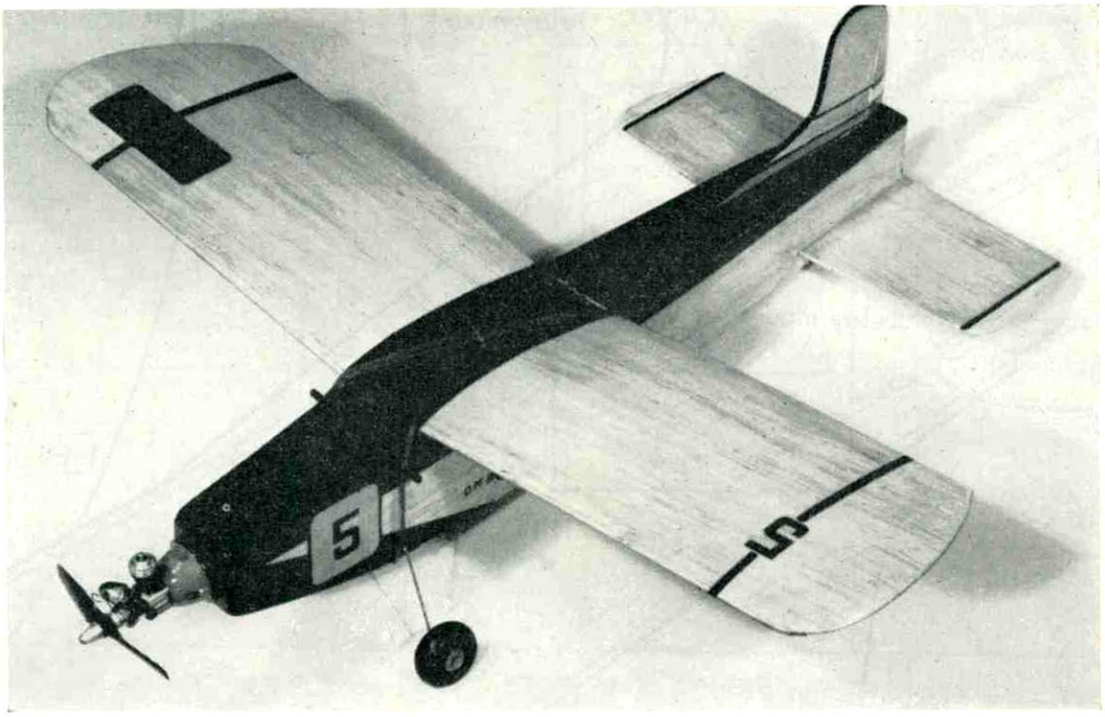


METRO GNOME

BY D. R. MANN

BUILD THIS PERKY 17 in. SPAN SINGLE CHANNEL MODEL FROM OUR FULL SIZE PLAN

METRO-GNOME is a small-field, lightweight single channel model. It has a span of 17¾ in. with an effective wing area of 70 sq. ins. Overall length is 16¼ ins. and at such a size, is just right for the Cox .010 or .020 cu. in. Tee Dee motors.

The bounceability of these lightweights is quite amazing, and even if you do damage Metro-Gnome, it takes little effort to repair. Construction is, of course, simplicity itself, the main ingredient is medium 1/16 in. balsa sheet.

Wing.

Start building the wing in one piece, cutting the the 1/16 in. sheet skin to shape. Cut out the ⅛ in. ribs and lay down with 3/16 in. x ⅛ in. spruce leading edge ready shaped. Pre-cement, and then add the 1/16 in. balsa skin. When set, separate at the centre line. Take one half and block up the wing tip 1 in. Place the root flush to the edge of the building board. Using the board edge as a guide to keep the sanding block vertical, sand away the overhanging balsa skin. Repeat for the other half and then join, blocking up *each* wing tip 1 in. to provide the correct dihedral, and reinforce the centre section with silk strip. There is *no* centre rib.

Tail Surface.

Select light 1/16 in. balsa sheet for the tailplane, to avoid tail heaviness. Add 1/32 in. ply plate for the relay before installing in the fuselage.

Fin and rudder are made from two laminations of 1/32 in. balsa. Place one lamination on the building board, lay in three strands of cotton for hinges, and add the other lamination. Contact cement might be a good idea here to avoid the warping effect possible with balsa cement shrinkage.

Fuselage.

The fuselage is a simple balsa box and provides no constructional problems. The relay type Tick-Tock system is detailed on the plan, but if you intend to use an escapement instead, then you should work out the installation before commencing construction.

