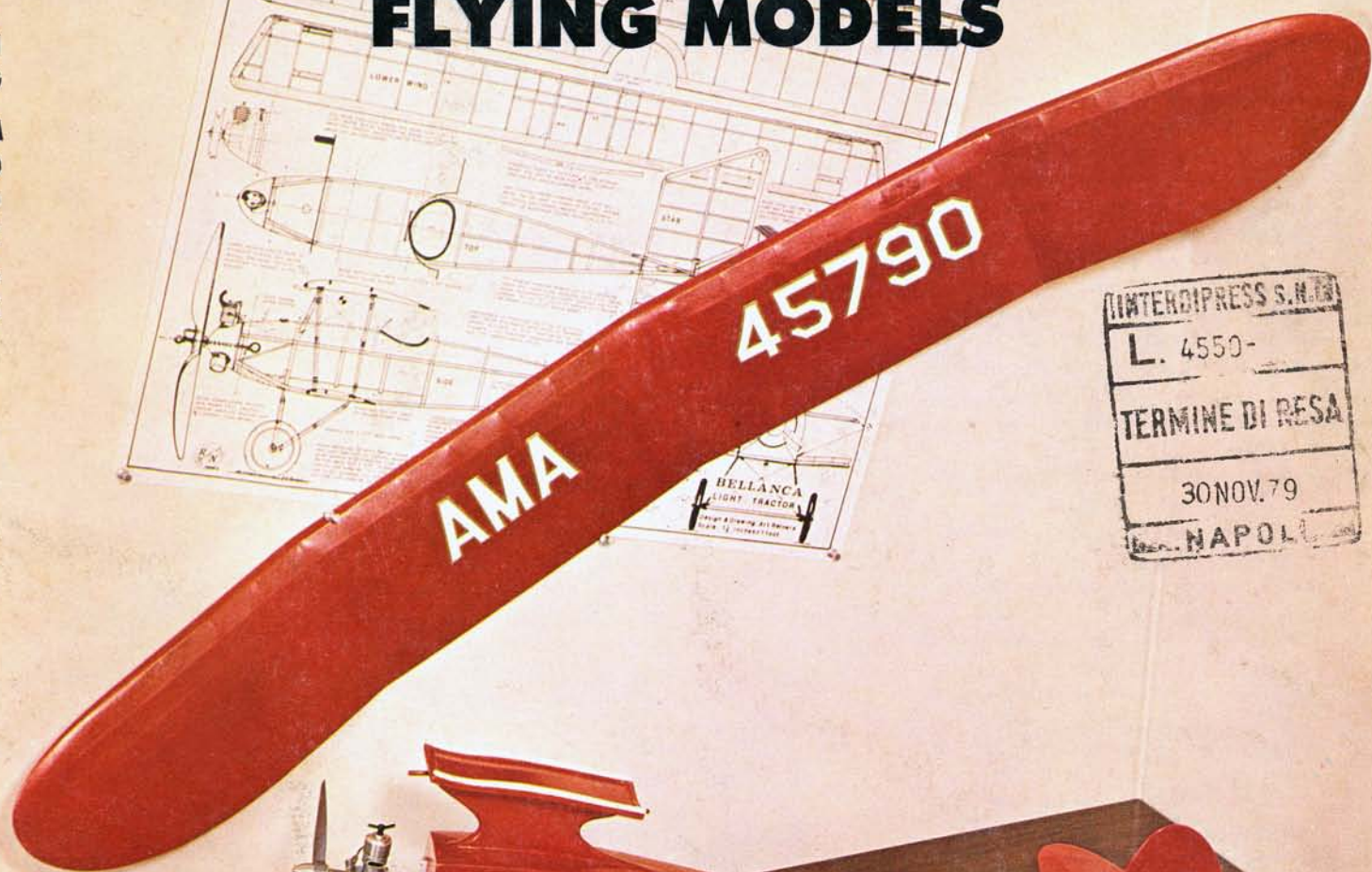


# Classic Flying Models

## 100 PAGES OF NOSTALGIC FLYING MODELS





# AIR TRAILS

# Classic Flying Models

VOLUME 3/NUMBER 3

FALL/1979

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THE LATEST NEWS, PLANS AND TECHNICAL DEVELOPMENTS IN BUILDING AND FLYING MODEL AIRPLANES.

# **m** air trails **odel building** section





# BONANZA

By LEE SCOTT

**Ever want to build a really detailed flying scale model?**

**Here's your chance—try this swift, eye-appealing beauty**

**I**N the past decade numerous small, single-engine airplanes have been designed to meet the desires of the private pilot. Of all these, the Beechcraft Bonanza 35 has been most outstanding in the elimination of drag elements. With the exception of flight instrument fittings and the radio antenna, nothing of consequence interrupts the smooth, eye-appealing lines of this popular, fast airplane. The result has been a gain of speed with the same power rating used in other designs of similar useful load.

It is interesting to note that the same sleek beauty of the full scale airplane can be reflected in a carefully constructed, flyable model.

Read the instructions and study the plans to familiarize yourself with the various details of construction. Start by tracing all bulkheads, wing ribs, stabilizer, gear doors, and the like, labeling each as it is traced. By tracing all of these items first, it is possible to work alternately on some parts while the cement on others is drying. Fold each bulkhead pattern on the vertical center line; this will insure duplication of the opposite side.

Lay a piece of waxed kitchen paper over the construction plans to prevent cement from sticking to them. Bulkheads #4 through #13 should be cut from a sheet of medium-hard balsa. A coat of clear dope painted on bulkheads, before cutting out the center and the longeron notches, helps to prevent small edges from splitting. Making sure the wood grain (see drawing) runs the right direction in bulkheads and ribs, not only prevents them from splitting but adds to the strength of the model.

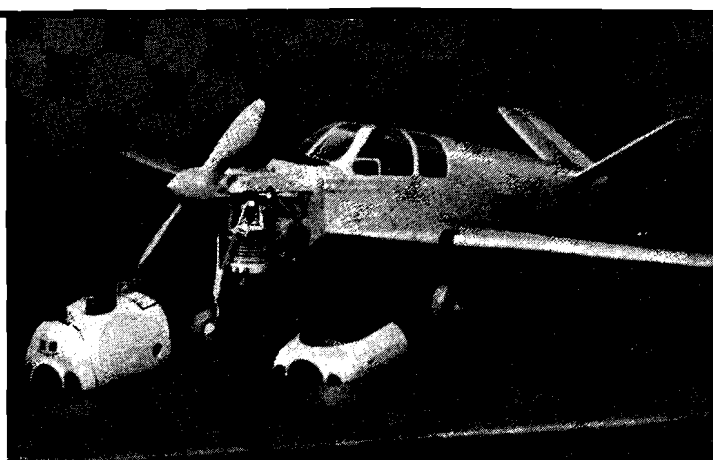
Pin the  $\frac{1}{8}$ " x  $\frac{3}{16}$ " center longerons on the top

view, cut the bulkheads on the horizontal center line, and cement the bottom portion in position. Cement  $\frac{1}{8}$ " longerons in place, and allow to dry. Turn the bottom half over and pin down between bulkheads #5 and #8 with a one-inch block under bulkhead #13. Cement upper half of each bulkhead in position, along with the cabin stringers and top longeron. Temporary supports should be cemented in, as shown on bulkhead #6; this supports the cabin while covering the fuselage.

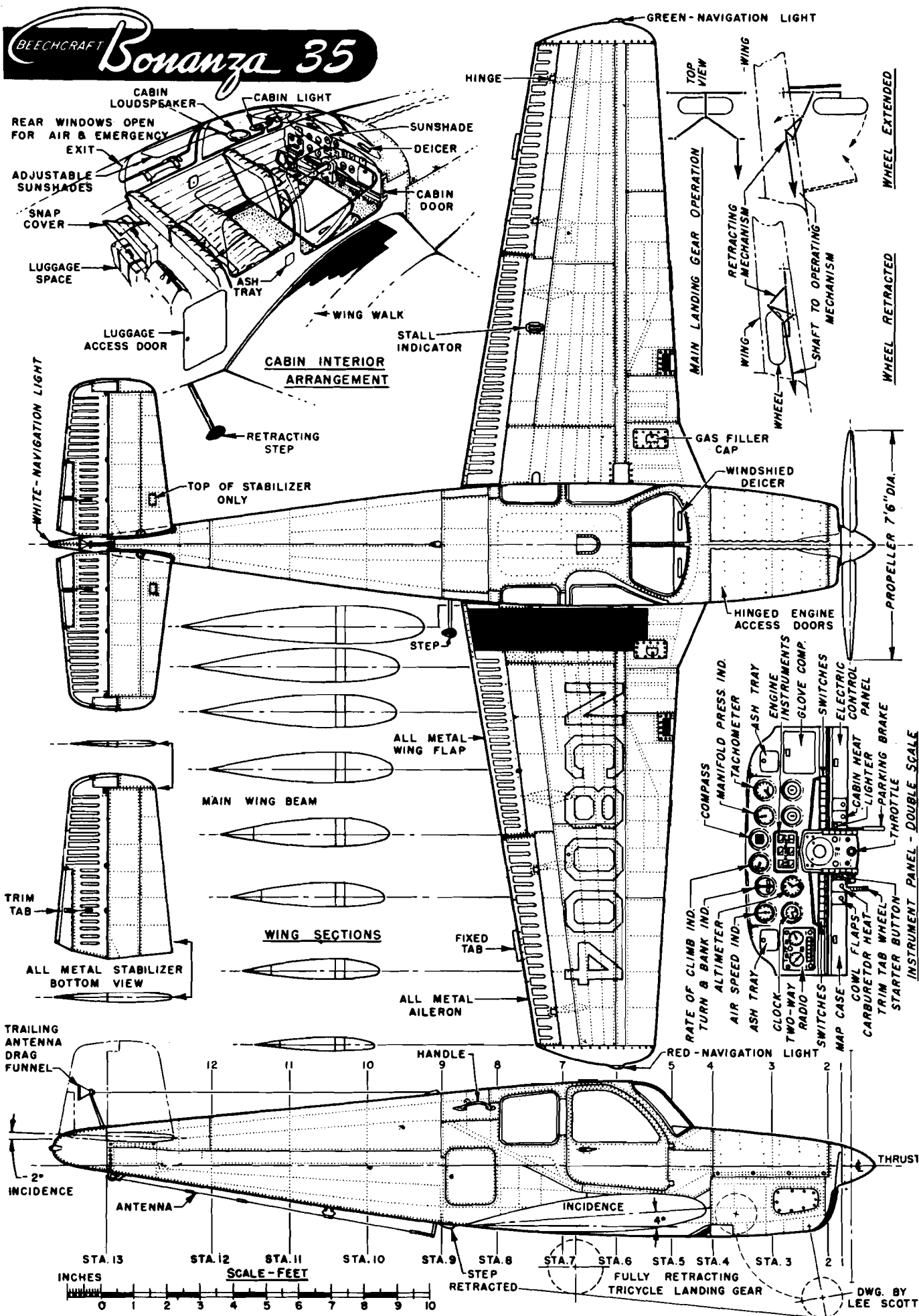
Put a wad of cotton in the exhaust and intake tube of the motor to keep out wood dust, and attach it, inverted, to two pine mounts. Drill two  $\frac{3}{32}$ " holes in the  $\frac{1}{8}$ " plywood firewall (bulkhead #4) for the  $\frac{3}{32}$ " wire, motor mount supports, and slide the pine motor mounts through the holes provided in the firewall. To make sure you have the bends in the right location, it is a good idea to form a sample motor mount support, landing gear and control horn, of soft wire before bending one of hard piano wire. Make sure the motor mount supports do not interfere with the fuel inlet or needle valve. Nail four pin staples over the wire mount supports, through the firewall, bend ends back, and cement. Nail a pin through each side of the firewall into the pine motor mount. The firewall may now be cemented to the rest of the fuselage and the instrument panel-to-firewall stringers added.

A soft  $\frac{1}{16}$ " sheet balsa is used to cover the fuselage. When dampened on the outside only, and heated, it will bend over the fuselage top easily. Push pins, at an angle, through the skin and into the bulkheads, where necessary, to hold





# BEECHCRAFT Bonanza 35

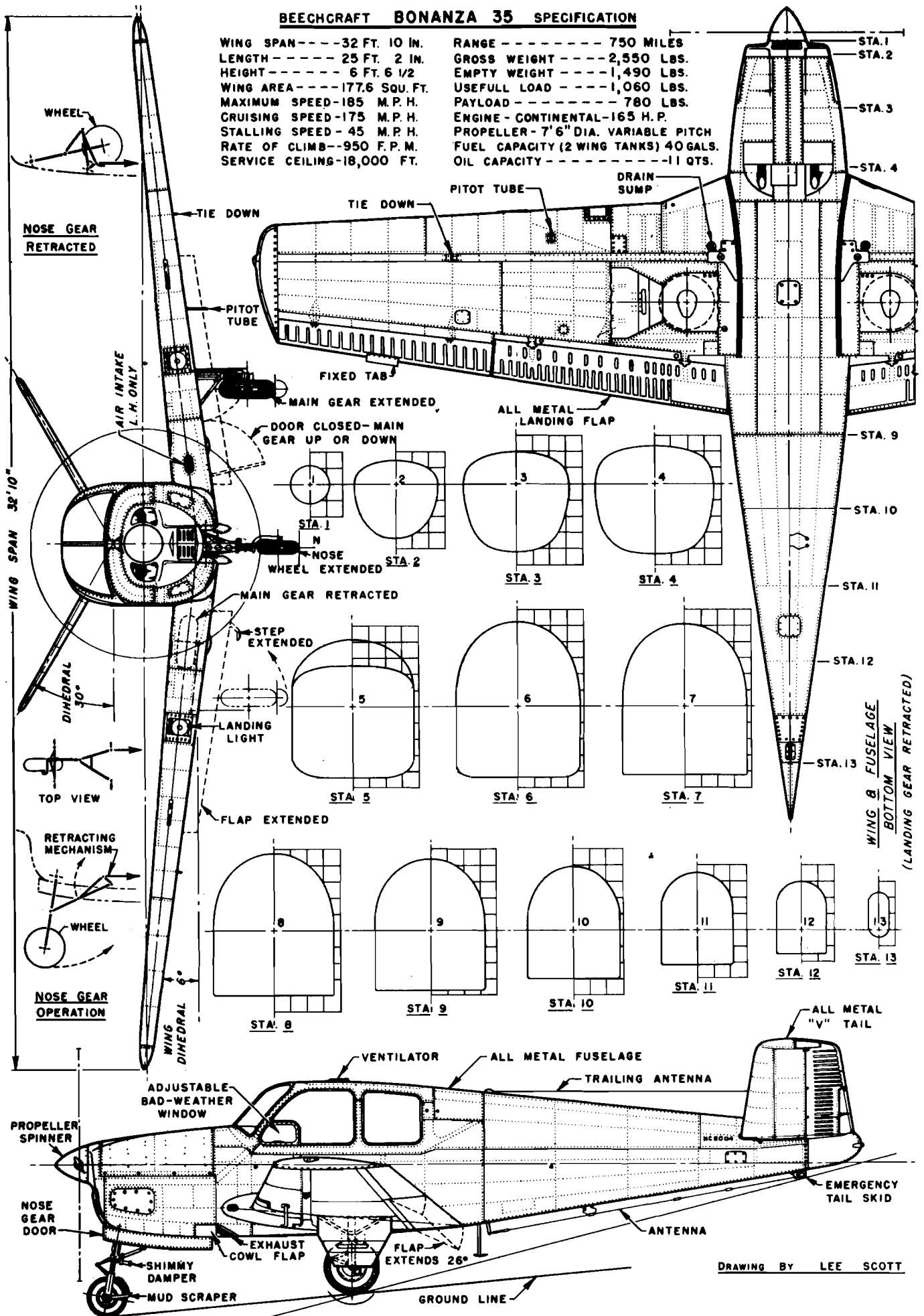




# BEECHCRAFT BONANZA 35 SPECIFICATION

WING SPAN --- 32 FT. 10 IN.  
 LENGTH --- 25 FT. 2 IN.  
 HEIGHT --- 6 FT. 6 1/2  
 WING AREA --- 177.6 SQ. FT.  
 MAXIMUM SPEED - 185 M.P.H.  
 CRUISING SPEED - 175 M.P.H.  
 STALLING SPEED - 45 M.P.H.  
 RATE OF CLIMB - 950 F.P.M.  
 SERVICE CEILING - 18,000 FT.

RANGE --- 750 MILES  
 GROSS WEIGHT --- 2,550 LBS.  
 EMPTY WEIGHT --- 1,490 LBS.  
 USEFUL LOAD --- 1,060 LBS.  
 PAYLOAD --- 780 LBS.  
 ENGINE - CONTINENTAL - 165 H.P.  
 PROPELLER - 7' 6" DIA. VARIABLE PITCH  
 FUEL CAPACITY (2 WING TANKS) 40 GALS.  
 OIL CAPACITY --- 11 QTS.



DRAWING BY LEE SCOTT

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11-8

## Bonanza

until the cement dries. It may be necessary to make a very slight "V" cut at bulkhead #8 to bend the covering over the forward part of the cabin. Cover the sides and top of the instrument panel in the same manner. **Do not cover the fuselage bottom until the wing, controls, and windshield have been installed.**

Taper the wing spar, as shown in the front view, and pin down to the wing drawing. The 3/32" sheet balsa wing ribs are then cemented in place. Slide a 1/16" square strip under the leading and trailing edges of the ribs to allow for skin thickness; then cement leading and trailing edges. Cement a piece of wing spar to support the landing gear, on the inside of wing rib #3 as shown. Cut a groove in the underside of the wing spar out to rib #3, for the landing gear wire. Cover top of wing with 1/16" sheet balsa and construct other wing likewise. For dihedral, butt the two spars together with a 1 9/16" block under each wing tip; cement a piece of spar behind the main spar between ribs Nos. 1. While this is drying bend the landing gear wire and solder the wheels on with washers. Insert the landing gear into the slot provided in the wing spar, push in the pin staples, wrap the spar with heavy thread, where shown, and cement. Attach the bellcrank to a piece of pine with a bolt, nut and washers; cement to rear of wing spar at the fuselage center line. Cement two aluminum tubes on the left wing only as shown.

Cement the 1/16" sheet balsa wing covering to the wing with the grain running parallel to the leading edge. Cut the leading and trailing edges to shape, and sand smooth. Hollow out the right wing tip and fill with about 3/4 ounce of melted lead or solder. Cement wing tips in place.

It is necessary to cut out the bottom part of bulkhead #7, and to cut a slot in the fuselage skin for the wing spar behind bulkhead #6, to cement the wing and bellcrank in place.

Cut the tail block to shape, hollow out and cement in place. Cut and shape the stabilizers, elevators, and tabs. Constructed as shown, the elevator hinges will be almost invisible.

It is important, in bending and assembling the elevator control horn wire, that the slide horn is on the left elevator and the push rod attaches to the horn on the right elevator. It must operate easily with as little play as possible between the slide and control horn. It was designed, in this manner, so as to give a travel gain in the right elevator. The tabs are attached to the elevators with four thin sheet-aluminum hinges. The stabilizer is then pinned and cemented to the tail block (note the 2° negative incidence).

While the elevators and bellcrank are in a neutral position, bend the push rod to go through the hole in the bellcrank, and prepare to solder a washer to the wire on the underside of the bellcrank by placing a fairly heavy piece of punctured wrapping paper on the push rod between the bellcrank and the washer. This will prevent solder from running through and binding on the bellcrank. Let the solder harden, remove the paper and the connection will pivot easily.



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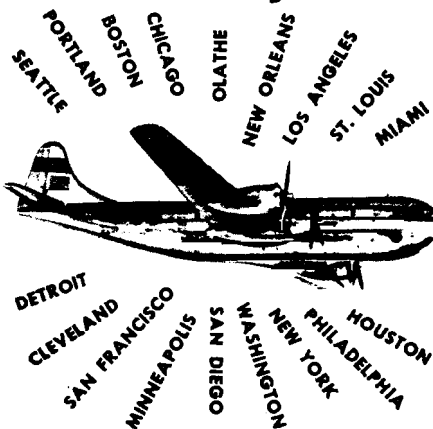
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A damp cloth placed around the edges and down into the top of the cabin will prevent the hot soldering iron from igniting the plane. It will also catch any solder that drops down into the cabin. Run the control lead wires through the aluminum tubes in the left wing, and bend through the holes in the end of the bellcrank. The lower part of bulkhead #7 can now be cemented back in place.

Cut out the windows and cement a  $\frac{1}{4}$ " square block on either side and in the middle between the instrument panel and the cabin top. Allow to dry, then cut to shape shown on the plans. Paint the interior with black dope, cut out the instrument panel drawing, and cement in place.

Cut the celluloid windows very slightly oversize and with a very sharp-pointed knife cut a slit around the edge of the window, being very careful not to split the fuselage covering. Place the rear windows in first, the windshield last. Do not use cement, but paint several coats of clear dope just around the very edge of the windows. This will seal the windows neatly and be less noticeable than cement.

Before cementing the  $\frac{1}{16}$ " sheet balsa fuselage under-covering in place, paint the forward part black to match the rest of the cabin interior.

Bend and attach the wire tail skid. Bend wire, solder and attach nose landing gear to the motor mounts as shown on the plans.

Cut parts for fuel tank from tin or brass and solder together.

Carve cowl from two blocks of medium-hard balsa and hollow out to accommodate motor, fuel tank and mounts. Dress snaps, counter-sunk, pinned down and cemented, are used to hold cowl on.

A 7" diameter, 5" or 6" pitch propeller should be used for flying. The plane should balance at the leading edge of the wing at the tip. It was necessary to hollow out the tail cone

so it would hold some lead before cementing it in place.

Since the control lines should be taut at all times, it may be necessary to bend slightly the left elevator tab down and the right tab up. This, plus the added weight in the right wing tip, will tend to throw the plane to the outside of the circle.

The detail drawings shown on pages 40 and 41 will enable you to add even more to the beauty of your own personal Bonanza replica.

## BILL OF MATERIAL

### Landing Gear

$\frac{1}{2}$ "-dia. nose wheel  
Two  $\frac{1}{4}$ "-dia. wheels  
 $\frac{3}{32}$ "-dia. wire  
Copper wire  
Six brass washers  
Solder

### Stabilizer

$\frac{3}{16}$ " sheet balsa  
 $\frac{1}{16}$ " wire control horn  
Pin hinges  
Aluminum hinges

### Cowling

$\frac{1}{2}$ " x  $2\frac{3}{4}$ " x 3" balsa block  
 $1\frac{1}{4}$ " x  $2\frac{3}{4}$ " x 3" balsa block  
Size "0" dress snaps

### Fuel Tank

Tin or brass sheet  
Brass tubing  
Rubber tubing

### Power

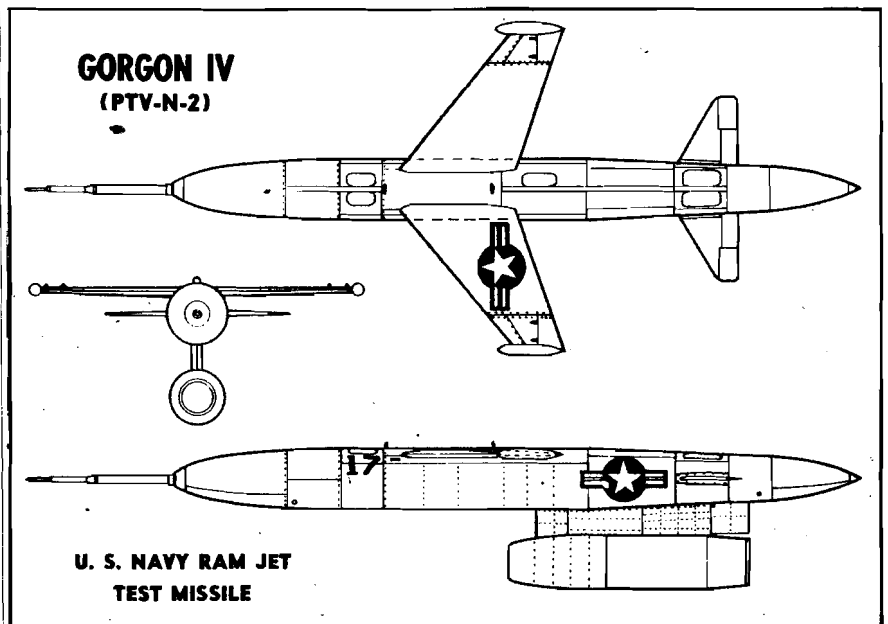
McCoy 19 motor or equivalent  
7"-dia. 5"-pitch prop  
Balsa prop spinner

### Fuselage

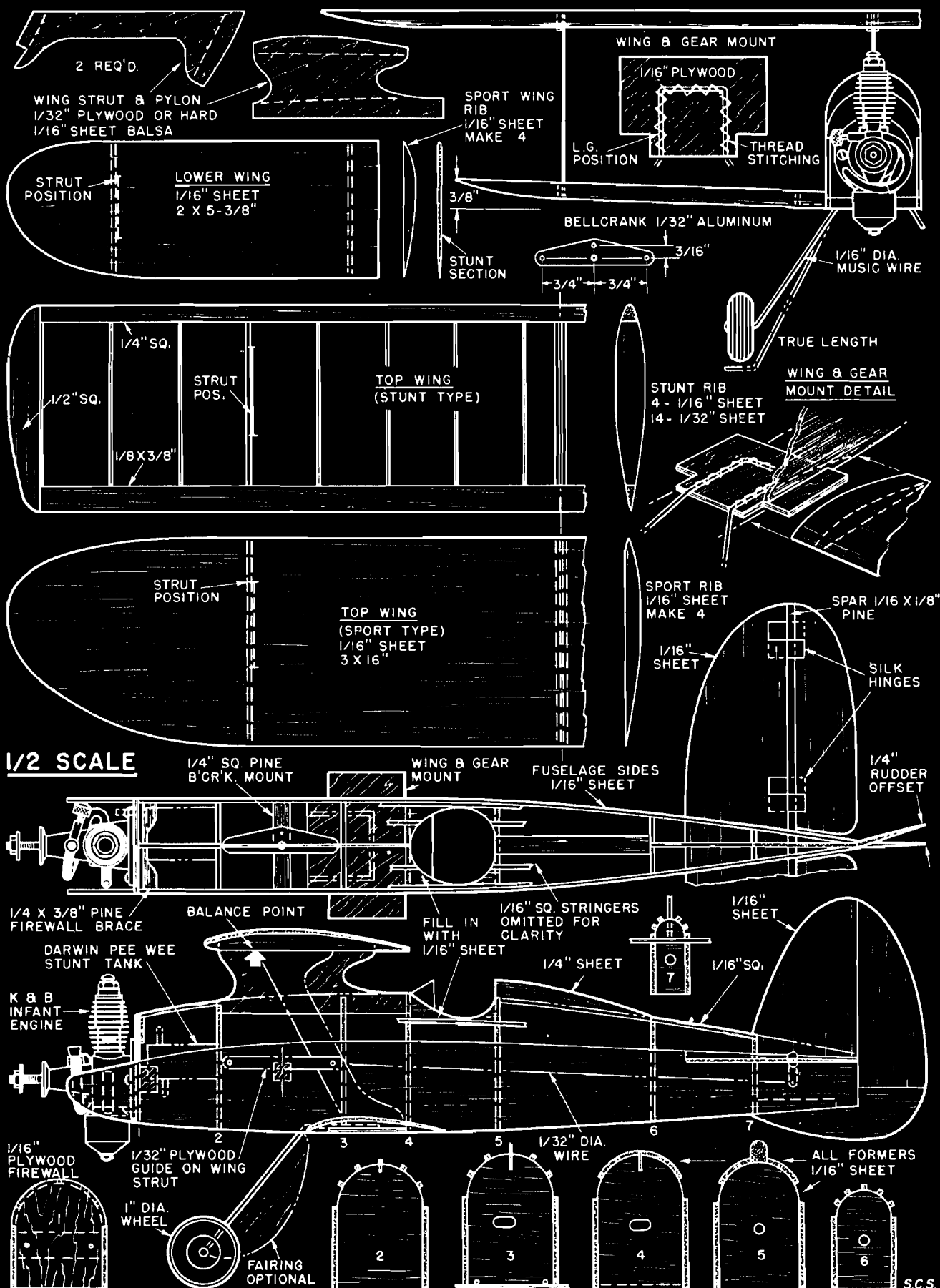
2 pine motor mounts  
4 nuts, bolts, and washers  
 $\frac{3}{32}$ " wire mount supports  
 $\frac{1}{8}$ " plywood firewall  
 $\frac{3}{32}$ " sheet balsa bulkheads  
 $\frac{1}{8}$ "-sq. balsa  
 $\frac{1}{16}$ " x  $\frac{1}{8}$ " balsa  
 $\frac{1}{8}$ " x  $\frac{3}{16}$ " balsa  
 $\frac{1}{16}$ " sheet balsa covering  
 $1\frac{1}{2}$ " x  $1\frac{1}{2}$ " x  $2\frac{1}{2}$ " balsa tail block  
 $\frac{1}{2}$ " x  $1\frac{1}{2}$ " x  $1\frac{1}{2}$ " balsa tail cone  
Fine bellcrank support  
Aluminum bellcrank  
Nut bolt and washers  
 $\frac{1}{16}$ " wire push rod  
Tail skid  
Celluloid windows  
Cement

### Wing

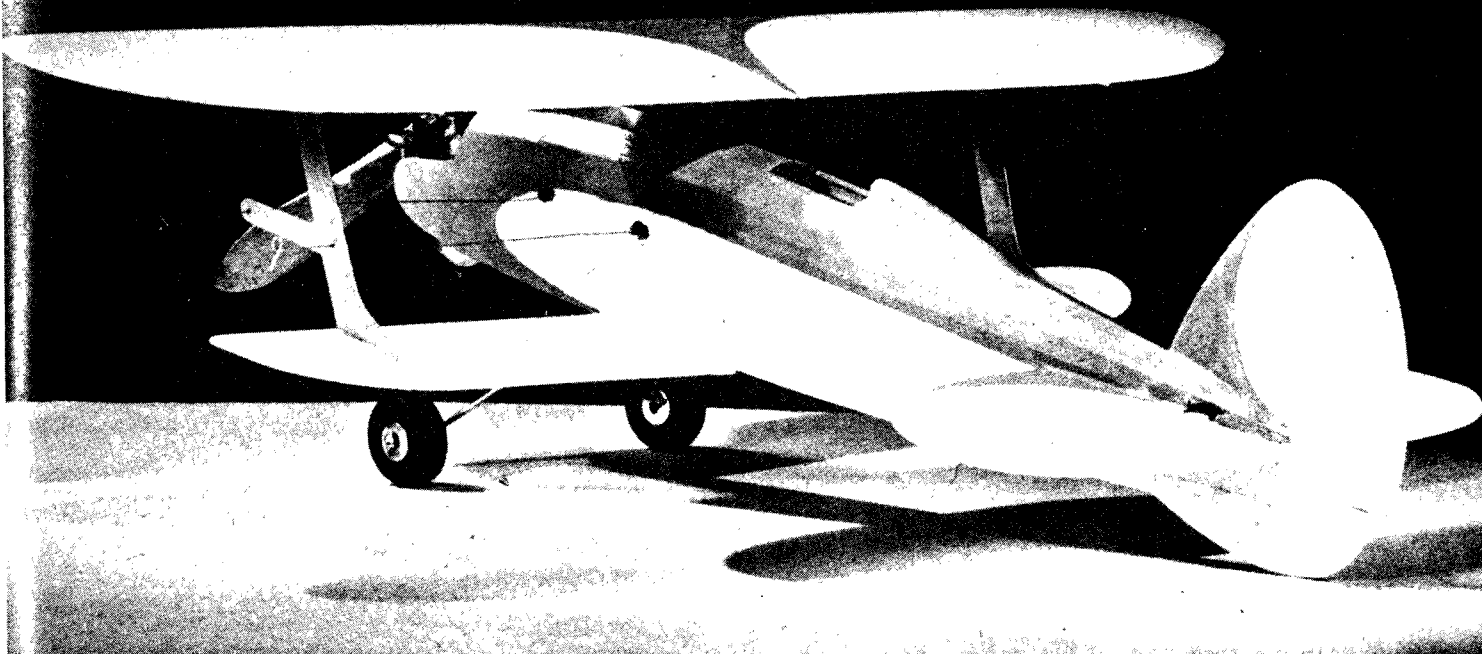
$\frac{3}{32}$ " sheet balsa wing ribs  
 $\frac{1}{2}$ " x  $\frac{3}{4}$ " balsa leading edge  
 $\frac{5}{16}$ " x  $\frac{3}{4}$ " balsa trailing edge  
 $\frac{3}{16}$ " x  $\frac{3}{4}$ " balsa wing spar  
 $\frac{1}{16}$ " sheet balsa wing covering  
 $\frac{3}{8}$ " x  $\frac{1}{2}$ " balsa wing tip  
Staples and thread  
 $\frac{1}{8}$ " aluminum tubing  
 $\frac{1}{32}$ " wire control leads



● Gorgon, a frightful monster inhabiting the ocean, came out of the pages of Greek mythology and is now inhabiting the Navy Air Missile Test Center at Point Mugu, Calif. The Gorgon IV, built by the Glenn L. Martin Co., is not a flying bomb but a test missile guided by radio and equipped with telemetering apparatus for the evaluation of its ram-jet power plant. Almost daily it is launched from an F-81 Black Widow over the ocean. Its telemetering equipment sends out a wealth of information to the ground station below. Powered flight lasts only ten minutes, after which the Gorgon IV zooms up, a parachute pops out of its fuselage, and the "bird" comes down to a gentle water landing. It is recovered by a Navy PT boat.







