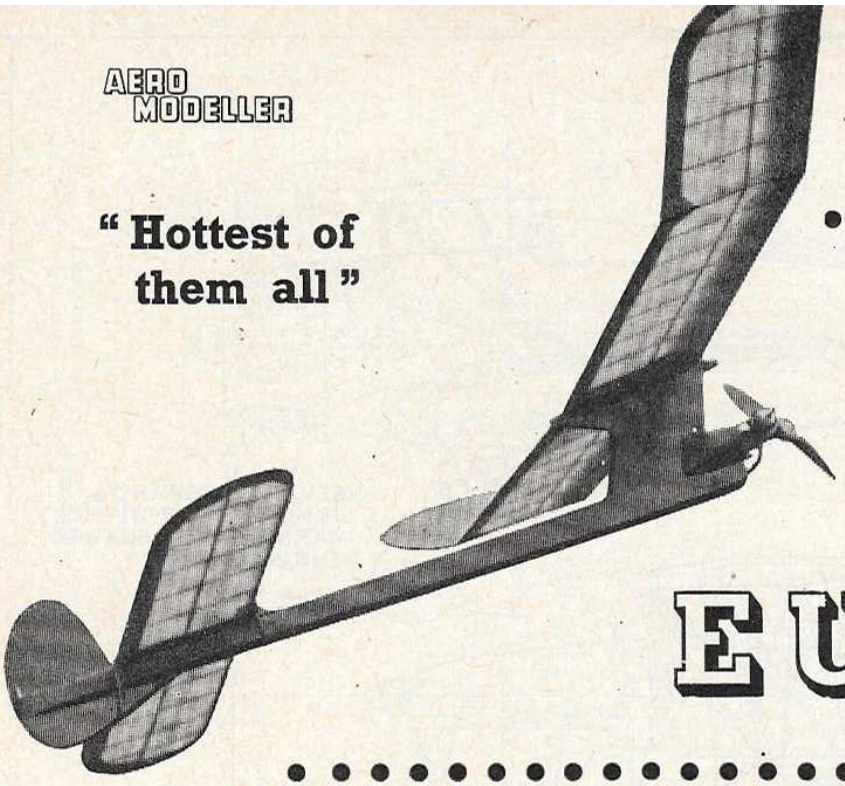
"Hottest of them all"



In response to universal request — we bring you the fastest climbing of all open Power designs.
—only 12 ounces for 2.5 c.c.
By NORMAN MARCUS

