NATIONALS SENIOR FUSELAGE WINNER

By Leo Baily

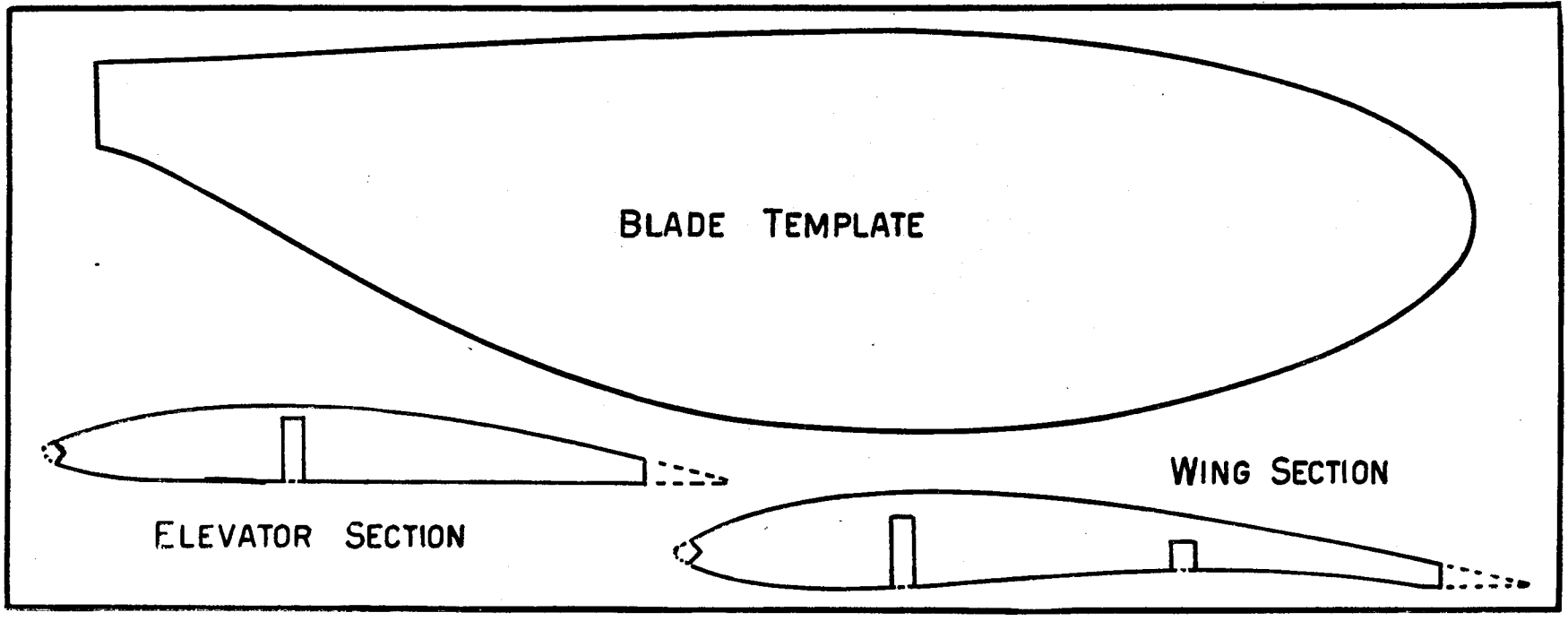
by LEO BAILEY

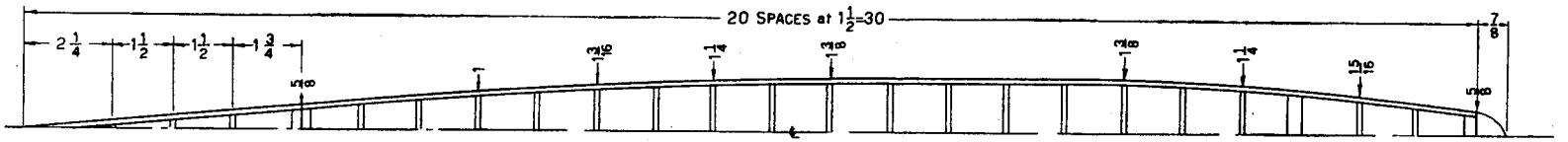
"The Old Stand-by" would best describe this design adopted by contest builders around Akron.

