

The uncovered framework shows the ruggedness and simplicity of the structure.

With Wheels Or Pontoons

*A Flying Scale Model of
the Arrow Sport Plane*

by Alan D. Booton

FOR the simple reason that stock automobile engines have decreased in weight and increased in horse power and dependability during the past decade, it takes but little imagination to foresee mass production of safe, low-priced plane designs—powered with the coming lighter and higher-powered, easily converted automobile engines—in the next decade.

The surplus planes from the World War are seldom seen outside museums, and the flock of medium-sized, second-hand planes are diminishing rapidly, so the fellow who is eager to fly his own plane is faced with the problem of finding a reasonably safe ship that is light on the purse for initial cost and upkeep thereafter. It used to be possible to build and fly your own plane, but now most States require all ships to be licensed, so that heads the prospective pilot in another direction.

Years ago, Henry Ford became interested in light-plane possibilities, but immediately abandoned the idea when his first venture ended fatally for his young pilot.

During the past two years, several pioneering companies have attempted to place on the market, with little success, planes powered with auto engines. The use of Ford engines seems to predominate. This month, Air Trails presents the Arrow Model F. The Arrow, powered with a converted Ford V-8 engine rated at 82 h.p. at 3,075 r.p.m., climbs 500 ft. per min., does 90 m.p.h. full out, cruises at 85 m.p.h., and lands at 45 m.p.h. with flaps down or 48 m.p.h. without flaps. The model is of conventional design and is very easy to build. After the model was tested and the stolid stability noted, the author decided to include the scientific float design for the readers' benefit.

FUSELAGE

Place waxed paper on the drawing to prevent sticking. A bread or drawing board makes an ideal surface to work on. Build two sides of the fuselage frame of $\frac{1}{16}$ " sq. at

the same time and split them apart with a razor blade when dry. Starting from the rear, cement in the $\frac{1}{16}$ " spacers, according to the top view, and keep sighting through the frame, so warps can be prevented. Cement the formers to the stations indicated.

Cement $\frac{1}{32} \times \frac{1}{8}$ " strips to the inside of #9 to extend to the back edge of #10, to form the plug effect. Cement the rear hook to #10 with a piece of $\frac{1}{8}$ " sq., in the position shown. Separate the rear portion of the fuselage with a razor blade. Cover the fuselage completely between #1 and #1ab and #2t, then the top of the fuselage back to #4t, leaving the cockpit, then the top of the removable rear end, with $\frac{1}{32}$ " sheet balsa.

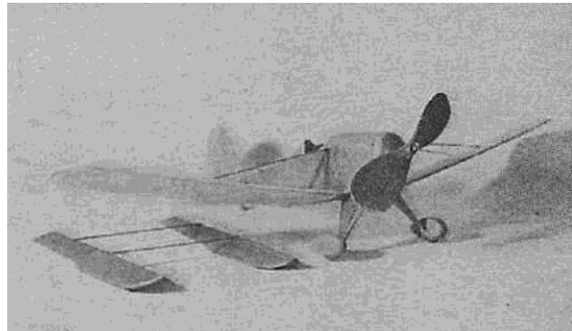
Carve the nose block and cement the $\frac{1}{16} \times \frac{1}{8}$ " strips on as shown on the nose block detail. Insert a double bearing (if you prefer) in the nose block. The bearing is made of one length of $\frac{3}{32}$ " alum. tube to turn freely. Knurl the ends of the $\frac{3}{32}$ " tube to hold the $\frac{1}{16}$ " tube in. Bend the double-acting landing parts and cement them to the fuselage. Note that the #14 music wire extends from axle to axle and the #10 music wire is only bent over the #14 music wire. As the #14 music wire part is bent, be sure to include the $\frac{1}{16}$ " tube bearing.

This bearing is heavily cemented to the rear-bottom edge of #3b. A length of $\frac{1}{8}$ " flat rubber forms the inner struts and is installed with considerable tension. Attach the tail wheel with a #8 wire fitting shown in detail. An easy way to install the wheels in the pants so they may be attached to the axles without "fiddling" many minutes, is to cement $\frac{3}{32}$ " alum. tube bearings in the wheels and then mount the wheels in the pants on $\frac{1}{16}$ " alum. tube. The pant-wheel unit can then be quickly placed on the axle.

