

*Build This*

# Brewster F2A-1

## IT'S OUR NAVY'S LATEST SHIPBOARD FIGHTER

Latest in the lineup of sea-arm, single-place craft is this job from the Brewster shops. A speedy midwing, the ship has everything that's needed for sky battles. What's more, 44 of this type were recently sold to Finland and are now in service against Stalin's Reds. Yes, the plane's good. And good, too, is this topnotch flying replica.

**By Manley Mills**

Author of "Here's a Great Gloster Gladiator," etc.

ONE OF the newest and fastest of U.S. Navy shipboard fighters is the all-metal Brewster F2A-1 single-seater mid-wing job, powered with a 1,000-h.p. Wright Cyclone engine. While exact performance figures remain a military secret, experienced observers declare that the ship's top speed is well over 350 m.p.h., and the take-off time is only six seconds with full military load. The service ceiling is reported to be above 30,000 feet.

Outstanding constructional features of the Brewster include a retractable landing gear of unusually clean design and an extra large cockpit canopy which affords remarkably good vision both fore and aft. One of the most "attractive" military planes ever built, the lines of its deep stubby fuselage, huge motor cowling, and tapered wings create a promise of ace performance and formidable striking power. And considered from the model builder's angle, its clean lines, ample wing area, and big three-bladed prop make it an ideal prototype for a flying scale model.

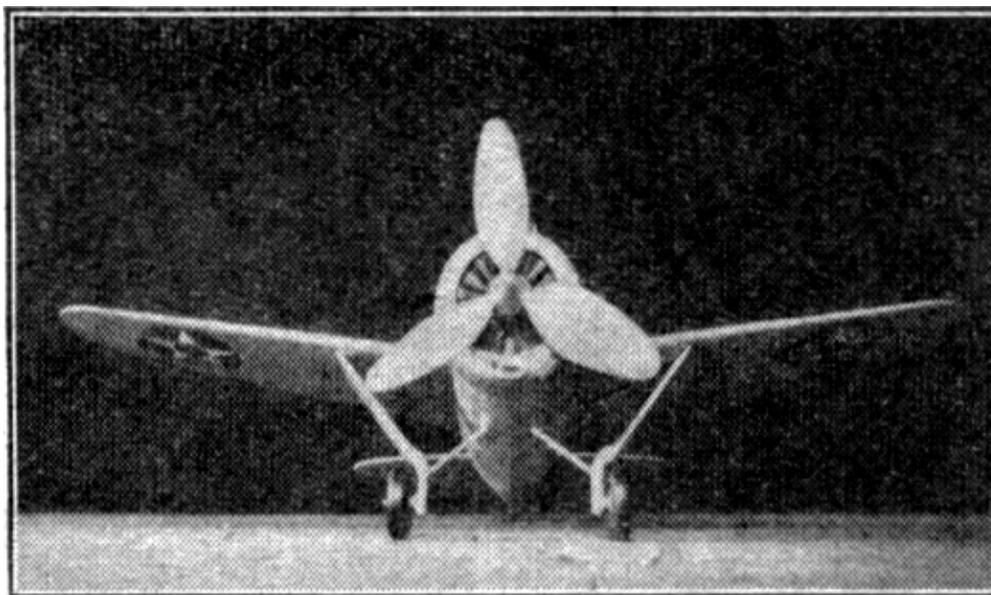
The author's model is a steady and consistent flyer, showing remarkable stability and ruggedness. It was built to an exact scale of 3/4" to the foot, the only changes being an increase in dihedral, horizontal tail area, and propeller blade area. However, as you can see from the photos, these alterations don't mar the appearance of the ship in the slightest, and they're absolutely necessary in a successful flying replica.

In order to keep the weight to a minimum, the landing gear is not retractable, so the wheel wells in the fuselage are omitted since they'd cause quite a bit of drag and increase the weight, too. In other words, this job is designed especially for topnotch flights, and it's advisable to keep the weight as low as possible.

