

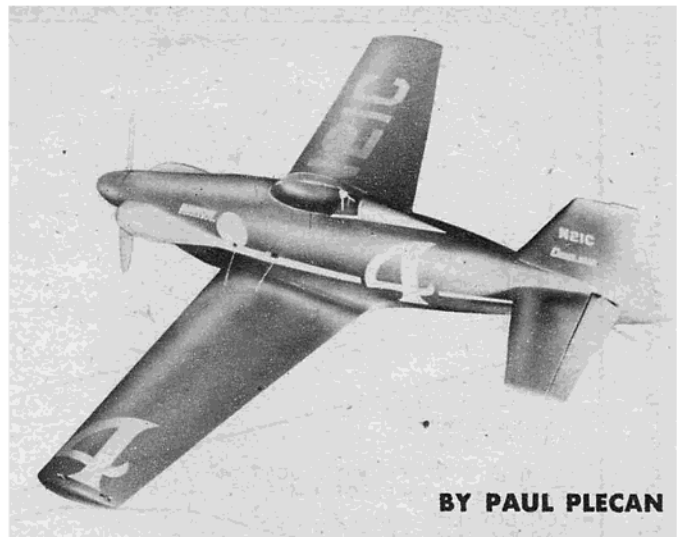
GOODYEAR TROPHY WINNER

MINNOW

AUTHENTIC PLANS BY EXPERT DESIGNER GIVE YOU ONE OF THE MOST INTERESTING CONTROL-LINE FLYING SCALE MODELS. PLANE USES A VARIETY OF POWER PLANTS

HERE'S a scale U-control design that is a model builder's dream come true. Fast, good-looking, and relatively simple to build, Minnow is the job for those flying-scale beauty contests next season. Scaled down from authentic factory drawings and Pete Bowers' on-the-spot data sheet, our model of the Minnow is 38" in span (2" = 1' scale) following the latest trend towards larger scale models. All details are included for an exact replica of Herman "Fish" Salmon's Goodyear Trophy winner. Cream trim on bronze makes as flashy a job as we can think of—just wait till you see one of these in the air on a sunny day.

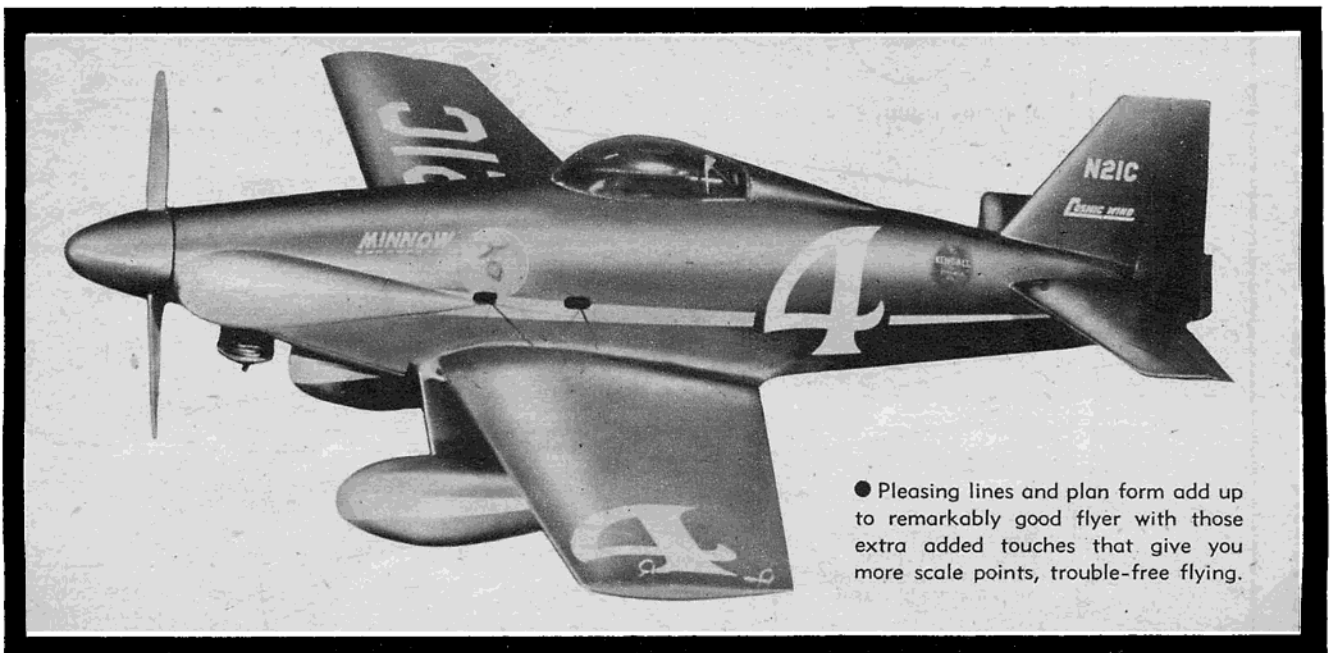
To duplicate the all-metal appearance of the original, the model was covered with sheet balsa. Due to the simple lines, planking is a cinch. Engine mounting details show the new Atwood Triumph engine, but since the bearers are fairly close together, almost any engine down to a 29 will do the job. However, a larger engine, like the Triumph or a 60 will provide the power needed for extra good flights.



