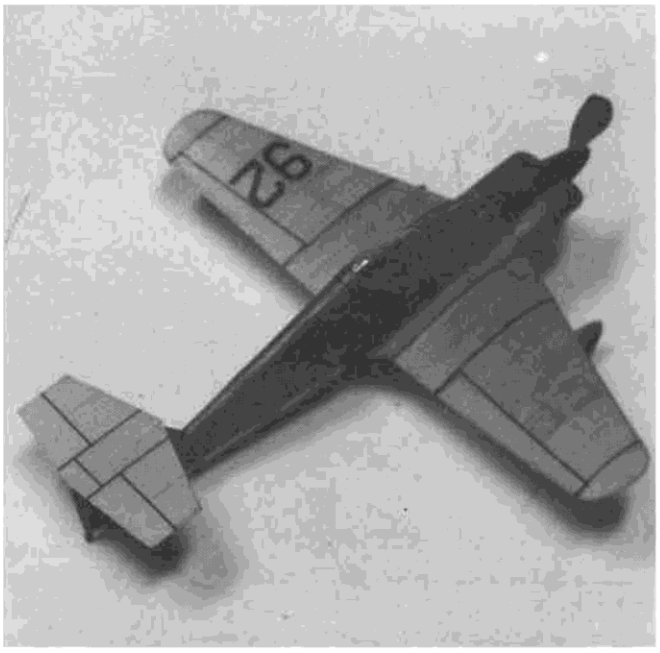

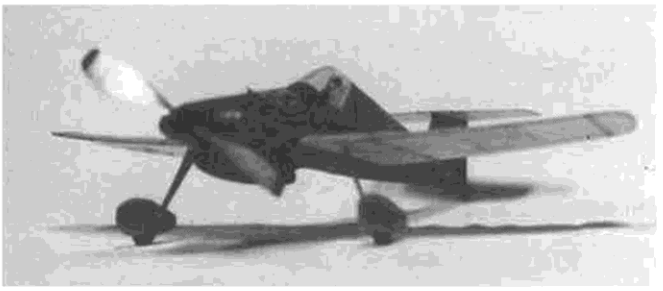

"RIVETS"

By MARK DRELA . . . A most unlikely design for a Peanut . . . that is until you see it finished and watch it fly! This little racer has flown in excess of a minute outdoors, and actually glides in a decent manner.

• Contrary to the impression one might get from its name, "Rivets" must be one of the cleanest racing airplanes of all time. Powered by only a small 100 hp engine, it won 16 firsts and 4 seconds out of 23 races in which it was entered.

Like the original, the Peanut is also a winning ship, having won 1st and 2nd in the two contests it was entered. With lightweight construction, flight times approach 60 seconds outdoors, in dead air. This, together with its high static scores, make a winning combination. The airplane is especially potent under the Flying Aces Rules, which give a bonus of 25 points for a low-wing racer, plus another 30 points if all the external detailing is duplicated . . . easy in such a clean airplane.

The emphasis in the model is on scale fidelity . . . the only deviations are a bigger tail and more dihedral. Nevertheless, the model came out relatively light . . . less than 3/10 oz. Due to the cheek cowls, wheel pants, and half-shell construction, this is a somewhat complicated Peanut. If you are a beginner, or if you never built a flying scale ship before, I would not recommend the Rivets.

Except for the spinner, super-light wood should be used for the block parts. All ribs, formers, and especially the tail surfaces, should also be built from very light wood. The spars and longerons do not have to be hard wood . . . medium is about right. Use Titebond throughout for wood-to-wood joints.

A few construction hints are in order. First of all, raise the wingtip about 1/16 inch when building the wing. Add the 1/16 washin when installing dihedral, and check it again when covering the wing . . . it is essential for stability.

Installing the landing gear is tricky. First, the bottoms of both wing panels are covered with tissue from W1 out. The rear wire struts are now installed by pushing them into W2 at the proper angle, bending them over, and epoxying to the top of the rib. After this operation, bend the wires over and cut to leave 3/32 long stubs which will be pushed into the wheel pants and epoxied. After covering or painting the pants, mount a wheel in each pant with 1/32 sheet spacers. Notch the small 1/16 sheet fairing where the front wire juts off at an angle. This fairing should be fairly hard wood, since it supports both of the wires. Push the front wire with the wheel and pant attached through W2 at the proper angle, bend over, and epoxy to the short spar. Wrap the wires with tissue and paint silver (don't shrink the tissue, though).

When building the fuse, pre-curve the longerons with your fingers. This is essential to maintain the correct fuselage contours. Formers F3 and F4 are glued on in one piece. F3a is later cut loose and re-glued to match the wing chord precisely. F4a is cut loose and discarded. The missing stringer slots are cut after assembly. This is easily done by using a felt-tip pen to mark the slots with the aid of a light, flexible straightedge. When cutting a slot, place the former in question flat on the corner of the bench to support it.

Omit stringers on the bottom between F3a and F6. When covering the fuse, omit tissue on the bottom between F2 and F6. The short stringers between F2 and F3a only serve to strengthen the wing mounting.