# THE SMITH SPECIAL

Indoor sport or stunt flying is possible now with the new small engines. Try this tiny, trim semi-scale biplane

By S. CALHOUN SMITH

**I**NDOORS or out this K&B-Infant-powered biplane is real flying fun. Oldtimers can trace the ancestry of the Special way back to the biplanes so popular with model builders during the '30s. How many of us wished then for a power plant such as the Infant to hang in the nose.

The Special was designed as a one-evening project and should prove simple enough for the young builder. The Infant pulls the model along at a good clip. Initial flights were made in a two-car garage with about 9 feet of thread out. We had to give that up when we wandered from the center of the circle and banged the ship against the walls. Outdoors we flew on 15 feet of line and the Special handled well. Because of its light weight (3 oz.), calm air is almost a "must" for flying, although the more experienced flyer can make good flights in a wind—but you'll be a busy boy, believe us.

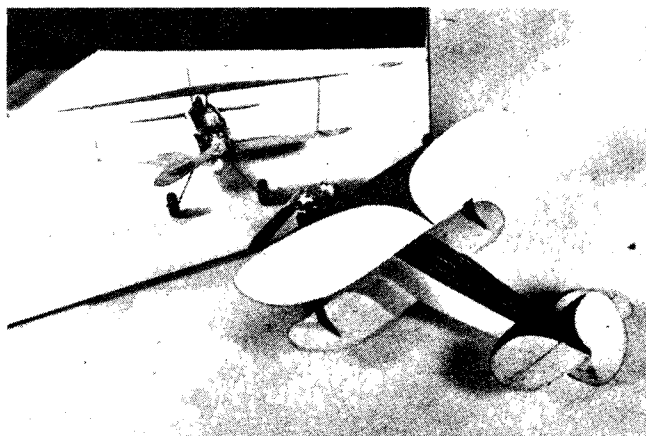
Two types of wings are shown in the plans, stunt and sport. The first test model was built with the regular lifting sport wing and performed loops and eights easily. We managed a few inverted laps, but this is not recommended for beginners. If you wish to build a true stunt job, use the symmetrical airfoil stunt wing and a stunt fuel tank such as the Darwin Pee-Wee.

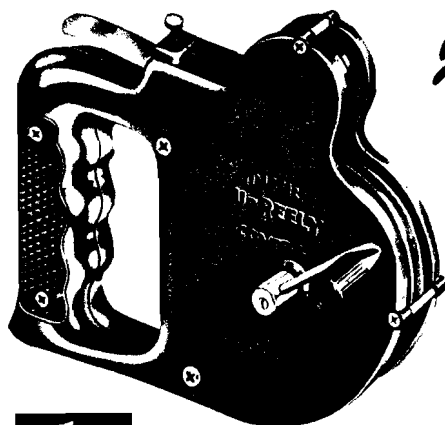
Interested? If so, grab a couple of sheets of 1/16" x 3" and two strips of 1/16" square. The rest of the odds and ends such as wire and plywood should be

down in the bottom of the scrap box. Plans are drawn exactly half scale, so if you can't wait for the Air Trails Full Size Plans simply double everything shown.

Construction can be started with the fuselage. Cut out the sides and formers from 1/16" sheet balsa. The formers themselves have parallel sides and simple half circles on the top.

● The Smith Special looks itself over in the mirror before going out to fly. Full size plans available from Air Trails Plan Department.





*Jim Walker*

ANNOUNCES

## A New U-REELY WITH METAL BEARINGS



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*Jim Walker*



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## The Smith Special

Remember to punch out holes for the push rod travel in the formers. The firewall is cut from 1/16" plywood. A 1/4" x 3/8" pine brace is cemented to the rear of the firewall. This block acts as a seat for the wood screws that hold the engine in place, and squares up the sides when assembling.

The fuselage can be built "in-the-hand," laying it over the top view as work progresses to check alignment. Begin by cementing the sides to the firewall and brace. Pin in place, check alignment from side and top, then add former 4. These two formers should be aligned carefully before proceeding. Next add formers 2 and 3 and the bellcrank mount. Formers 5, 6 and 7 can then be added in that order; use plenty of cement at the rear where the sides come together.

While the basic fuselage structure is drying, cut out the pylon, head rest, rudder and sub-rudder. The pylon is specified as 1/32" plywood but if this is unobtainable, hard 1/16" sheet balsa may be substituted. The grain should run vertically. Ditto for the wing struts but more of that later. Cut out the wing and landing mount from 1/16" plywood. Bend the landing gear to shape and fasten to the mount with thread stitching and several coats of cement.

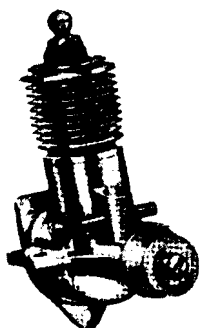
The stabilizer and elevators should be cut out and assembled at this point. The plans are self-explanatory. The control horn is made of 1/32" brass, 1/8" wide. Bend a right angle in the strip so that the hole is 1/4" below the elevator spar. Wrap the other end of the strip down snug against the spar with thread. Cover with two coats of cement.

The rest of the control system can be assembled and fitted into the fuselage next and the stabilizer cemented permanently in place. Control-line leads can be .010" wire with a simple loop in end through the bellcrank. Elevator travel should be about 1/4" up and down, more for the stunt version.

Now to assemble all these parts to the fuselage. First comes the pylon, then the head rest. Add the wing and gear mount, use cement liberally here. Next add the sub-rudder and fin. Check alignment of these by sighting at the fuselage from the rear end. Cement the rudder in place with the amount of offset indicated. This about completes the fuselage except for the 1/16" square stringers which may be added later after the fuel tank is fitted in place.

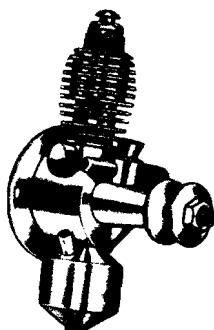
The sport wing can be cut out of 1/16" sheet and sanded smooth. The trailing edge is tapered slightly to about 1/32" thick. Cut out the ribs and prepare the wing surface before cementing in place. This type of wing can be neatly built by using the following procedure: Paint the top of the wing lightly with water from the leading edge to about 2/3 of the way to the trailing edge. Working quickly, give the bottom surface one coat of thin dope, covering the same space chordwise as the top surface. The dope will shrink and curl the sheet, and the water will allow the sheet to bend in the right places. Cement the ribs in place and hold with pins pushed in diagonally. When the water, dope and cement are dry the wing will

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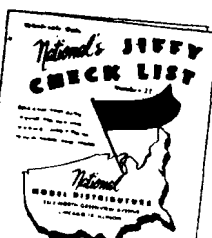


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Micro Wire, Fuel,  
Props — and every-  
thing needed for in-  
door gas model  
flying.

Dealers Only  
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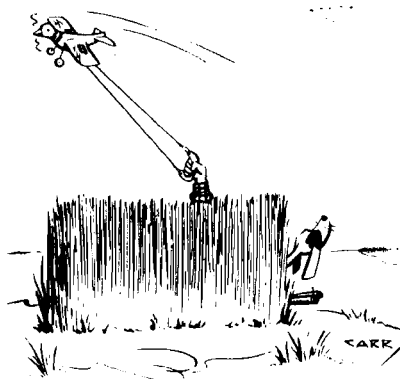
be set in the proper curve. Check to see that no warps develop while drying. Any warps can be twisted out and held that way while the sheet is drying.

Repeat the operation for the two lower wing panels. These are simpler because of their size.

If you are building the stunt wing, cut out all the ribs and lay out the leading and trailing edge over your plans. The leading edge should be blocked up with  $\frac{1}{8}$ " scrap blocks, the trailing edge with  $\frac{3}{16}$ " sheet. The ribs can then be cemented in place with ample clearance above the plans. Tips are soft  $\frac{1}{2}$ " square or sheet balsa carved to streamline shape. Lower wings for stunt version are  $\frac{1}{16}$ " sheet sanded to symmetrical section as indicated on the plans.

Now comes the only tricky part—assembly of the wings to the fuselage. Cut out the wing struts, leave a little extra on the bottom in case a little "fudging" is in order. Lay the fuselage down on your work board with the landing gear hanging over one edge. Lay a scrap of  $\frac{1}{8}$ " sheet under the gear mount so that the fuselage will be resting level. Now pin the fuselage down to the board through the sides and the sub-rudder. Slide the wing down onto the pylon and check for equal elevation of the wing tips and  $0^\circ$  incidence. Cut scrap strips to support wing tips equally above the board. The wing can now be cemented in place and the tip supports pinned to the wing and the board. Let dry a bit before proceeding.

Cut a slot through the lower wing surface to receive the lower ends of the I-struts. Slide the struts through the



slots and lay the lower wings in place on the fuselage mount. Check the dihedral angle holding the struts in place against the top wing ribs. Now is the time to insure proper alignment so shave or beef-up accordingly. When everything is lined up, the lower wings and struts can be cemented in place. Now go eat your supper and let the thing dry thoroughly.

Well, nearly finished. Add the line guide to the left I-strut, drill for lines and run leads through and bend a simple loop in the ends. Fit the stunt tank in place with the feed pipe level with the needle-valve of the engine. Now add the  $\frac{1}{16}$ " square stringers and  $\frac{1}{16}$ " sheet around the cockpit.

Use lightweight Silkspar for covering the fuselage top and bottom. Paper can be added to fuselage sides and wing leading edges for extra strength, but we do not recommend doing so because of the added weight.

One coat of filler, or sealer, one coat of colored dope, and one coat of hot fuel-proofer completes the job. A fancy finish is passed by for the sake of weight reduction.

The Infant engine is held in place with two wood-screws  $\frac{5}{16}$ " long. Side thrust, if necessary, may be added by placing a washer behind the engine mounting flange on the left side.

Because the fuel line in the Infant tank is on the left (inside of circle) side, we found it necessary to rig a Rube Goldberg fuel line from a length of  $\frac{1}{8}$ " O.D. copper tubing going into the tank. This enabled the engine to practically run the tank dry in flight. Of course if the stunt tank is used, the regular Infant tank will not be used. But don't cut that mounting stud off—you may use the regular tank on some free-flight job.

And finally, props: we used a hand-carved type as recommended by K&B. We also experimented with slightly more pitch, but the difference in performance didn't warrant the trouble. Best success was achieved with the Air-O single blader. Although primarily intended for free flight, the fly-wheel action developed by the added lead weight made the engine start easier and turn more rpm.

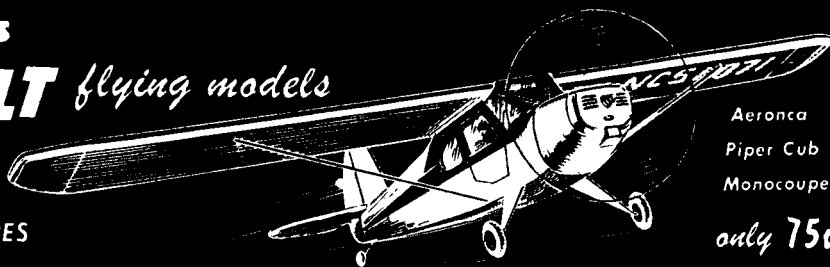
The Special can be flown on from 10 to 15 feet of No. 20 cotton thread or silk and nylon of smaller size.

If the builder so desires, all wood sizes given as  $\frac{1}{16}$ " sheet can be made of  $\frac{1}{20}$ " sheet if available and a considerable saving in weight will result. Although performance is good now, a bit less weight should really make your Special jump.

## MONOGRAM'S SPEEDEE-BILT flying models

ONLY SPEEDEE-BILT KITS

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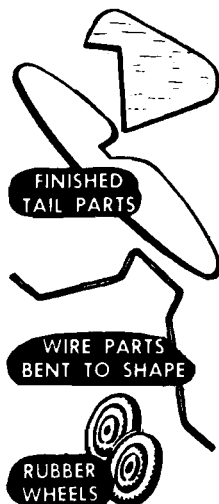
Ask at your favorite store for SPEEDEE-BILT KITS, by MONOGRAM—the only kits with the Monofail wing and the Monofuse fuselage—the only kits with all the hard work done and the fun left for you.

Plastic Cowl • Plastic Prop • Completely Finished Parts

**Plastic Cowl:** Molded plastic cowl with all details of the big ship. No holes to drill. No carving. Strong and realistic.  
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No more warping or twisting. **Monofuse Fuselage:** Sides and formers completely cut out. All edges smooth and clean. No more cutting formers and stringers.  
**Tail Surfaces:** One piece tail parts ready cut. No more tissue covering. **Cabin Closure:** Cut to fit from heavy plastic. No cutting. No patterns to make. **Decal**

**Sheet:** Large ( $2\frac{1}{2} \times 7$ ") number sheet. No cutting out of printed numbers. **Landing Gear:** Ready formed wire. Strong and sturdy. No more wire bending. No torn off gears in crash landings. Speedee-Bilt kits include rubber wheels, rubber motor, finished cowl block and Monogram's famous picture plans.



**Monogram MODELS, INC.**  
221 NORTH PULASKI AVENUE CHICAGO 1





Robert L. "Bob" Palmer, Jr., of Burbank, Calif., builds highly accurate models for wind tunnel tests. His Go Devil, Chief, Squaw, Papoose, Warrior, Mars and Venus designs—many kitted by Veco—have established him as a top-notch stunt designer and flyer. Won flying scale at the Nationals and 66 stunt trophies. Now 34, started modeling at 12; married, has 6-year-old daughter. Suffered set-back during 1948 in midst of stunt career when industrial accident severed 4 fingers on right hand. Designed glove-gauntlet to hold control line handle in his palm, now flies better than ever! Then switched to smaller engine, large wing area set-up to get better all-weather flyers. Took 1st at big Tucson meet this year with Smoothie.

## Mr. Palmer's "Smoothie" Stunter

One of the world's top-ranking stunt designers presents a fine fast model for .29-.35 motors

By ROBERT L. "BOB" PALMER

■ Just as the name implies, *Smoothie* is a smooth flying stunt model designed to meet all requirements for contest winning performance. Span is 51", the area, 495 square inches minus flaps; length is 31", the engine recommended is .29 to .35 displacement; weight 2 lbs. 6 oz. to 2½ lbs.; speed, 65 to 70 mph.

How many times upon going out to the flying park have you heard remarks to this effect, from fellows interested in models, when asked about flying at the next contest: "Aw, I wouldn't have a chance . . . So and so will be there. They are too good at flying. I couldn't beat them!" If you are one of these fellows, ask yourself this: "Do I want to compete and try to be a winner? Maybe if I did, I'd win over them someday." If your answer is "yes," then follow these instructions.

First of all, the model is one of the most important things to be considered, for without a good model you can't even begin to do good com-

petition stunts, no matter how much you want to. If you purchase a model kit, or design one of your own, how do you know if that particular design will do competition stunts suitable for top contest work?

The only way to learn that is to be interested enough to ask someone who knows models, preferably a consistent winner, and have him answer the questions that are bothering you. You will find that most modelers are willing to help you. They will fly your model for you, and tell you what is wrong, and the improvements to make. Fly your model and have them tell you what you do wrong and how to improve on stunts you can already do.

It will pay in the long run to start with a good model, and an experienced modeler's suggestions. I have talked to most of the top winners and all of them are a swell bunch of fellows, willing to help anyone who wants to learn to be a top-notch flyer. I have helped modelers over

difficulties and now some of them are expert stunters.

To the interested reader who is already a stunter, or who wants to become a stunt man, here are four rules to follow to become a top competitor:

1. *A Good Model:* This is most important. The stunt kits on the market are very good, and usually, if followed to the letter, will fly well.

2. *A Dependable Motor:* The various model airplane motors advertised are very good. The .29 to .35 displacement motors are best for stunt; run according to instructions from the manufacturer.

3. *A Good Tank:* A good tank is very important. Its design will either make or break a stunt model.

Clarence Lee, who drafted the

original plans for the *Smoothie*, also designed the tank for this model. He has experimented with tanks for four years and knows most of the answers on good tank design.

The location of the tank to the intake of the engine is just as important as the design.

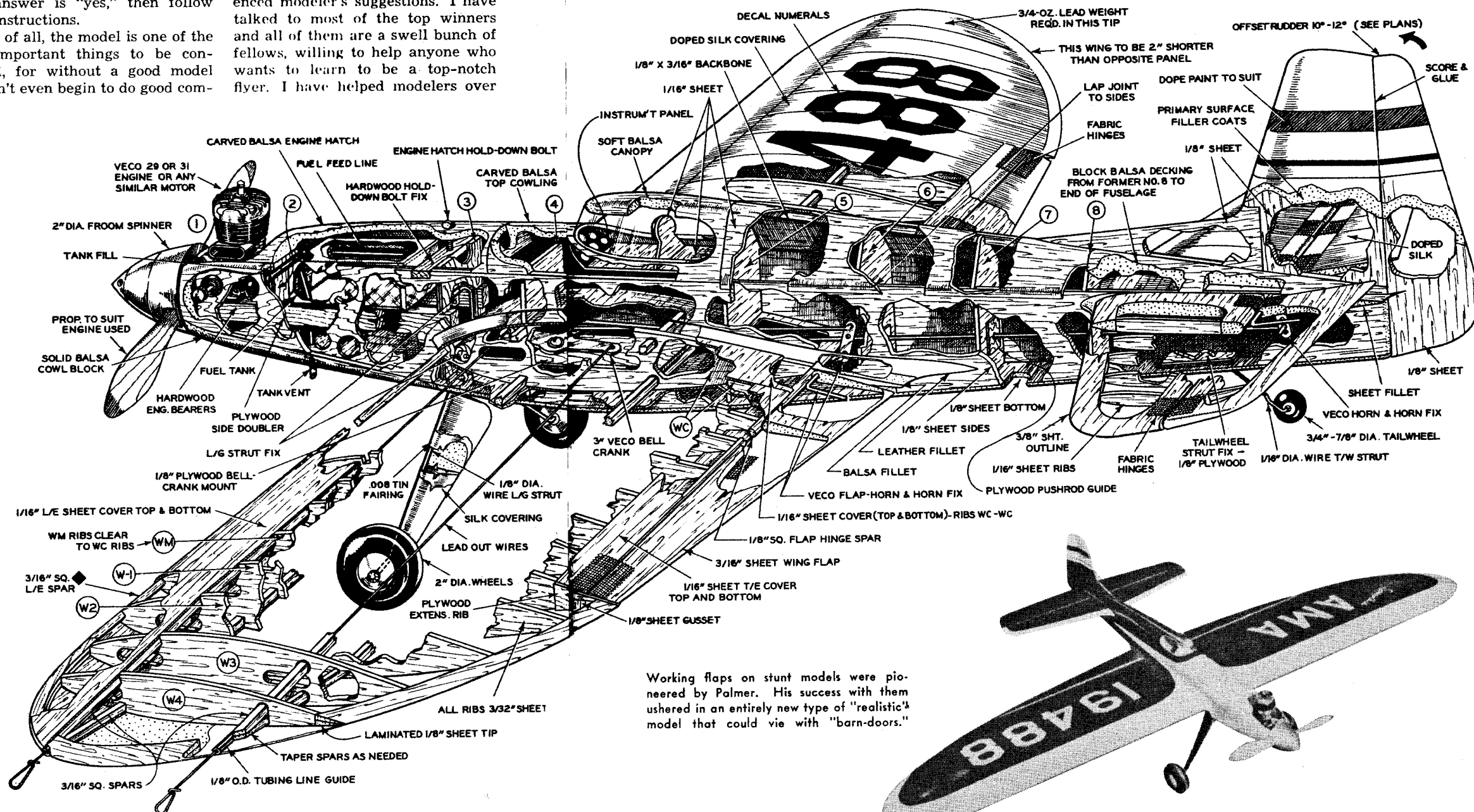
4. *Practice Flying:* It takes constant practice to be able to fly well. After finding the right combination—that is, propeller, engine, and model—practice constantly to fly with more ease each successive time.

Trying stunts that are difficult should also be practiced. For example, stunting with a wider radius than necessary, then tightening them up as you become more acquainted with the looping radius of the model.

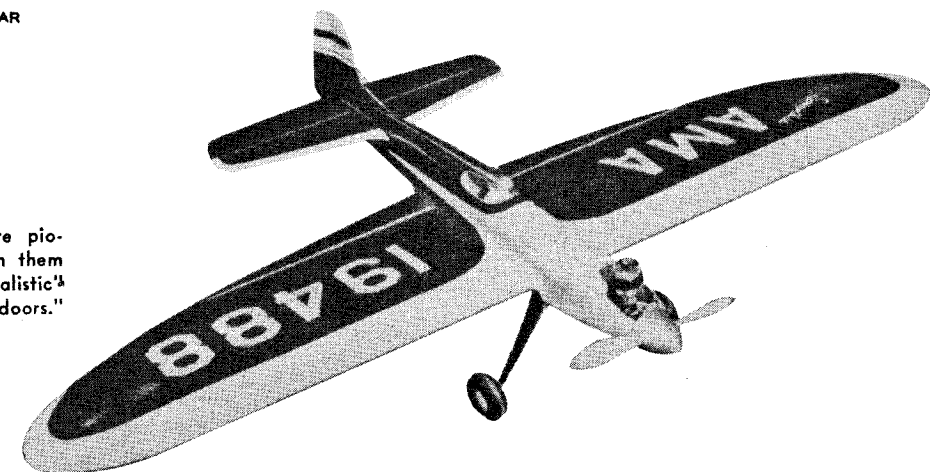
Try those stunts on which you are especially rusty.

It seems as though most modelers prefer flying under ideal conditions. When the wind comes up they go home. "Yet when contest day rolls around the wind may be blowing a gale. So you want to be sure and practice in the wind as well as under ideal conditions. This can be attained by having a model that will fly in the wind. I had the same difficulties, and so I kept right on trying to find an answer to a "wind" model. *Smoothie* is the answer. I have flown this model in high winds, and I have won every time.

It takes a large area to stunt a model commonly known as a "barn-door" type. In *Smoothie*, I have cut



Working flaps on stunt models were pioneered by Palmer. His success with them ushered in an entirely new type of "realistic" model that could vie with "barn-doors."



down the wingtip area, eliminating too much lift, and as a result there is no buffeting and bouncing in the wind. It takes a real model to fly under all conditions.

Assemble all the bulkheads. Plank bottom of fuselage up to the gear. Wait until later to assemble top of fuselage. Bolt the motor in, and put the nut plates in place; glue belly blocks and spinner blocks in place.

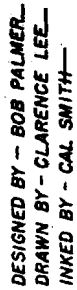
The first step in assembling the wing is to prepare the trailing edge. Slightly bevel both sides of a 3/16" square, and glue in place 1/16" x 1" sheet balsa as shown. Splice in the center where wing will run through fuselage with 1/16" x 3/4" balsa. Stand the trailing edge assembly on edge in a straight line; mark from the center 1" for first rib, then every two inches for eight spaces on left side and seven spaces on the right side.

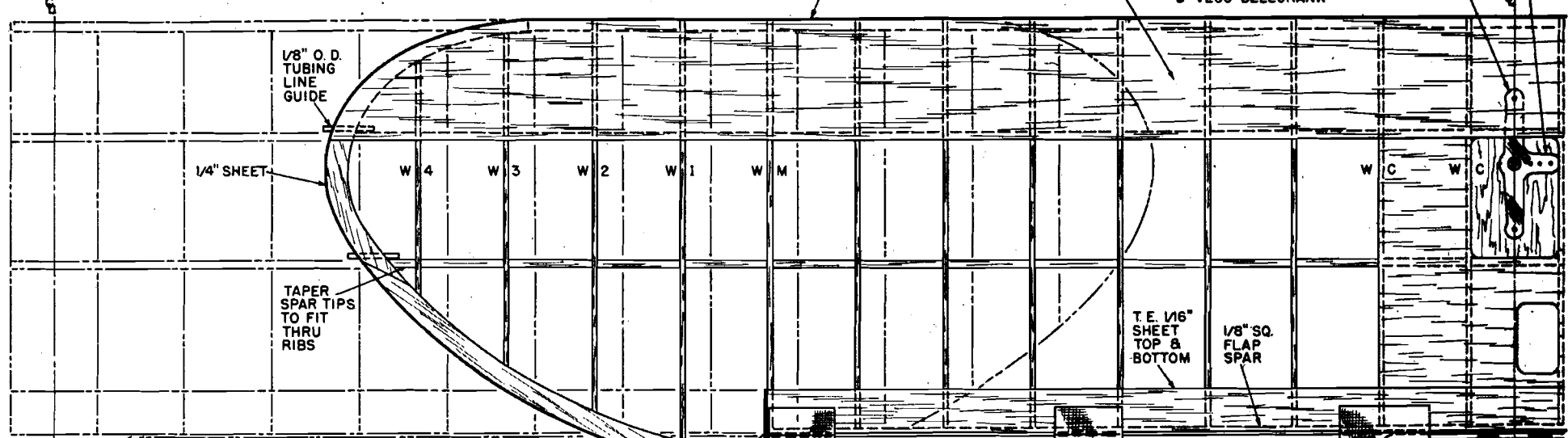
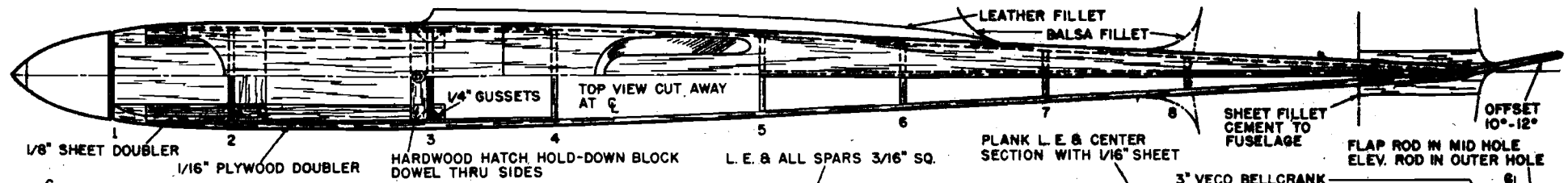
Splice two 3/16" square by 36", with a piece of 1/16" x 4" plywood and mark the same as the trailing edge. Assemble the wing upright on the table, putting the ribs in vertically. Attach the spars and the leading edge. Secure these with rubber bands. Sight wing and line ribs in straight line. Glue all joints and then insert the two spars through the 1/4" holes; glue a splice of 3/16" x 4" in the center. These spars go on out to the tip. Cut tip ribs out and attach to forward and rear spars. Cut tips of laminated 1/8" balsa, and attach to wing and spars.

Be sure and assemble the plywood extension to main wing. Install bellcrank floor of plywood and glue six times around spars. Screw bellcrank in, using a second nut, the first one on under bellcrank. Wires should be attached to bellcrank before installation; use small grommets in bellcrank, soldering wire to grommet to prevent cutting large hole in bellcrank. Plank the leading edge and center section. Use brass tubing for lead-outs at wingtips.

Make flaps of 3/16" balsa. Sand and taper. Remember to make inboard flap 2" longer. Take Veco flaphorn and splice with 1/8" piano wire as shown in plans, and solder well. Line up flaps and measure from center line to flap for installing flaphorn. Make hinges of aircraft tape, sew together on sewing machine, knot each end. Install flaps on wing and cover with silk. Dope the leading edge and all edges of the wing two times. Cut silk 1" oversize and draw through a pan of water. Pull out all wrinkles and dope to wing. Let dry and apply two coats of clear dope.

Further construction details may be found on the AT full-size plans available.