BY PAUL PLECAN

A modified form of crutch construction is used, simplifying fuselage alignment. The only hard items are the wing fillets and forming of the cockpit canopy. We know that won't scarce you, so let's clear the bench. To eliminate the drudgery entailed in enlarging plans, you can obtain *Air Trails'* full size plans if you wish. For those who want to start in right away, the plan border has been marked off at 1" intervals to facilitate enlargement by the graph method.

The first item on the agenda is the fuselage. Four crutch or keel pieces are needed first. Obtain sheets of $\frac{1}{8}$ " balsa that are as similar as possible for these (preferably cut from the same plank). Formers are next, cut from firm $\frac{1}{8}$ " sheet stock. Since half-formers are shown on the plan, two of each will be required. Start assembly by cementing and pinning two keel pieces together at the rear end (spread apart about 20°). This angle will permit insertion of former 10 coated with cement along the side edges. After pinning it in place, work forward—



● Pleasing lines and plan form add up to remarkably good flyer with those extra added touches that give you more scale points, trouble-free flying.

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formers 9, 8, 7 and 6—in that order. Keep an eye on the line-up, as the fuselage may bend to one side if one keel is stiffer than the other.

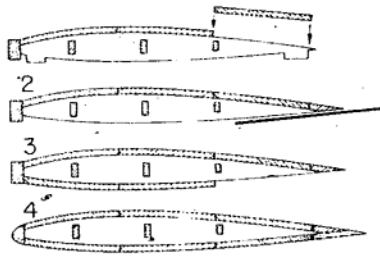
Due to the double taper of the engine bearers, they are added after formers #4 and #5 are in place. The remaining formers are slipped into place and the keel sides bent in and cemented to the formers. Note from the fuselage top view that the taper is abrupt slightly aft of #5 and at #4. The keel pieces should be cracked slightly at these points by scoring the keels with a razor. Make the crack gently and cement to formers. Take soft $\frac{1}{8}$ " x $\frac{3}{16}$ " balsa strips and start planking. See supplementary sketch. Apply strips in order shown, as the fuselage may warp if one side is done completely before starting the other.

The planking beneath the keel, aft of #7 is now added. Sheet balsa is cemented in place across the fuselage bottom, aft of the wing. The corners are now sanded (see sketch) and soft $\frac{3}{16}$ " x 1" strips cemented in place. Sand these round to conform with the fuselage curves.