After the fuselage tissue is water-shrunk, and the wings steam shrunk (more on that later), the wing is ready to be attached to the fuselage. First glue the leading edge and trailing edge

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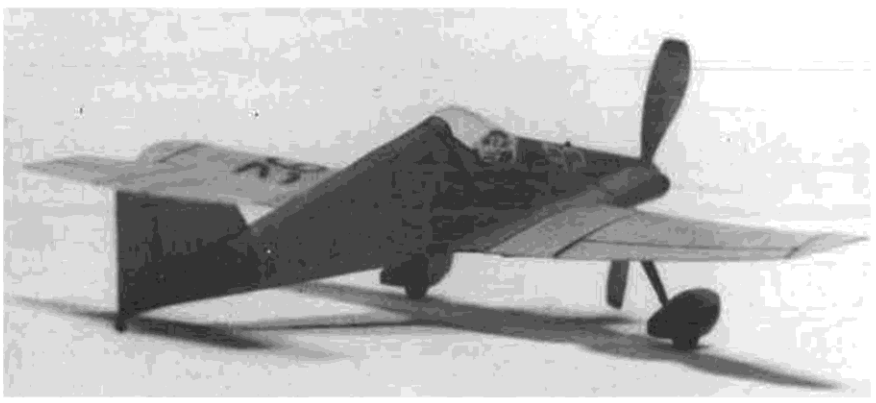

A little tricky to build, but an excellent flier if the weight is kept down. Here's an excellent subject for those equipped with a small vacuum molding machine.

to F3a and F6, checking alignment and incidence. When dry, cut short pieces of hard 1/16 square to fit between the spars and side longerons and glue securely in place. These transfer all the loads to the fuselage.

Now comes the hardest part of building the Rivets, the cheek cowls and fillets. The two front blocks are first pre-shaped, covered with wet tissue, and cemented exactly in place. The whole process is mainly trial-and-error, so take your time. The upper blocks of the cheek cowls are next. They should fit precisely for a neat job. While the glue dries, the bottom cheek cowl sheets and fillets can be cut from soft .020 and .015 sheet. Or, translated into English, about two-thirds and one-half the thickness of 1/32 inch sheet. Most modelers will have to sand down 1/32 inch sheet. For those of you already scoffing at the idea, you will change your mind when you try to make the necessary bends on a 1/32 fillet. Just get out the ole' sanding block and get to work. To avoid feathered edges, sand a piece of sheet first, and then cut the pattern. Bend the wood with a heavy breath and gentle pressure. The necessary 3-D surface in the fillets is obtained with the thin wedges as shown on the plan. When the cheek cowls and fillets are completed, apply tissue in the area between both W1's, F6, and the front cheek cowl blocks and water-shrink. The cowls and fillets are also covered with wet tissue on top. Make the bottom scoop from 3 pre-bent pieces of soft 3/32 balsa. Shape the outside surface and cover with wet tissue. Then, scoop away as much balsa from the inside as you dare and cement in place.

Every effort was made to keep the tail light, which resulted in the small wood sizes shown on the plan. Even 1/16 square or 1/20 square are really more than big enough for the small tail on the Rivets. However, these small sizes require special shrinking procedure. First of all, none of the gussets must be omitted. The type shown on the plan is lighter, easier to cut, and works just as well as the sheet variety. Use dope to attach the tissue . . . white glue softens with heat and moisture. Grain should run fore-and-aft on the stab, and up-and-down on the fin. The tissue should be on as tight as possible before steaming. Get a teakettle going, and pass each side *once* in the steam. Weight the part down on a flat surface and wait five minutes. Repeat if necessary. The sag from the steam takes time to dry out just as in water shrinking, so don't steam again immediately after the first operation, assuming the tissue didn't shrink enough. Overshrinking is the last thing you want, since there is no way to reverse it!

This method applies to the wings as well. To prevent sagging, run the tissue grain chordwise. This may be sacrilege to some modelers, but since tissue shrinks more across the grain than with it, the dip is minimized by the extra pull from the wingroot to the tip. This was confirmed by experimentation. The fuselage is just barely strong enough for water shrinking, and the extra tissue tautness gives greater resistance to motor torsion. Run the grain up-and-down to prevent stringers from sagging between formers under the tight tissue. After shrinking, give everything one or two thin coats of dope.

The control surfaces and metal panel joints were outlined with black tissue strips. Compared to black chart tape, these weigh practically nothing, won't leave a sticky edge to grab dust and lint, and look just as good. The tissue strips can be sliced easily with two halves of a double-edged razor blade (must be sharp!), separated by a balsa spacer. Cut the strips on a soft board and bury the corners of the blades in the board when cutting. Strips of different widths are obtained by varying the thickness of the spacer. Attached to the model with clear dope, the black strips go a long way toward improving the looks of your model, and unlike felt-tip lines, do not have fuzzy edges. If you look hard enough, you will see riveting detail in one of the photos. These rivets were made with a felt-tip pen, and waterproofed with dope when dry. If you decide to attempt this, practice first on an old peanut to get the hang of it. Get a good 3-view for all extra scale work.

The secret of this model's performance is a good cruise, and a superb glide. With a loose freewheeler and proper adjustment, the ship has the glide of a sick HLG, which is better than most other peanuts, which as a rule, fall out of the sky when their power runs out. Mushing must be avoided, so bring the C.G. a little in front of F4. Just how much will vary with different airplanes. The stab incidence can be changed by sliding narrow balsa wedges under the leading or trailing edge. Whatever you do, remember to maintain a fast glide, and make sure the prop will freewheel with ease. My ship uses a 15 inch loop of 1/8 Sig rubber, which will be too thin if you tend to build heavy. With this particular airplane, a high climb is essential for good flight times. Switch to thicker rubber if your ship just cruises around at grass-cutting level. Properly adjusted, the peanut should easily climb past 50 feet every time.

So there you are, all ready to reap in that gleaming hardware. Good luck and watch the thermals! •