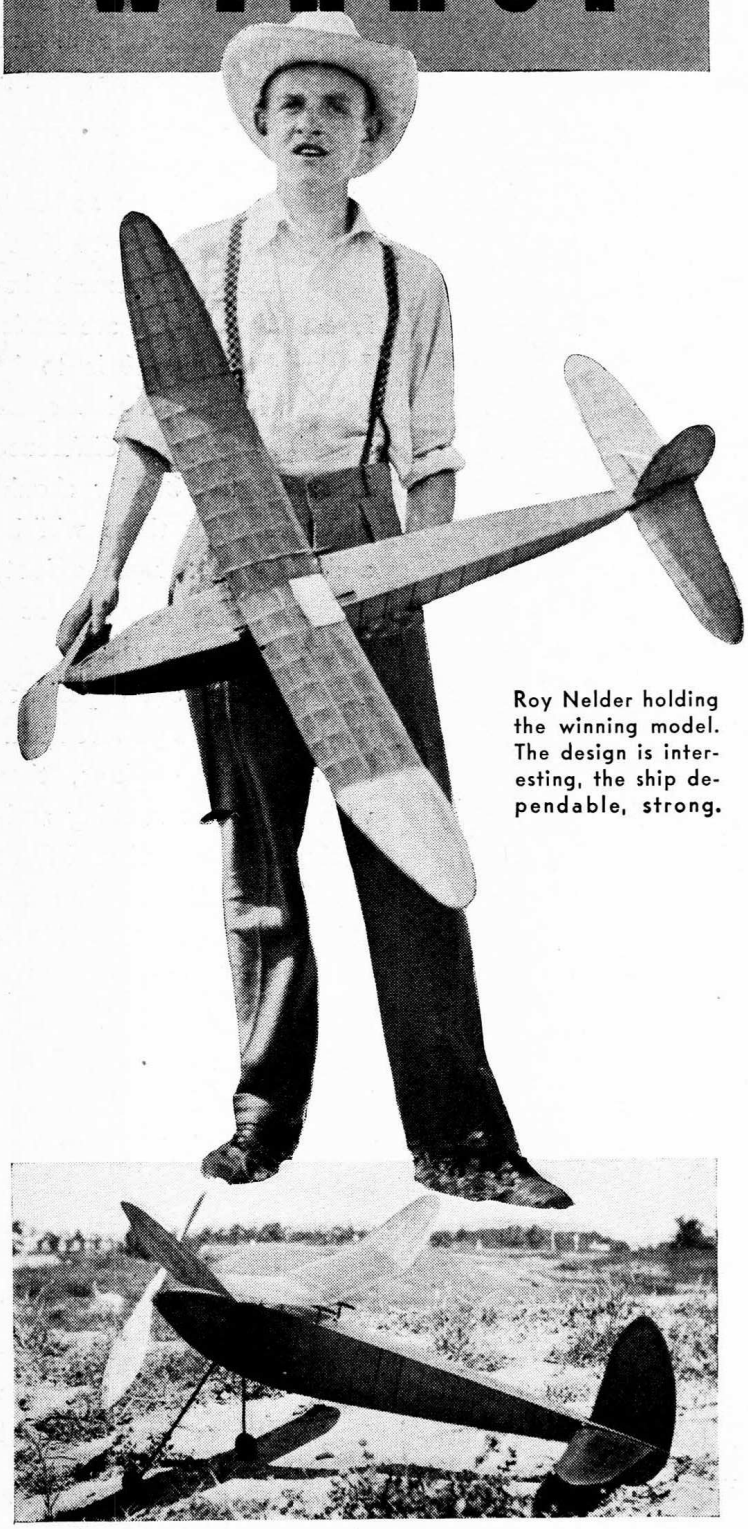
THE 1938 moffett trophy winner



Roy Nelder holding the winning model. The design is interesting, the ship dependable, strong.

Another world's championship model—this time a Canadian design, winner at the 1938 Nationals

By ROY NELDER

THE United States has lost the Moffett Trophy for the second time in the six years it has been in competition. In 1936 at Detroit Vernon Gray of New Zealand won the trophy flying his entry by proxy. Canada has always sent a strong team to the Moffett contest, and their victory this year was the result of much serious preparation.