Tail surfaces are next, but we won't go into detail—if you've built even a solid model, you'll know the routine. Just a word of advice, though. Use a large flat sanding block to obtain a smooth job. Sandpaper held around your fingers will produce ridges and hollows that will spoil the job. The elevator horn can be metal or plywood, as long as it is securely mounted and shaped as shown in the side view. Use silk hinges and plenty of 'em—we like to spread them out over the full span of the stabilizer for strength.

The bellcrank can be mounted now. Note that the push rod is $\frac{3}{32}$ " dia. brass tubing with "L" ends bent from $\frac{1}{16}$ " dia. steel wire. The rear "L" joint is soldered and connected to the elevator first. Then, with the bellcrank and elevator at "neutral" the front "L" can be soldered to the push rod.

While we're on the subject, note that the lead-out wires from the bellcrank slant back along the wing panel to the



1. With leading edge cemented in place, cement 2" widths of soft $\frac{1}{8}$ " sheet balsa to upper wing camber.
2. Overlapping sheet at rear is carefully sanded to line up with undercamber. Trim "stubs" off rib bottoms.
3. Apply bottom covering, working from front to rear.
4. Finished rib, with leading edge and trailing edge sanded to shape.

loop guides at the tip. This helps keep the nose of the model pointed to the outside of the circle and makes allowance for the drag on the control lines. (If you've done any control-line flying you've noticed that the lines arc out to the model, due to drag.) So we took that into account in designing this job.

The wing is next, but even though it is fairly simple, don't relax to the point where a warped wing will result. Work on a flat board. The ribs are slipped into place on the spars and the center section is pinned over the working drawings. Soft $\frac{1}{8}$ " sheet balsa is applied now and left until the cement is dry. Use 2" widths and cover small areas; it's much easier that way. Remove all pins holding the center section to the plan and "bank" the wing so that one panel is flat on the plan (note how the stubs on the bottom of the ribs line up the ribs for correct incidence).

Cover the panel in small sections and allow the cement sufficient time to dry well. Then do the other panel. Once the top portion of the wing is covered and the cement dry, the wing can be removed from the work bench and the bottom covering applied after you sand the trailing edge to line up with the bottom of the ribs. Apply the bottom covering on the center section first and work out toward the tips. Keep an eye out for warps and if any seem to be developing, twist the wing in the opposite direction when applying the sheet covering. For counterclockwise flying, it won't hurt if a slight negative warp sneaks into the right wing tip, as that will help keep the outside wing down and the lines taut.

Before cementing the soft tip blocks into place, note that several lengths of $\frac{1}{8}$ " dia. steel wire are cemented into the right wing tip. If you've ever seen a model bank and fly into its own circle, slackening its wires and crash, you'll know why this outboard weight is desired to keep the outer wing down. Use 24" of $\frac{3}{32}$ " dia. steel wire (four 6" lengths, cemented to the spars or leading edge between ribs 5 and 7 will do) or an equivalent 1-oz. weight near the right wing tip.

The assembled wing is now sanded, also the fuselage and tail assembly. Follow up with 2 or 3 coats of Duco white Primer Surfacer. Either brushing or spraying will do. We sand the works smooth in 30 or 40 minutes, when the primer has dried well. Use a 240 or 280 wet or dry sandpaper to start and work down to a 300 or 320 grade. Again we say a flat sanding block is a must. The wing is cemented to the fuselage, using liberal quantities of cement. To provide more than ample gripping surface for the cement, $\frac{1}{4}$ " square cross braces are cemented to the bottom of formers 5 and 6 (front and rear), as per the cross sections on the main plan.

