



**YOUR
FREE
PLAN!**

Peter Moir's **BOUNCER** Control-line trainer for I-1.5 c.c.

MY FIRST ATTEMPTS at control-line flying were disastrous. I learned the hard way, in a series of spectacular prangs, because I simply did not know that wrist movement spells disaster for the beginner. Eventually, I got the idea of the "flying business" and the memory of those initial mishaps gradually faded, but they were brought sharply into focus again by some young school-boys who wanted to fly control-line and sought assistance. They needed two things. The first was an aircraft which simply would not break, and the second was some physical means of restricting the movement of the wrist. Thus BOUNCER and RIGIDRIST handle were born.

Two fuselage scheme

Let's get busy with building. The fuselage can be built in two versions using either balsa or plywood. $\frac{3}{8}$ in. plywood is heavier, and more difficult to work than balsa, but stronger. Cut out the housing for the bellcrank, the lightening holes in the rear fuselage and the canopy; Percy the pilot is optional, but he looks well in his greenhouse. Incidentally, his canopy makes a most convenient carrying handle! Do not form the cut-out for the engine until the fuselage and doubler are glued together. Use Cascamite glue rather than cement for this joint, also for jointing the wing platform and tailplane platform to the ply fuselage. Cover the rear of the fuselage with paper and dope it well. Finally, form the cut-out for the engine, drill the engine bolt holes, the bellcrank pivot holes and the hole for the tail-fixing dowel. The curves in the wing platform are easily shaped by bending the balsa over a tin can containing a 100 watt electric lamp, or even over your soldering iron.

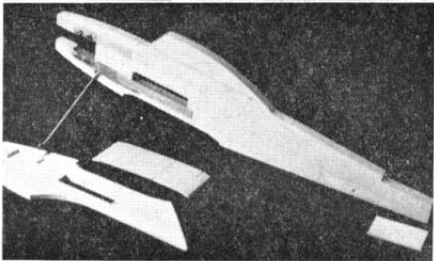
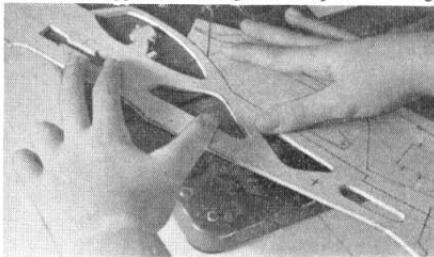
Cut the bellcrank from a scrap of plywood and mount it on its pivot, cut from a nail and secured with cement. The lead-outs and push rod are bent as shown; cranking the ends dispenses with the need for soldered retainers, and, of course, simplifies reassembly.

Using balsa, the fuselage has a $\frac{3}{8}$ in. medium backbone and a $\frac{1}{2}$ in. medium balsa doubler. The fuselage must have cut-outs to receive the engine bearers and the bellcrank, and the doubler must be relieved to accommodate the undercart, engine crankcase and fixing nuts. Upper and rear edges of the doubler should be chamfered before assembly. Engine bearers are $\frac{3}{8}$ in. square hardwood, and it is advisable to drill the lower bearer for the bellcrank pivot *before* the bearer is fitted.

Form the undercart from a length of 12-gauge steel wire, bent as shown and bound to the lower engine bearer, smothering the binding in cement. Now glue the bearers into the balsa backbone, using slow drying glue in preference to cement. Before the doubler is glued to the backbone, the engine fixing nuts must be set in position, so drill the bearers for the bolts, cut two rectangles of tinplate and drill them, too. Slip the plates over the bolts, run on the nuts and then solder the nuts to the tinplate. Finally, cement the nut assemblies to the engine bearers. This is a good time to ensure that the bolts are cut off so they do not project beyond the nuts.

The doubler is glued to the backbone and the two are cramped together while the glue sets. Round off the edges of the backbone, and doubler and glue on the wing and tailplane platforms, pinning them in position while the glue sets. Finally, drill the fuselage and fit the tail dowels and tailskid. Cut the tailplane parts from $\frac{1}{2}$ in. hard balsa, then sand to section. The elevator cut-out permits the rubber bands to be passed through. This may look larger than necessary, but after a few flights, when hands, bands and aircraft are uniformly oily, you will appreciate it. Elevators have sewn thread hinges, using light nylon fishing line. The elevator horn is well cemented in place.