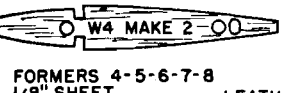
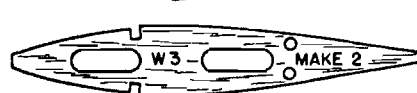
NOTE: RIGHT WING 2" SHORTER THAN LEFT WING  
OMIT ONE MAIN RIB AT CENTER - FLAP  
TAPER AS SHOWN - PUT 3/4 OZ. LEAD  
IN RIGHT TIP

RIGHT WING

1/16" PLYWOOD RIB  
EXTENSION - MAKE 2

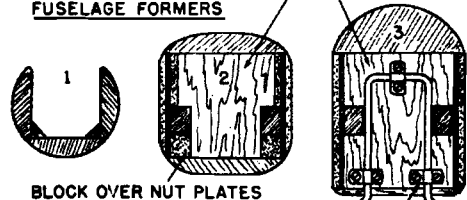
LEFT WING

FLAPS 3/16" SHEET

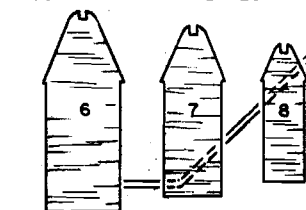


FUSELAGE FORMERS

1/8" PLYWOOD



BLOCK OVER NUT PLATES

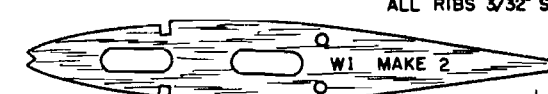
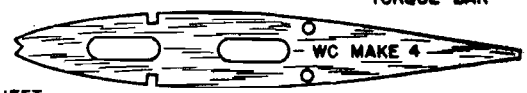


VECO L. G.  
CLIPS OR  
SIMILAR  
1/8" DIA. PIANO  
WIRE L. G.

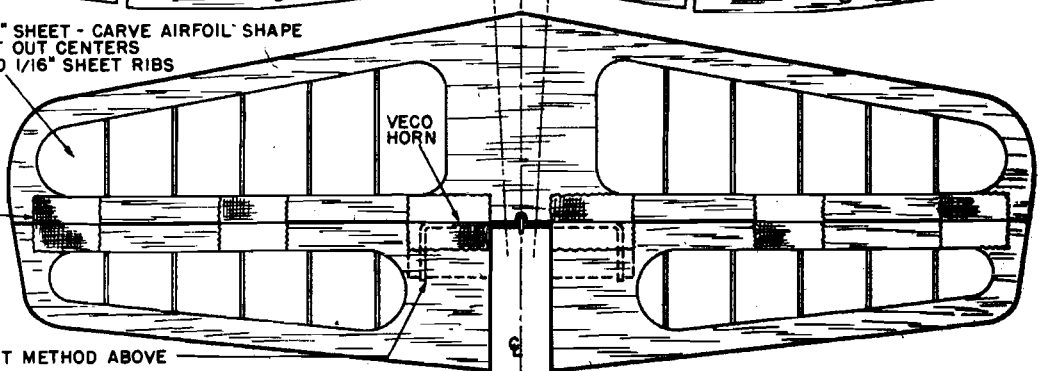
HINGE DETAIL  
SEW 2 PIECES AIRCRAFT FABRIC  
TOGETHER USING HEAVY  
THREAD, KNOT ENDS



ALL RIBS 3/32" SHEET

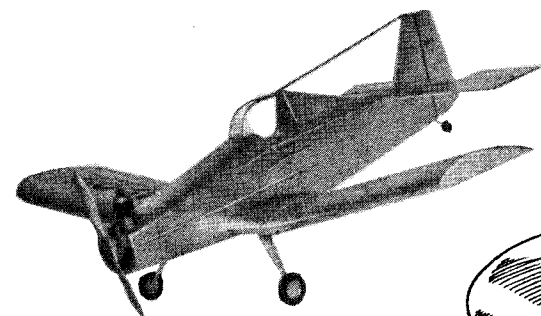


3/8" SHEET - CARVE AIRFOIL SHAPE  
CUT OUT CENTERS  
ADD 1/16" SHEET RIBS

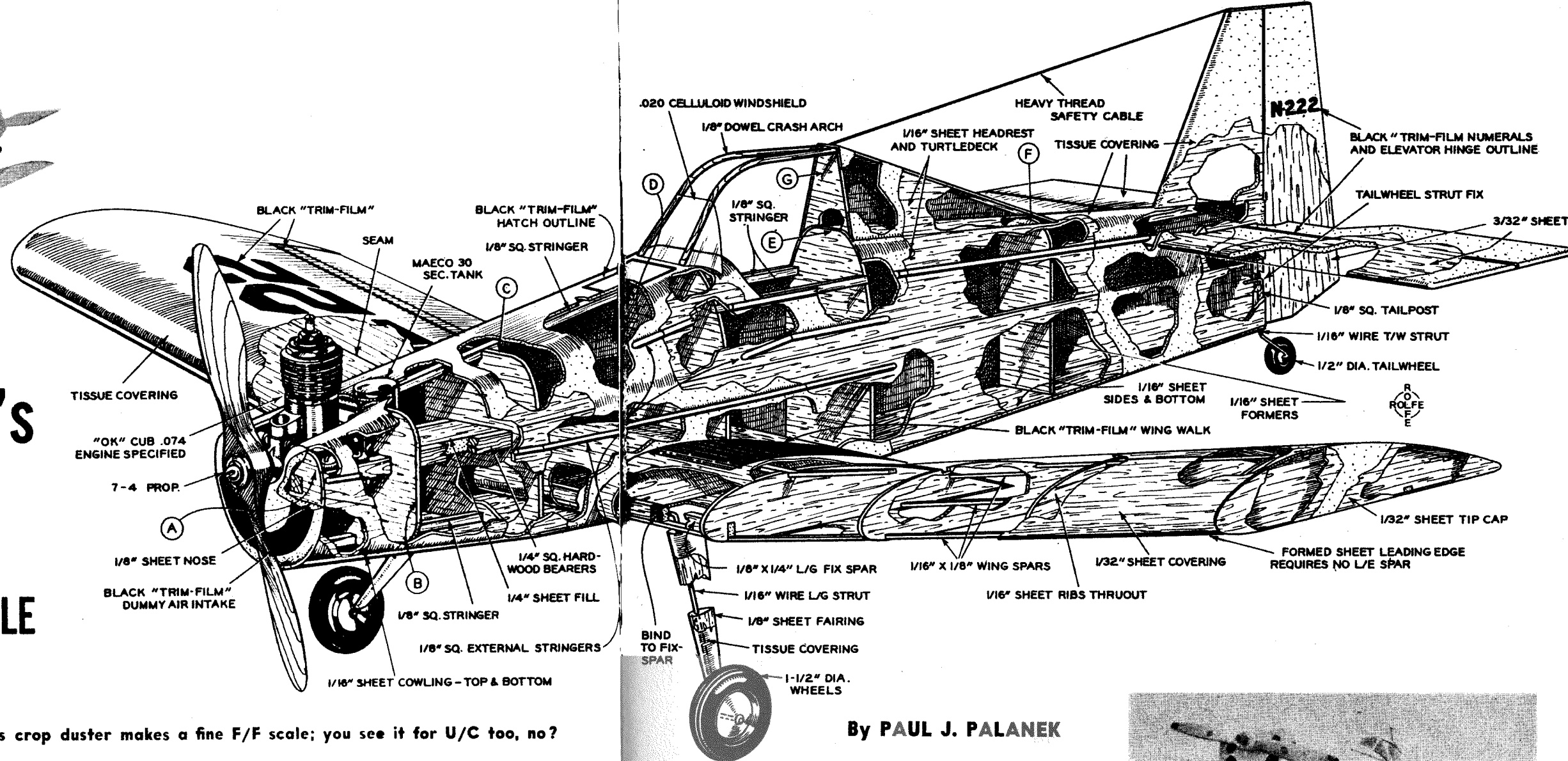


SEE FLAP MOUNT METHOD ABOVE





# Texas A & M's AG-1 FREE FLIGHT SCALE



An aluminum-bender's classic, this crop duster makes a fine F/F scale; you see it for U/C too, no?

Realizing the need for a good crop-dusting plane, Texas A & M Aircraft Research Center designed the Ag-1. The airplane's sole purpose is dusting, spraying, seeding, and fertilizing.

The craft was constructed under a C.A.A. contract. The project had the benefit of personnel assigned for various periods by C.A.A., the Department of Agriculture, two airplane manufacturers, and the Texas A & M College System; many important parts including the engine, propeller, landing gear, and

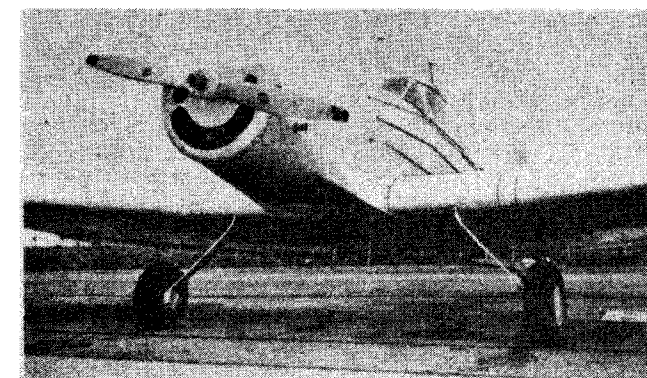
seat were contributed by their manufacturers.

Estimated performance of the airplane under full load conditions is unusual: maximum speed, 115 mph; cruising, 100 mph; operating speeds, 60 to 90 mph; landing, 45 mph (normal landing without pay load, 37 mph); rate of climb, 600 feet per minute; service ceiling, 12,000 feet; cruising range, 400 miles; and take-off distance to a height of 50 feet, 1300 feet.

Full span slotted flaps and slot-lip ailerons give ultra-maneuverability which is required for its given

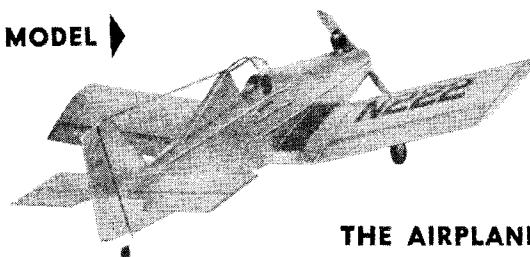
work. We thank Mr. Fred E. Weick and his staff at Texas A & M for their technical assistance in the preparation of the model, which is a direct copy of the original with little modification except where needed for free flight. All of the model's surfaces are sheet balsa covered, which not only adds realism, but strength for rough landings.

We were very pleased with the performance of the model Ag-1. The Cub .074 proved perfect for all purpose flying. Building data on full-size plans.

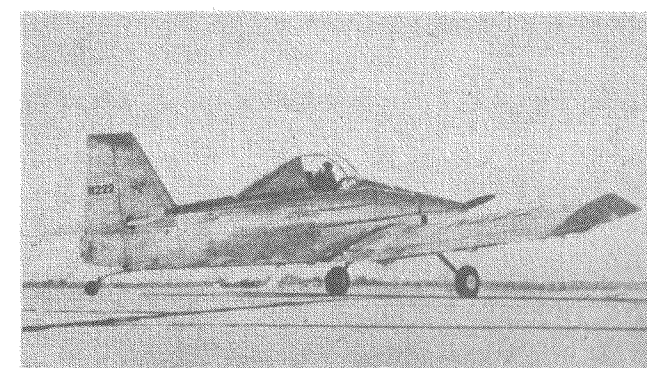
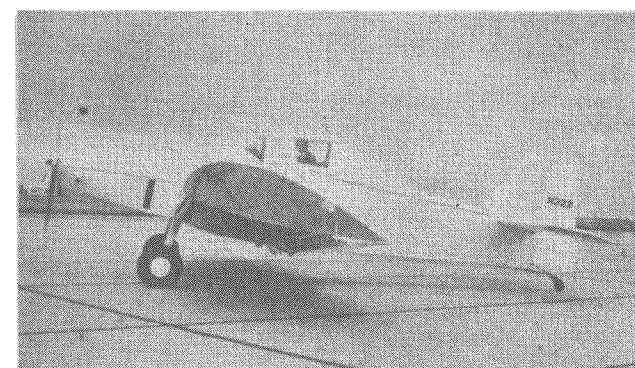
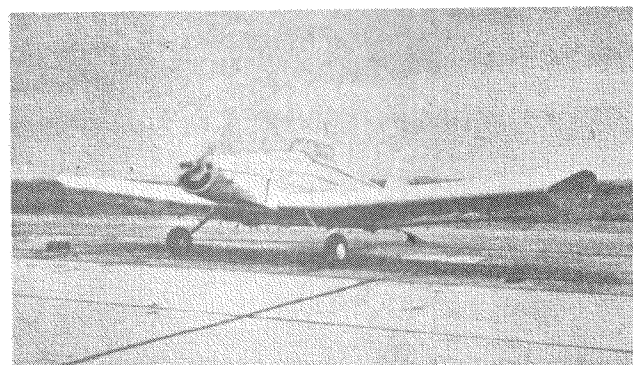


These Levy & Shipp photos show successive stages of the Ag-1. First there was a crash arch above the cockpit and down-slanting wing tips (photo below). Then tips were slanted upwards and outwards for polyhedral effect. Latest change was in cockpit canopy for shade.

THE MODEL ▶

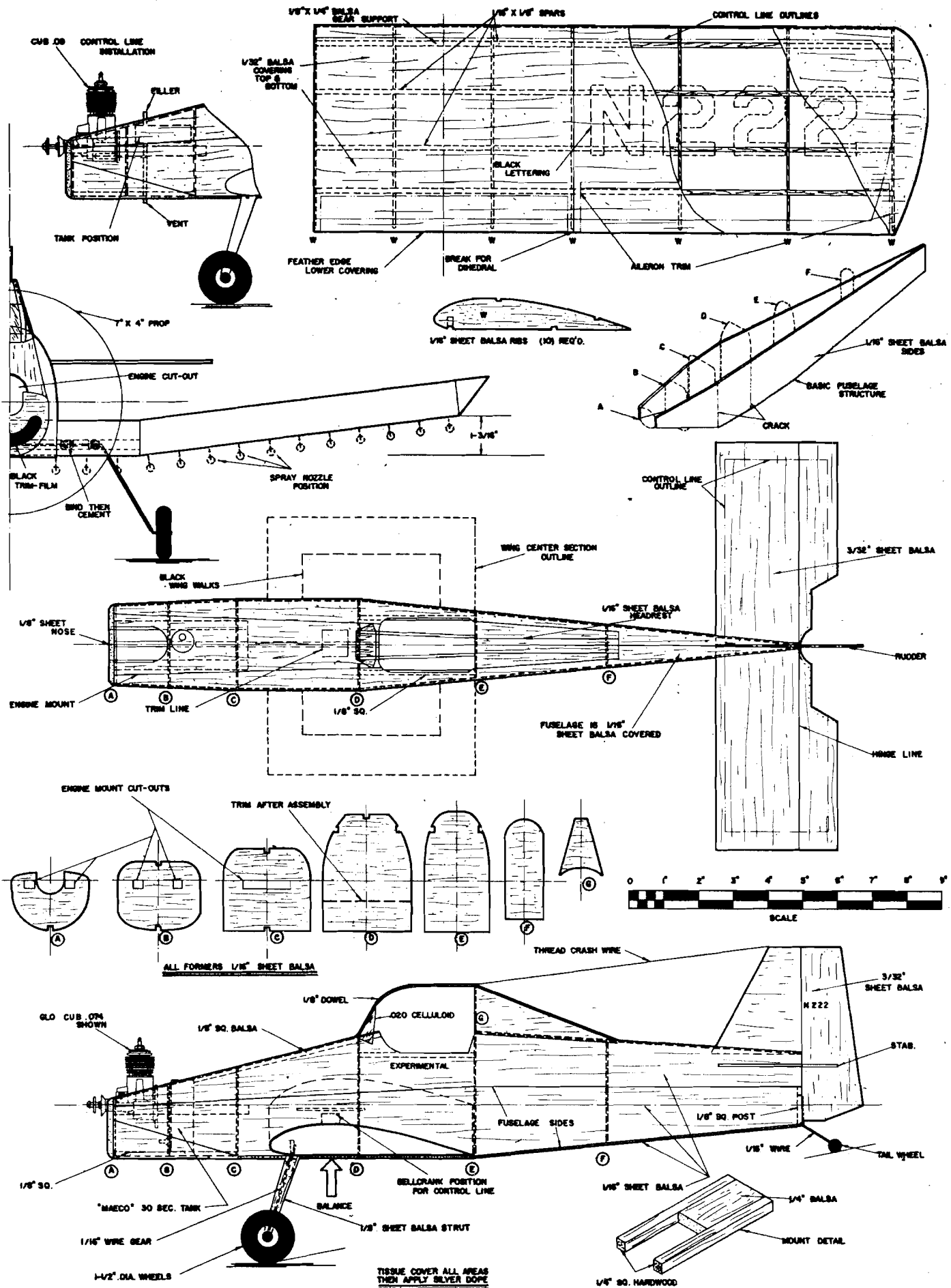


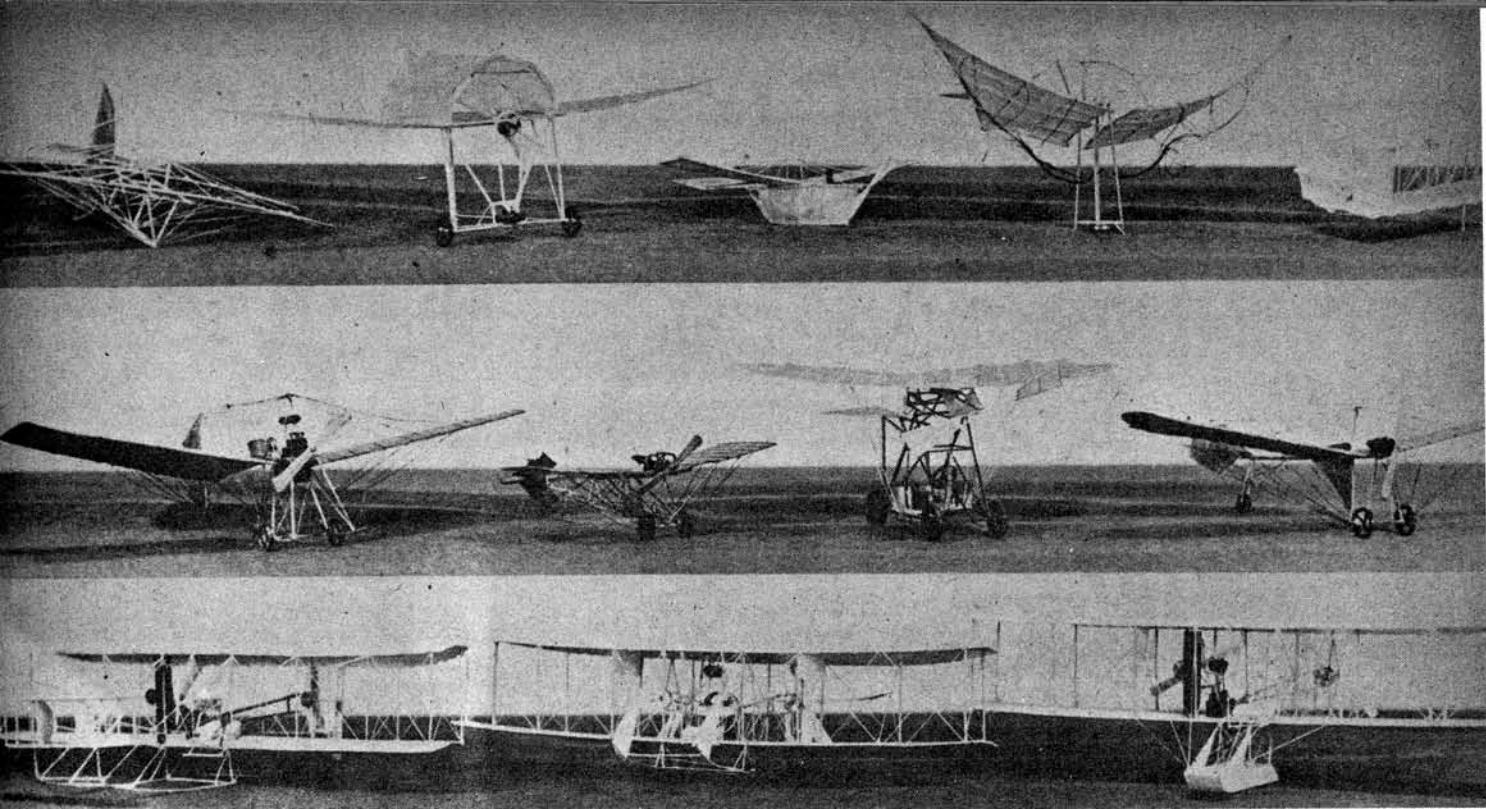
THE AIRPLANE ▶





# AG-1 FREE FLIGHT SCALE





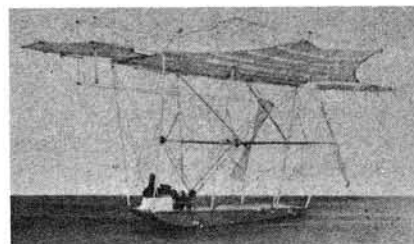
Top row, from left: Santa Clara glider by Prof. J. Montgomery, 1905; Ellenhammer of Denmark flew this in '04; successful flying model by Frenchmen Tatin and Richet, 1890; "flapper" in which Belgian Vincent de Groof was killed (1874) released from balloon;

Chanute's glider. Center row: Santos Dumont's Demoiselle; Fokker's first, the Spider; Trajan Vuia's 1906 successful French design; Hans Grade (Germany) 1909 job flew for 55 min'. Bottom row: Wright Model B; improved B, 30 hp engine; Wright C, pontoon by Navy.

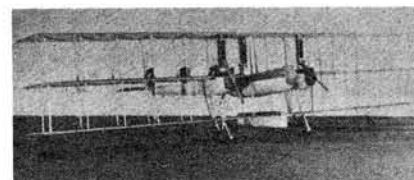


## Quarter Scale Collection

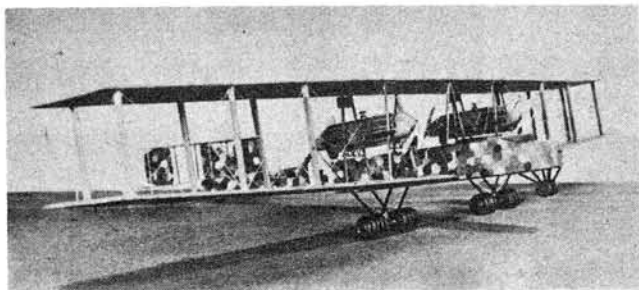
Late in 1950, Parks College of Saint Louis University (formerly Parks Air College), now celebrating its 25th anniversary, was given one of the finest collections of model aircraft in existence today. The gift of Mr. and Mrs. Charles M. Williams, it contains 120 scale models tracing the history of flight during the past one hundred years. Included are ten Wright planes and a scale replica of the launching tower with the falling weight used to assist in catapulting the early underpowered aircraft. Also in the collection are a number of models of aircraft built before the turn of the century when flight consisted mainly of man's dreams.



Sir Hiram Maxim's Enormity, built after U. S. inventor moved to England. Steam engine; tethered on circular track; flew; crashed.



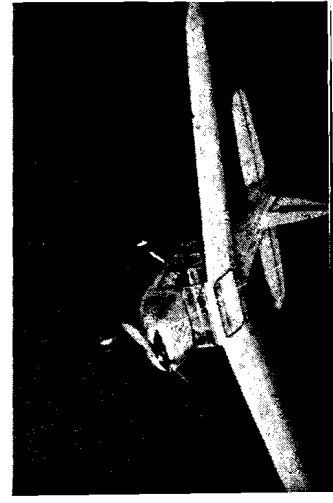
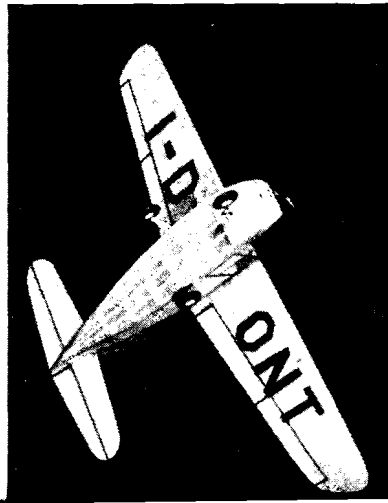
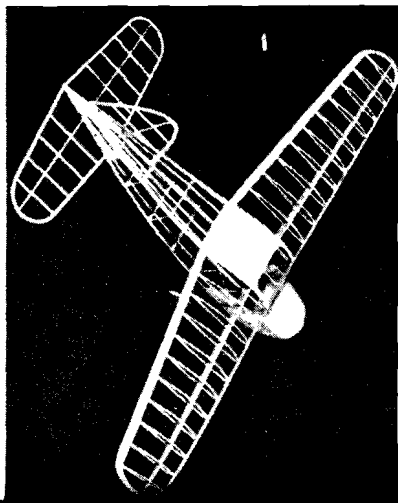
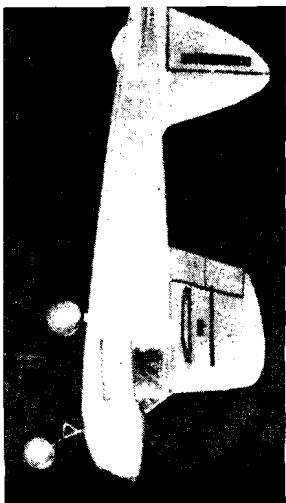
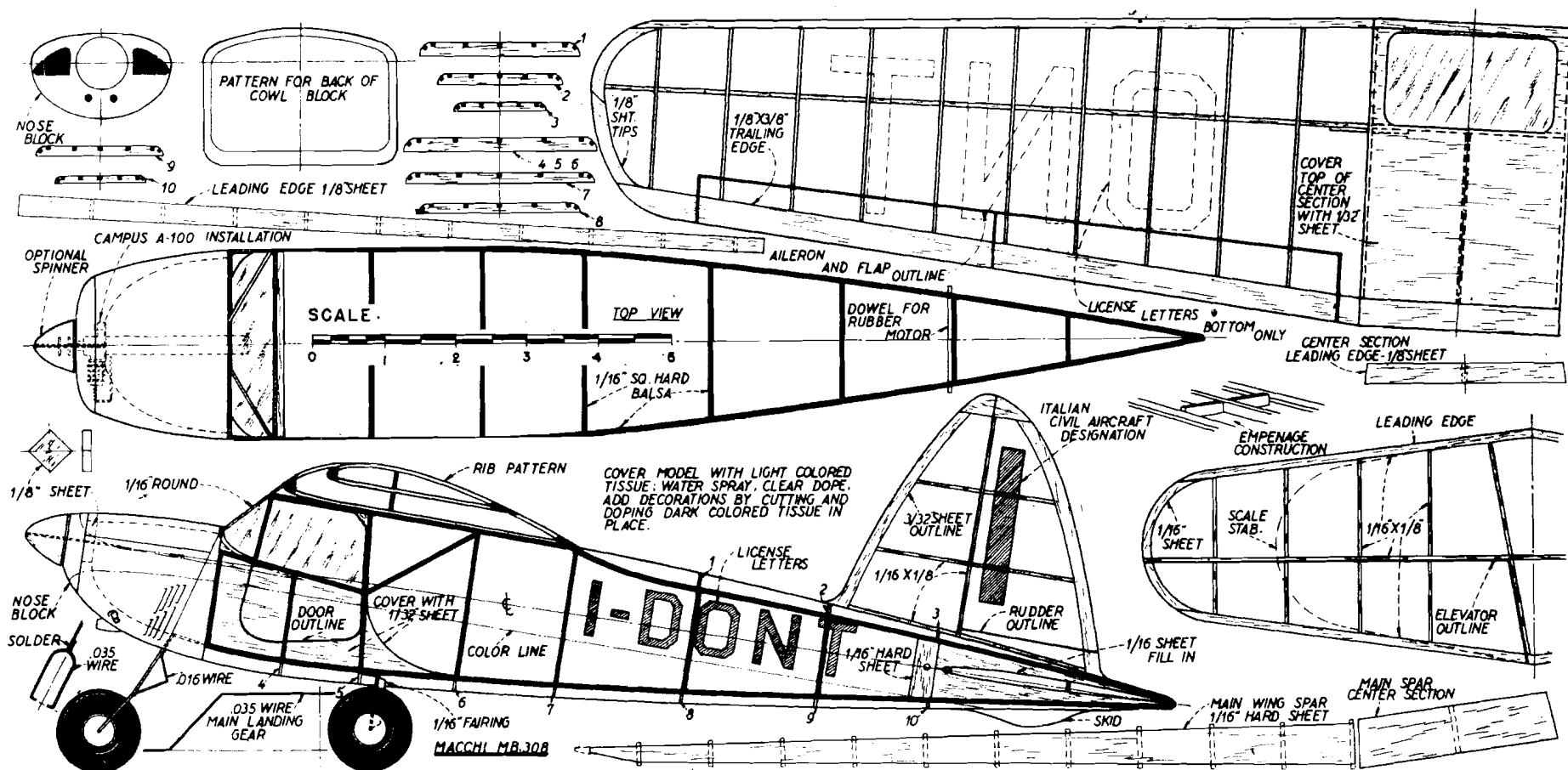
Caproni C.A.-4 bomber. Italians used this tripe for night bombing in WWI. Three Liberties; 98 mph. Bombs under lower wing.



Giant Zeppelin bomber, built by German AF, was one of largest aircraft of WWI. Had four 300 hp Maybach engines; crew of 6.



British Handley-Page of WWI. Had two Liberty engines of 400 hp each; 97 mph. Span 100 ft.; weighed 14,000 lbs. fully loaded.