Nelder's winning flight was 5 minutes and 17 seconds. He had made a flight of 10 minutes and 37 seconds to win first place on the Canadian Moffett team in the eliminations held previous to the Detroit meet. Fortunately, the model was recovered undamaged after both these long flights.

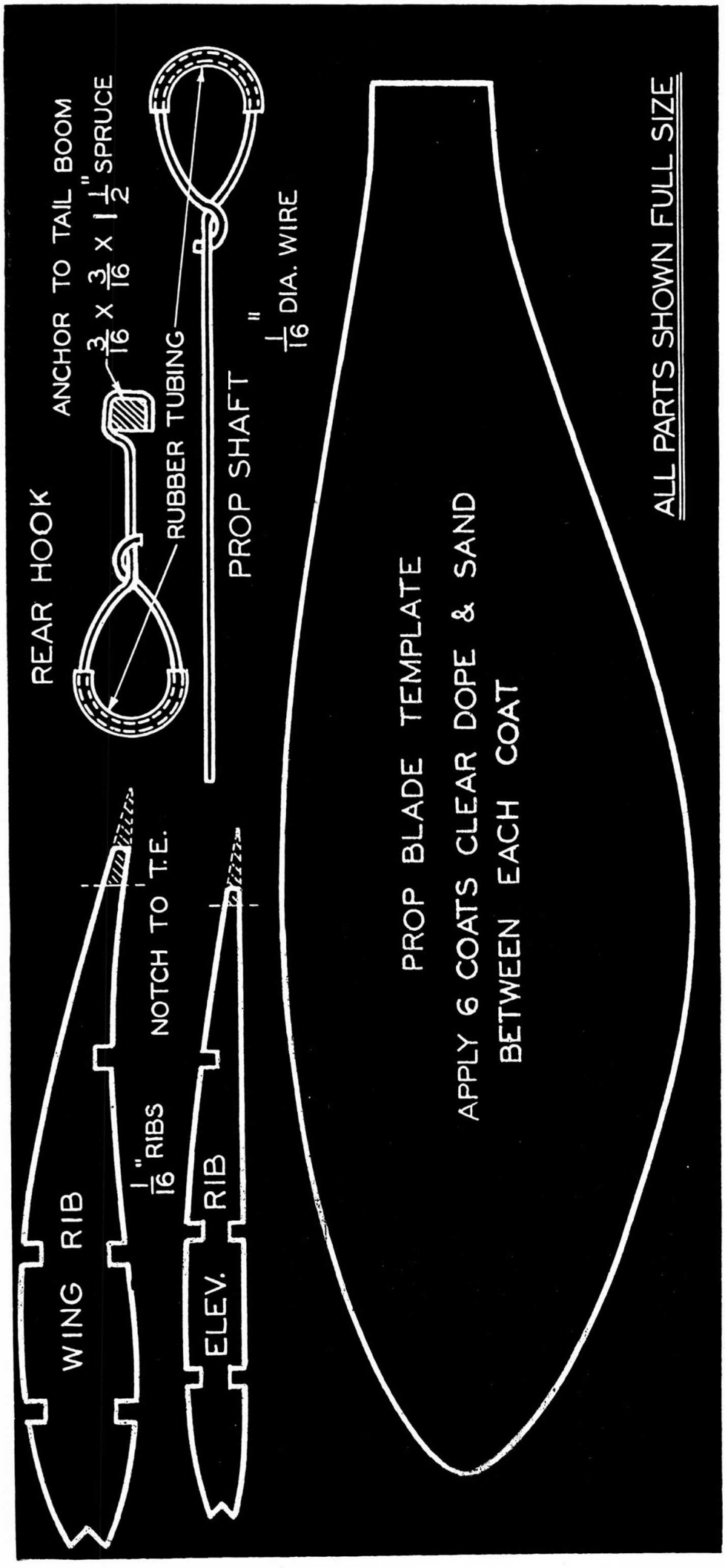
Flying conditions in Toronto and the surrounding parts of Canada are quite different from those which the Canadian entrants encounter during contests in the States. They seldom have calm weather in the early spring—and such weather is necessary for test-hopping the models built for the spring and summer contests. The wind cuts down duration and is responsible for many unnecessary crack-ups. Nelder's Moffett Winner showed no evidence of crack-ups despite extensive test flying and contest work done prior to Detroit. The covering and doping was perfect, without any blemishes. The propeller was doped to a high luster free from nicks and burrs. Close inspection of the model after its winning flight made it seem as if it had just left the workshop. This is a tribute to the construction skill and good flying judgment of Roy Nelder.