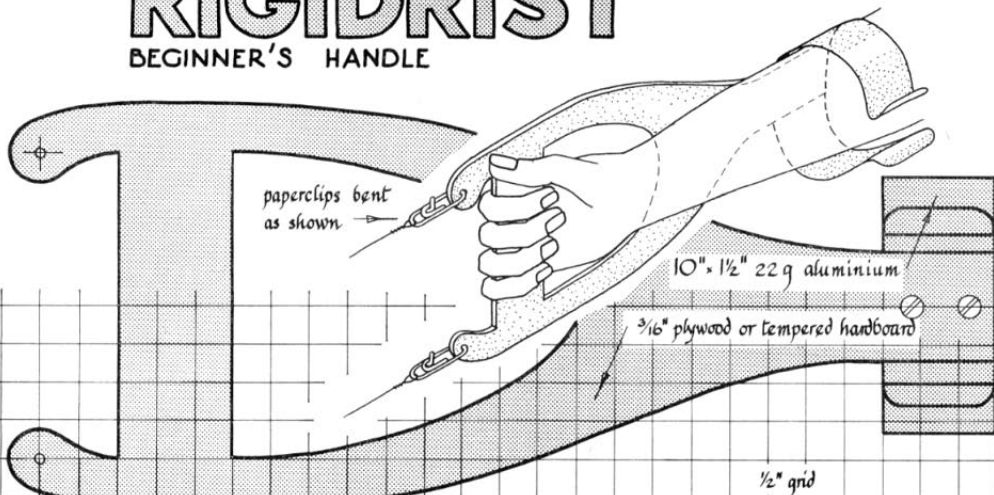
The wing is the simplest part of all. It is made of $\frac{1}{4}$ in. balsa, sanded to a rudimentary aerofoil section, but the section is not critical. What is more important is the reinforcement of its circumference with nylon fishing line set in cement, as for the tail unit. It gives really "wallop-proof" edges. Super Bouncer has square tips with end plates. Cut the wing at the centre section for dihedral and cement together with $\frac{3}{4}$ in. dihedral at each tip. Pre-cement these joints for extra strength, and reinforce with a strip of cloth cemented on top and bottom. In fact, a worthwhile strengthening measure is to cover the entire wing with linen. This is the ultimate in strong wings; it is more trouble, of course, and heavier, but strength is what we are after, not contest performance. Two copper wire line guides complete the wing.



The RIGIDRIST

(SCALE: HALF SIZE)

BEGINNER'S HANDLE



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The undercart for the ply version is in two parts, the rear component being shortened and bent after forming. A simple jig consisting of a board with nails driven into it makes light work of the undercart shaping. Bind the two parts together with thin copper wire before soldering. Cut two slots in the bottom of the fuselage to locate the undercart components, then drill the fuselage and secure the undercart with two bolts. For wheel retainers copper wire can be wrapped twice around the axle and soldered.

The tank is simple, there being no need for an elaborate wedge type with involved venting. Solder it from tinplate, tin your material well before soldering and use a really hot iron. Solder in the feed tube before the two parts of the tank are mated; that way it is easier to get the end correctly positioned in the tank. Fix with two $\frac{3}{8}$ in. screws.

The fuselage, wing and tail unit are all given three coats of dope, rubbing down between coats, as a base for subsequent painting. Then you do your decorative best.

Now install your engine, equipped with a really flexible nylon propeller, and either use locknuts or solder lockwires between the pairs of bolt heads. Assemble the wing and tail unit to the fuselage with suitable size rubber bands to achieve a firm fixing. To prevent the wing sliding on its platform under the action of centrifugal force, which it can well do when everything is oily, cement $1\frac{1}{2}$ in. wide strips of medium glasspaper to the

wing platform and centre section. Then all you require before flying is a pair of 30 ft lines. If you are a beginner, then the Rigidrist handle is just the thing for you.

The RIGIDRIST is simple enough. Cut it from $\frac{3}{8}$ in. plywood or hardboard and equip it with two connectors made from paper clips. The forearm strap is made from a 10 in. x $1\frac{1}{2}$ in. length of 22-gauge aluminium, which is easily re-shaped to suit different arms.

A few words of advice for the beginner. 1. Ensure that your assistant points the model slightly out of the circle when he releases it. 2. Make sure that the lines do not catch in the grass during take-off. 3. Keep the arm well up for take-off, but as soon as the aircraft comes off the ground, gently lower the arm to a horizontal position. 4. Remember that the aircraft will go wherever you point your arm, but the wind will affect the altitude of your model, and you will have to correct—but gently! 5. At all times and at all costs maintain line tension; watch this during take-off or when flying in a breeze, and if the lines go slack, step back smartly. 6. When the engine cuts, allow the aircraft to come down, but when it is just above the ground, raise your arm to flare out the approach and make a perfect landing. Happy Bouncing!

At left, salient differences between ply and balsa fuselages showing fretted ply example in the process of shaping and part assembled balsa fuselage with bearers and u/c legs, nose doubler, wing and tail rests. At right are Bouncers no's 17 and 18 showing how they come apart to avoid damage in a hard landing.