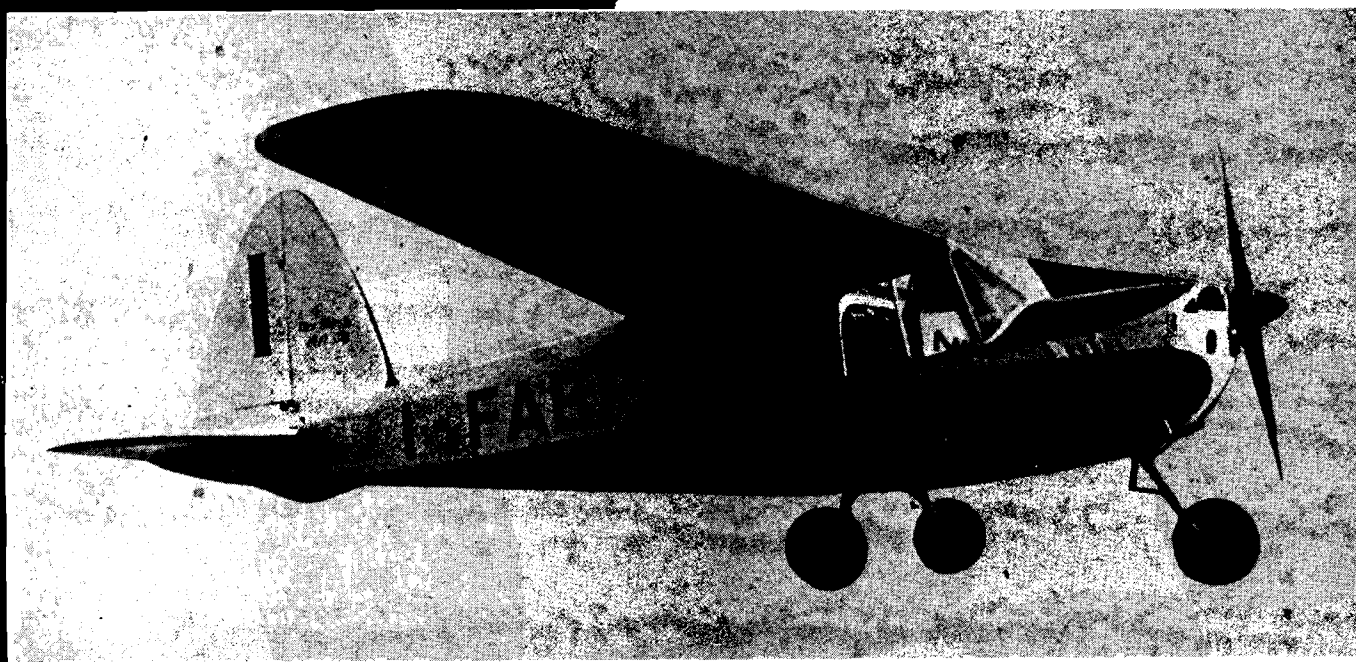
# Macchi MB-308

A design to warm the heart of any builder of rubber-powered flying scale models. This neat job also takes Campus A-100

ITALY'S top offering to the lightplane enthusiast, the MB-308, bids fair to become the favorite of all Europe. The wing is of a tapered cantilever design coupled with a simple fuselage of neat, compact design seating two side-by-side. Tricycle landing gear or twin floats may be used. It is sold with or without a motor; the continental A-65 is the recommended power. The price is \$3-5,000; no accurate means of computing cost is available due to fluctuating European currency. Span is 32' 9½"; length overall 21' 3½".

Ideally suited to a stable flying design, the MB-308 is presented here as a small scale job for T-56 rubber or CO<sub>2</sub> power. The model shown in the photos uses a Campus A-100 motor. Construction is simple and light. Use carefully selected balsa as specified.

Build two body sides on the plan side view. Assemble them as per top view and attach bulkheads



By CRISTO RUSSO

● Solid model builders can construct a same-size scale model right from these plans. The flying model clan can obtain full size working drawings as a part of Air Trails Full Size Plan #949.

and stringers, using hard 1/16" sq. throughout. Trace the nose block on soft balsa blocks; cut to outline shape; carve to contour; sand and give several coats of clear dope, sanding between coats. Cut the blocks in half and with a small gouge, hollow to the wall thickness shown. Cement together and attach to nose of fuselage. Bend and insert wire landing gear. Wheels are of balsa or celluloid. Small Trexler pneumatics may be used.

Stabilizer and rudder are of conventional construction. Exercise care to prevent any warpage. Cover with Jap tissue and water-spray. Give one thin coat of clear dope (use eight parts thinner to two parts dope).

Make a template from tin can metal of the largest rib (center). Proceed to cut ribs of 1/16" sheet balsa. Make a cut along the top surface; move the template down 1/16" and make another cut. Thus you have a rib 1/16" sq. Cut sufficient



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1. MAIN BODY	2. WING	3. TAIL SECTION	4. ENGINE	5. PROP	6. LANDING GEAR	7. COCKPIT	8. CANOPY	9. WHEELS	10. TAIL FIN	11. WING ROOT	12. WING TIP	13. TAIL BOOM	14. TAIL FAN	15. TAIL FAN BLADE	16. TAIL FAN BLADE	17. TAIL FAN BLADE	18. TAIL FAN BLADE	19. TAIL FAN BLADE	20. TAIL FAN BLADE	21. TAIL FAN BLADE	22. TAIL FAN BLADE	23. TAIL FAN BLADE	24. TAIL FAN BLADE	25. TAIL FAN BLADE	26. TAIL FAN BLADE	27. TAIL FAN BLADE	28. TAIL FAN BLADE	29. TAIL FAN BLADE	30. TAIL FAN BLADE	31. TAIL FAN BLADE	32. TAIL FAN BLADE	33. TAIL FAN BLADE	34. TAIL FAN BLADE	35. TAIL FAN BLADE	36. TAIL FAN BLADE	37. TAIL FAN BLADE	38. TAIL FAN BLADE	39. TAIL FAN BLADE	40. TAIL FAN BLADE	41. TAIL FAN BLADE	42. TAIL FAN BLADE	43. TAIL FAN BLADE	44. TAIL FAN BLADE	45. TAIL FAN BLADE	46. TAIL FAN BLADE	47. TAIL FAN BLADE	48. TAIL FAN BLADE
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Make your own P-38 Lightning today! No special tools! No special equipment! No special instructions! No special anything!

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**DYNA-MODEL PRODUCTS COMPANY**

76 SOUTH STREET, OYSTER BAY, NEW YORK

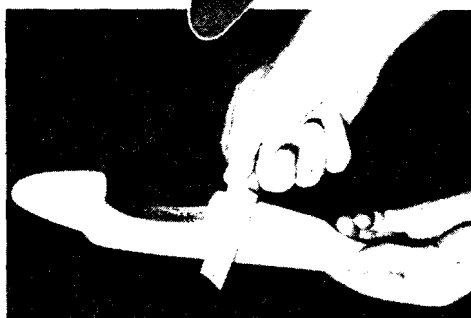
107 East 126th Street New York 35, N. Y. Dept. A



# Ornamental Ventura

BY RONNIE ALBERT

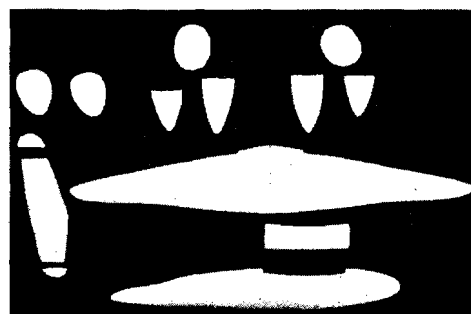
For your shelf, a slick replica of Lockheed's Ventura, successor to the famed Hudson. The first of a new solid-scale series.



To check, paste templates on cardboard and use thus.

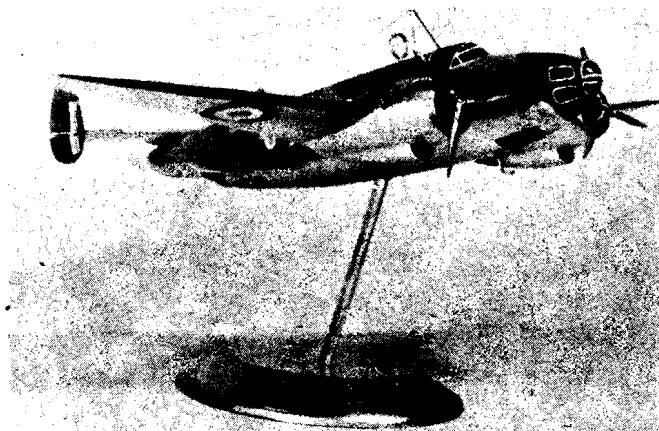


Frequent checks with wing-rib templates insure scale.



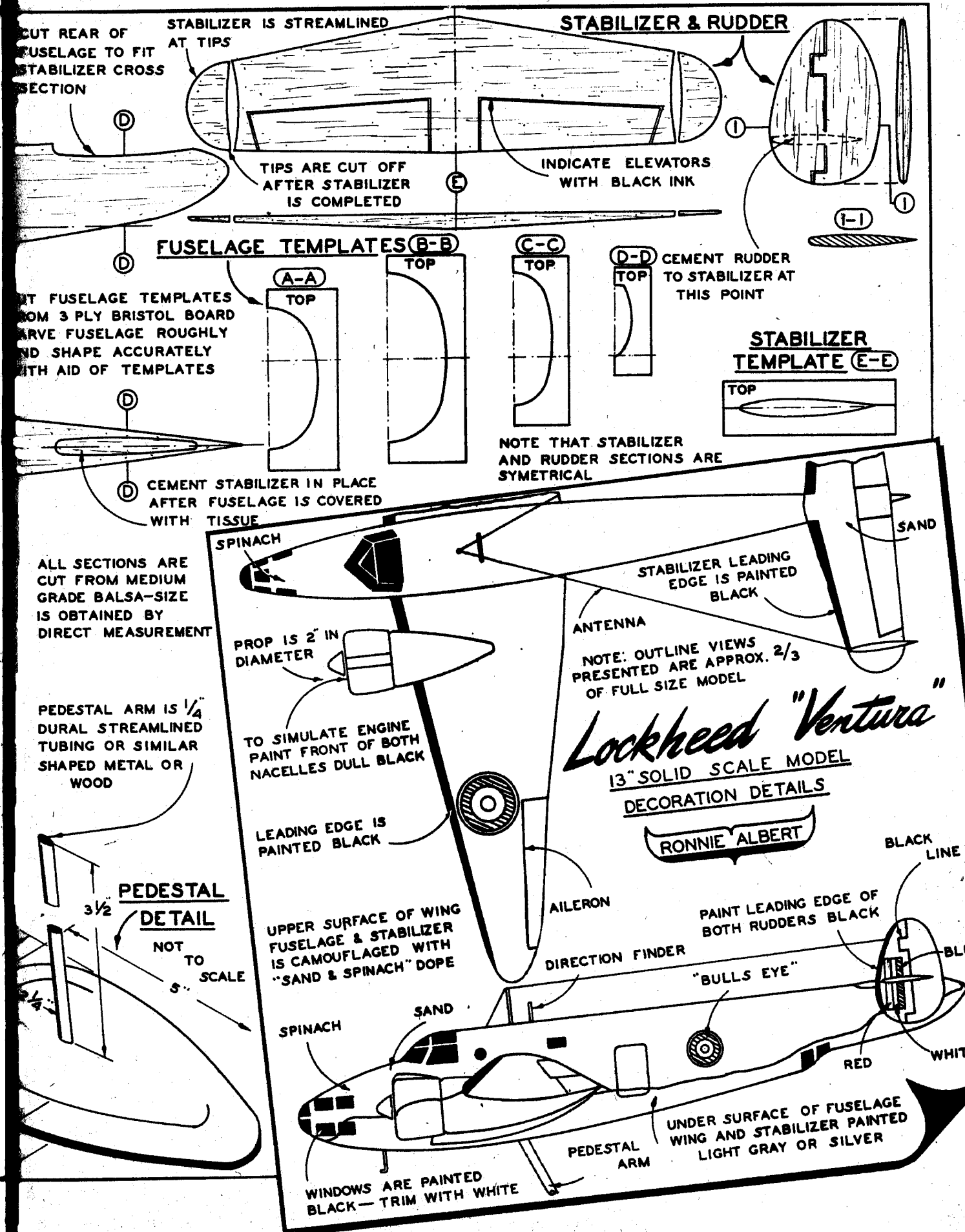
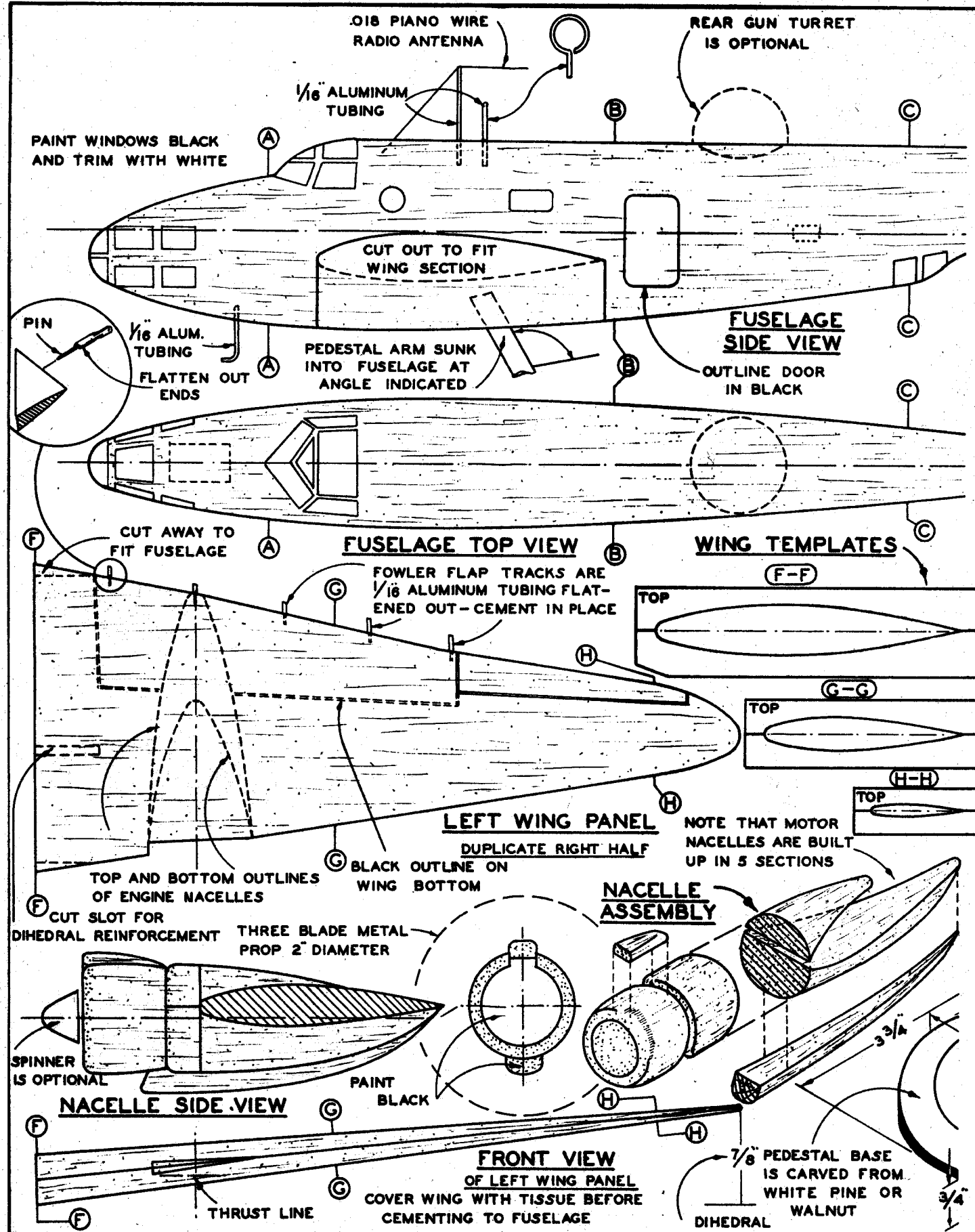
Parts' photo shows how one-piece wing fits in body notch.

**B**OMBERS! bombers! and more bombers is all one hears in this present-day war, for it has been proven time and again that this type of aircraft can—and will—spell the difference between victory and defeat! Throughout the nation seven days a week, twenty-four hours a day, bombers are rolling down the assembly lines. Of the various bombers now being manufactured, the Lockheed Hudson has proved to be the outstanding number—probably because it has been more actively used. You all know the Hudson has proved its worth in England, but now a new bomber wings across the warways of the world—the Vega Ventura, big brother of the famous Hudson. Greater in bomb-carrying capacity and range, considerably faster, and more formidable in firing power than the Hudson, the Ventura again shows vividly the soundness of American engineering. Adapted, like the Hudson, from a commercial design, this internationally famous transport for trade has become a bomber for democracy.

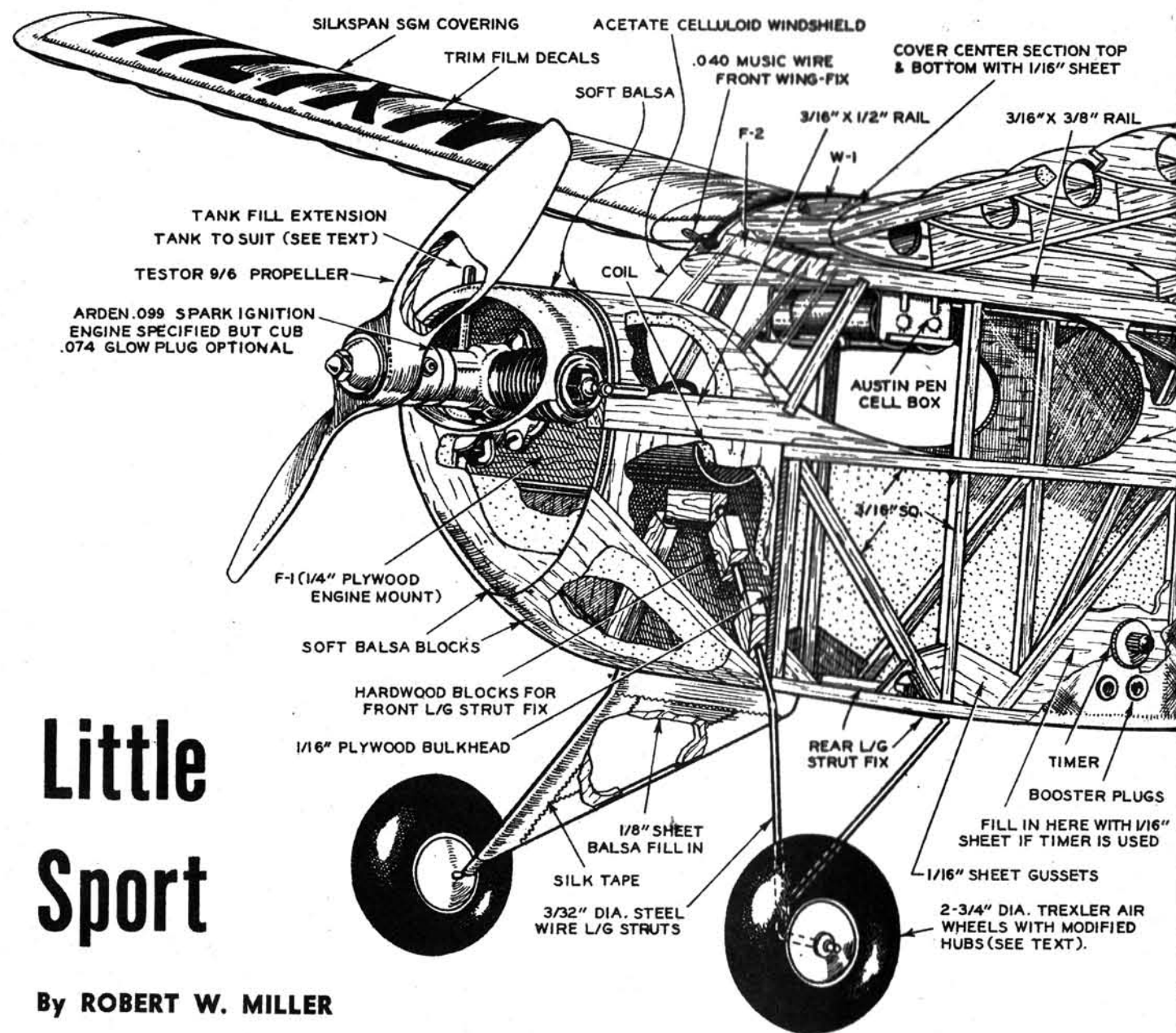


Wing shape, bottom turret, air scoops, other details make the Ventura novel project.

# LOCKHEED VENTURA—full-size drawings







# Little Sport

By ROBERT W. MILLER

■ Here is a Class A model for .099 size engines which should please the heart of any model builder. Our first thought was of size, a large enough model to take the bite out of the average engine in this smaller class and give us a ship which would be a pleasure to fly.

A rugged frame was the next thing in order and by using hard balsa in practically every point of construction, plus a covering of Silkspan SGM, a model of unusual strength evolves. With a combination of this sort you will have a sport job second to none and one which you never need leave at home because it's too windy to fly.

A spark ignition Arden .099 was used as the test powerplant in this model with fine results, but for those

who would want to glow plug it, merely watch the balance of the ship and keep the tail construction light while beefing up the nose with hard balsa cowlings blocks, etc. A Cub .074 glow plug engine is an excellent size for ignitionless operation.

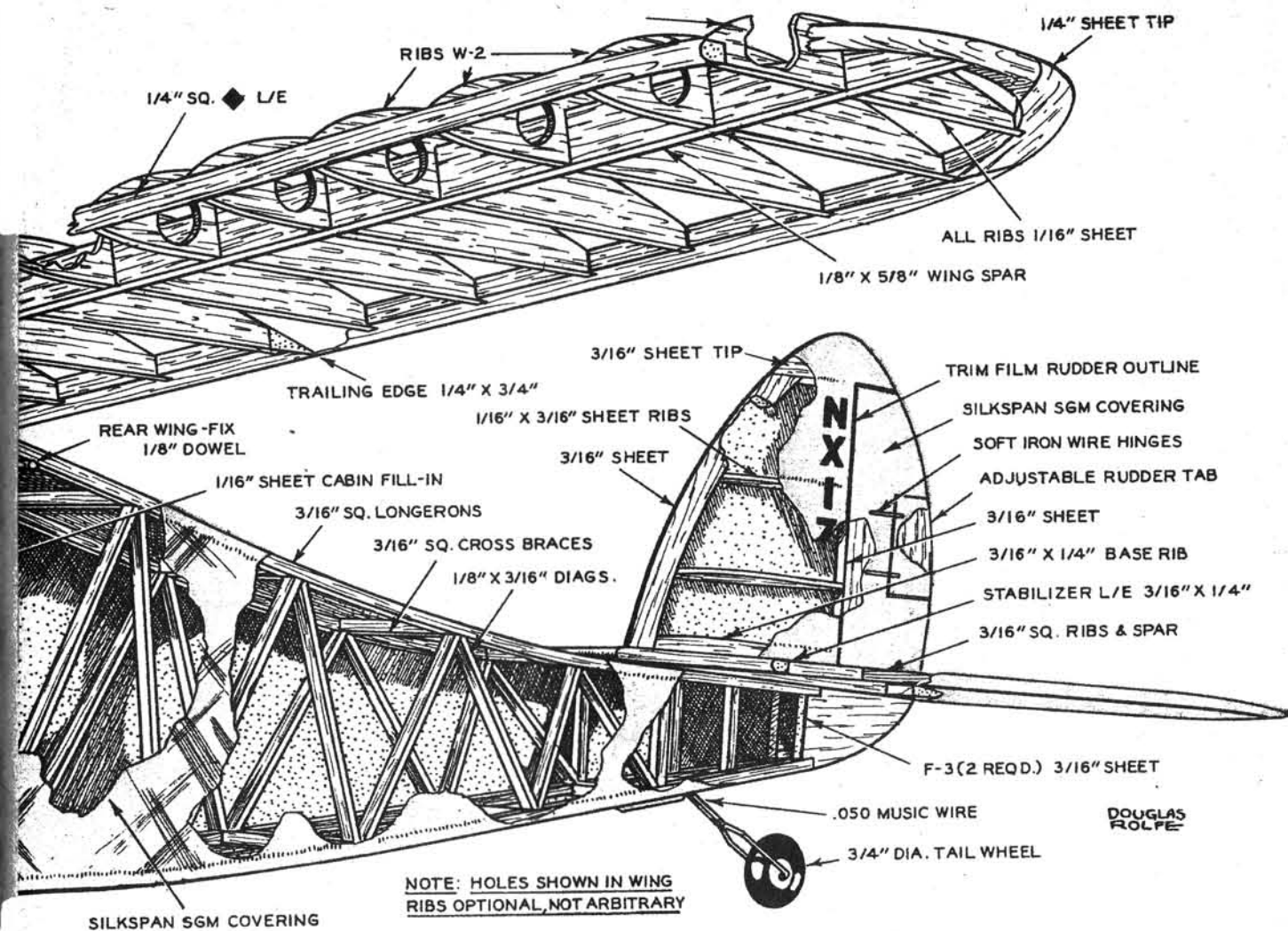
The fuselage sides are built in the usual manner, one on top of the other. The 1/2" x 3/16" balsa runners at the front of the fuselage are cemented to the 3/16" sq. fuselage side pieces during their construction, and it is advisable to cut them to the window outline and notch them before they are cemented in place.

After the sides are dry, sand them lightly and then jig them upside down on the bench, using a square and some weights to hold in position. Insert the four 3/16" sq. x 3/8"

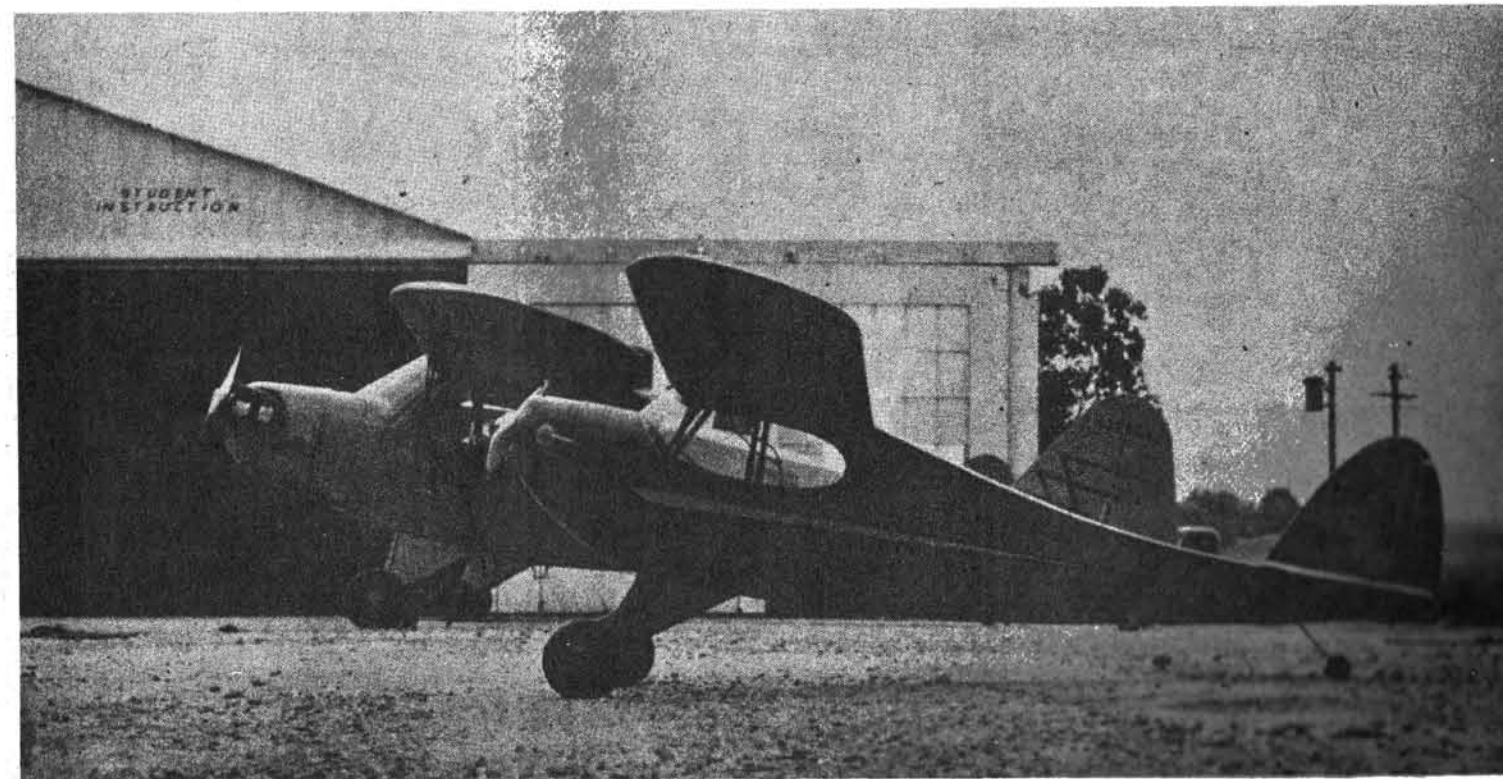
spacers at the points marked "A." After the cement is dry, add the gussets on the bottom sides of the fuselage and put in a 3/8" x 1/8" cross brace, on edge, where the rear landing gear strut will cross.

Bulkhead F-1 should be jigsaw-cut and the bottom edge beveled as shown in the side view of the plan. Drill the motor mounting holes and also holes for the wires if the model is ignition operated. Apply a good coating of cement to the notches and mount F-1 on the 1/2" x 3/16" rails, being careful to keep it square with the fuselage.

Shave the inside faces of F-3 so that they are about 3/16" wide when the ends of the fuselage are drawn together.



Glow plug or ignition—radio control or sport free flight—take your pick; sure looks like a big Cub!