CONSTRUCTION

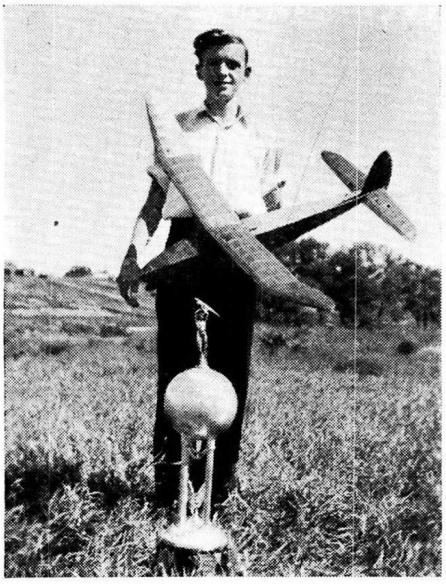
Fuselage is square-cornered, rectangular cross-section. The 1/8" square longerons and bracing are built into two identical side panels, following the dimensions shown in the side view. These dimensions are referred to the thrust line and the outside edge of the longeron. The front and rear ends of the fuselage are filled in with 1/8" sheet to provide additional strength for the nose and tail plugs.

In joining the two halves of the fuselage, hold the three dimensions indicated in the top view; 1¼" at the nose, 3¼" and 1½" at the rear where the tail boom joins the fuselage. Fill in the cross-bracing to round out the fuselage to a smooth shape.

1/32" sheet balsa is set flush with the edges of the front fuselage. This planking extends back to the first diagonal brace. Before planking the bottom, the



landing gear should be added. The fuselage should be strengthened at the landing gear location by two 1/8" balsa gussets set inside the fuselage and cemented to the 1/32" planking and the longerons. Two lengths of 1/16" inside diameter brass tubing are inserted through the fuselage—the edges trimmed off flush with the outside of the fuselage. Extend a piece of wire through the front tubing and bend the ends to form an inverted U shape. The legs of the U are cemented and threaded to the 1/16 x 1/4 x 8 1/2" bamboo landing gear struts. These struts are braced at their mid-point by two short lengths of wire cemented and threaded to the struts, and their ends inserted in the rear brass tubing. The wheels are two cross-grained thicknesses of 1/8" lined with brass tubing axle bearings. The rear wire struts can be pulled out of the tubing and the landing gear folded up alongside the fuselage to facilitate carrying and packing the model.



Roy Nelder, the ship and the trophy.

Tail boom is built up from 1/8" square filled in with 3/32" sheet balsa. It attaches to the fuselage in the same manner as the nose plug. That is, the plug is built up from 1/16 x 3/8" sheet balsa. The rear hook is anchored to a piece of 3/16 x 3/16" spruce set in the tail boom. 1/32" diameter wire hooks are cemented to the boom and the rear of the fuselage. These hooks are joined with rubber bands on the top and bottom.

Nose plug is clearly illustrated. Fit a $^1/_{16}$" brass plate over the front of the plug to serve as a propeller bearing. A similar plate is secured to the rear of the nose plug to hold the propeller shaft at the correct angle: 2 degrees negative with slightly less right thrust. Rubber and hooks are used to secure the nose plug in the same manner as the tail boom.