# EUREKA

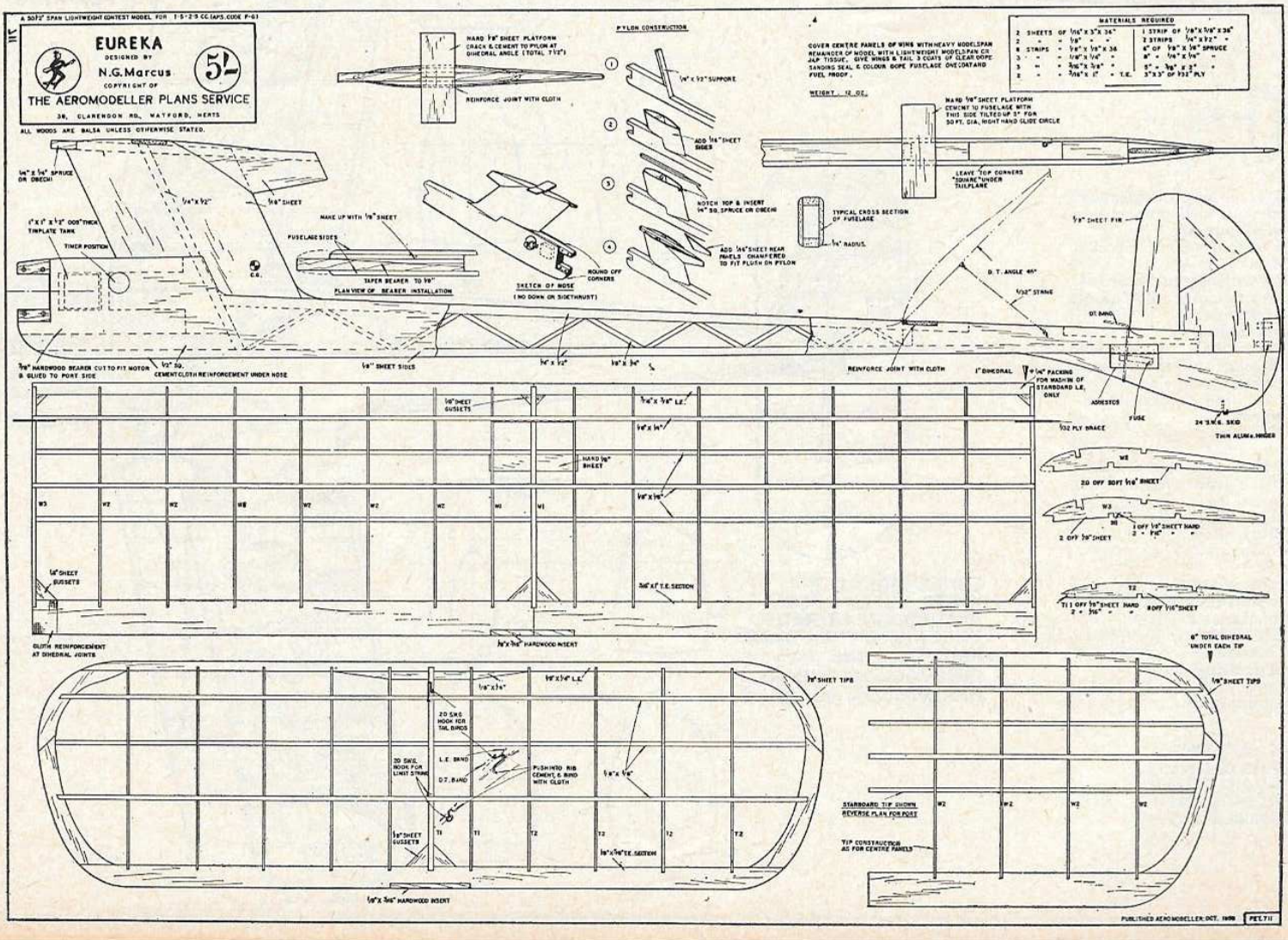
POWER MODELLING is now divided 80 per cent. "open" and 20 per cent. F.A.I. if the 1958 entry figures in British contests are any measure, and the demand for fast climbing lightweights is on the upswing.

Here we have the "hottest" of them all. Norman Marcus has been out of the contest sphere for a season or so (explained by his marriage on August 9th), but his Eureka design has been making its mark in the hands of John O'Donnell, winner of Power at the Nats.

The design was evolved to improve upon the *Jaded Maid* which, although successful, had some drawbacks. It was too fragile, being rather on the large side for its original 12-oz. weight which made windy weather flying rather a problem. With Eureka it was decided to keep the weight down to about 12 oz. and to reduce the general size of the model to make a sturdier job. The wing span was determined by the size of Norman's model box!

The thrust line was moved upwards and the fuselage was shaped so that the side areas (and side view of the wing) would roughly balance about the thrust line—to equalise the moments of the side forces about the C.G.

FULL SIZE COPIES OF THIS 1/6th REPRODUCTION ARE AVAILABLE AS PLAN PET 711 PRICE 5/- PLUS 6d. POST FROM AEROMODELLER PLANS SERVICE



Propeller tip position determined the height of the pylon as wing was required to be clear of propeller slipstream, and the tailplane was moved more into the prop blast. The fin was placed behind the tail for convenience with the pop-up tailplane D.T. and also to give extra moment to the fin area. (Fins in front of the tailplane had proved rather disastrous with some of Norman's earlier models.) This rear fin set a fashion which is now a characteristic of many British power designs. The thought of letting the motor run at full power on such a small, lightweight design was rather frightening; but after a few seconds motor runs Norman chanced his arm and let it go flat out. Much to his amazement and joy Eureka climbed almost vertically, slowly turning in right-hand spirals—and that was how it flew contest after contest. Unfortunately, the glide proved to be rather inconsistent, with the model "falling out of the sky" on occasions. Reason for this was that when the motor cut, and the model speed reduced suddenly, the laminar flow over the wing broke away at the first spar and did not re-attach itself properly. A sheeted leading edge version of the model showed considerable improvement in the glide.