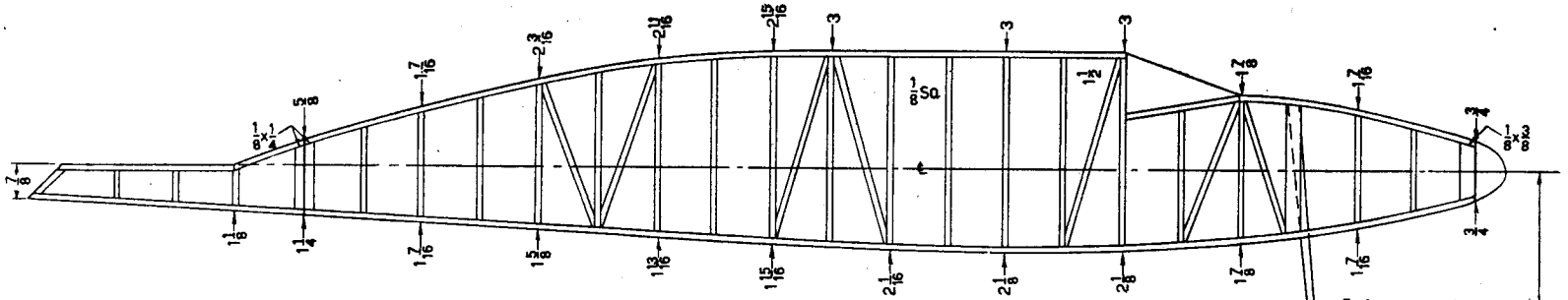
ANOTHER winning model has come from one of our best model centers of the country, Akron, Ohio. The Senior Fuselage model of Leo Bailey, which is a consistent winner, again shows Akron on top.

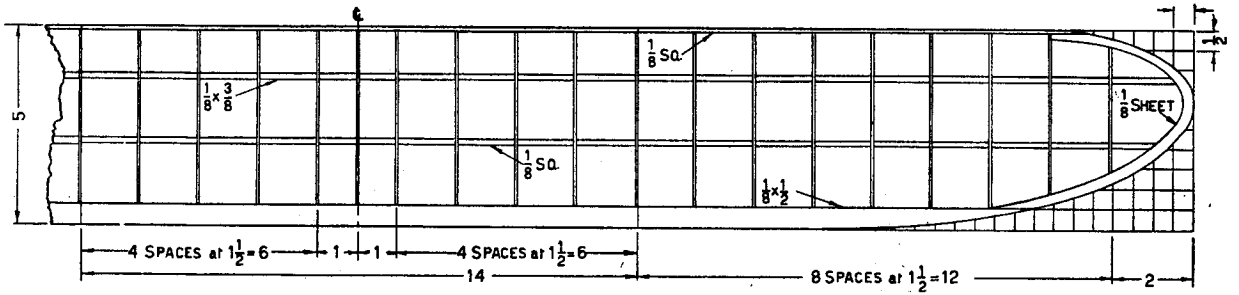
Because of the inherent flying qualities of this design, and its contest-winning tendencies, this model has become an old stand-by of the designers and others. Complete records of its flying prowess would be imposing—but too long. However, a good indication of the model's abilities can be recognized in the fact that besides taking first in the Senior Event at the '38 Nationals, with the second highest duration in its class, a copy of the original won first in the Scripps-Howard contest. In the same race the original took fifth place.

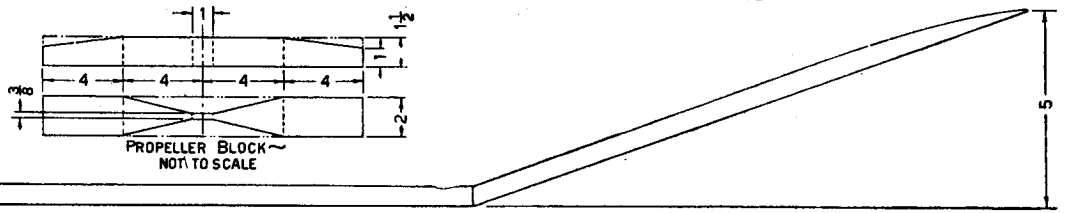
This model incorporates two features in design which at the present time are not very widespread. First, it has a moderately high-angle wing setting, and second, it has a rubber tensioning