Wing Mounts are balsa $^3/_{16}$ x $^1/_4$ x 6$^3/_4$" attached to the fuselage by bamboo uprights $^1/_{16}$ x $^3/_{16}$". The ends of the bamboo are inserted halfway through the balsa pieces. The other ends fit along the longerons. Corner gussets of $^1/_8$" balsa are added between the longeron and the fuselage bracing to provide better cementing surface. The balsa wing mounts are joined by cross-braces of bamboo $^1/_{16}$ x $^3/_{16}$ x 3". The ends of the bamboo are inserted and cemented to the balsa. The angle of the wing mount shown in the drawing is the correct one. Duplication of this angle in your model will permit using the wing flat atop the wing mount without the trouble of balsa incidence blocks.

Wing is built in four pieces and joined to the correct dihedral just before covering. The two center portions are uniform chord (5"). The two outboard panels are tapered and the shape can be readily duplicated by laying out half-inch squares and plotting the outline. Nineteen full-size ribs and ten shortened ribs are required. Ribs are notched $^1/_4$" into the trailing edge.

When joining the four pieces of the wing, notice the $^1/_8$" balsa gussets placed between the end rib and the leading and trailing edges of each of the four sections.

Elevator is built in one piece and after covering is inserted through the tail boom. Cut away the $^3/_{32}$" sheet balsa covering in the tail boom to receive the elevator. The correct angle for the elevator is the one shown in the drawing—that is, the flat under-surface should be directly in line with the thrust or reference line. A few drops of cement between the elevator and the tail boom will hold it in position. A tissue fillet is used to smooth out the junction between the elevator and the tail boom.

Rudder is built directly to the top of the tail boom. The ribs are $^1/_8$ x $^1/_8$" balsa. The bottom portion of the rudder is cemented to the bottom of the boom. The shape of both these portions of the rudder can be made full size for easy working by laying out the points on $^1/_2$" squared paper. The rudder is offset $^1/_8$" to the right. If the first flights show further rudder adjustment is necessary, it can be readily warped.

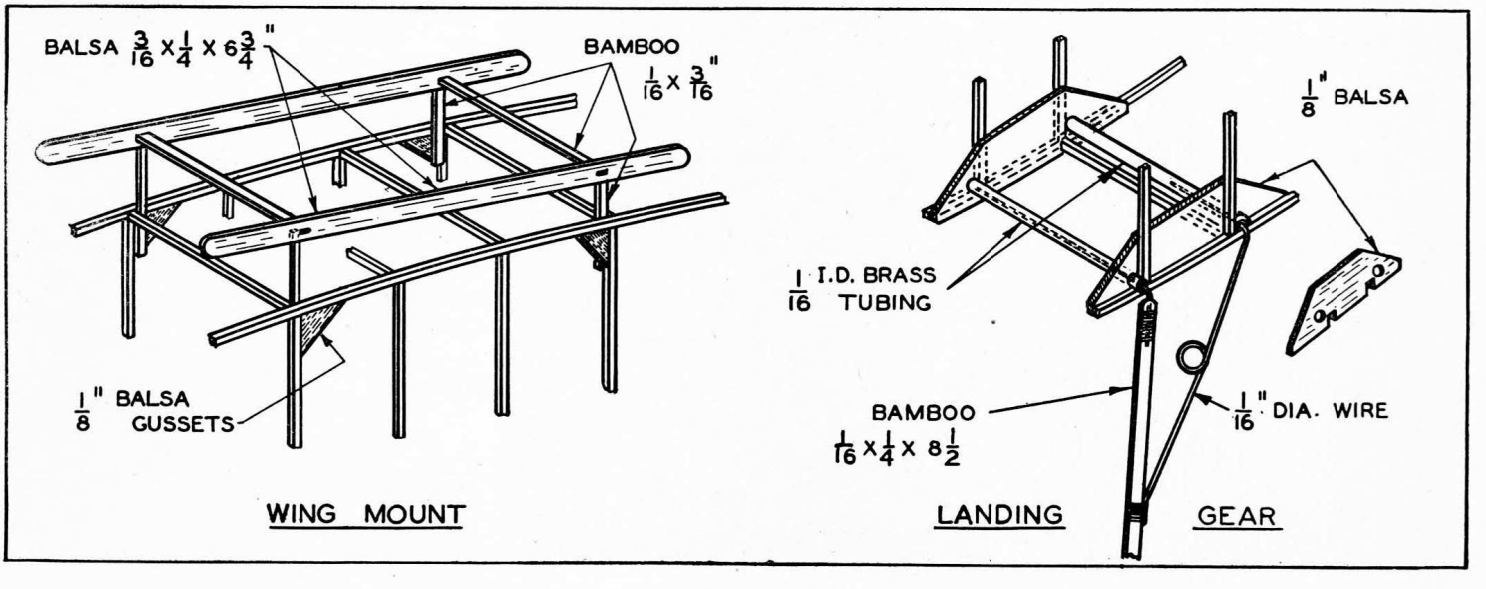
Propeller is carved from a block 1$^7/_8$ x 2$^1/_4$ x 18". A full-size blade pattern is included with the article. At the mid-point of each blade the rear face of the propeller should be cambered to a depth of about $^3/_{16}$". The propeller should be doped, sanded, and polished to a high luster. The front and rear of the propeller hub are fitted with guards of $^1/_{16}$" sheet brass. The front fitting is flanged outward to engage the propeller shaft for free-wheeling action. The flange is cut so it engages the shaft in only one direction when it is driving the propeller. It is free to slip over the flange when the propeller is spinning free. The front and rear fittings are cemented and anchored to the propeller with short pins inserted through holes punched in the brass. A ball-bearing washer is used between the propeller and nosing.