Before you start work, it's a good idea to study the plans until you understand them thoroughly. Any details that may not be entirely clear on the plans are explained fully in the text.



*Just as always, Manley Mills turned out an unexcelled piece of workmanship. And this model shows clearly why his replicas are deemed ace-high. Ever see a neater job? Well, you can make yours just as good if you follow the author's instructions to the letter.*



*In this front-view photograph, our Brewster F2A-1 looks almost like the real thing. The only dead give-away that she's a miniature is that flying-scale prop.*

## FUSELAGE CONSTRUCTION

WHILE the body consists of, the usual bulkhead, and stringers, a special method of fabrication is used which insures a perfectly aligned framework. First off, cut out Plates 1 and 2 and fasten them to your workboard so that the border lines meet and a full length side view of the fuselage is formed. With carbon paper, transfer the bulkhead drawing to a sheet of stiff cardboard that isn't too thick for easy cutting. Cut out the stringer notches carefully on the cardboard patterns and be sure to mark them plainly when tracing the outlines on the wood.

Since the bulkheads, including the tail post, are made in halves, it's necessary to make two pieces from each pattern, using 1/16" sheet balsa. Incidentally, to keep from splitting the wood while cutting the notches in the balsa, fold a piece of medium sandpaper and use the edge like a saw. You can actually cut them faster and more accurately this way than with a razor blade.

Lay a sheet of waxed paper over the plans, or rub a little soap over them at the joints, and jig the master stringer in place with pins. In this construction method, the left half of the fuselage is made on the board, leaving off the cockpit hood and windshield until the entire fuselage is complete.

When gluing on the bulkhead halves, check them carefully with a triangle to see that they dry absolutely vertical. Let all the joints set thoroughly before installing the stringers, and be careful not to push the formers out of line while gluing in the stringers. After this half is completely dry, take it up and build the other half onto it, lining up corresponding halves of the bulkheads with a straight-edge.

You can make an easier job of the hood by building it as a separate unit, without the windshield, making the latter after cementing the hood to the fuselage. Cut the 1/16" square longitudinal members of the hood to length and fasten them temporarily to the body stringers with a few spots of cement. Install a couple of temporary cross-members and a diagonal brace between them and glue on the hood formers. After the cement is dry, cut the frame loose with a razor blade.

For covering the hood, use the thinnest celluloid obtainable. By referring to the side view, you'll observe that, due to its contour, four separate pieces of celluloid will be needed to cover the hood. To make patterns for these pieces, hold a sheet of bond paper tightly over the frame and mark off the correct outline with a soft pencil. Then cut along the lines with a pair of scissors while holding the paper firmly against your sheet of celluloid.

Beginning at the rear of the frame, glue the celluloid in place, clamping it with clothespins, if necessary, until it dries. Use the cement sparingly so it won't spread too much and make unsightly streaks on the celluloid when pressure is applied. To simplify covering and assembly of the model, don't glue the hood permanently to the fuselage until you've completed these operations. Let the temporary cross-members remain in place until you're ready to install this unit.

## MOTOR, COWLING

THE REAR part of the cowling is built up in the same manner as the fuselage, and consists of two formers -- "E" & "F" -- connected by 24 equally-spaced stringers, covered with 1/32" sheet balsa. The front part of the cowling consists of four laminated sheets of balsa sanded to the correct curve after being cemented to former "E." Details of the bearing button and dummy motor are clearly shown in the plans.

To provide easy inspection and replacement of the rubber strands, the motor stick and cowling are detachable by pulling out a wire pin that goes through the motor stick at bulkhead "F-5." Slide the motor stick into the fuselage with enough of it projecting so that the cowling can be glued onto the end. When the cowling is in place, push the motor stick back until the rear face of the cowling fits solidly against the front of the fuselage. Let it remain in this position until the cement is thoroughly dry, making sure that the motor stick is all the way down in the bulk head notches.

