 3-5 per cent nitro fuel) which, compared with our test result of just under 1.50 bhp at 15,000 for the original Speed 61F on 5 per cent nitro, seems a reasonable claim.

Above: Webra Dynamix carb has increased choke area and a slide type throttle valve coupled to a sliding rod metering valve which acts as accelerator pump when throttle is abruptly opened. Right: close-up of Dynamix sliding throttle valve and fuel metering valve. Note longitudinal channel in outside of latter and cross hole which feeds fuel to tapered slot on opposite side.



Axiflo RK-40

By courtesy of Grumman Aerospace engineer Bob Kress, who designed it, we have just received from the USA one of the first production kits for the Midwest Axiflo RK-40 ducted fan unit. Some of the background to this significant new development was related in the October 1977 *Radio Motor Commentary* columns. The kit, engineered by Kress Technology Inc., New York, manufactured in Taiwan and distributed by Midwest Products Company of Indiana, is expected to be available shortly in the UK through Irvine Engines. The RK-40 is, of course, for .40 cu. in. motors. Other units for .049, .20 and .60 engines will follow.

Below: new Midwest Axiflo RK-40 kit supplied in this 16″×12″×3″ box, contains everything (less engine) to build a .40 size high-performance ducted fan unit.

Below: Axiflo RK-40 kit is fully prefabricated. Moulded parts include rotor (tested to 30,000 rpm) stator blades, engine mount and tailcone tank. All plywood parts are ready cut to shape. Not shown here is duct skinning.