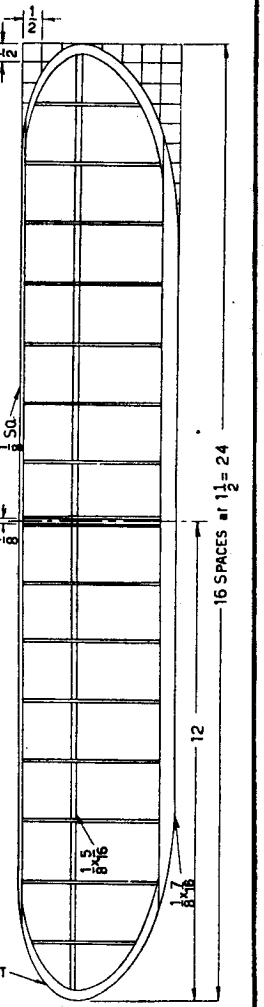

BLADE TEMPLATE
ELEVATOR SECTION
WING SECTION

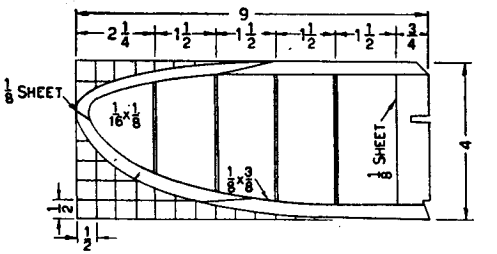


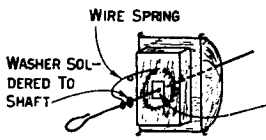












SHEET COPPER --2 FOR PLUG - 1 FOR BACK OF PROP

NOTE: ALL WIRE PARTS 1/16 STEEL WIRE

¼ DIA. ALUM. TUBE -FOR FREE WHEELING

0 1 2 3 4 5 6 7 8 9 10 11 12

SCALE

SENIOR FUSELAGE WINNER

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device which is exactly the same as Albert Judge used on his 1936 Wakefield Winner. Setting the wing at the angle of 4 already puts it practically at the angle it will fly, and makes excessive down-thrust unnecessary. Using the rubber tensioner allows an excessively long motor without the necessity of a long, unwieldy and ugly fuselage.

FUSELAGE

The fuselage is of the cabin type and square-cornered.

Make a full-sized layout of the fuselage sides and pin the longerons of 1/8" square hard balsa to the drawing. Cement in the 1/8" square hard balsa braces and diagonals and also the fore and aft main cross-braces of 1/8 x 3/8" and 1/8 x 1/4". Coat the joints liberally with cement. Build the other side of the fuselage on the first one, keeping a sheet of wax paper between both halves so that they will not stick together. Allow the cement to dry thoroughly— three hours should suffice—in order to be sure that the fuselage sides will not change shape. (Note that the boom is built attached to the fuselage in order to keep it lined up. It is removed after the fuselage is completely built, but not covered.) Remove the sides from the drawing and build the fuselage up by inserting the cross-pieces at the wing leading and trailing edges, top and bottom. After those joints have dried, cement in the nose and tail main cross-braces. The remainder of the cross-braces may be inserted after the glue holding the nose and tail cross-braces has set.

The next job is to make the nose and tail plugs. Cut the boom off and build the tail plug on it as shown in the drawing. Use care when constructing the nose plug. Its proper construction is important. Follow the dimensions given on the drawing carefully.

The landing gear is made of bamboo. The struts make a V, the apex of which is at the double cross-piece at the top of the fuselage. Additional strength is obtained by binding the struts to the lower fuselage longerons with thread. Put the two-inch-diameter wheels in place after the glue holding the axles and struts has dried.

The landing-gear attachment was the last operation before covering. The fuselage should be covered with a good grade of tissue. Use banana oil to attach it to the longerons and cross-pieces. (You may use a double covering for additional strength.) After the fuselage is covered, spray the paper with water. After it is thoroughly

dry, paint it with model dope. Spraying the papering with water insures a tight covering with a minimum of wrinkles. Doping increases the strength of the fuselage.

WING

The wing of this model is of the regular construction and is of the polyhedral type.

Make a template of the rib section of hard balsa and cut out twenty-seven ribs from 1/16" soft sheet balsa. The front spar is 1/8 x 3/8" medium-hard balsa, the rear spar is Y1/8" square balsa. (Note that the spar slots in the ribs are deeper than the spars. They are made that way in order to keep a smooth surface after the wing is covered.) The leading edge is 1/8" square and the trailing edge is 1/8 x 1/2".