## PROPELLER

AS FAR as results are concerned the type of propeller shown in the plans is just as efficient as the "true-pitch" type, besides being much easier to make and balance. If you prefer, however, you may carve the blades from blocks of hard balsa in the usual manner. By hollowing out the front part of the spinner, you can install any standard type of free-wheeling device that will fit in the space thus provided, which will improve the gliding qualities of your model. If you do install free-wheeling, make a bushing from a piece of 1/32" inside diameter brass tube and fit it in the rear part of the spinner so the prop will spin easily without wear.

It takes a little more patience to balance a three-bladed propeller than a two-bladed type. If one blade is much heavier than the others, it will point straight down when you hold the prop so it is free to turn. In that case, cut off two short pieces of equal length from an ordinary pin - experimenting, of course, to find the exact length needed - and imbed them in the tips of the other two blade. In case there is one light blade, with the other two about equal in weight, the light blade will come to rest pointing straight up. To balance it, just imbed the cut-off pin in the light blade only.

Incidentally, a handy tool for cutting the propeller blade grooves in the spinner is a piece of 3/16" dowel with an inch-wide strip of fairly coarse sandpaper cemented around it at one end. Used as a gouge, this tool will cut the grooves accurately in a short time.

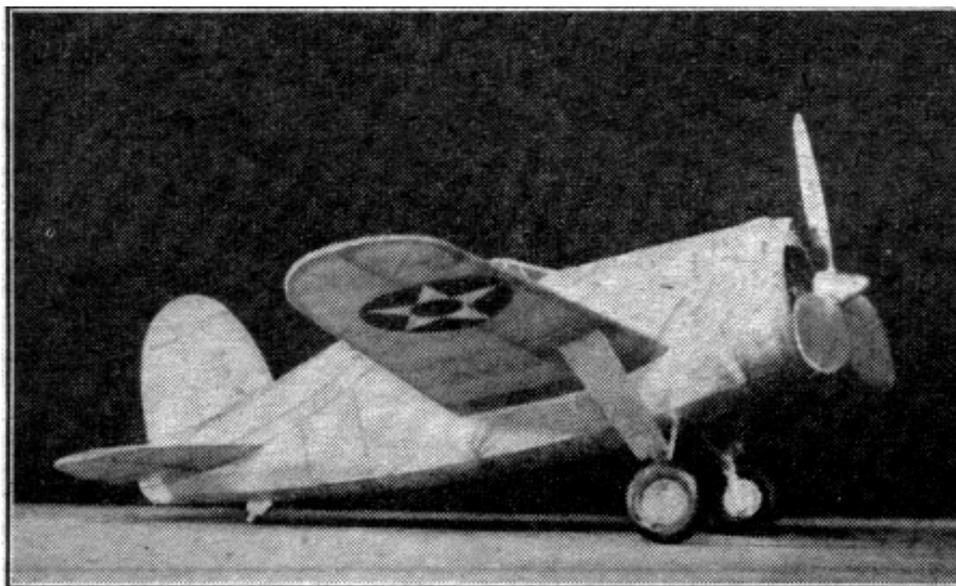
## BILL OF MATERIALS

(All wood is medium balsa)