ABOUT THE AUTHOR

Four years ago Roy Nelder started in the model hobby building scale models. It was only a short time until outdoor contest models were included in his model work. In the spring of 1937 his contest work began to show results when he won second in the Moffett elimination conducted by Eaton's of Toronto. Later the same year he lost his entry at the Canadian National Exhibition contest on an unofficial flight of 12 minutes. Unfortunately it was not returned in time for the contest.

The following winter Roy designed and built the model described in this article. His goal was a victory in the Eaton contest. He reached this goal with a first in the Canadian Moffett elimination, and second in the Wakefield eliminations. The prize was a free trip to Detroit for the 1938 National Meet. Here he won the Moffett International Trophy.

Nelder is 17, lives in Toronto, and is a mighty capable modeler. The neatness and painstaking care that usually accompany scale-model construction are clearly evident in Roy's outdoor models. Careful construction of a fundamentally sound design is his way to contest victories. Roy is a pleasant modeler to know—a typical member of the Canadian delegation which has become such an important part of all our national meets. He's always welcome to attend our meets—even though he did carry off one of our most beautiful trophies!



MOFFETT TROPHY

Both the propeller shaft and the rear hook are covered with $^1/_{16}$" inside-diameter rubber-spaghetti tubing to prevent the wire from cutting through the rubber motor.

Rubber motor is made up of twenty-six strands of $^1/_8$ x $^1/_{30}$" brown rubber. The motor length is 40".

FLIGHT

This is characterized by a slow, steady climb. However, the climb continues long after the faster-climbing models have started their downward glide. No warp is used for the wing. Make it a point to keep the wing flat throughout the span.

When adjusting a new model, Nelder first tries for a good glide. After getting it to his satisfaction through experimentation with a variety of different adjustments, he gives the model a short flight with a few turns in the motor. If the model shows a stalling tendency, it can be corrected by additional down-thrust. But in no way change the setting of the wing and tail so as to interfere with the best glide setting. Strive for the maximum in climb. Use the least down-thrust possible without the danger of stalling.

The model climbs in seventy-foot circles, and to the right. During the glide the diameter of the circles remains practically the same. This feature can readily be controlled by the amount of right thrust put into the propeller-shaft adjustment. Likewise, the right thrust adjustment can be used to control the turn during the climb. If the weather is windy, use slightly more right thrust and a tighter circle during power and glide. This will prevent the model from mushing and losing its hold on down-wind turns.