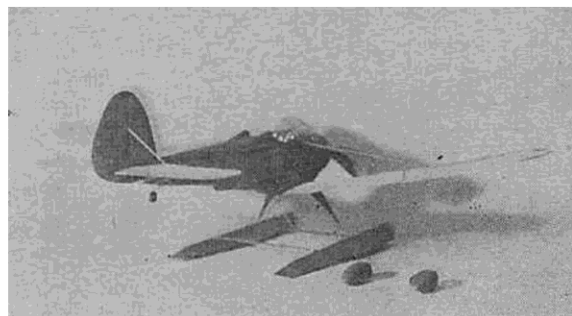
WINGS AND TAIL SURFACES

Assemble the wing panels on your work board, using plenty of pins to keep the many parts lined up.

The Arrow Model F



The landing gear can be quickly changed to floats for hydro work.



When equipped with pontoons, the graceful lines are enhanced. The rear-quarter view reveals the instrument panel and other details.

Table of Weights

Fuselage	1.00	ounces
Wing80	"
Tail32	"
Propeller and plugs.....	.65	"
Rubber	1.50	"

Total.....4.27 ounces

MATERIALS

Fuselage

6 pcs. $\frac{1}{8} \times \frac{1}{8} \times 36$ " hard balsa for longerons and braces.

3 pcs $\frac{1}{16} \times \frac{1}{8} \times 24$ " for fuselage braces.

1 pc. $\frac{3}{8} \times 1\frac{3}{4} \times 8$ " for wheels, plugs, etc.

2 pcs. bamboo $\frac{1}{8} \times \frac{1}{4} \times 9$ " for landing-gear struts.

Short length of .045 wire for axles and $\frac{1}{16}$ " wire for shaft and rear hook.

1 sheet writing paper for landing-gear sockets.

Wing

2 pcs. $\frac{1}{8} \times \frac{1}{8} \times 24$ " medium balsa for leading edge.

2 pcs. $\frac{3}{32} \times \frac{7}{16} \times 24$ " for trailing edge.

4 pcs. $\frac{1}{32} \times \frac{1}{8} \times 24$ " for cap strips of spars.

2 pcs. $\frac{1}{2} \times \frac{1}{2} \times 24$ " medium balsa for spars.

2 pcs. $\frac{1}{16} \times \frac{1}{16} \times 24$ " for rear spars.

1 pc. sheet balsa $\frac{1}{2} \times 2 \times 12$ " for covering of center section.

4 pcs. $\frac{1}{2} \times \frac{7}{8} \times 24$ " for ribs.
Bamboo for tips.

Elevator

1 pc. $\frac{3}{32} \times \frac{3}{32} \times 24$ " for leading edge.

1 pc. $\frac{1}{16} \times \frac{1}{16} \times 24$ " for spar.

1 pc. $\frac{1}{16} \times \frac{1}{4}$ " for front spar.

1 pc. $\frac{3}{32} \times \frac{3}{32} \times 24$ " for trailing edge.

2 pcs. $\frac{3}{16} \times \frac{1}{2} \times 24$ " for ribs.

Small length of .035 wire for tail hooks; bamboo for tips.

Rudder

1 pc. $\frac{1}{8} \times \frac{1}{4} \times 6$ " for leading edge.

1 pc. $\frac{1}{16} \times \frac{3}{16} \times 7$ " for trailing edge.

1 pc. $\frac{1}{16} \times \frac{1}{2} \times 7$ " for tab.

2 pcs. $\frac{3}{16} \times \frac{1}{8} \times 6$ " for cross braces.

1 pc. $\frac{1}{16} \times \frac{1}{4} \times 6$ " for cross brace.

Bamboo for tips; soft iron wire for tab hinge.

Extra Items

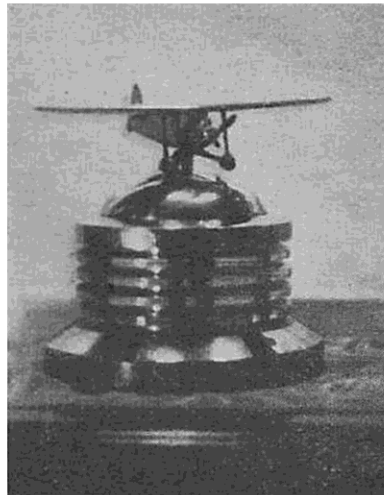
1 propeller block, medium hard, $1\frac{1}{2} \times 2 \times 18$ ".

1 ball-bearing washer.

Short length of .035 for free-wheeling spring.

70 feet of $\frac{1}{8}$ " flat, brown rubber.

Cement, banana oil, tissue, dope and castor oil, for making wood polish.



The Stout Trophy, which is held this year by Ervin Leshner.