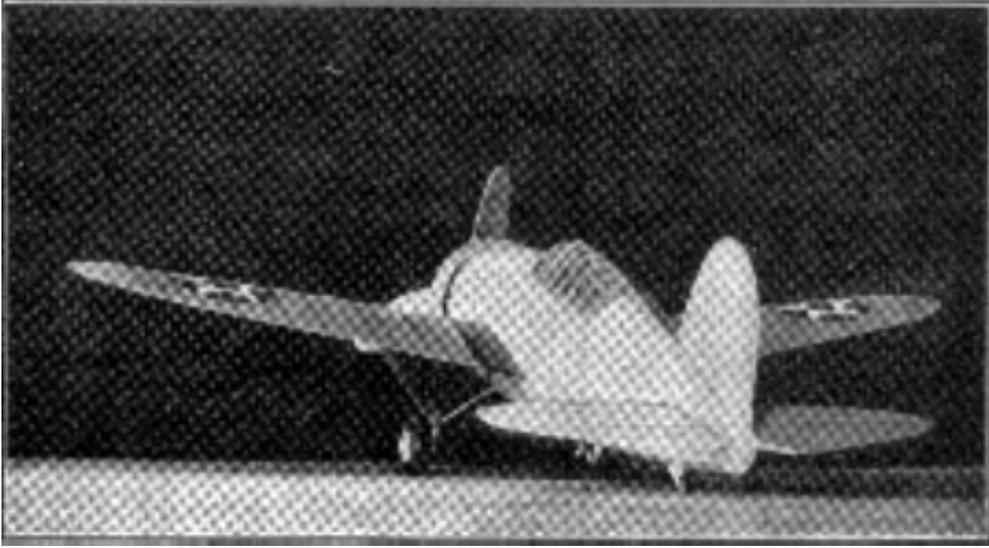
Fifteen strips 1/16" sq. by 18" for stringers;  
Three sheets 1/32" by 2" by 18" for ribs, cowl, and filled-in parts;  
Three sheets 1/8" by 2" by 18" for cowl, prop, spinner, and landing gear;  
Two strips 1/8" by 1/2" by 18" for wing spars;  
Two strips 3/8" by 1/4" by 18" for leading edge;  
Two strips 1/8" by 3/16" by 18" for trailing edge;  
One pair 1-3/4" dia. wheels, two bronze bearings for prop shaft,  
One sheet .005" thick celluloid, one length No. 13 piano wire,  
twelve feet 1/32" by 1/8" brown rubber, three sheets silver tissue, cement,  
clear dope, and silver, yellow, and black dope.

## TO MAKE THE WINGS

ONLY the left-hand panel is shown in the plans. To make the right section, trace the drawing on a sheet  
(Balance of article was not available. gth)