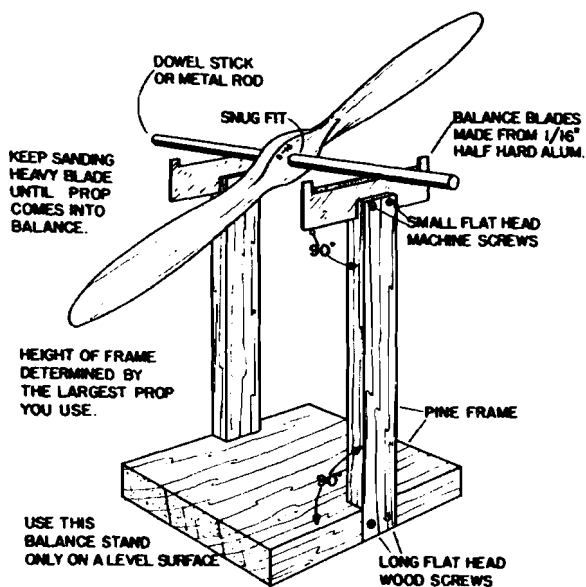
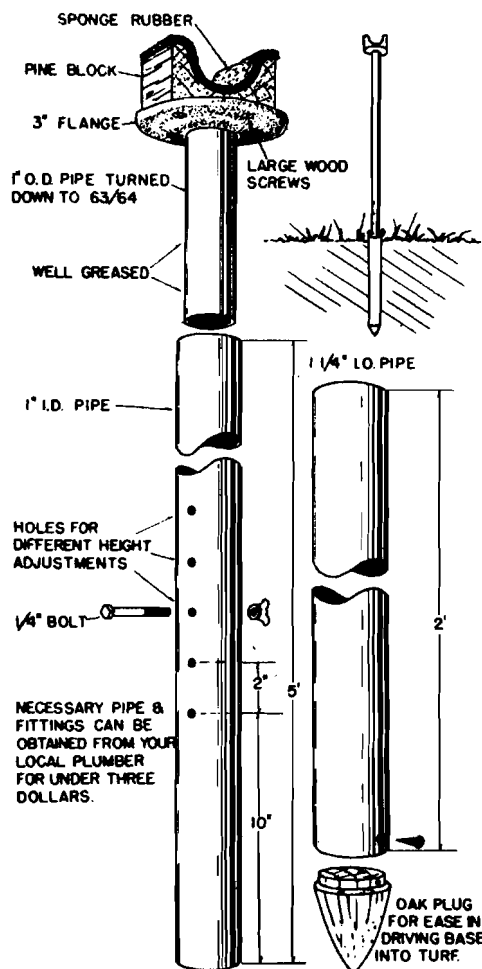
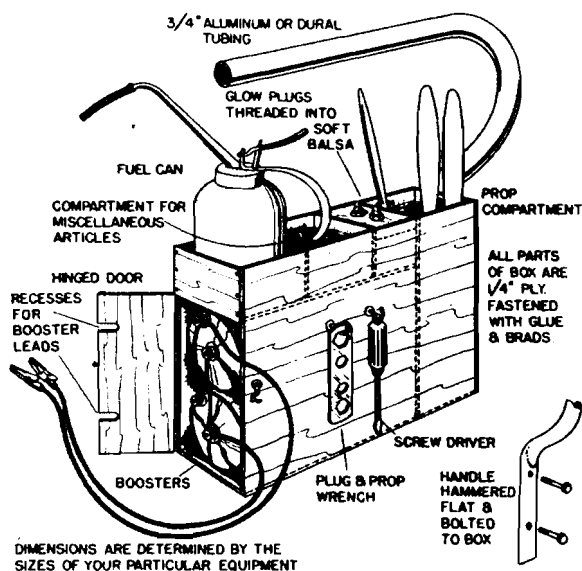
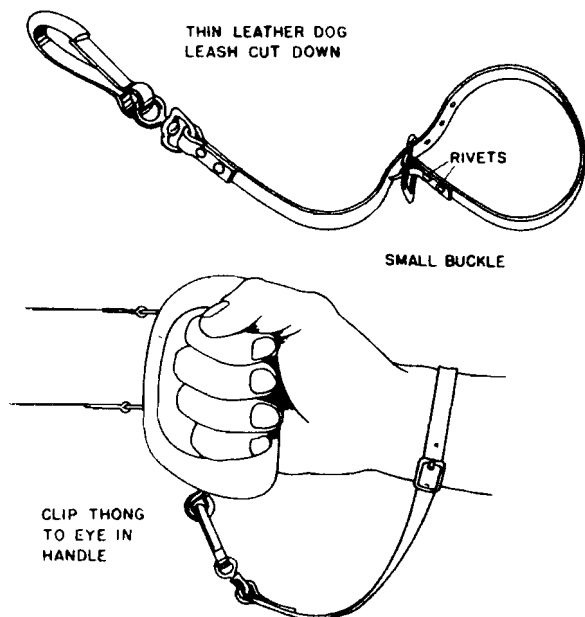




# Speed Pointers

By HAROLD STEVENSON

Here are four fine suggestions for speed fans from Harold Stevenson, air-model artist par excellence, and speed-flyer who flies just about par. The safety thong is easily made and permits you to disengage the handle without a lot of fuss. The speed pylon has been used by several active clubs and found to be most satisfactory. All the hard work is done by your ("friendly") local plumber. You'll add rpm's to your motor and lengthen its life with a properly balanced prop; keep smooth, sharp edge on the balance blades. Mr. Stevenson's contest "mady box" keeps things neat and handy.

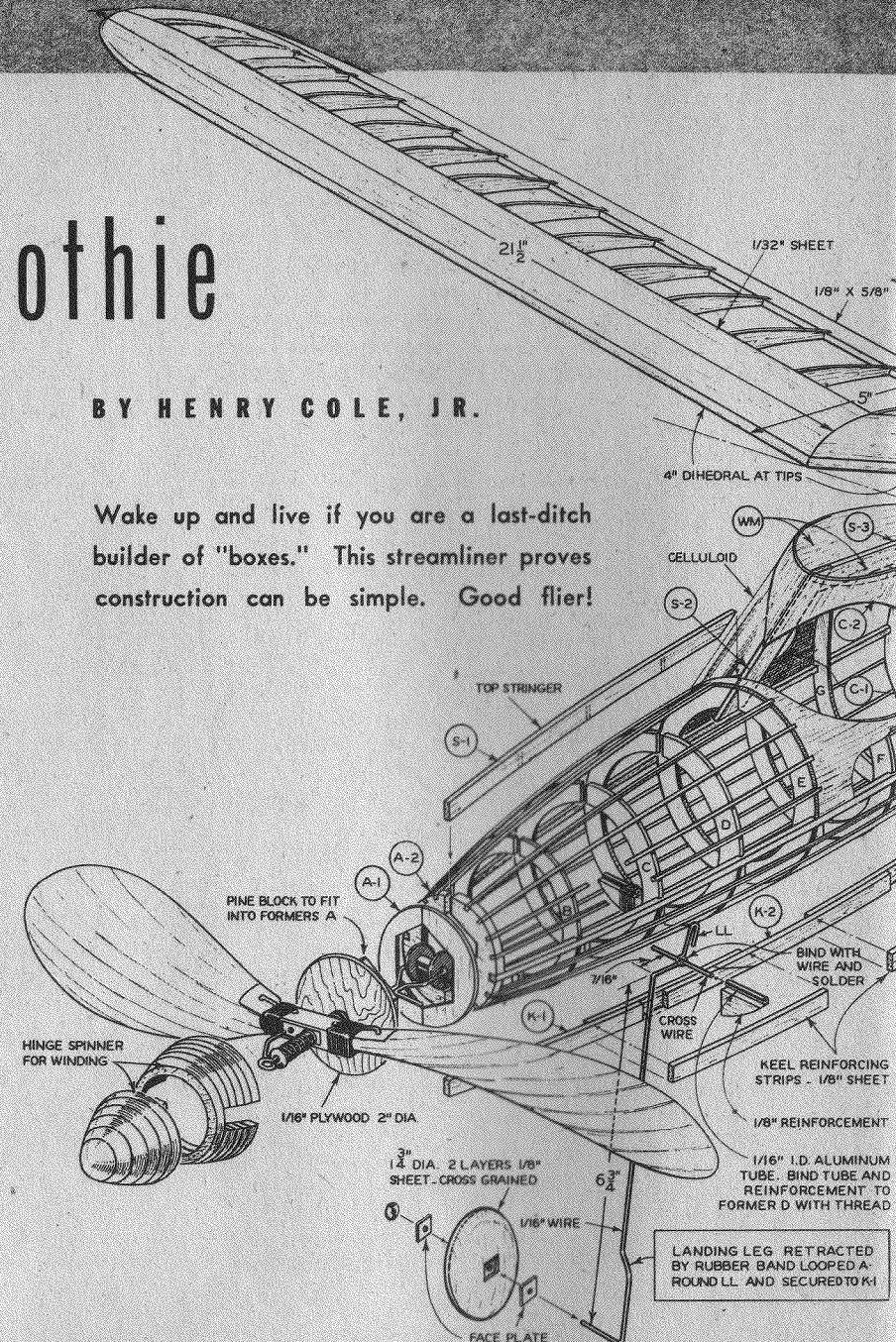
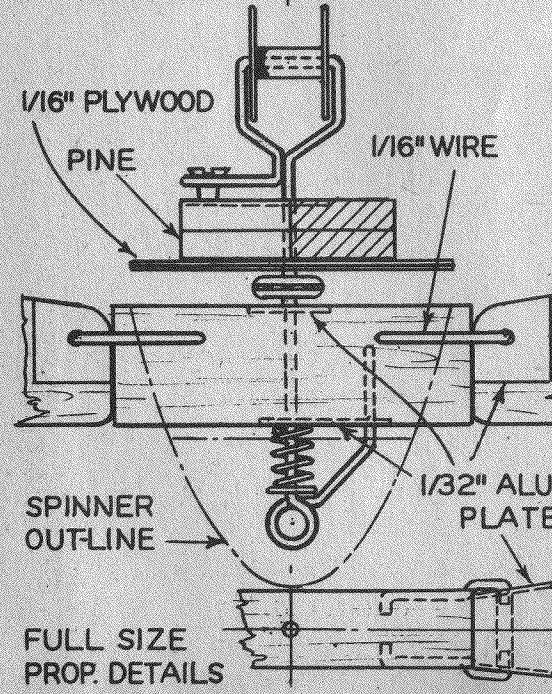
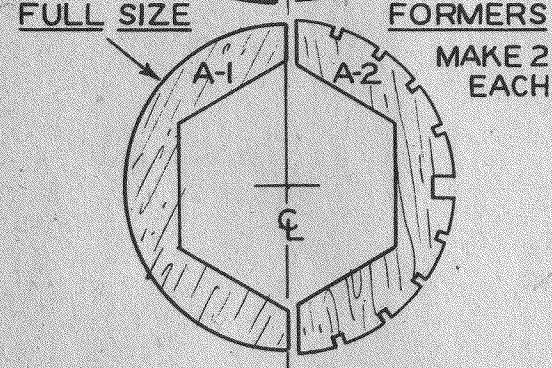
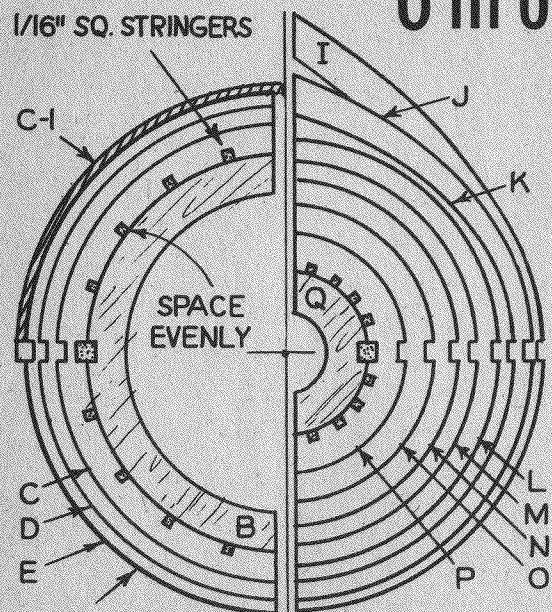




# Smoothie

BY HENRY COLE, JR.

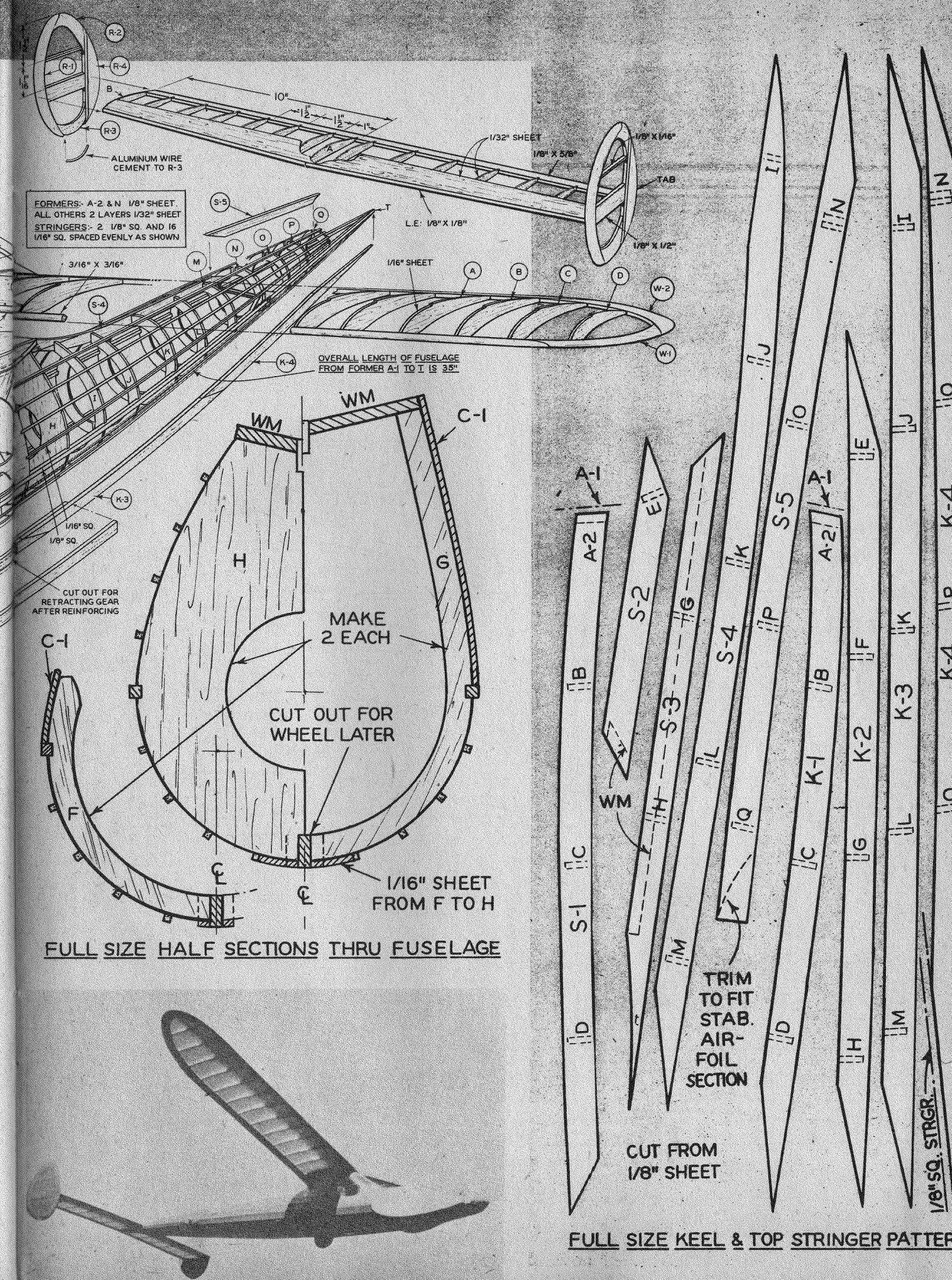
Wake up and live if you are a last-ditch builder of "boxes." This streamliner proves construction can be simple. Good flier!



DRAWINGS BY DOUGLAS ROLFE

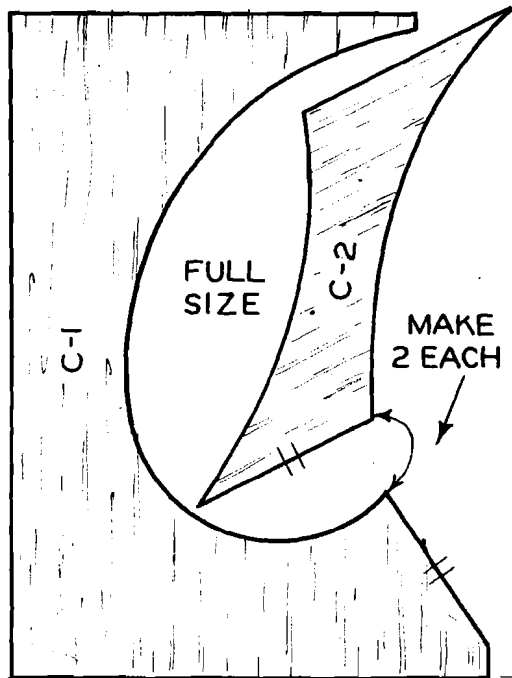
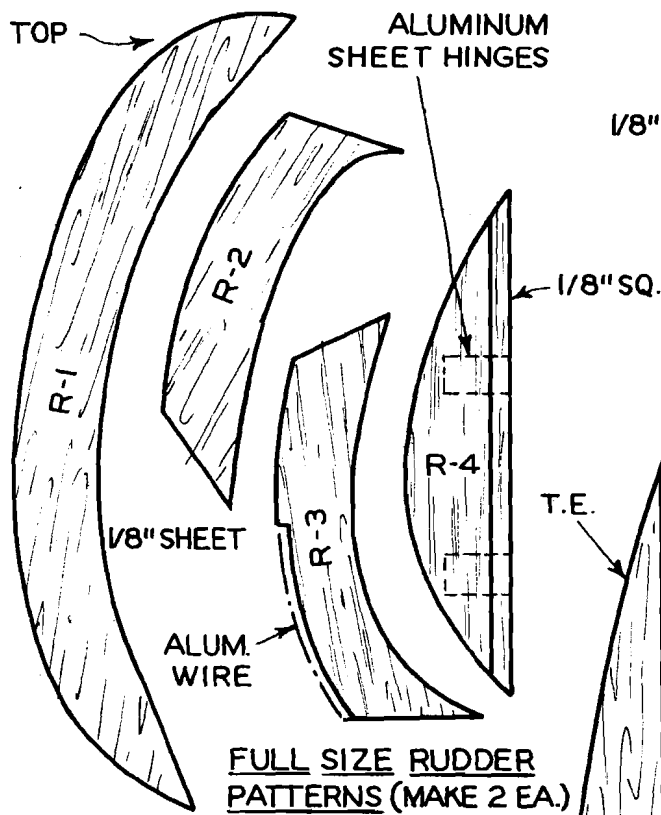
THE first test model of this design was built in the spring of 1941 to take to the Nationals. The model was so stable that it required only two test flights to adjust it. On its third flight it was wound to maximum (1,300 turns) and launched on an official flight in a local contest. It climbed so fast on the initial burst that it was difficult to follow with the eye. When the tensioner caught, the model was a mere speck above, having climbed almost out of sight on the motor run. At 2:27 the timer clicked his watch and declared the model out of sight. Still dazed by the amazing climb we had just seen, we were disappointed at losing the model, but thoroughly inspired to rush another one into production for the Nationals.

This model had the same aerodynamical set-up as the lost one, but the fuselage drag and skin friction were cut to a minimum due to a new streamlined cabin design. Characteristics of the Smoothie were exactly the same as those of the test model with the exception of a greatly improved glide obtained through better streamlining.

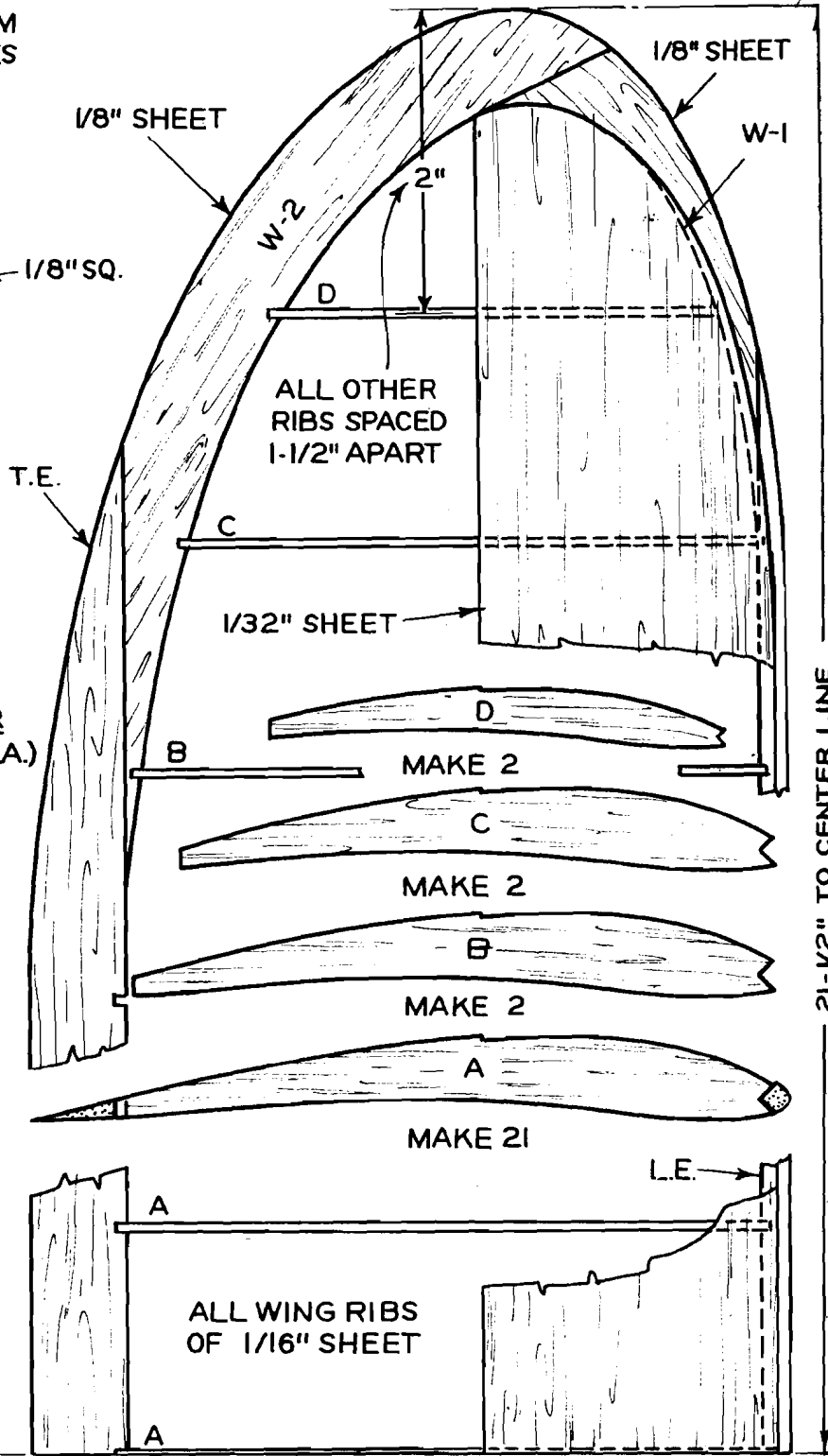




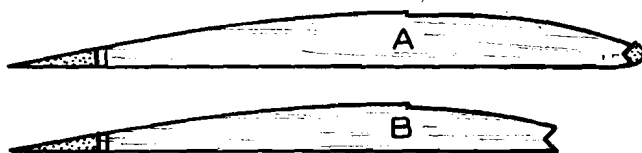
# Smoothie



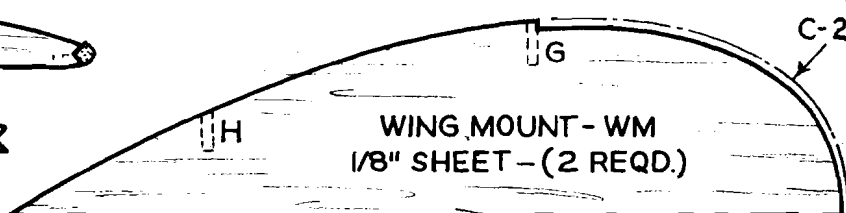
**CABIN COVERING - 1/16" SHEET**



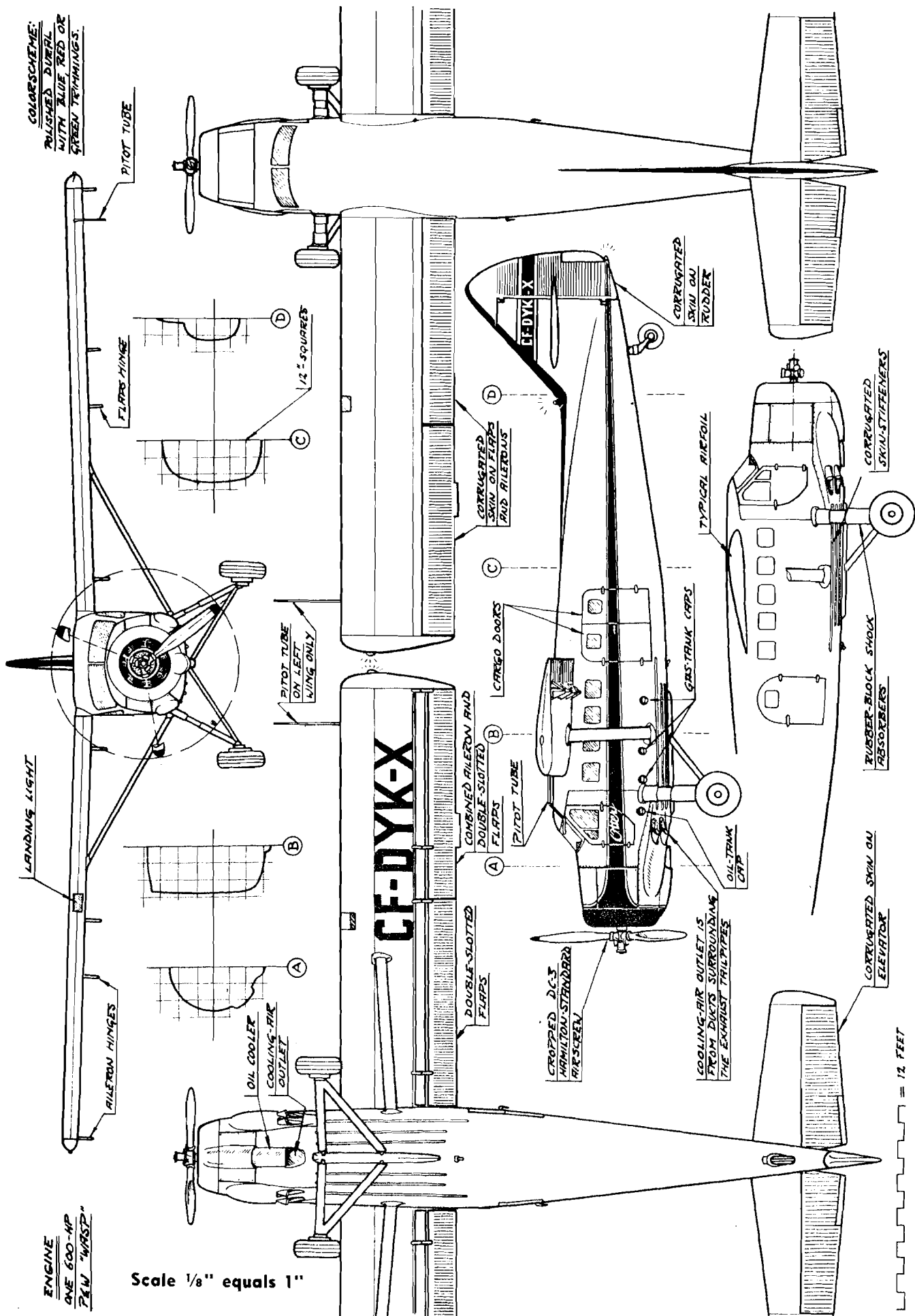
**FULL SIZE RIB PATTERNS AND WING TIP OUTLINE**



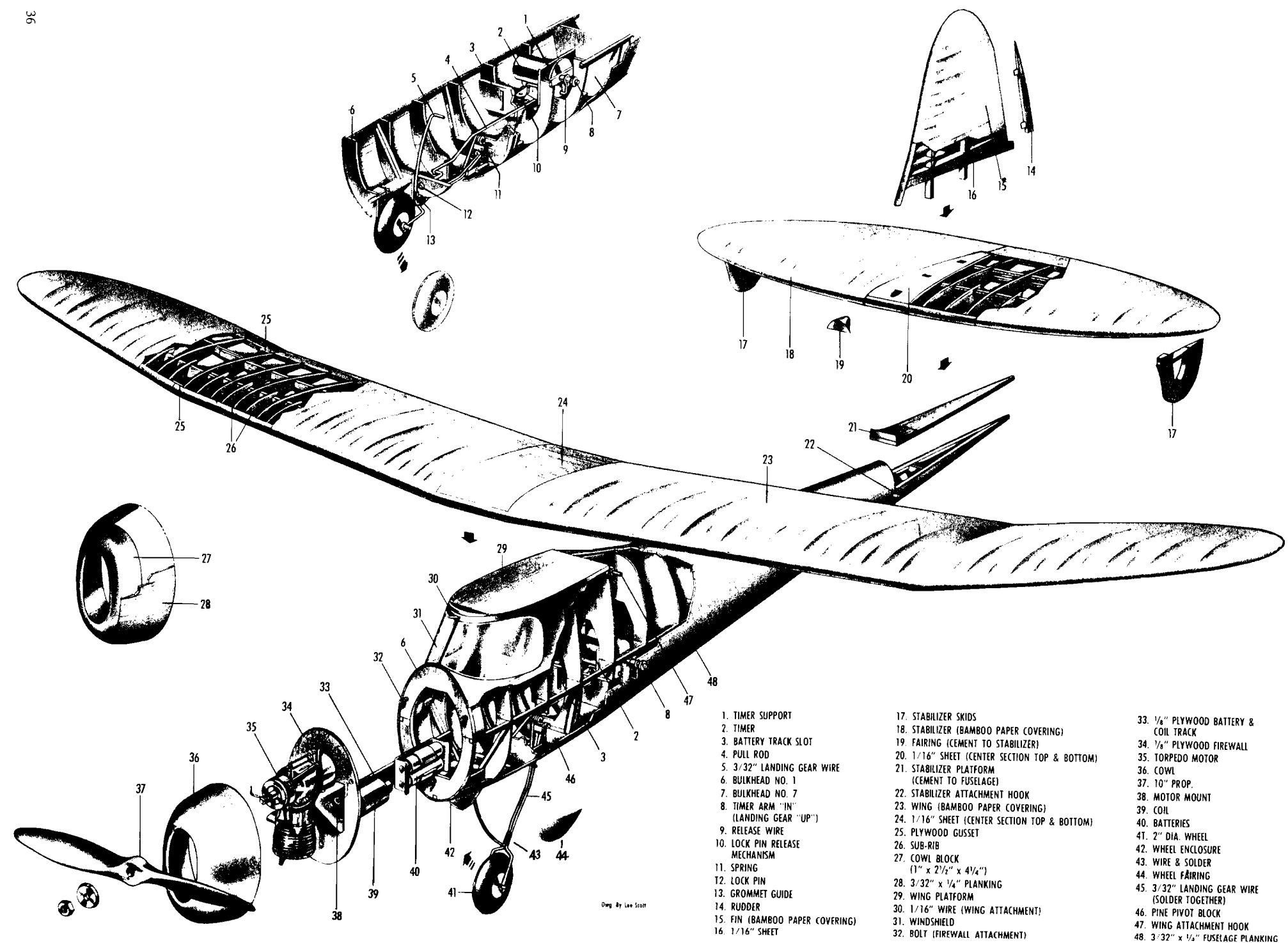
**FULL SIZE STABILIZER RIBS**



# de Havilland DHC-3 "Otter" BY BJORN KARLSTROM







# GLORY-BEE

by VERNON OLDERSHAW

ONE OF THE MOST CONSISTENT FLYERS AT THE NATIONALS, THIS SHIP IS A MUST FOR ALL MODEL BUGS

**T**HE Glory-Bee was created by the author to combine in one model beauty as well as performance. To accomplish this, a general design of a good flying model was first sketched on paper. This gave the outline of the wing, its size and aspect ratio, as well as the size of the stabilizer, rudder, and the length of the moment arm. The line of thrust, the location of the center of gravity, and the center of lateral area, along with the location of the wings and their respective degrees of incidence were also included in the sketch.