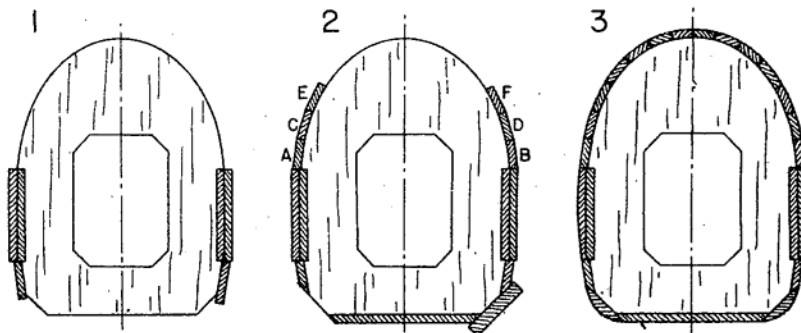
Note that the wheel pants have a triple core, instead of the usual single one. This allows a slim well-rounded and streamlined cross section, as can be seen in the front view. Insert the wheel when assembling the core, as it cannot be slipped in place later. The cheek cowl is simple—merely bandsaw them to shape as the side and top views show and carve to the cross-section indicated. The holes at the front of the cowls should line up with corresponding holes in the side of the keel pieces to allow cooling air to enter the cowl and aid in cooling the engine. The air outlet is at the bottom of former 4.

Form the celluloid canopy by soaking .010" or .020" sheet celluloid in "Tiger" Mold-ex and pulling down over a wooden form. The form should conform with the side and top view and be $\frac{1}{8}$ " longer and $\frac{1}{16}$ " deeper to make up for shrinkage once the celluloid has been removed from the form.

Spinner is from hard balsa and held in place with dress snaps to disc of $\frac{1}{16}$ " plywood ($2\frac{1}{2}$ " dia.) cemented to the rear face of prop.

Bend all the landing gear struts from $\frac{3}{32}$ " spring steel wire. The helper strut is necessary if engines of .49 cu. in. displacement or larger are used as it keeps the landing gear from flexing too much on heavier ships. The line-up strut helps align the assembly when cemented to the bottom of rib 1A. The upper arm joins to the bottom of rib 1A and the lower arm is cemented to the side of the wheel pants, helping line up the pants.

The engine bearers are notched to accommodate the cylinder-crankcase fastening bolts on the engine (see detail). The Triumph 49 used in the original model was glow plug equipped to save on weight, and was inverted to preserve the smooth cowl lines when viewed from the side or above. A flexible needle valve



1. $\frac{1}{8}$ " sheet cemented to formers below keel. Approximately $\frac{3}{8}$ " wide.
2. Add bottom sheeting. Sand as shown at left and cement corner strip ($\frac{3}{16}$ " x 1") in place. Apply top planking strips to alternate sides (A, B, C, D, etc.).
3. Cross section of fuselage, sanded to final shape.

extension was used, so that cowl protuberances would be kept to a minimum. If you want to use the engine upright, lower the engine bearers $\frac{1}{2}$ ". You may use the Atwood tank that comes with the engine or a larger tank (held on with clips) to the aft side of former 3.

With a full tank, ready to go, the original model balanced a little nose-heavy. This was remedied with a little pay load in the tail. We bored a large hole in the tail skid block, put in lead b-b ballast to bring the C.G. to the proper point and sealed the hole with plastic wood. That reminds us of another subject—fillets. They can be carved from Plastic Wood, providing you have a few round "rat-tail" files. Plastic Wood is quite hard when dry and requires the proper files.

The assembled model should be sprayed, if possible, to obtain the smooth-

est finish. After 2 coats of Duco Cream lacquer, use 320 wet-or-dry sandpaper. Kept wet, the paper shouldn't clog up, and plenty of elbow grease will pave the way for a really smooth finishing coat. Allow the final coat to dry overnight before masking off the lettering. About 3 or 4 coats of bronze will be necessary to hide the cream under-coat. If you can't get bronze lacquer, try some artist's bronze powder from the local art store. Mixed with Duco clear lacquer (a teaspoonful of powder to a half-pint of lacquer) the result should be good. Agitate the mixture frequently as the powder settles quickly. Other finishes such as Berryloid and Testor's work equally well.

Flying is a routine that will be dictated by your own personal experience. The author prefers near-high or maximum rpm on all flights. Keep those lines tight, even with a slight breeze.