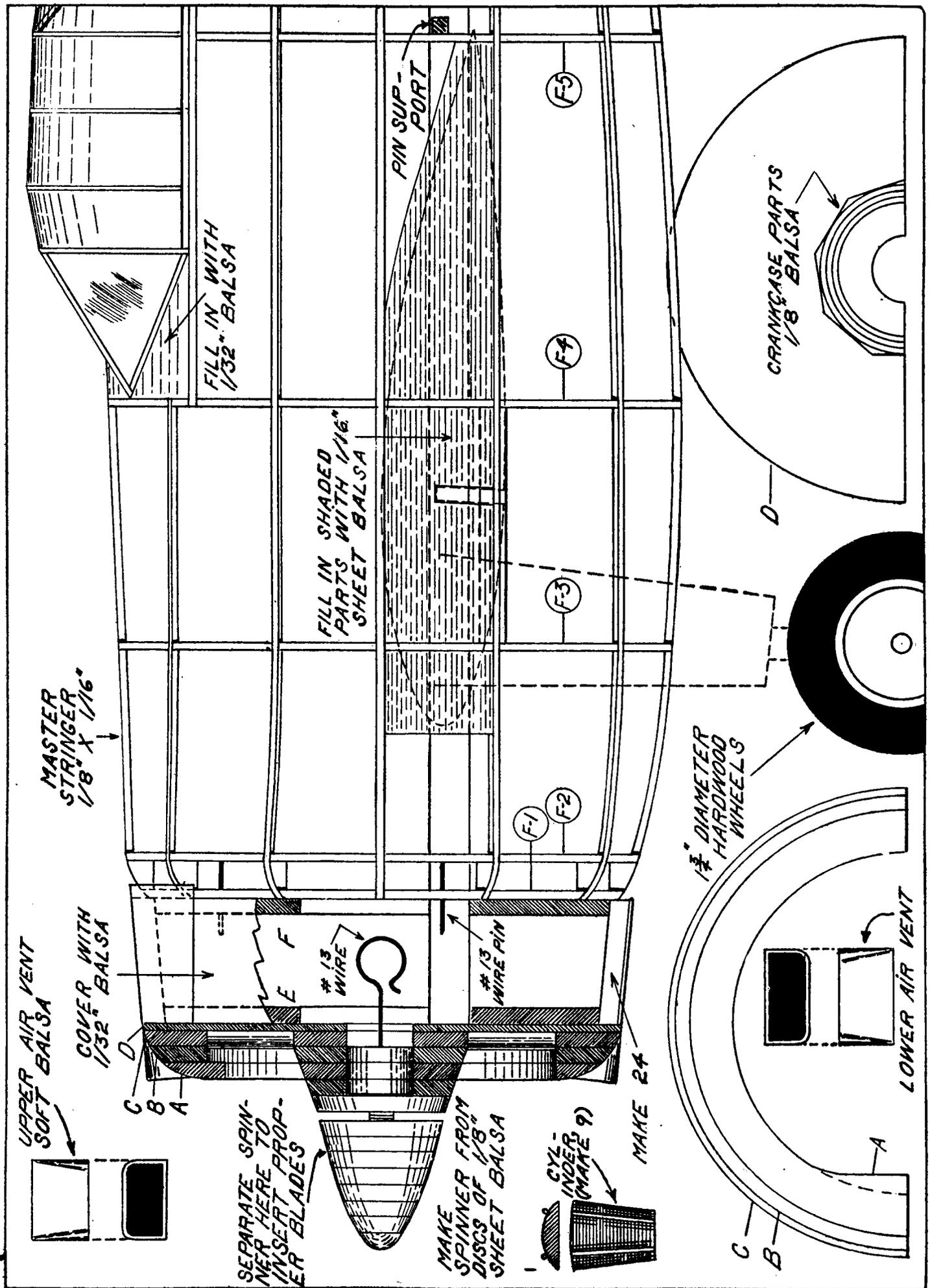


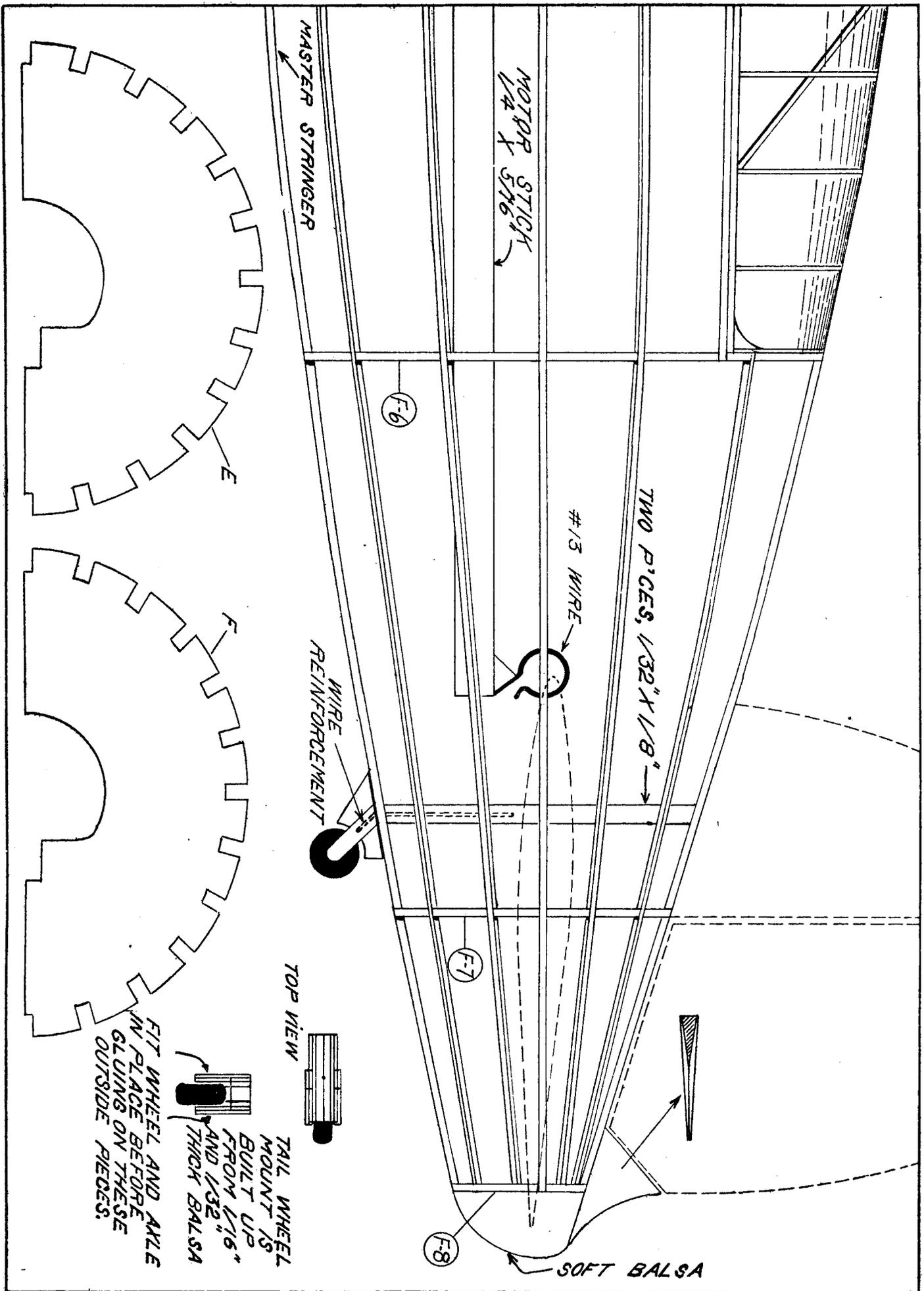
Instead of trying to paint on those wing cocardes, it's a better bet to hike down to the nearest supply shop for a set of decals. Those transfers, you know, can be put on much easier and they assure realistic appearance.