The airfoil was derived from the Davis formula for fluid foils. Several different foils had been tested, including those which had appeared in Air Trails. For the most part, all were very stable and gave the models a high rate of climb under power, but were too fast in the glide for contest work. To decrease this speed, the air foil was made thicker. Though the model is still faster than most models, it has a very low sinking speed and will take off on anything that even smells like a thermal. This despite the fact that the model has a 14-ounce-to-the-square foot wing loading. Your model need not weigh that much because the author used very hard balsa with lots of cement and dope thrown in for good measure.

A model of simple construction was first built to test the design. The only change made was to increase the aspect ratio. This stopped the tendency of the model to drop off at the end of the motor run. Around this tested design the Glory-Bee was constructed. It is easy on the eye as well as being a good performer. The model has been contest-proved. At a recent Santa Barbara California meet, under ideal flying conditions, over a polo field where thermals were non-existent, it won over competition in all classes.

To build the Glory-Bee, the modeler should first make himself familiar with the plans. This is what every article that deals with model building will tell you. It is a very good idea and will save you a great deal of time and needless mistakes.

The fuselage is built by the crutch method, that is, by building each half separately, then joining them later. This method is changed slightly by building the bottom half on the drawing and then removing from the board and building the top right on to the bottom.

Cut out all the bulkheads and the cowl ring. The bulkheads are then cut in two just above the notch for the  $\frac{1}{8}$ " square longeron. Now pin two  $\frac{1}{8}$ " longerons in place on the top view of the drawing. Then place all the lower halves of the bulkheads in place, making sure that each one is vertical to the drawing. Cement them in place. Next cement the bottom longeron in place. Note that there are two  $\frac{1}{8}$ " sq. sticks  $\frac{1}{8}$ " apart from number 4 to number 2 bulkheads. Now the  $\frac{3}{32}$ " x  $\frac{1}{4}$ " planking is put on. If the strips are tapered at the back they will be easier to apply. Be sure to cement the strips together and to each bulkhead. The cowling can

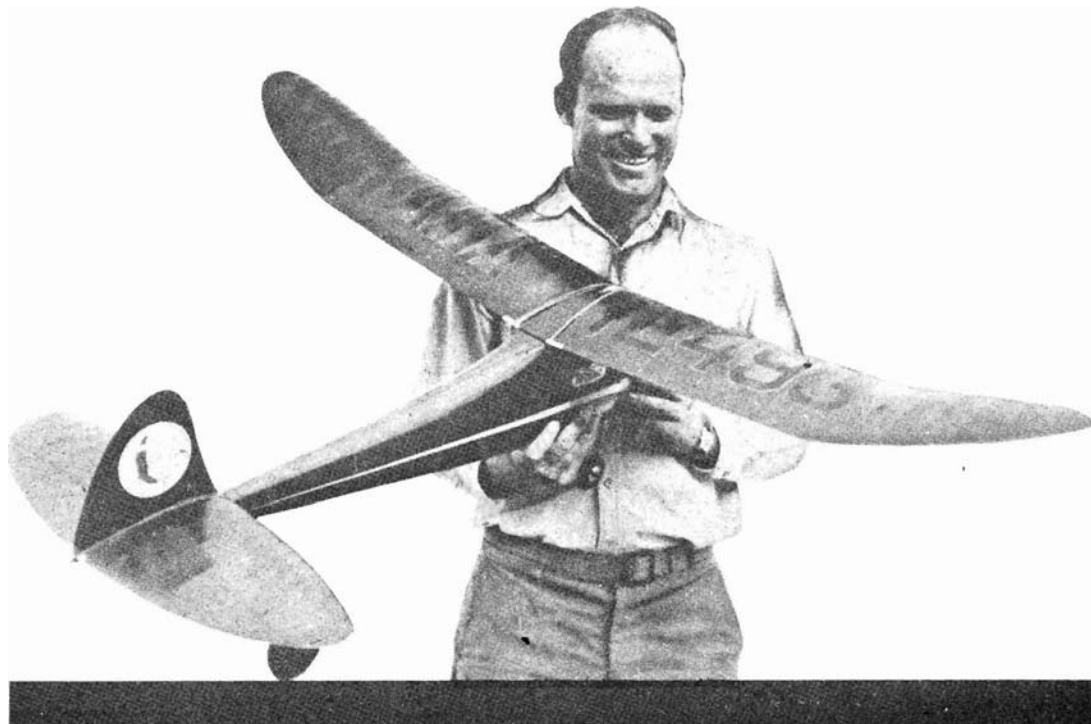
be made right along with the rest of the fuselage by pinning the bottom of the cowl ring in line with the rest of the fuselage and running the planking to form the cowl. The cowl can be cut off flush with number 1 bulkhead. Let the bottom half dry thoroughly before removing.

After the lower half of the fuselage has been removed from the board the timer and landing gear and the landing gear release are put in place. This can best be done by assembling the landing gear first and then putting into the plane from the top. Have everything fastened to the pivot block before putting into the plane. The 3" support wire and release pin block should be put in place after the pivot block. The planking is cut to permit the placing of the landing blocks. Be sure to have all reinforcing sticks in place.

The locking pin release is made from sheet brass or dural. Cut parts as shown on the drawing. The release is assembled on a piece of  $\frac{3}{32}$ " piano wire. Solder a washer both top and bottom of the release to hold pieces in their proper position. A small block is drilled to hold the  $\frac{3}{32}$ " piano wire pivot. Cement wire into the block and then cement block in fuselage. The wire to the locking pin should have a guide at bulkhead number 3. To the timer, solder two hook-up wires that are long enough to reach to the front of the fuselage. Before starting the top of the body be sure that the landing gear will work and work well. Make sure that all parts are cemented securely because repairs and adjustments are difficult to make later.

To make the top of the fuselage simply cement the top of the bulkheads in place with small pieces of  $\frac{1}{16}$ " sheet to hold them. Cement wing platform to bulkheads #3, #4, #5. Add top longeron and all wing hooks. Finish planking the top of the fuselage. Sand the body smooth and give one coat of dope.

Mark the shape of the firewall (after cutting off cowling) on a sheet of  $\frac{1}{16}$ " plywood. Cut out center the same as on bulkhead



# GLORY-BEE

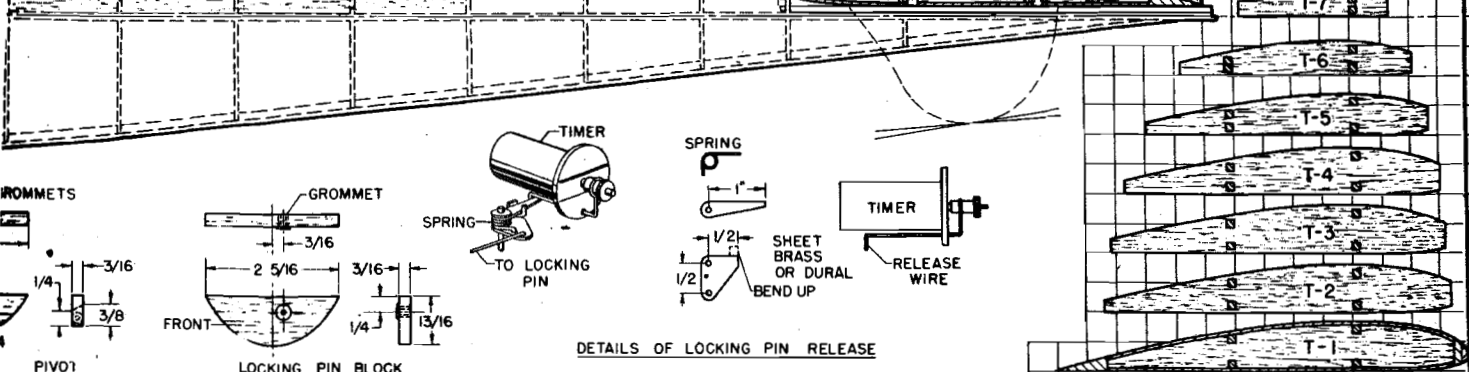
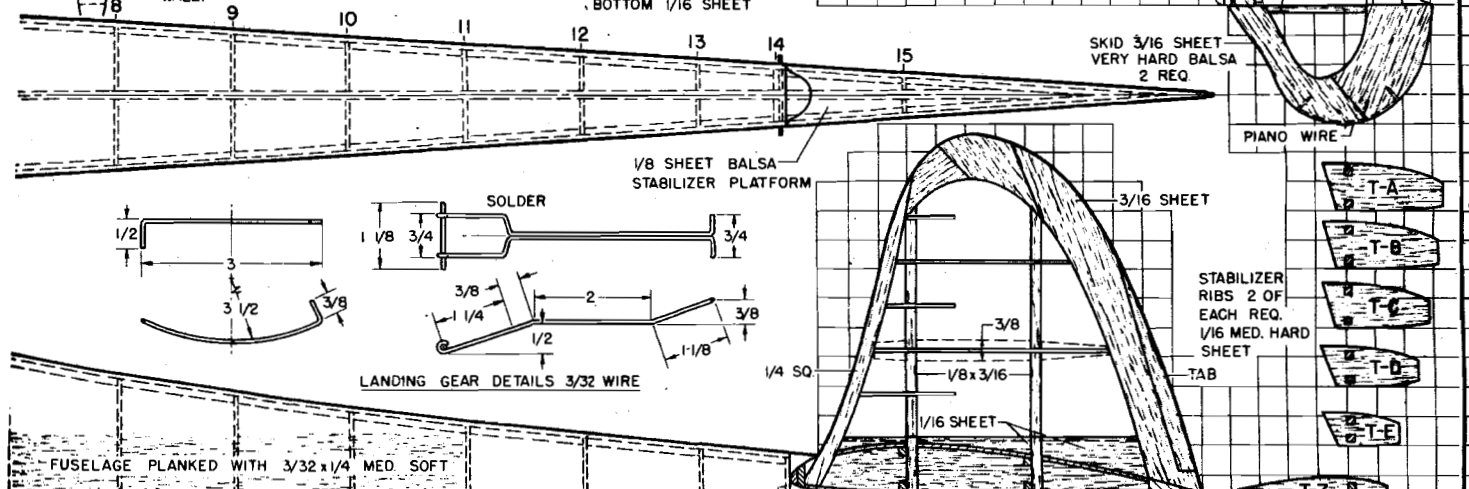
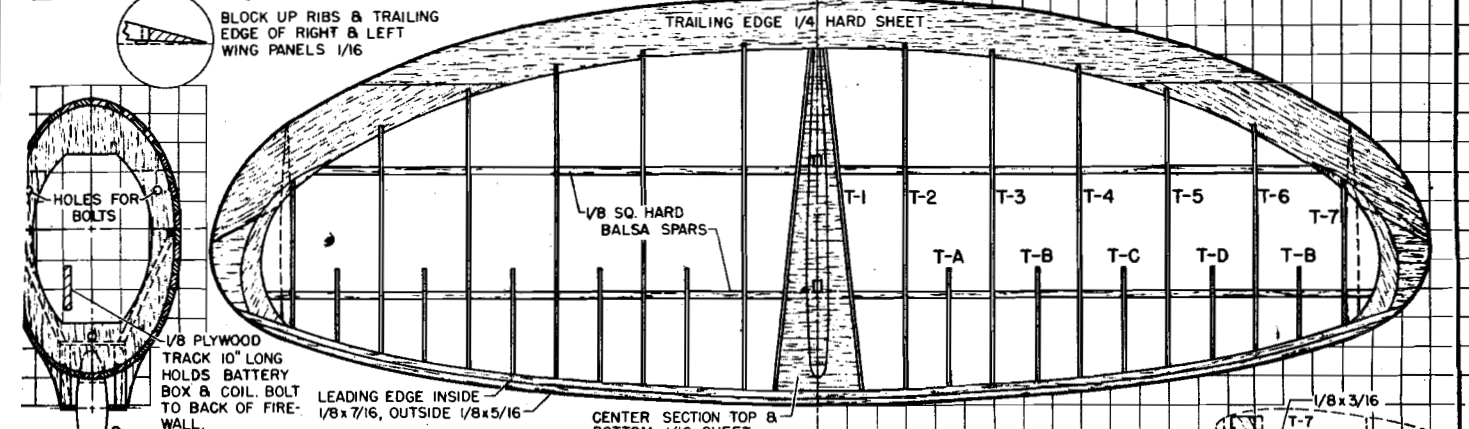
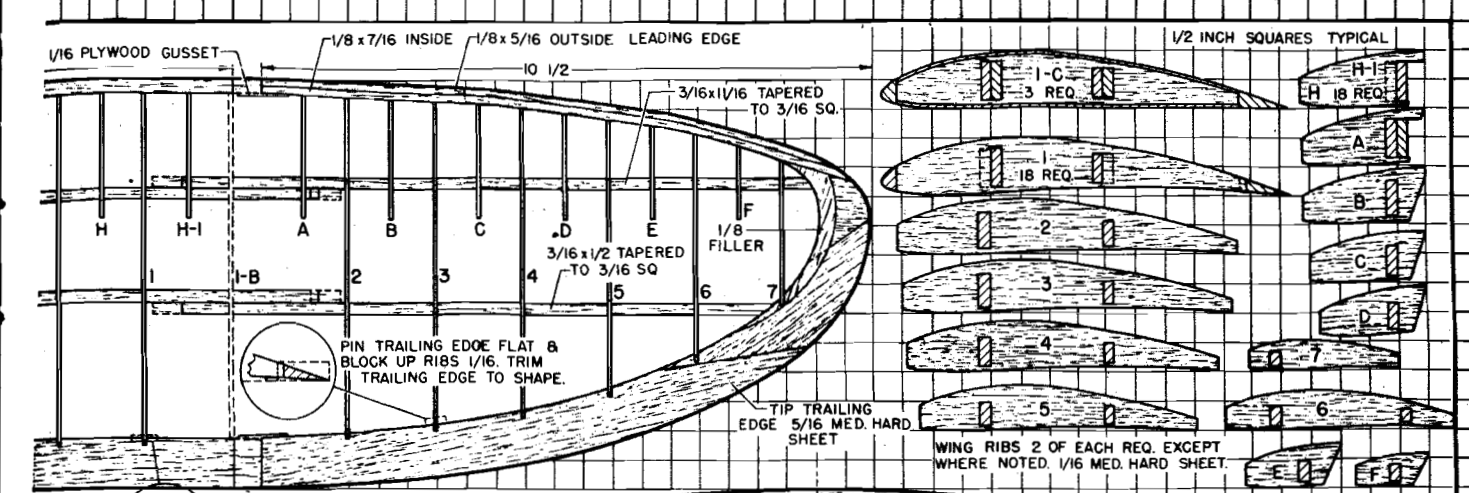
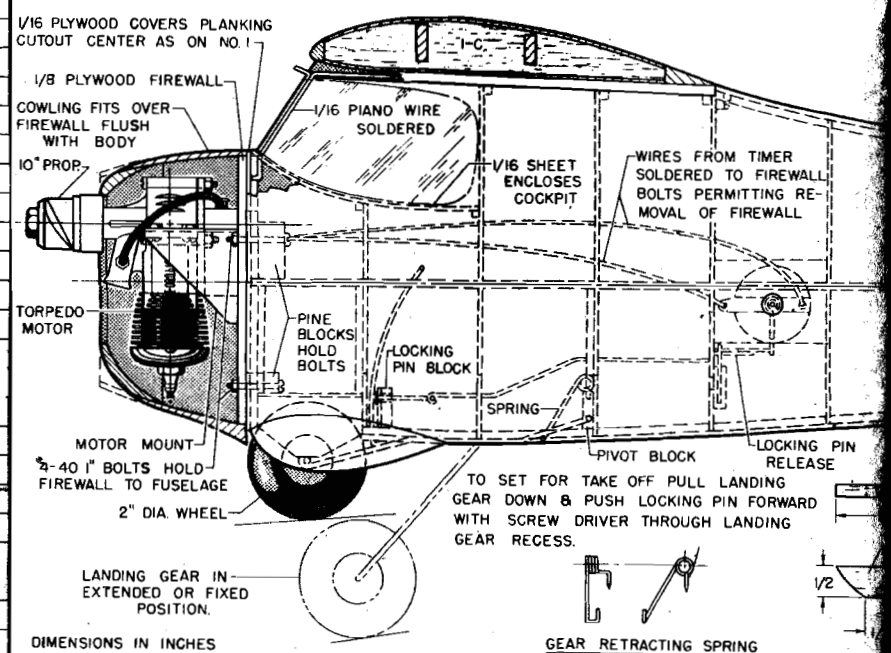
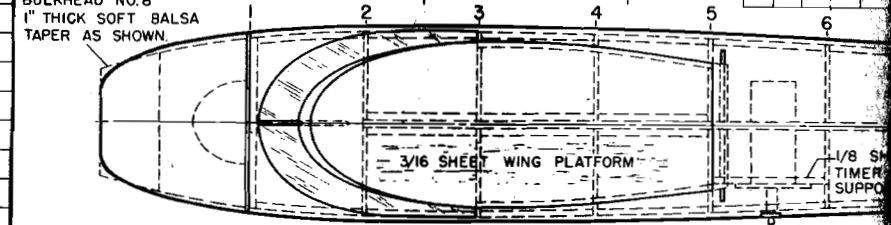
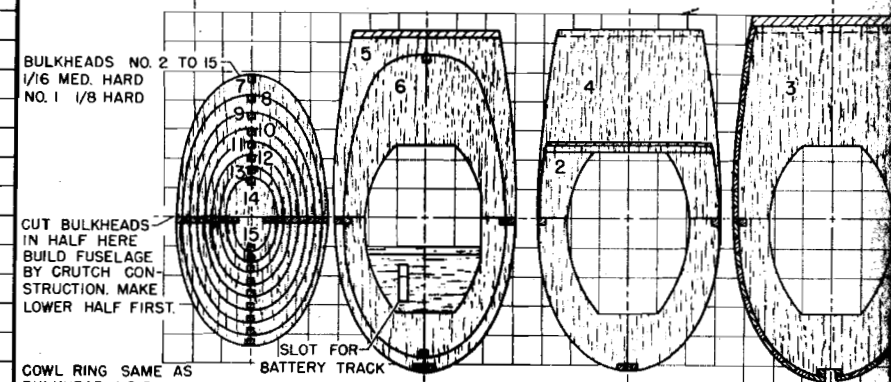
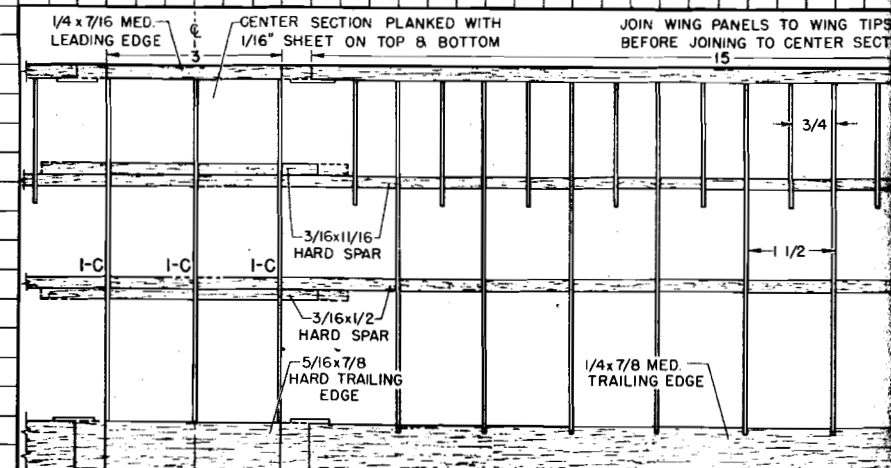
#1, then cut out on the marked shape and cement to the front of the fuselage. The firewall is the same shape as number 1. Cut from 1/8" plywood. Now mark holes for mounting firewall to fuselage and drill holes for 4-40 bolts. Hold in place on front of fuselage and mark bottom hole only. Drill bottom hole. Insert a 4-40 bolt through bottom hole of firewall and in the bottom hole in the fuselage. Holding the firewall in place and using the two top holes as guides for the drill, drill the two remaining holes in the front of the fuselage. This will insure true alignment for the mounting bolts. Now shape a block to fit inside of the fuselage behind #1 bulkhead to hold the mounting bolts in place. Hold them in place and drill using the holes in the fuselage as guides. Solder one wire from the timer to each of the two top mounting bolts. Fit bolts into blocks and cement to fuselage.

When wiring the engine, run one side of the batteries to the left top mounting bolt, using a washer as a contact to the bolt. From the other bolt the wire goes to one side of the coil. The movable point is connected to the other side of the coil. The other side of the batteries is grounded to the motor. Ground the condenser and hook loose end to the movable point on the motor. Make sure all connections are soldered well. Booster connections are the right-hand mounting bolt and the motor.

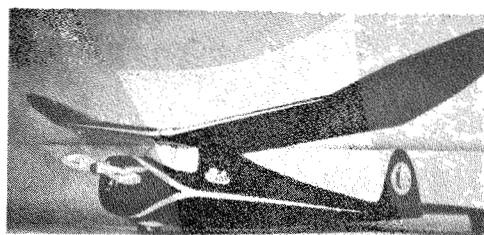
Finish fuselage by adding fairing around wheel well and covering the inside of the wheel well with 1/16" sheet to keep out dirt. Put on the windshield. Dope and sand fuselage to the desired finish. A good wood filler will help to make a beautiful model that will hold its own in any appearance event. A smooth finish will also give the model better performance.

There is very little that is unusual about the construction of the wing, stabilizer, and rudder and the builder should have no trouble with them. Select good wood for the spars and trailing edges and use medium hard ribs and you will find that your flying surfaces will have little tendency to warp. Be sure to use plenty of cement in the spar joints.

One word about the wing tips. You will notice that the trailing edges are pinned flat and the ribs are blocked up 1/16". When tips are removed from the board the trailing edges are trimmed up to the ribs with a straight taper from the outside edge.



DESIGNED BY VERNON W. OLDERSHAW TRC'G BY LEE SCOTT





● Clean lines of the Swift are accurately shown in this view of the model.

# THE GLOBE SWIFT

by J. NOONAN

THIS FLYING SCALE MODEL OF THE GLOBE SWIFT  
IS A FAITHFUL COPY OF ITS PROTOTYPE

**T**HIS postwar de luxe airplane, offered by the Globe Aircraft Corporation of Ft. Worth, Texas, includes many new features not found in conventional light aircraft. Some of these are the luxurious cabin and instrument panel with dual controls and side-by-side seating, retracting hydraulic electric landing gear and flaps, **trimming flaps and anti-stall slots.** Construction is all-metal. It is powered with the Continental 85-hp motor and includes a starter and generator as standard equipment. Skis or floats may be used, making it adaptable to any climate or locality.

Due to clean design, its maximum speed is 140 mph at sea level. Cruising speed is 125 mph, landing speed with flaps, 42 mph, without flaps, 47 mph. Rate of climb is 600 ft. per min.; service ceiling, 14,000 ft.; range, 750 miles.

The Swift has a span of 29 ft. 2 in., an over-all length of 19 ft. 7 in., and a height of 9 ft. 9 in. It is fitted with 6.00 X 6 wheels and hydraulic brakes.

Our model plans were drawn to exact scale from the manufacturer's plans, even to the incidence of the wing and stabilizer. A control-line model or a rubber-powered model may be built, but heavier construction should be used throughout for a controlled model.

Begin construction by laying out full-size pencil drawings to the

desired size. The model shown in the photos has a 30" span.

Lay out two fuselage sides, one on top of the other, where the heavy lines are shown; assemble the sides and fit bulkheads in place. Add stringers and drawing paper cabin outlines. Carve nose blocks roughly to shape and cement in place. Cement a stiff rib, cut from "A" pattern to each side of the fuselage and fit the wing tongues in place. These extend from the center line to the outer edge shown on the top view. Add small blocks of soft balsa to form the fillets and carve to shape. Carefully build up the stabilizer platform. Check for alignment and sand the entire structure smooth. Cover with wet Silkspar, which allows large areas to be covered with one piece and gives smooth fillets. Apply two coats of clear dope to the paper and sand lightly. Finish balsa parts by rubbing cement into the wood and sanding smooth.

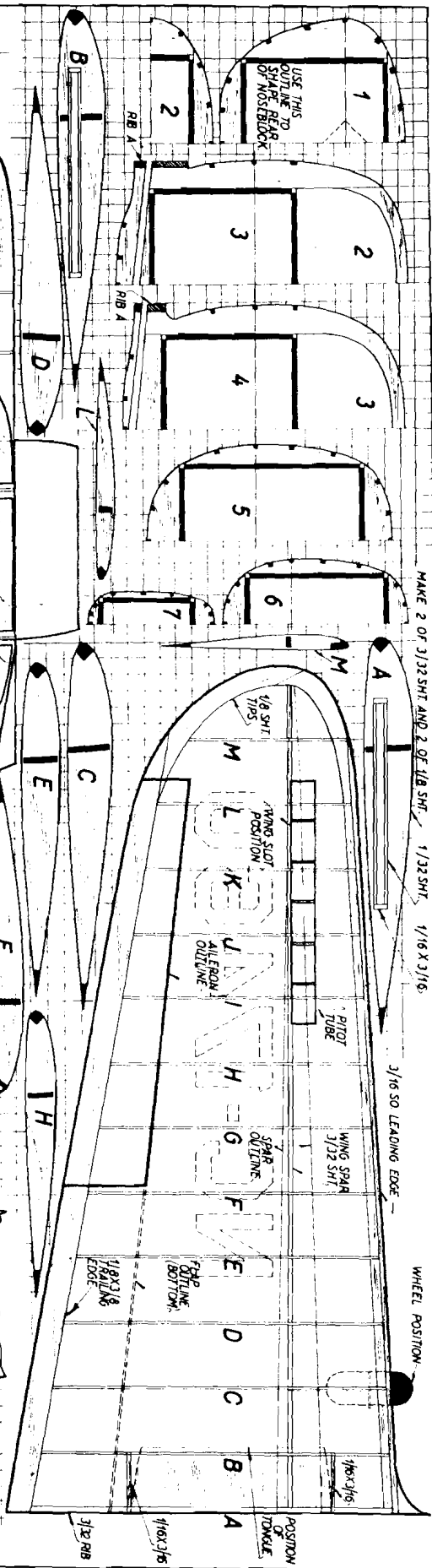
Stabilizer and rudder construction are quite simple; only be careful to prevent warping. Apply one coat of thinned clear dope, and cement the parts to the fuselage. Watch carefully while the cement sets to prevent poor alignment due to uneven shrinking of the cemented joints.

The wing half should be drawn on tracing paper, so that by reversing it you will have a right and left panel exactly alike. Carefully cut ribs from quarter-grained balsa, spars, and



MAKE 2 OF 3/32 SHT AND 2 OF 1/8 SHT, 1/32 SHT, 1/16 X 3/16.

WHEEL POSITION



7/16 SQ X 1/4 BLOCK

DIEDRAL 1-1/2" EACH WING TIP

THESE WINDOWS ARE BLUE OR GREEN CELLULOID, OTHERS CLEAR

RADIO ANTENNA

STRINGS ARE OMITTED CLARITY

1/16 SHT

1/2 DIA TAIL WHEEL

1/16 X 1/8 LEADING EDGE

1/16 SHT TIPS

SCALE PROP

GRILLE INTAKE

WINDOW OUTLINES OF STIFF PAPER

WING TONDOLE

BALSA BLOCK

INTAKE

EXHAUST

040 WIRE

BALSA

FLYING PROP OUTLINE

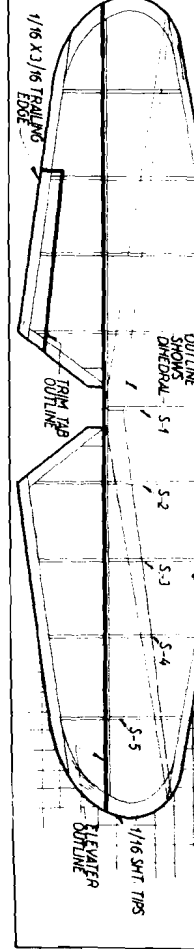
1-1/4 DIA WHEELS

WING POSITION

# THE GLOBE SWIFT

EXACT SCALE FLYING MODEL

1/16 X 3/16





**WHY PAY MORE**  
**WHEN TODAY, TOP PERFORMANCE,**  
**DEPENDABILITY AND SUPREMELY**  
**EASY 'SERVICING COST ONLY...**

**\$14.95**

**TO BILL COBEY**

Dear Bill:  
 Just saw the Cobey-Waite perform.  
 It certainly reflects the same conscientious, diligent engineering that you put into the many Army and Navy power plants that you designed.

**TO GEORGE WAITE**

Dear George:  
 As an old time gas model enthusiast I certainly am delighted to know that you are finally producing one of your designs under your own name. It goes without saying that it will be "tops"!

Class  
**"A" Engine**

**MODEL 1470**

**COBEY-WAITE**

**"The Engine Designed and Built by Aircraft Specialists"**

**TO MOLDED INSULATION CO.**

Gentlemen:  
 It's a pleasure to know that one of the foremost producers of precision aircraft controls is lending its effort toward the production of model aircraft engines. Your share in this program will reflect the best in aircraft precision manufacture.

**A SCREW DRIVER IS THE ONLY TOOL REQUIRED TO SERVICE YOUR COBEY-WAITE**

**SPECIFICATIONS**

**BORE—.562 IN.**

**STROKE—.593 IN.**

**DISPLACEMENT**

**—1470 CU. IN.**

**WEIGHT—3.5 OZ.**

**H. P.—1/10 @ 8500**

**R. P. M.**

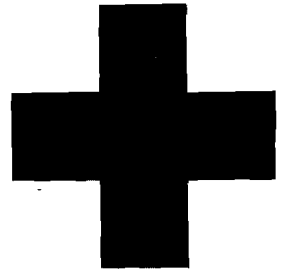
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**Bob Hope says,  
 "Help keep  
 Red Cross  
 ready."**



A Public Service of This Magazine & The Advertising Council

**The Globe Swift**

tips from hard balsa and assemble. When dry, carve and sand leading and trailing edges to shape. The tips should taper from a rounded edge where they join the leading edge to a knife edge at the trailing edge joint. The well to take the tongue joint is built into the wing. Make sure it is a tight fit and that each wing has 1½ inches of dihedral before covering the wing panels. Use wet Silkspan to cover the wings and when dry give two coats of thinned dope.

Build up landing gear struts as shown, attaching the wire to the wing spar and leaving some allowance for springing backwards. Attach tail wheel and cement well to the bottom stringer.