Cut all formers, F1 from ⅛ in. ply, F2 from 1/16 ply, F3 from ⅛ in. balsa, F4 and F5 from 1/16 in. balsa. Cut two sides from 1/16 in. balsa. Cement ply dowel reinforcements in place and join with F3 and F4. When set, draw the fuselage sides together at the rear and cement tailplane and F5 in position, being careful to ensure that

Continued on page 184

THE TICK-TOCK SYSTEM

SIMPLE R.O. MANUAL PULSE, MARK/SPACE PROPORTIONAL OR PULSE TRIM BANG-BANG SYSTEM — BY D. R. MANN

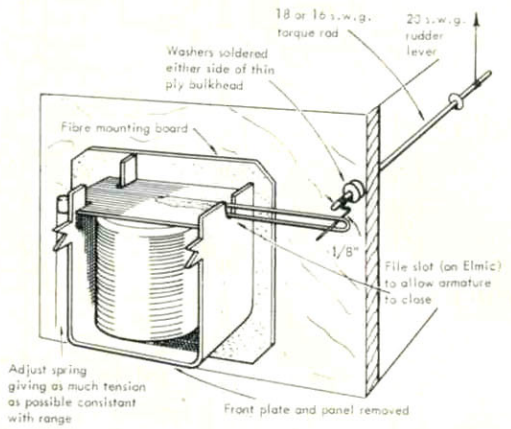
THE "Tick-Tock" system is a simple lightweight control system for tiny .010—.020 cu. in. power aircraft. The author is a keen member of Exeter Radio Control Club, who's members have been quick to employ this method of rudder-only control. It is definitely worth further investigation, in view of its very practical nature.

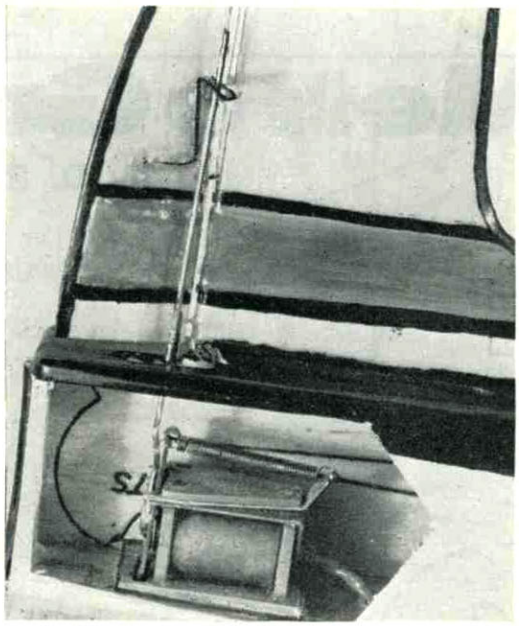
The principle of the "Tick-Tock" system is simply use the armature of a relay or escapement to actuate the rudder. Thus, the relay or escapement is driven by a small relayless receiver such as the MacGregor Minimac, together with a pulsed tone transmitter which gives a 50/50 mark-space signal for neutral rudder and full or no signal for left and right movements (slight symmetry adjustment is possible for trim). Alternatively, the receiver system may be used in conjunction with a variable mark/space transmitter for fully proportional control, or with a simple push button single channel transmitter for manual pulse operation—the choice is yours.

Fig.1. illustrates the actuator system employed in the Roaring 20. Here an Elmic escapement is modified so that only the coil, frame and armature remain. A wire yoke, soldered to the escapement armature engages with a torque rod, which transmits the armature movements to the rudder.

The second type of "Tick-Tock" system is installed in "Metro-Gnome", illustrated here and also on our full-size plan. Instead of a modified escapement, the Minimac receiver drives a 50 ohm relay, which is mounted under the rudder in the tail of the model, so that the relay armature is vertical. A length of piano wire soldered to the armature, passes through the fuselage top, and engages in a rudder yoke, transmitting movement of the relay armature to the rudder.

The transmitter is a MacGregor transistorised single channel tone unit, to which has been added a simple pulser, providing 50/50 mark-space signal, with trim variation. Left and right rudder commands are then full on and full off signals, keyed from a single pole, double throw, centre biased off, lever switch.





At right another version of the Tick-Tock System, showing relay in extreme rear of model, with relay armature connected direct to the rudder. Piano wire soldered to armature engages with rudder to effect control surface movement.

METRO-GNOME

Continued from page 181

the alignment is correct, since the tiniest error of such a small model may have an adverse effect on the trim. If you intend to use the 3.6v. 100 DKZ DEAC power pack as the designer did, then sew this to F2 now, as indicated on the plan. Cement F2 in place and then F1, though not before fitting the tinplate strip, with engine retaining nuts.

Now fit all the incidentals of your particular installation and satisfy yourself that all works correctly. If all is well, sheet the fuselage top and bottom with 1/16 in. balsa as indicated, and be sure that the grain runs across the fuselage—so much stronger. Cover the top and bottom of the nose compartment with 1/32 in. ply and add the 1/32 in. ply undercarriage guides. Add the fin, and rudder assembly and, if you like, reinforce the joint with $\frac{1}{8}$ in. sq. balsa.

Finish the model to your favourite colour scheme, but remember that mere fractions of an ounce added can so easily detract from flight performance on these tiny jobs. The prototype weighed a very creditable 6 ozs. complete with Cox Tee Dee .010 powerplants, but anything up to 6 ozs. would be satisfactory.