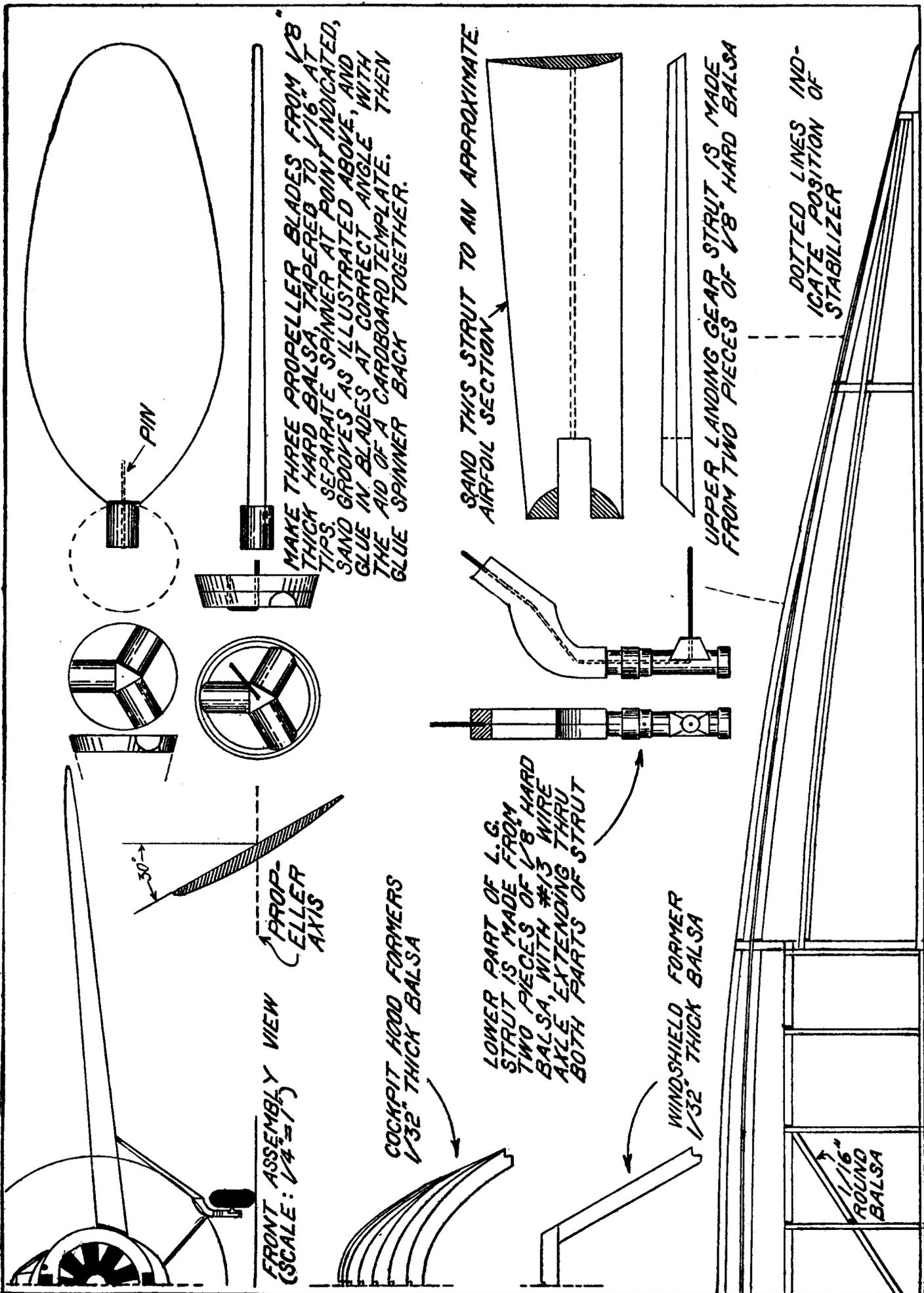


Smooth! Streamlined! These qualities spell SPEED-in caps! But, you say, performance is necessary, too. And can she fly? Fellows, this is one craft that's really at home the air.

***Scanned from May, 1940  
Flying Aces***







MAKE THREE PROPELLER BLADES FROM  $\frac{1}{8}$ " THICK HARD Balsa, TAPERED TO  $\frac{1}{16}$ " AT TIPS. SEPARATE SPINNER AT POINT INDICATED, SAND GROOVES AS ILLUSTRATED ABOVE, AND GLUE IN BLADES AT CORRECT ANGLE, WITH THE AID OF A CARDBOARD TEMPLA. THEN GLUE SPINNER BACK TOGETHER.

SAND THIS STRUT TO AN APPROXIMATE AIRFOIL SECTION

UPPER LANDING GEAR STRUT IS MADE FROM TWO PIECES OF  $\frac{1}{8}$ " HARD Balsa

DOTTED LINES INDICATE POSITION OF STABILIZER

FRONT ASSEMBLY VIEW (SCALE:  $\frac{1}{4} = 1$ )