The entire model was given two coats of silver dope and the trim was added by flowing black dope through a ruling pen to form the outlines and filling in with a brush. Note that the rear windows are of dark blue celluloid or plastic. Clear celluloid may be doped on the

inside to give this effect if no colored material is available. An easy method of fitting the windows is as follows: Cut the celluloid to approximate size, leaving a ¼" margin extending on all sides; fit this in place and mark exact outline with a wax pencil. Cut to shape and rub off the pencil marks with a cloth, then cement lightly in place.

The choice of a propeller is optional, but both scale and flying props are shown. Use eight strands of ⅜ rubber for the motor. Our model balanced perfectly, but due to varying weights of material some small weight might be needed in the nose or tail as the case may be.

Select a patch of high grass for test flying, starting with hand glides and working up to powered flight as you gradually become familiar with the model's flight tendencies. Tail surfaces may be warped slightly to trim the model correctly.

**CHAMPIONSHIP COMBINATION!**



**LITE-NING SPARK COILS**

Electrically designed for maximum spark with minimum battery drain... Tough... light... durable.

**\$2.50**

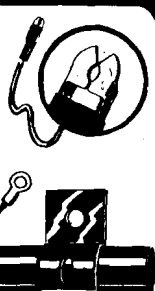
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**LITE-MING HI-TENSION LEADS**

Will fit any terminal. Will not shake loose. 25c.

**LITE-MING CONDENSERS**

Quality material, advanced design for uninterrupted service. 35c



Manufactured by

**UNITED STATES IGNITION COMPANY**

NEWARK 4, N. J.

# MITE

by ALAN ORTOF

**H**ERE is one of the new engines of the postwar period. Developments of all kinds have been promised, but the compression-ignition engine is the first real step to give the young and uninitiated a real chance in our complicated model field.

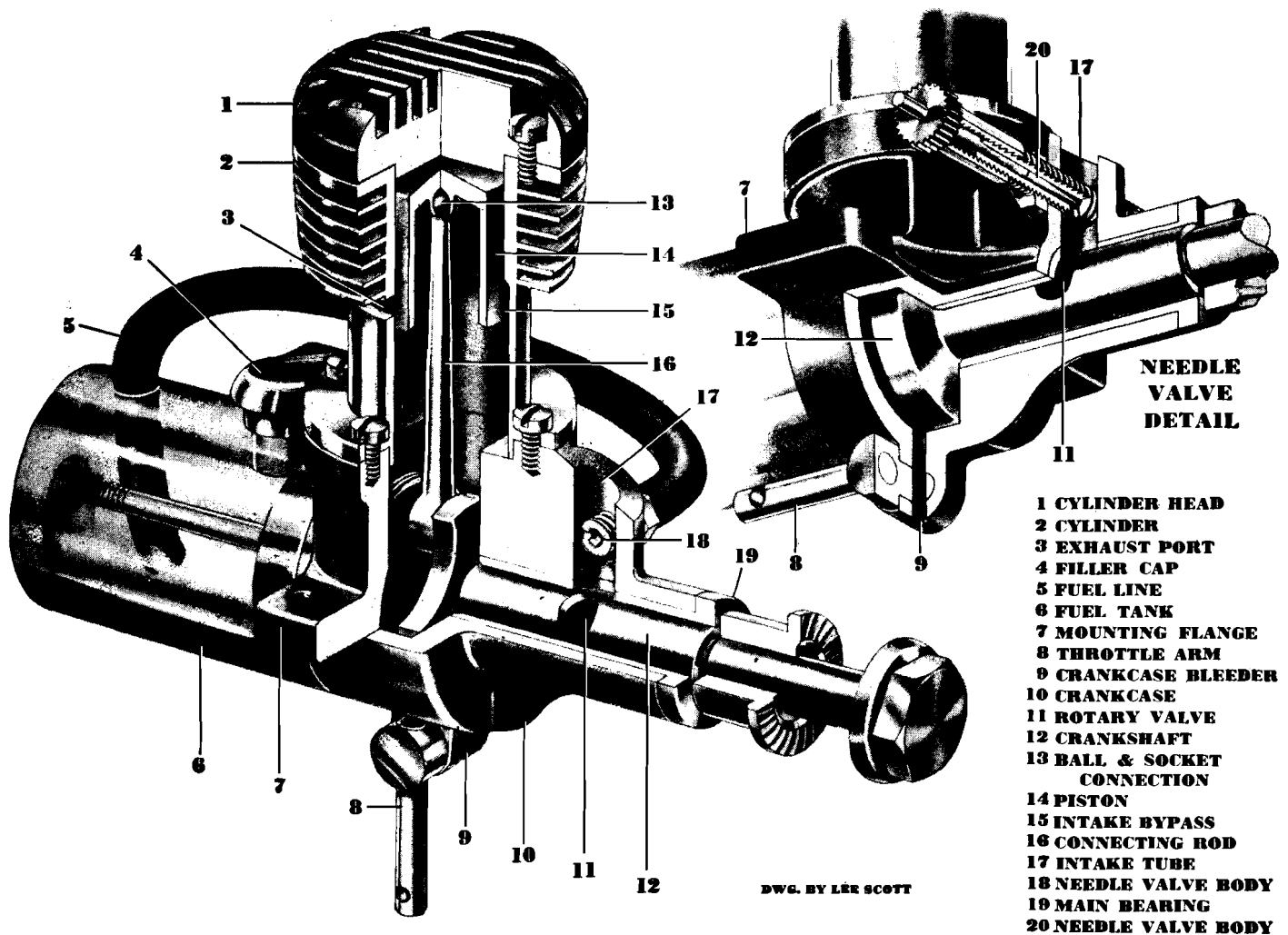
With the elimination of the ignition system, the greatest bugaboo of all engine-powered flying is now almost a thing of the past. As a design feature, the Mite has a fixed compression of  $13\frac{1}{2}$  to 1. Most compression-ignition engines use variable compression heads, varying the compression from 9 to 1 and upward. Other features of

this little powerplant are its light weight,  $2\frac{3}{4}$  ounces including gas tank, short over-all height of  $2\frac{3}{8}$ ", and the use of a combination throttle and engine cut-off. RPMs can be controlled smoothly all the way down to 1,800 rpm. The throttle control is essential for testing free-flight jobs, and the cut-off, to prevent those unnecessary flyaway flights.

The Mite has a bore of .500 and a stroke of .500 with a displacement of .099. Cylinder body is of steel and the intake by-passes are milled into the front and rear of the inner cylinder wall. The cylinder barrel is honed and lapped to size. Exhaust ports are milled into both sides of the cylinder barrel. Crankcase, cylinder head, and back cover plate are die cast of magnesium. The single-piece crankshaft is machined out of alloy steel and is ground and polished. A 10-32 x 1" standard hex machine screw is used for the hub shaft. Main bearing is of special Navy bronze and is honed to size. The hardened and ground piston is of 4130 alloy steel and the connecting rod socket is machined of 24 ST aluminum.

The connecting rod is machined of the same alloy steel as the piston and the crankpin bearing is hardened and polished. Lucite is used for the gas tank and is immune to any of the special base fuels. The metal fuel line actually meters the fuel to the engine. A standard needle valve is employed and is used as a fixed jet. Recommended system is to set the needle valve to the peak running efficiency with a minimum of engine knocking and then throttle the engine to the desired rpm. 17 ST aluminum is used for the throttle arm and throttle; the throttle arm comes extra long and can be shortened to meet the needs of the individual models.

On the strobatac tests, the Mite turned up 6,800 rpm with an 8"-diameter 10"-pitch prop, 7,000 rpm with a 9"-diameter 4"-pitch prop.



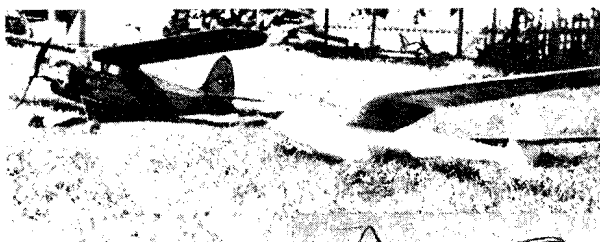
# THE AIRHOPPER

An eight-foot sailplane either towed by a gas model or launched by hand tow.



BY STANLEY ORZECK

PLANS BY PAUL PLECAN



The author's TD Coupe, used as a towplane, and the Airhopper. The gas model is equipped with an automatic towline release.

**E**IGHT feet of soaring grace, the gull-winged Airhopper provides a practically new kind of model flying. Its novel features, particularly a reliable automatic release—workable for either hand or gas-model towing—and its thermal-sniffing ability are points of interest.

The ship has really been flown successfully behind a gas job and, although a plane tow is tricky for beginners, detailed instructions and notes on performance will be found under the flying directions.

The longest flight was just under an hour in duration, covering four miles. A cloudless sky kept the model in sight, and judging from the specklike appearance in the air, the size of the ship indicated an altitude between 1,500 and 2,000 feet was reached. And this was from sixty feet of line. Imagine the consistent soaring flights possible with 500 feet of line!

A word to the wise. Don't shoot the works if those nice fluffy, cumulus clouds are around. The Airhopper will be in them in a jiffy.

## CONSTRUCTION

**Fuselage.** Draw a centerline on a straight wooden plank and cut the bulkheads A to I from  $\frac{1}{16}$ " sheet. The lower parts are cut away on the dotted line shown on the full-size bulkhead layout. Pin the bulkheads to the board at the proper spacing, line them up, then cement the  $\frac{1}{8} \times \frac{1}{4}$ " main longerons in their notches. Cement the  $\frac{1}{8} \times \frac{1}{8}$ " longerons in place as indicated in the side-view drawing. Add the "keel" longeron, along the bottom centerline of the fuselage. The landing-gear braces are shown in detail and are cemented solidly into the fuselage. Any 2" wheel will do, but an airwheel is best. A sponge wheel can be home-made by inserting a length of  $\frac{1}{16}$ " inside-diameter tubing through a sponge ball, adding a  $\frac{1}{4}$ " diameter disk to each side, and compressing the unit until it flattens into a wheel. The tubing will have to be headed over or penced to hold the disks compressed. The fuselage is covered with  $\frac{1}{16}$ " sheet forward of Bulkhead E, and  $\frac{1}{32}$ " sheet to the rear of E. The upper portions of the bulkheads are now added to the half-completed fuselage, and the two  $\frac{1}{8}$ " square longerons installed. A  $\frac{1}{4} \times \frac{1}{8}$ " longeron is cemented along the top centerline of the fuselage. All the longerons should be flush with the outside of the bulkheads. An opening for the wing to slide through must be left in the fuselage sides. When covering the fuselage, the balsa should be cut into small rectangular panels so that it may be applied in much the same manner as used in all-metal trans-por-ts. The cement dries too fast when large areas are covered.

**Tail.** The lower portion of the rudder is built integrally with the fuselage, and the  $\frac{1}{32}$ " sheet covering should fair into the fuselage and the rudder. Full-size outlines are given for nearly every part of the rudder. The diagonal braces inside the rudder are  $\frac{1}{8}$ " square. Cover the rudder and cut the proper curve for mounting the stabilizer. The stabilizer spars should be perfectly straight. The stabilizer leading edge tapers from  $\frac{1}{4} \times \frac{1}{8}$ " to  $\frac{1}{8}$ " square at each tip. After assembling, the leading edge and trailing edge of the stabilizer are covered with  $\frac{1}{32}$ " sheet.



The front of the leading edge of the stabilizer should coincide with the leading edge of the rudder when mounted. Assemble the upper portion of the rudder and, before covering, attach the tab with small brass or copper hinges. The tab is cut from  $\frac{1}{8}$ " sheet and sanded to a triangular cross section.

**Wing.** Full-size ribs are given. Cement the entire outline to a sheet of hard balsa, and cut six No. 1 ribs from  $\frac{1}{16}$ " stock and six No. 1 ribs from  $\frac{1}{8}$ " stock. Now trim the rib outline down to the next smaller size rib, and use it to cut two No. 2 ribs. After two ribs of each size have been cut out, the outline should be trimmed down to the next smaller size. The wing is built in three parts, the center section and two outer panels. Since the wing is of such high-aspect ratio, it will have to be built on an absolutely flat surface to avoid warping. When building the center section, slant the end ribs so that the proper dihedral may be had upon cementing all three panels together. The  $\frac{3}{8} \times \frac{1}{4}$ " upper and lower spars are joined together by cementing a small rectangular piece of  $\frac{1}{16}$ " balsa between the ribs through the span of the wing, so that the spar thus formed resembles an "I" beam. See detail on plan. Note that the  $3\frac{5}{8}$ " dihedral in the center section is measured from the center to the tips, and not from the intersection of the fuselage and wing. The leading edge is covered with  $\frac{1}{32}$ " sheet up to the spar line. Before covering the trailing-edge portion, cement in the  $\frac{1}{8} \times \frac{1}{8}$ " diagonals. The  $\frac{1}{32}$ " sheet covering on the trailing edge is  $1\frac{5}{8}$ " wide. In making the outer panels, it will be necessary to taper the spars from  $\frac{3}{8} \times \frac{1}{4}$ " at the No. 1 rib to  $\frac{1}{8} \times \frac{1}{8}$ " at the No. 12 rib. The leading-edge covering should extend back to the spar and the trailing-edge covering should taper from a  $1\frac{5}{8}$ " width at the No. 1 rib to a width of  $1\frac{1}{4}$ " at the tip rib. When all these panels are complete they should be pinned together to see if the end ribs of the center section have been

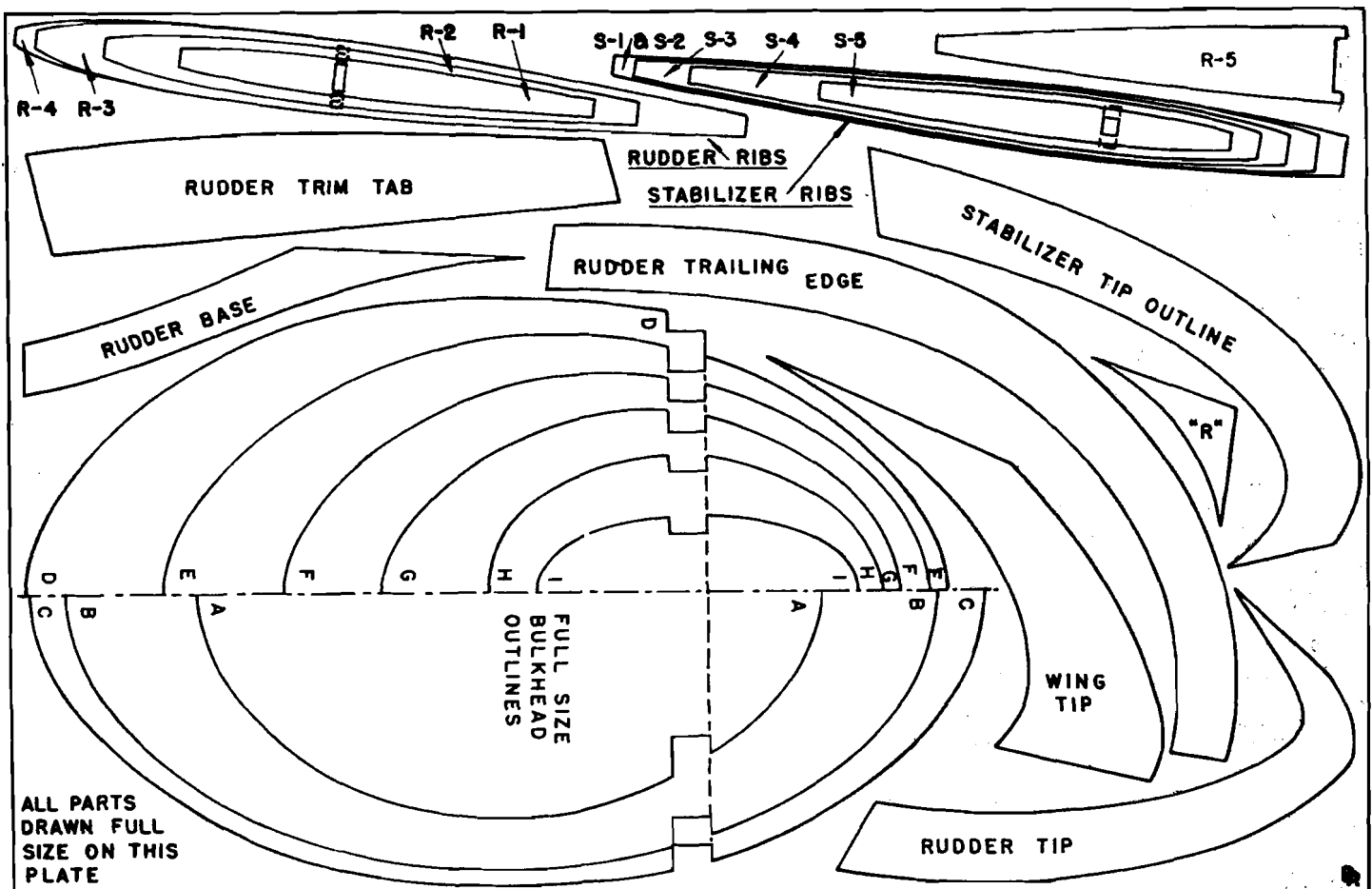
slanted at the proper angle. The outer wing panels should be flat, with no dihedral.

The end ribs of each panel should be primed with one coat of cement, rubbed into the pores of the wood. After the cement has dried, another coat should be added, and the tip sections pinned in place. The wing is covered with bamboo paper, sprayed with water and left to dry. At least two coats of clear dope should be used on the wing to tighten up the covering. The wing can be cemented into the slot in the fuselage, but use the cement sparingly, so that the wing may be cut away if glide tests show that the incidence is too great or too small. The entire model should have two or three coats of clear dope, and if desired, a color scheme of some sort to help visibility. If a fine finish is wanted, a few extra coats of dope should be applied, with light sanding between every coat. Use a fine-grained rubbing compound for a glossy finish.

## FLIGHT

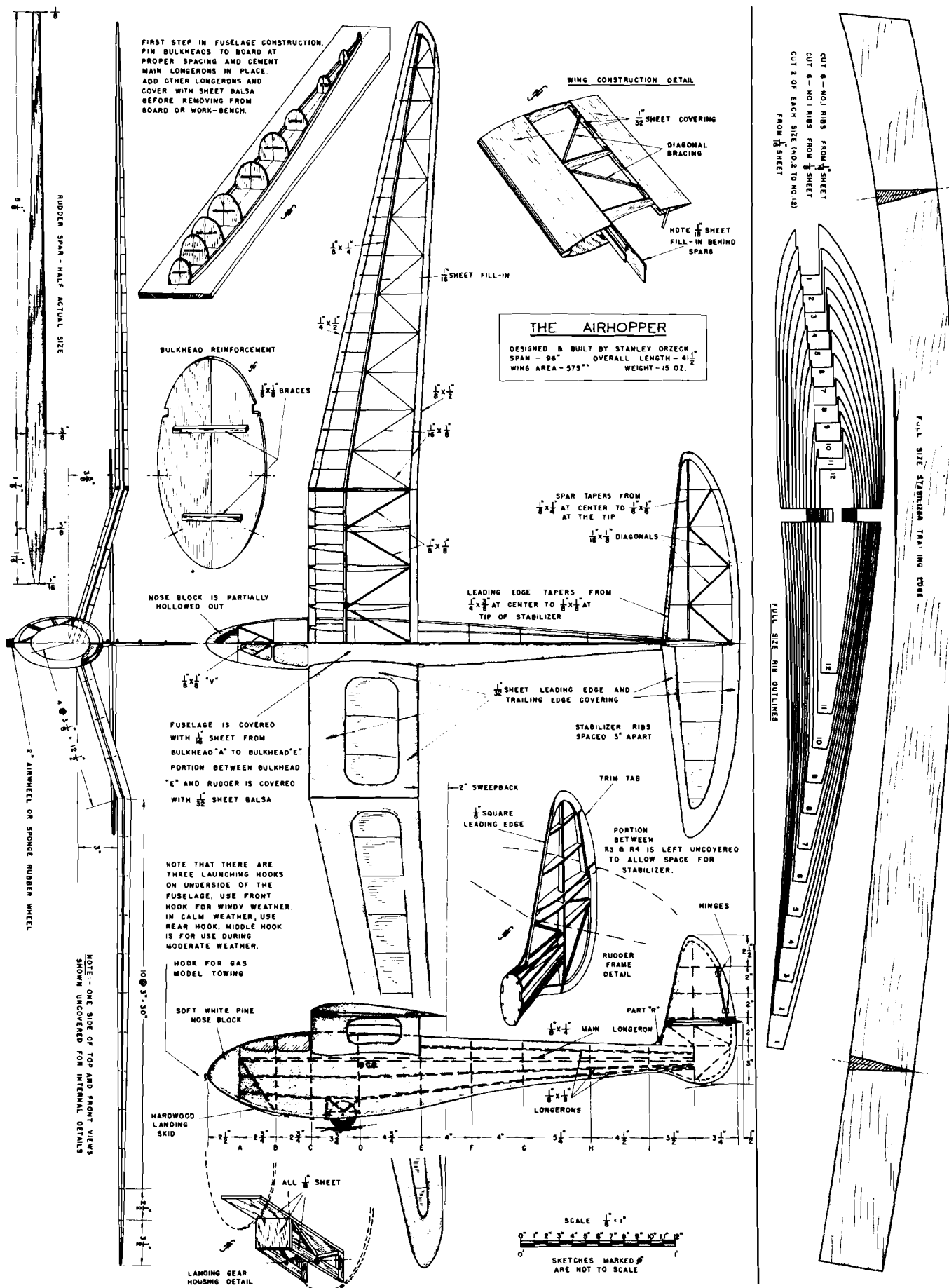
The Airhopper should balance at a point  $\frac{3}{4}$ " behind the wing spar, and all surfaces should be set at 0 degrees incidence. If your model balances correctly, well and good, but if it doesn't, add some clay to the nose or tail to correct

Towline launching from ground is done with cords as long as 500 ft. Release height may be as great as 375 ft



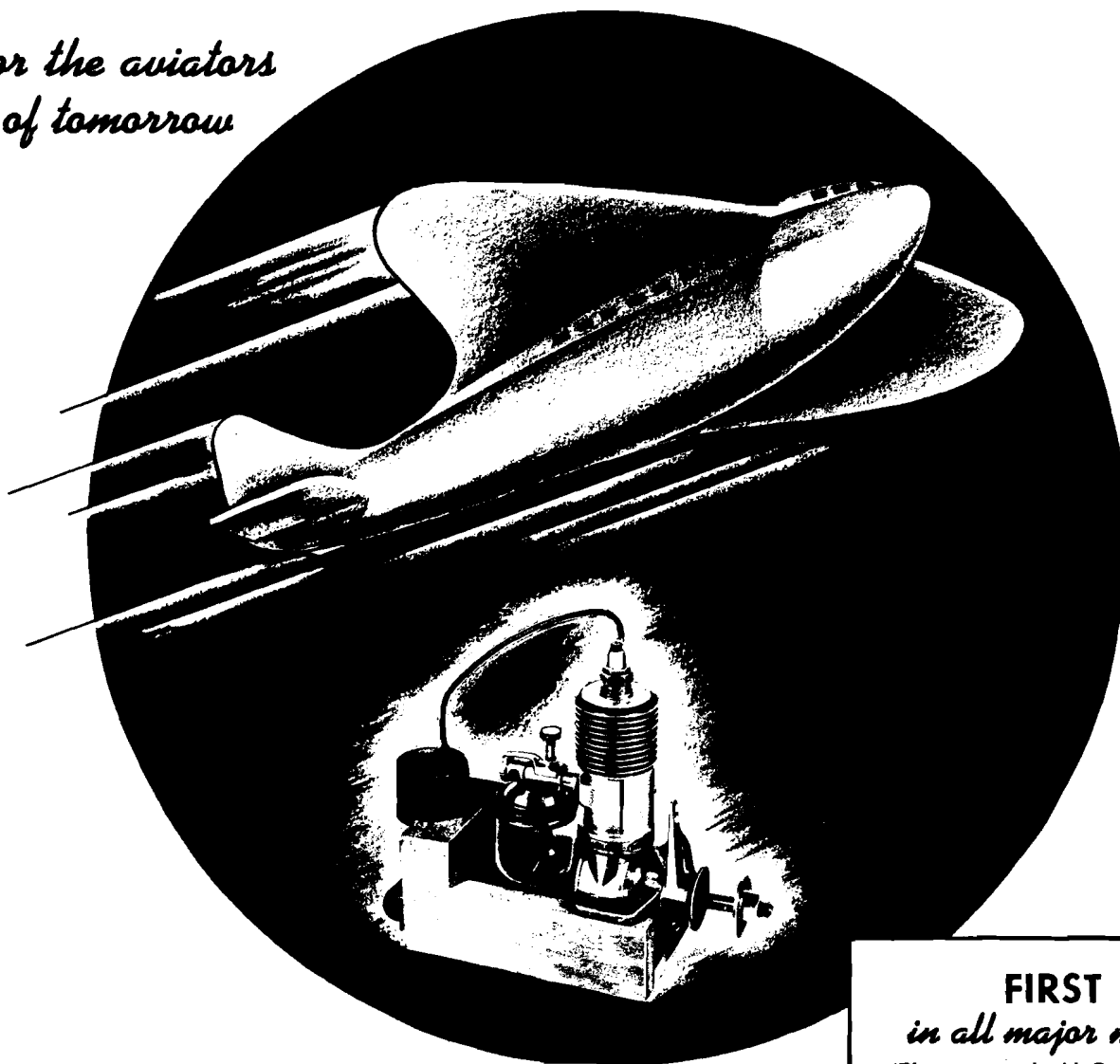


# THE AIRHOPPER



# BROWN JUNIOR MOTORS

*for the aviators  
of tomorrow*



Model 'planes are today's wings for the airmen of tomorrow—for the pilots, engineers, and designers of the future! And wherever model 'planes are built, Brown Junior Motors are the favorite. Over 50,000 are now in use!

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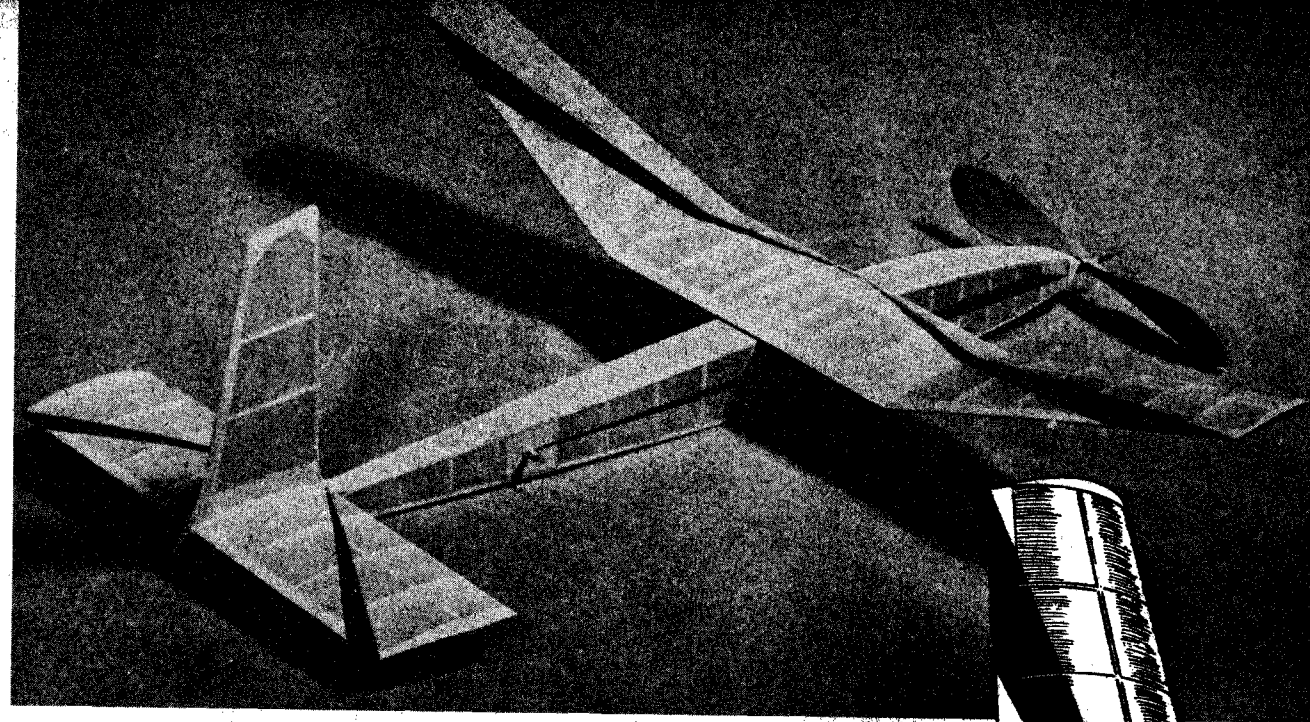
## FIRST *in all major meets*

'Planes powered with Brown Junior Motors won first place in each of 13 major 1939 contests, held in all parts of the U. S. Year after year Junior Motors lead the field.

## *Exclusive Features*

Junior Motors give you assured performance plus refinements and features not to be found in any other motor at any price. Every motor tested under its own power before being shipped. Complete replacement part stocks and expert service available wherever Brown Junior Motors are sold.