The model is wound through the front. Attach the front of the propeller shaft directly to the winder. It will not be necessary to detach the rubber from the propeller shaft. The motor is given between eight hundred and nine hundred turns.

MATERIALS

(Balsa, unless otherwise noted)

Fuselage

4 pcs. $^1/_8$ x $^1/_8$ x 31½", longerons
12 pcs. $^1/_8$ x $^1/_8$ x 24", bracing
2 pcs. $^3/_{16}$ x ¼ x 6¾", wing mount
2 pcs. $^1/_{16}$ x $^3/_{16}$ x 8" (bamboo), wing mount
1 pc. 1 x 1¼ x 1⅝" (hard), nose block
1 pc. $^3/_{16}$ x $^3/_{16}$ x 1½" (spruce), rear hook anchor
4 pcs. $^1/_8$ x $^1/_8$ x 6½", tail boom
2 pcs. $^1/_8$ x ⅞ x 2½", landing-gear gussets
1 pc. $^1/_8$ x ⅜ x 1½", wing-mount gussets
1 pc. $^1/_{16}$ I. D. x 6½" brass tubing, landing gear
2 pcs. $^1/_{16}$ x ¼ x 8½" (bamboo,) landing gear
4 pcs. $^1/_8$ x 1¾ x 1¾", wheels
1 pc. $^1/_{16}$ x ½ x 15", front and rear plug
1 pc. $^1/_8$ x 1 x 7", front fuselage
2 pcs. $^1/_8$ x ¾ x 6", rear fuselage and tail boom
6 pcs. $^1/_{32}$ x 1 x 12" planking, front fuselage
2 pcs. $^3/_{32}$ x 1 x 12" planking, tail boom

Wing

4 pcs. $^3/_{16}$ x $^3/_{16}$ x 14", leading edge
2 pcs. $^3/_{16}$ x $^3/_{16}$ x 9", leading edge
4 pcs. $^1/_8$ x ⅝ x 14", trailing edge
2 pcs. $^1/_8$ x ⅝ x 9", trailing edge
5 pcs. $^1/_8$ x $^1/_8$ x 14", spars, (center section)
4 pcs. $^1/_8$ x $^1/_8$ x 9", spars
2 pcs. $^1/_8$ x $^1/_8$ x 8", spars
2 pcs. $^1/_8$ x $^1/_8$ x 6½", spars
2 pcs. ¼ x ⅞ x 2", tips
1 pc. $^1/_8$ x 1 x 1", gussets
10 pcs. $^1/_{16}$ x ¾ x 12", ribs

Elevator

2 pcs. $^1/_8$ x $^1/_8$ x 8¾", leading edge
2 pcs. $^1/_8$ x ½ x 9", trailing edge
4 pcs. $^3/_{32}$ x $^3/_{32}$ x 9¼", spars
4 pcs. $^3/_{32}$ x $^3/_{32}$ x 8¼", spars
2 pcs. $^3/_{32}$ x $^3/_{32}$ x 8¾", spars
2 pcs. ¼ x ⅝ x 4", tips
3 pcs. $^1/_{16}$ x $^7/_{16}$ x 12", ribs

Rudder

1 pc. $^1/_8$ x $^3/_{16}$ x 5½", leading edge
1 pc. $^1/_8$ x $^1/_8$ x 6⅜", center spar
1 pc. $^1/_8$ x 1 x 7", trailing edge
1 pc. $^1/_8$ x ¾ x 4", tips
1 pc. $^1/_8$ x ⅝ x 12", lower rudder
3 pcs. $^1/_8$ x $^1/_8$ x 6", ribs

Additional Items

1 pc. 1⅞ x 18", propeller block
1 pc. $^1/_{16}$" dia. x 12" wire, rear hook and shaft
1 pc. $^1/_{32}$" dia. x 3" wire, nose and tail attachment
1 pc. $^1/_{16}$ x ¾ x 5" sheet brass, bearings, plates, etc.
1 pc. $^1/_{16}$" inside dia. x 2½" rubber tubing, covering for hooks
1 ball-bearing washer
dope, cement, and 4 sheets of tissue