PROPELLER AXIS

COCKPIT HOOD FORMERS  $\frac{1}{32}$ " THICK Balsa

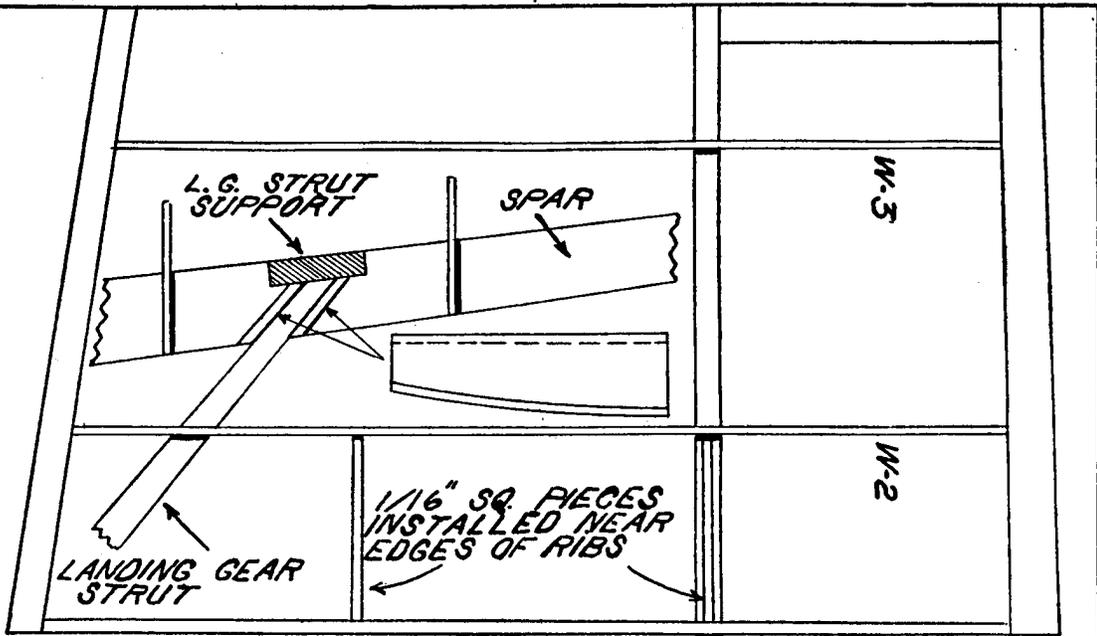
LOWER PART OF L.G. STRUT IS MADE FROM TWO PIECES OF  $\frac{1}{8}$ " HARD Balsa, WITH #13 WIRE AXLE EXTENDING THRU BOTH PARTS OF STRUT

WINDSHIELD FORMER  $\frac{1}{32}$ " THICK Balsa

$\frac{1}{16}$ " ROUND Balsa

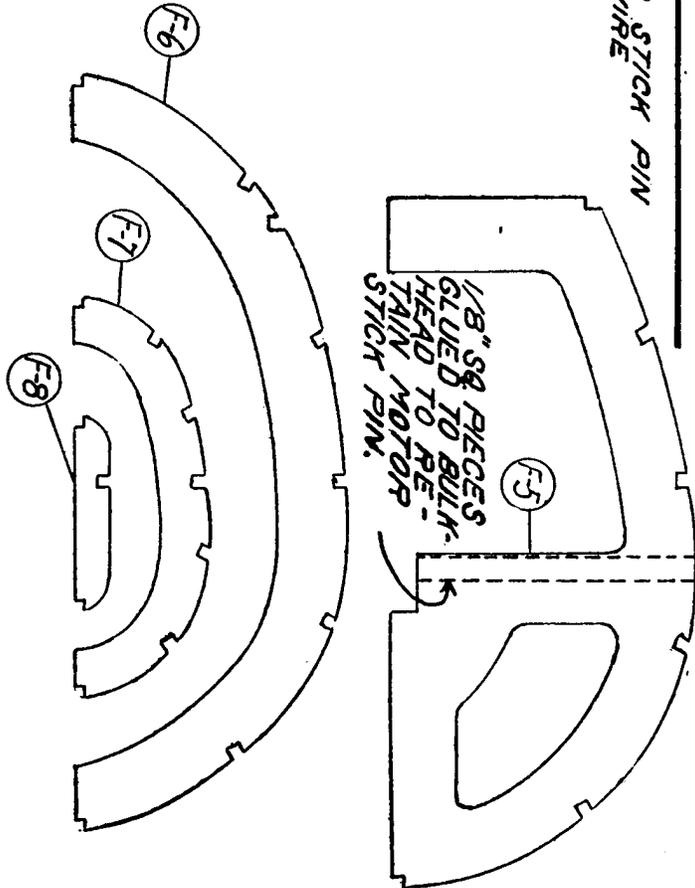


ALL RIBS ARE CUT FROM 1/32" STOCK EXCEPT W-1, WHICH IS 1/16" THICK.



MOTOR STICK PIN  
#13 WIRE

1/8" SQ PIECES  
GLUED TO BULK-  
HEAD TO RE-  
TAIN MOTOR  
STICK PIN.



WING SPAR 5/8" X 1/2" STOCK, TAPERED