Lay the Spars on the full-size drawing of the wing and cement the ribs in place. After the cement has dried, attach the leading and tapered trailing edges. The tips of the tapered 1/8" sheet balsa are then cemented into place. Cut the spars, and leading and trailing edges at such an angle that the proper dihedral of 5" under each tip is obtained. Then 1/32" thick sheet gussets should be cemented to each side of the main spar and trailing edge in order to increase the strength of the joints.

After all the cemented parts of the wing have thoroughly dried, cover it with a good grade tissue. The top side is usually covered first, as it is the more difficult. The paper should be sprayed with water to shrink it and give it a smoother, finished look. After the paper has shrunk, dope it with a thinned-out dope. Take extreme care that the paper does not stick to the spars, as a smooth section is desirable.

TAIL AND RUDDER

The tail and rudder are made in exactly the same manner as the wing. Note that the tail has a clark Y type of airfoil, whereas the rudder is flat.

Cut out the sixteen tail ribs from the 1/16" soft balsa sheet and cement them to the 1/8 x 5/16" hard balsa spar. (Note that the center ribs are spaced 1/8" apart to hold the rudder rib snugly.) The 1/8" square leading edge and 1/8 x 7/16" tapered trailing edge should be attached to the ribs as soon as possible along with the tips, which are made of 1/8" sheet balsa. The rudder does not have a spar, but instead has a husky leading and trailing edge with four husky ribs.

The leading and trailing edges are 1/8 x 3/8" stock, and the ribs 1/16 x 1/8" The root rib is 1/8 x 3/4" and should fit snugly in the slot formed by the two center elevator ribs.

After the cement holding the parts together has thoroughly dried, cover the tail and rudder surfaces. Water-spray the surfaces and, after drying, apply a coat of thin dope. Make sure that the surfaces do not warp. The final operation on the surfaces is the attachment of small hooks, made of straight pins, to the tail surface leading and trailing edges. These hooks are used in order to hold the rubber bands which attach the tail to the fuselage.

PROPELLER

The propeller is carved from a block 1 1/2 x 2 x 16", shaped as in the drawing. The propeller is carved in the usual way, with 1/8" under camber. Finish the propeller, after cutting in the blade shape with fine sandpaper. Dope the blades to a smooth finish. Cement the metal guard to the back of the propeller and the freewheeling device on the front. The freewheeling device is merely a 3/8" length of 1/4" diameter aluminum tubing, with a notch filed in it for the 1/16" diameter steel wire shaft to catch on when the power is on. The propeller shaft has a washer soldered on it in order to have a bearing surface for the rubber tensioning spring.

ASSEMBLY AND FLYING

Insert the rudder in its slot in the tail surface and attach the surfaces to the fuselage with rubber bands. Place the wing on the fuselage and secure it with rubber bands. Insert the twenty strands of 3/16" brown rubber 44" long into the fuselage and attach it to the rear plug and the propeller shaft.

After completely assemblying the model, put about a hundred turns in the rubber and then allow them to run out. This will bring the tensioner into play. Slide the wing to the point where the model will be slightly nose heavy when held at the trailing edge of the wing. Glide the model. If it dives, add negative incidence to the elevator till it has a flat glide. If it stalls, add positive incidence. Warp a little right turn into the rudder. Put about fifty turns in the rubber and try flying the model. Add negative incidence or right rudder thrust, as the case may be, until you have a steady climb in rather tight spirals. After the model is correctly set, put the winder to it and watch it head for the clouds.

ABOUT LEO BAILEY

Leo Bailey is one of the reasons for Akron's usual success at the Nationals. His record certainly shows that he "more than does his share" to keep Akron up with the front of the line.

Leo has been a rather consistent winner in the Akron contests. His heart, apparently, is entirely in rubber models, as he has flown in all events except gas. Last year he won a scale-model event and placed high in many other contests. In spite of his local record, Leo has only dabbled in the Nationals events. The '38 Nationals is the first in which he has entered with a vengeance. As a result, his ship won the Senior Fuselage Event with a flight of 23 minutes and 35 seconds.

The General Tire and Rubber Company has found Leo Bailey indispensable as a draftsman. Leo, however, hopes to be an aeronautical engineer some day. He was twenty-one on July 29, 1938, (just after the contest), and has been building models for the last ten years. Because of his age, in all future Nationals he will be a strong contender in the Open Class events.