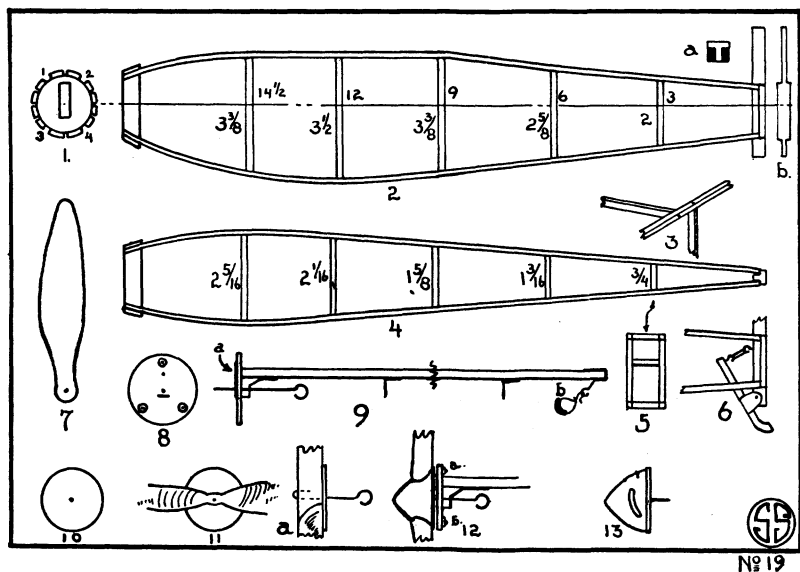


Building and Flying Model Airplanes



This is the fourteenth of a series of articles by Paul Edward Garber, telling how to make model airplanes. Mr. Garber is in charge of aeronautics at the Smithsonian Institution.

Fuselage and Power Plant

After the wooden sticks which form the fuselage sides have thoroughly dried in their forms, they can be removed and assembled into a frame. They are to be jointed at the front to the nose piece the making of which was described in our last article. Four one-eighth inch grooves are to be cut in the periphery of this piece as shown in Figure 1, Nos. 1, 2, 3 and 4. These can be cut with a knife, burned with a hot piece of iron, or filed. They should be of such size that the longerons, or fuselage sticks, go into them flush with a tight fit.

The tail piece is next made. It is a piece of "T" section cut from a stick $3\frac{3}{4}$ inches long as shown in Figure 2, a and b, the latter being a rear view. The "T" flanges are left on the sides for a distance of $1\frac{1}{2}$ inches, $\frac{3}{4}$ inch from the bottom end. Figures 2 and 4 show a number of spars of different sizes separating the longerons. Two of each of these are to be cut from sticks $\frac{1}{8}$ inch square, then with all the requisite parts ready the frame is assembled. To do this the two sides are first made the spars being spaced as indicated by the figures above the center line which denote numbers of inches from the tail.

When the sides are completed they are joined together as shown in Figures 3 and 4. Figure 3 shows how the upper and lower spars are set in advance of the side spars. All of the joints are first touched with glue or ambroid and then nailed,

using No. 20 $\frac{1}{2}$ -inch brads. With all of the spars in place the tail piece is nailed and glued in position and finally the nose piece is similarly fastened.

This practically completes the fuselage but, in order to make it more nearly resemble the original, three $\frac{1}{16}$ -inch strips should be run down the length of each side and in addition short strips are run from the nose to the first upper and lower spar on top and bottom. These are to round out the fuselage, and slots for these strips are shown in Figure 1.

The tail skid is made from a piece of wood $\frac{3}{8} \times 3/16 \times 2\frac{1}{2}$ inches of the shape shown in Figure 6. A small piece of tin or aluminum sheet is bent around it and fastened with a nail for a pivot to the bottom of the tail piece. The upper end has a nail driven through it with the projecting end bent into an eye. A similar eye is formed in a nail driven through the tail piece, and a short rubber band is used to join the two eyes, thus giving elasticity to the tail skid to prevent breakage when the model is maneuvering on the ground.

We will next start on the power plant and the first move will be to put an extra cross brace into the stage 3 inches from the tail as shown in Figure 5. The brace is $\frac{1}{2}$ inch below the top and forms a box for the motor stick to rest in. We next make the propeller. Figure 7 shows the blade outline of the propeller. This shape is reproduced on cardboard to form a pattern. The blade is 5 inches long, and $1\frac{1}{4}$ inches wide. With this pattern proceed with the making of a ten-inch pro-

peller as explained in a recent article of this series.

Figure 8 shows a disc of thin plywood $1\frac{1}{2}$ inches diameter which is pierced with a slit and two holes so spaced that the bearing which you made last week will be accommodated therein as shown in Figure 9. The shaft hole must be exactly in the center of the disc. The long stick shown in Figure 9 is 15 inches long and $5/16$ inch square. To it the bearing is fastened by a nail driven through at "a" and a binding made where the strip joins the wood above the shaft hook. The tail hook and cans are lashed in place as shown.

Lindy's bus carried a spinner cap mounted on the propeller head resistance. We can make one as follows: Cut a piece of cardboard into a disc $1\frac{1}{4}$ inches diameter, Figure 10. This is now attached to the motor stick and shaft by passing the shaft through the disc and hub and bending the shaft over in the outside of the hub to retain it, Figure 11a. The spinner cap is formed of plastic wood, which is a new product resembling putty but working like wood. Most hardware and paint stores carry it. From it the nose is molded as shown in Figure 12 and in the end view, Figure 13.

For purposes of winding the motor and for making repairs the motor stick has been made separate from the fuselage. It is attached to it now by using dress clips. Three are spaced on the plywood disc and nose piece as shown in Figures 8 and 12. They can be fastened with small nails or wire or thread passed through the holes. Dress clips are sold at all notion stores in various sizes. The smallest should be used.

The fuselage is to be covered with China silk, using ambroid as adhesive. Each side and the top and bottom are covered separately, using a piece of fabric slightly larger than the frame, and applying it over the longerons and spars which have previously been coated with ambroid. The material must be stretched tight, and after it has dried all projecting edges must be trimmed off with a razor blade. The last section on the bottom near the tail is left open, because of the tail skid, and the top sections second and third from the front are left open because these spaces are covered with the wing. Fit the fabric neatly around the nose and tail post but leave no overlapping as this would interfere with the movement of other parts.

Science News-Letter, November 19, 1927