Now for the construction of the model. The wing and tailplane are straightforward in their original form, but if it is decided to use geodetic construction, as in the John O'Donnell modification, care should be taken to "build in" the slight warps into the wing (*see* trimming notes). The tail is flat and quite simple. The fuselage was built in "mid-air". First the $\frac{1}{8}$-in. sheet sides of the body and the $\frac{3}{8}$-in. hardwood motor mount should be cut to shape. The mount is glued to the left-hand side of the fuselage and is left to dry. Make the fuel tank from ·005-in. tin sheet and cement it in position. Next the $\frac{1}{2}$ x $\frac{1}{4}$-in. longerons, the spacers, and the $\frac{1}{2}$ x $\frac{1}{4}$-in. pylon member are added. Then the other $\frac{1}{8}$-in. sheet side is cemented in place. The fuselage should be held flat until the glue has dried completely. Add the pylon sheeting, and the hard balsa wing (and tail) mounts. The fin is built up from pieces of $\frac{1}{8}$-in. sheet (it has proved to be completely warp free) and is cemented to the body. Now smooth the fuselage to shape and fill the grain with sealer. Give one coat of coloured dope and then finish with fuel proofer. Norman uses Banana Oil with diesel engines.

Cover the centre portion of the wing with heavy-weight Modelspan tissue and the outer panels and tailplane with Jap tissue (or lightweight Modelspan). Give all surfaces three coats of clear dope.

Now for the trimming. It should be emphasised that the method described here is for fast climbing power models of the pylon variety that climb and glide in right hand circles. Norman has used this system on all his successful models: it was suggested first by Paul Gilliam of *Civy Boy* fame. The right wing is warped to give about 2 degrees wash-in at the dihedral joint—this is equivalent to about $\frac{1}{4}$-in. packing under the L.E. and both the tip panels are washed-out about 1 degree relative to the dihedral joint rib. These warps should be built-in when setting the dihedral before the wing is covered, otherwise trouble will follow with the wing twisting in changing atmospheres. The tailplane is left flat.

Secure the wing and tail to the fuselage. Check the C.G. position is between 70 per cent. and 80 per cent. of the wing chord. The wing and tail incidences are 3 degrees and 1 degree positive respectively. The engine should not have any downthrust or sidethrust.

On low power and using short engine runs (about 5 secs.) adjust the glide. With the rudder straight, tilt the tailplane—right hand side up—until a glide circle of about 50-ft. diameter is achieved. Now increase the engine revs and trim the power turn by means of the rudder tab only. Remember to move the tab in small amounts—about $\frac{1}{32}$in.—especially when the engine is running at full speed. The best arrangement is with the tab about $\frac{1}{16}$ in. out to the left-hand side. If the tab is moved sufficient to affect the glide trim, correct this with tailplane tilt or by varying the incidence. It has been found that increasing the tailplane incidence will speed up the climb and will open the R.H. turn. Decreasing the tail incidence has an opposite effect, so watch for spinning.

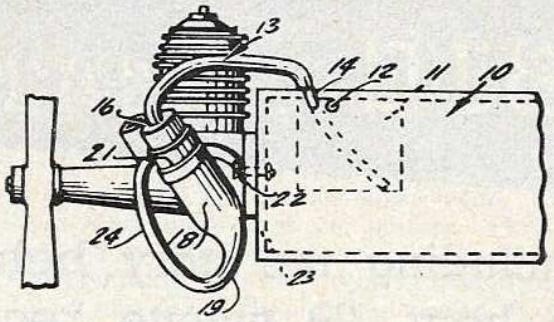
When the trim is correct, the model will climb vertically, turning to the right (about 1 turn every 6 to 8 secs.), but rolling to the left. When the motor cuts the model will flick to the right straight into the glide without stalling.

The best of the "Eureka" originals climbed to about 500 ft. on a 15 secs. engine run and would glide for another 4 to 4½ min. in evening air.

If a ball-bearing type diesel (weighing about 6 oz.) is used, the engine position should be moved backwards to keep the C.G. about 75 per cent. of the wing chord.

I trust those who build this "potent heap" will have as much fun as I did with it—and exclaim — EUREKA ! !

## Important Patents No. 2




2824406 N. VANDERSCHEL APPLN. DATE 26/10/56

**Limited run fuel tanks with detachable headers are relatively conventional but Vanderschel's invention of 1956 was at that time novel and is, today, different in so far as the header tank is a permanency, carried by the model. According to his invention the header is communicated to an external, preferably transparent, flight tank by means of a flexible tube rising above the header fuel level. The tube extends through a piston-like stopper which is adjustable within the flight tank to afford a predetermined capacity. On removal of the piston and tube, after starting on the header tank, engine run is obviously limited by the flight tank contents while the residue in the header outlet tube drains back to its origin. The flight tank is secured to the fuselage by a spring clip and may be adjusted angularly to provide efficient feed for the model's normal flight angle.**