Weight,  $6\frac{1}{2}$  ounces  
Displacement, .6 cu. in.  
Bore  $\frac{3}{4}$ " Stroke 1"



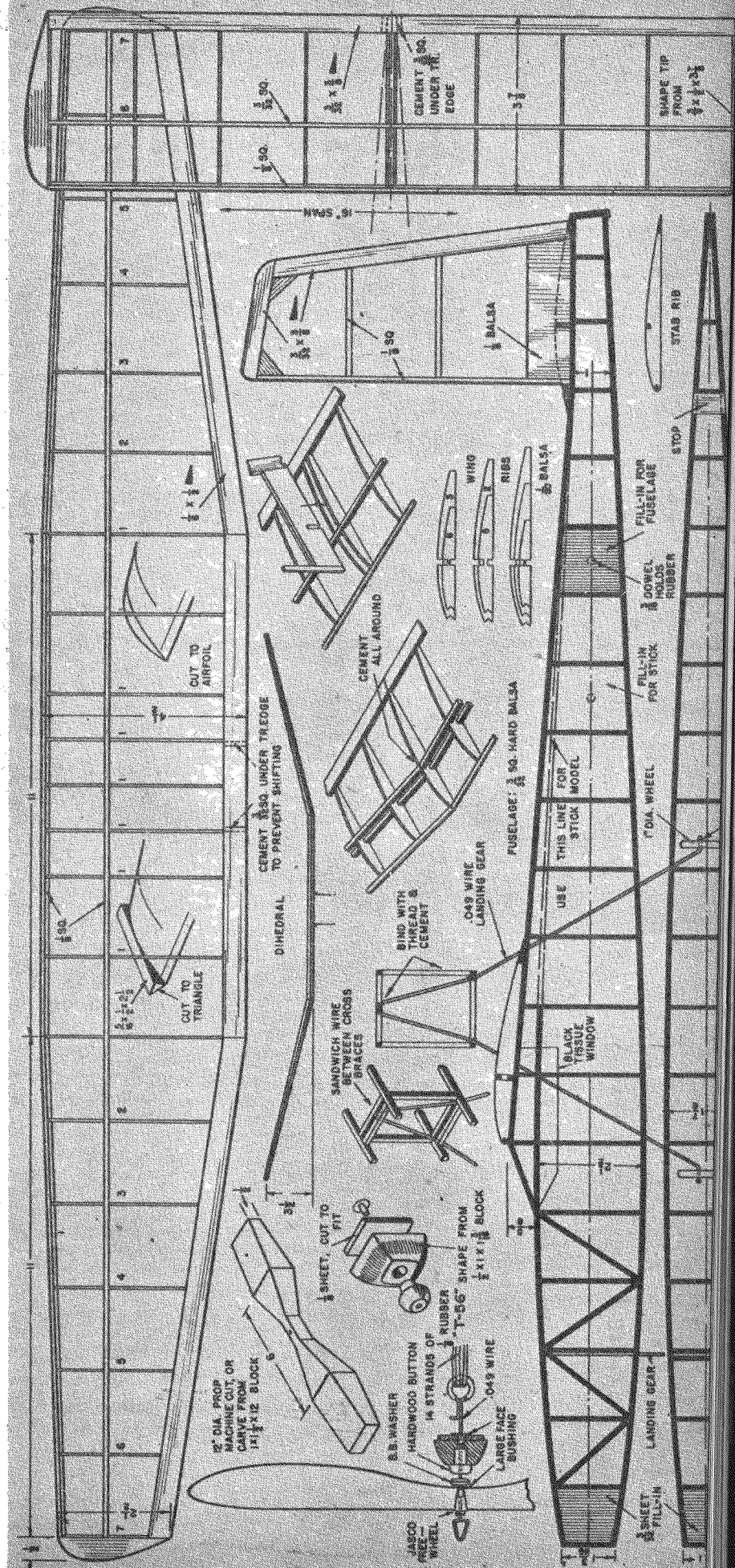
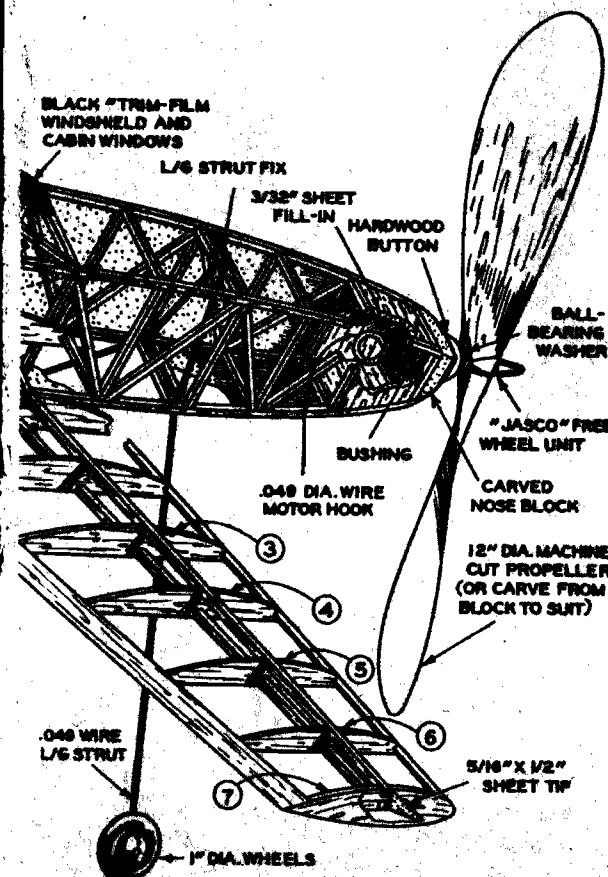
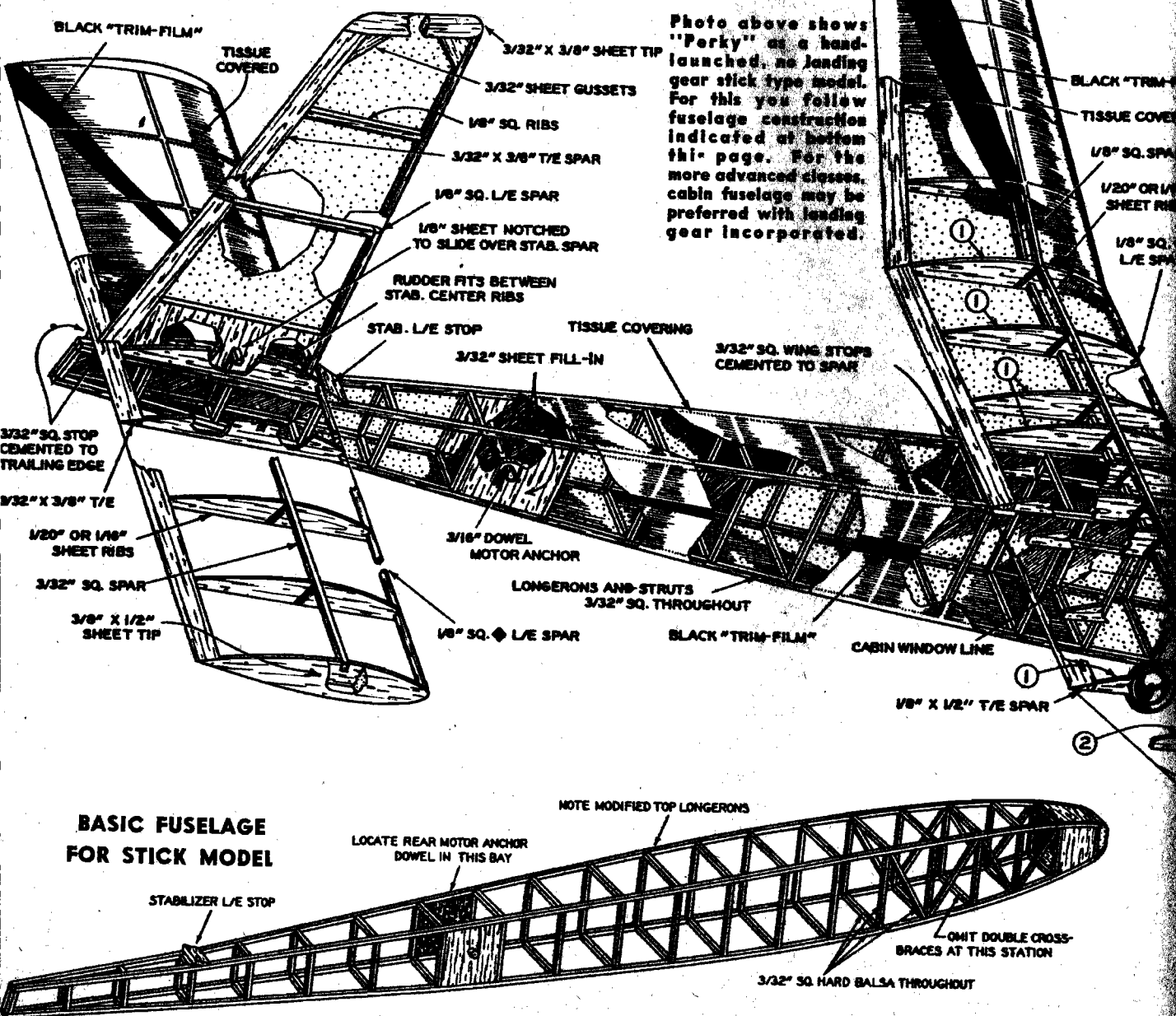
# Perky

Specially designed for group work, this quite husky little rubber-powered trainer may be built as either a cabin craft or "stick type" model

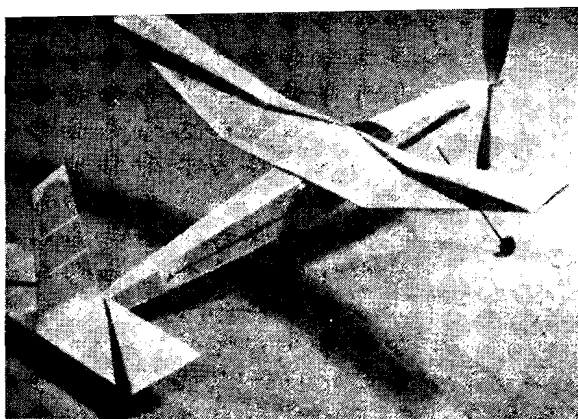
By OLD-TIMER

Fulfilling requests from Air Adventurers clubs, Air Scout groups, schools and recreation centers, AIR TRAILS has prepared "Perky"—the rubber-powered trainer which will get the novice air model fan off to a good start on his or her aviation career.

To every would-be modeler let us state most emphatically that it's far wiser to begin with a rubber model than to rush into gas-engine-powered operations. You'll be a better modeler for every rubber-powered plane you build. And don't let anyone tell you that such craft are "too easy"! You must learn to cope with strong bursts







Here's the cabin and landing gear version. Although design is conventional and simple, it's a perky little flyer. 14 strands (7 loops) of T-56 rubber are used as motive power.

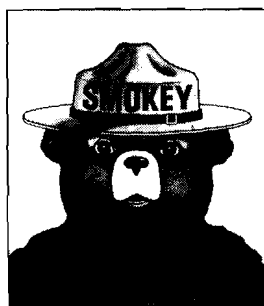
of power in the initial flight stages and handle correctly the rapid falling off of power which occurs when the motor unwinds.

The fuselage sides are made of 3/32" square balsa. Build two sides one atop the other, using pins along-side the longerons to keep them in place. Do not pierce the longerons with the pins, for this will weaken them. The nose section is filled in with 3/32" sheet balsa—also the section which will hold the dowel. Note that the stick model dowel is located forward of the cabin model dowel. The stick model does not have a landing gear to help balance the model, therefore the rubber length must be shortened to hold the center of gravity position in approximately the same place.

When the fuselage sides are dry remove them from the plan. Leaving the rear section cemented together, separate the forward part and add the cross pieces starting from the front. Add the fill-in at the nose and double the cross pieces at the landing gear position on the cabin model. The gear is bent into shape over the plans and then cemented into position. The nose block is now carved to shape.

Use the fuselage as a guide and carve the plug from the fuselage to the nosebutton. Add the 1/8" sheet key to the back. This should fit the nose of the fuselage tightly. If a machine-cut prop is used, sand it smooth and insert the shaft and freewheeler and then the winding hook at the front as shown. The wheels are held in place by a small drop of solder on the axle or by a Sullivan Nylon wheel retainer. Sand the entire fuselage with sandpaper block. Make sure every joint is securely cemented, for while sanding the surfaces some may have been removed. Give the fuselage a coat of dope and set aside to dry.

The wing is made next. Start by cutting the required ribs. Lay the leading and trailing edge and bottom spar directly over the plan. Then cement the ribs in place. When dry raise the tips to the dihedral angle shown with blocks while the center section is (Continued on page 59)



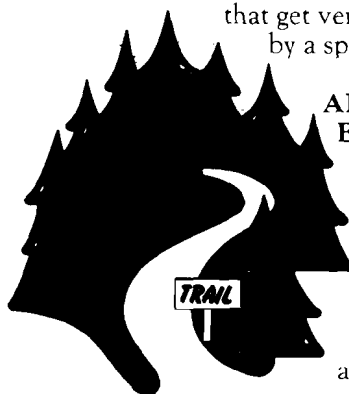
## A FAULTY SPARK ARRESTER CAN START A FOREST FIRE.

by Smokey Bear

Today everyone knows that the internal combustion engine is responsible for a great deal of the smog in our country. But not everyone knows that sparks from engines in all kinds of vehicles are also responsible for a great many forest fires. And, as more campers and vacationers head for the forest every year, the number of spark-caused forest fires continues to grow.

### SOLID ENGINE POLLUTANTS MEAN TROUBLE.

Every engine produces some sort of exhaust. And in this exhaust are tiny, solid particles that get very hot. If these particles are not trapped by a spark arrester, they can start a fire.



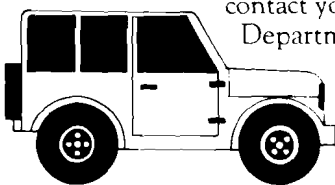
### ALL TYPES OF VEHICLES AND EQUIPMENT NEED SPARK ARRESTERS.

Agricultural equipment, construction equipment, locomotives, motorcycles, cross-country vehicles, and even chain saws require spark arresters if you use them in or near brush or forest areas. So always be sure you have the correct spark arrester for your vehicle.

### BE SURE YOU HAVE THE PROPER SPARK ARRESTER.

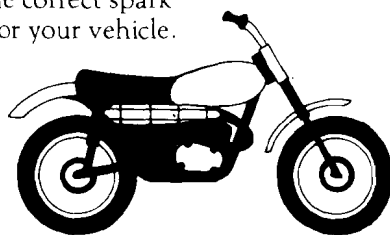
If you're not sure what kind of spark arrester is correct for your vehicle, ask someone who knows. Check with the company that sold you your vehicle.

If they can't give you the information you need, contact your local office of the United States Department of Agriculture, U.S. Forest Service.



### BE SURE YOUR SPARK ARRESTER IS WORKING CORRECTLY.

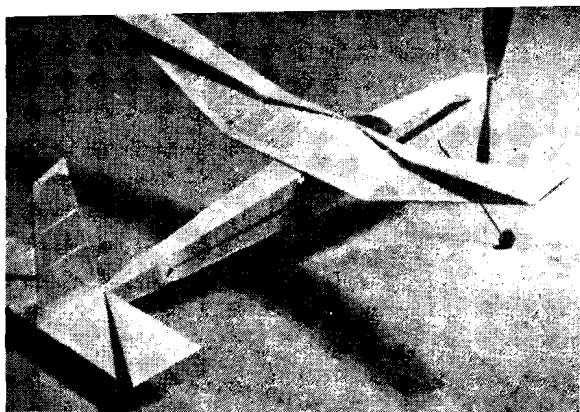
Always check your spark arrester before heading into a brush or forest area. If you're not sure about the condition of your spark arrester, take your vehicle to someone who knows what kind of trouble to look for. It's always better to be safe, than sorry.



### REMEMBER, ONLY YOU CAN PREVENT FOREST FIRES.

Using a safe spark arrester is one way to help prevent spark-caused forest fires. But observing safe operating procedures and carefully maintaining engines is also important. So remember, whenever you travel into the forest, be extra careful. So the forest will still be there on your next visit.





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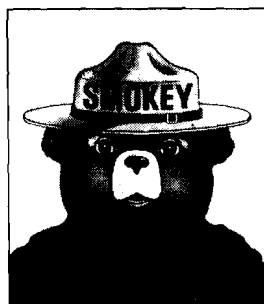
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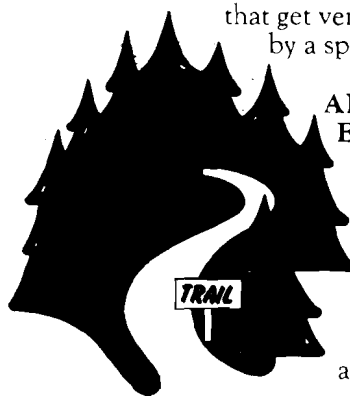
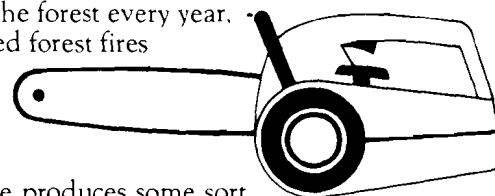
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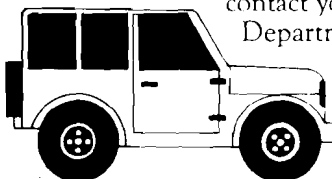
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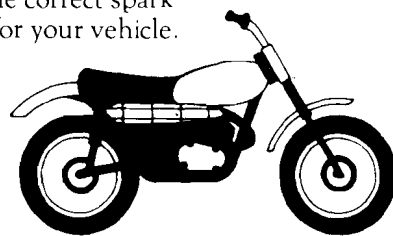
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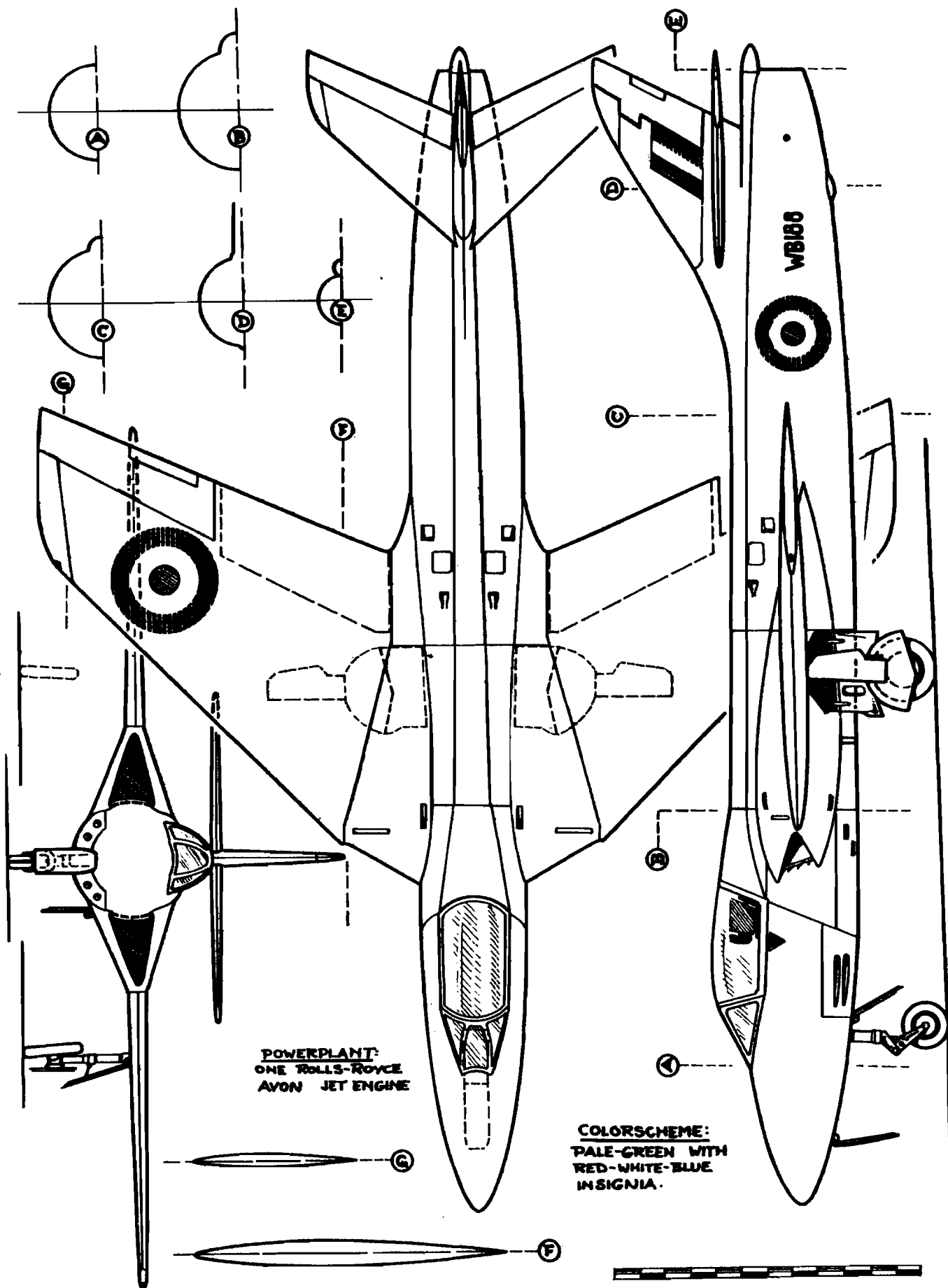
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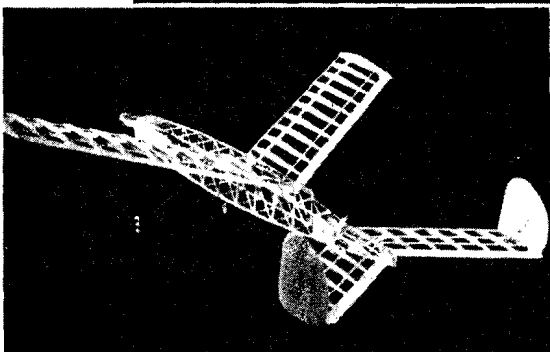
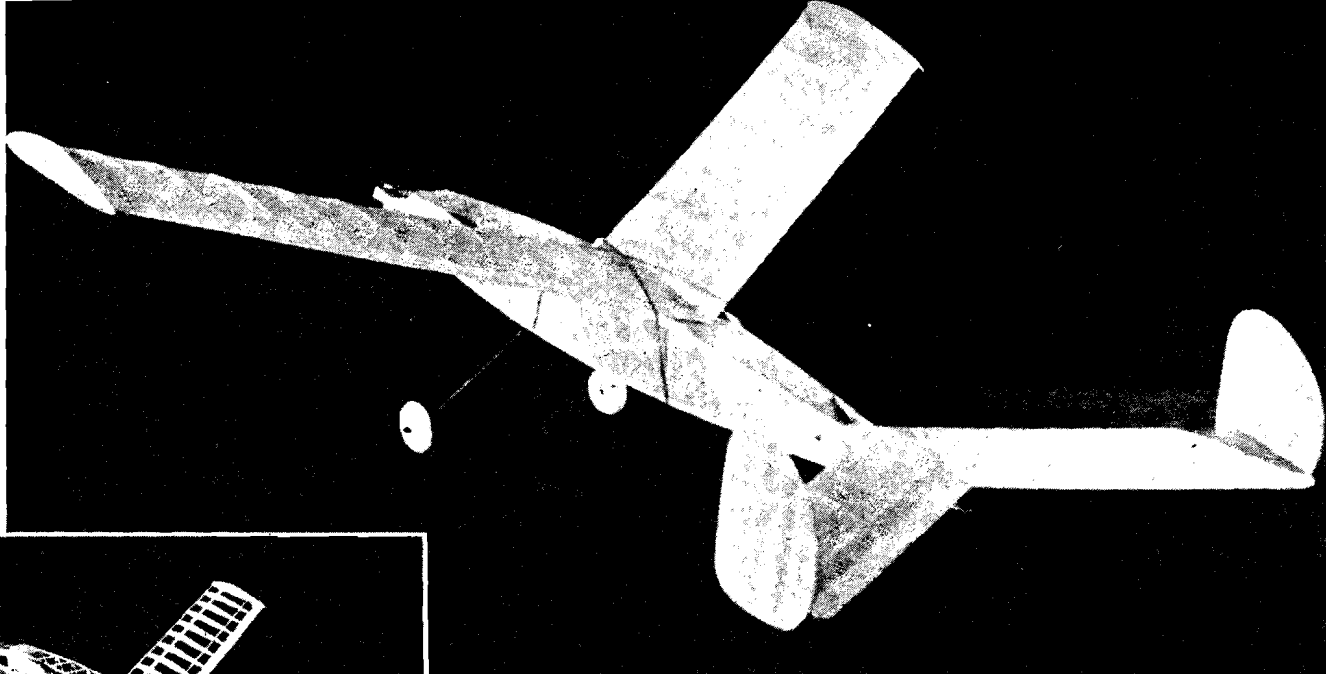
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# Hawker Hunter

Scale 3/16" equals 1' By BJORN KARLSTROM



# Nightmare

**No, you're not dreaming. It's an honest-to-goodness T-56 rubber job with a new slant (or two). Performance is unusually good.**

**By AL CASANO**

**T**HE unusual appearance of this ship prompted its name, so henceforth, Nightmare it is.

This design is no accident, but rather the result of long, and sometimes painful, experimenting with different combinations of wings, stabs, props, airfoils, and ideas. The author has been designing and building for twenty years and believes that rubber-powered jobs give more satisfaction, and afford more opportunities to really study model aerodynamics than any other class of models.

Take this job, for instance—the requirements were a crate of unusual appearance, combined with good flight characteristics. We built a thirty-degree swept-forward wing, with equal sweepback in the stabilizer. It was not so good—the stability wasn't there. Larger rudders, smaller rudders, deeper fuselage—they were all tried, but still the stability was only fair. So we tried again, with a twenty-five degree set up—and that was it! A total of three ships were built, and the third, Nightmare, was the ship we wanted. This plane is really easy to build—only one size wing rib, only one size stab rib, sheet rudders, no body formers—it's a cinch!

But talking won't build it, so let's go. First build the two fuselage sides. Pin down the top longeron (you can stick pins through wood without damage if you use the thin steel pins and not the fat ugly brass ones). Place a drop of cement on side of longeron at each point where cross brace meets longeron. Put in cross braces, cutting off at bottom longeron outline. Now put in diagonal braces, cut to length, and then

cement in bottom longeron. Work carefully here.

When first side is thoroughly dry (in about two hours) make the second side, and let dry. It is important that sufficient time be allowed for drying on all parts. Take the two finished sides and place over plan view in a "standing up" position. Cement together at back, put in the two cross-pieces at nose block end, and allow to dry, using steel squares or any fairly square objects to keep the two sides braced upright. Next add all cross-pieces and landing gear, taking sizes from plan. When dry, sand well, and cover with Silkspan. Don't let fuselage hang around uncovered for too long a time—it may warp or twist. Now make nose block per plan, and drill out planked section at rear for dowel, to hold rubber at rear.

The prop may be carved by hand from a solid block, or any machine-cut prop of 12" dia. may be used. Jasco prop-folding hinges will simplify the "tool making" end, and for the boys who don't like to bend shafts for props, that concern

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If September's dog days have got you down and you don't feel up to making full-size plans, save yourself time and trouble by ordering Air Trails Plan #1049.



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## Coming Air Events and Contest Calendar

Contest directors are invited to send listings of meets to Contest Calendar, c/o Air Trails, Box 489, Elizabeth, N. J. Such announcements must be received at least 90 days before contest date.

To secure more information on a contest, write to the individual listed. His or her city and state address is same as location of meet unless otherwise noted. Where different city is listed in address, the state is the same.

Air Trails makes every effort to check listings. It should be noted, however, that contests carried in this Calendar are subject to change without notice.

Sept. 11—Los Angeles, Calif., Los A. Aeromodelers glider meet.  
Sept. 11—Rochester, N. Y., Ray C. Edmunds, 675 South Ave.  
Sept. 11—Trenton, N. J., M. G. Michlik, 237 E. State St.  
Sept. 11—Pittsburgh, Pa., Box 4439, Pittsburgh 5  
Sept. 17-18—St. Louis, Mo., Air Age Exhibit, Lambert Field.  
Sept. 18—Chanute AFB, Ill., Lt. Harry G. Vogler, Jr., Hq. 3489th Mobile Trn. Group.  
Sept. 18—Royal Oak, Mich., J. R. Kates, 604 S. Edison Ave.  
Sept. 18—Pittsburgh, Pa., Box 4439, Pittsburgh 5.  
Sept. 18—Antioch, Calif., control-line meet.  
Sept. 18-20—Spokane, Wash., 13th Annual International Northwest Aviation Council Convention, Box 1143.  
Sept. 24-25—Sullivan, Mo., Airport, dedication ceremonies.  
Sept. 25—Pittsburgh, Pa., Box 4439, Pittsburgh 5.  
Oct. 1-2—Adelanto, Calif., Soaring regatta (7th heat), El Mirage Field.  
Oct. 9—Modesto, Calif., Control-Line Flying Circus.  
Oct. 16—Gilroy, Calif., free-flight meet.  
Oct. 29-30—Adelanto, Calif., Soaring regatta (8th heat), El Mirage Field.  
Oct. 30—Fresno, Calif., free-flight meet.  
Nov. 11-19—Philadelphia, Pa., World Hobby Exposition at Commercial Museum.  
Jan. 13-15, 1950—Miami, Fla., All-American Air Maneuvers.

## Nightmare

has come to the rescue with a ready-made shaft and spring tensioner that is really good—so now you don't have to be a pro to build your rubber-power prop and shaft.

The wing and stab are built by identical procedure. Pin down bottom spar, cement in ribs, put in leading edge, trailing edge and rear spar in that order. But remember—one left and one right panel for the wing and stab. There is 3¼" of dihedral, at each wing tip. Stab has no dihedral.

When dry, sand and cover with Silkspan or regular rubber model tissue. Water-spray all covered parts, let dry, and dope with two coats of clear dope, allowing a half hour between coats for drying. Install wing saddles, and make sheet rudders, while dope is drying on covered parts.

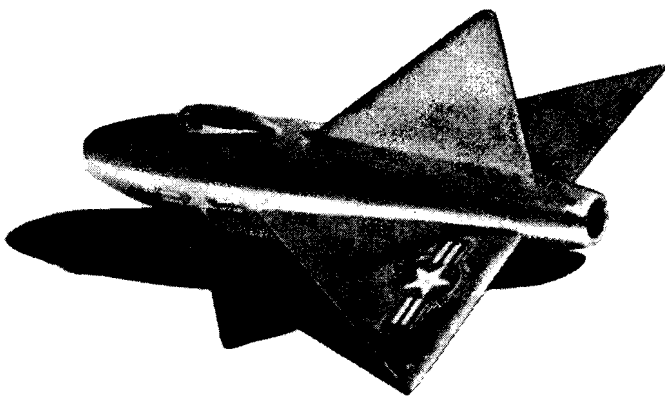
Next cement rudders to stab per plans, and cement stab to fuselage. The wing is held to fuselage by tying on with one strand of ¼" rubber.

Power for Nightmare is twenty strands of ¼" flat T-56, with six inches of slack.

Glide and power run is to the right. Slide wing forward to correct diving tendency, back to overcome stall. Trim tab in left rudder controls turn. These are glide adjustments, and should be made first. For correcting under power, use thrust line at nose block—down thrust to correct stall, right thrust to give more turn.



# XF-92A



Rocket engine powers jet model for some spectacular flights

By LLOYD A. MOSHER

■ The original XF-92A was made as a simple whip-controlled model for a young friend of mine. Somebody suggested putting something in it to leave a smoke trail for a more realistic flight. Turning this thought over in my mind brought forth the idea of using the small Jetex engines—and *voila!*—eighteen models later, we have an aeroplane so realistic in flight that it has to be seen to be believed!

Its convenient size, lack of fuel odor or engine noise makes it an ideal "city" project as it can be flown anywhere without the numerous objections usually prevalent where the buzz of a gas engine can be heard. As it is not subject to hot fuels and is almost impossi-

ble to crash, you can spend all the time you wish on your doping job and know it will stay like that. After flying you can put it right back on your living room table for all to admire.

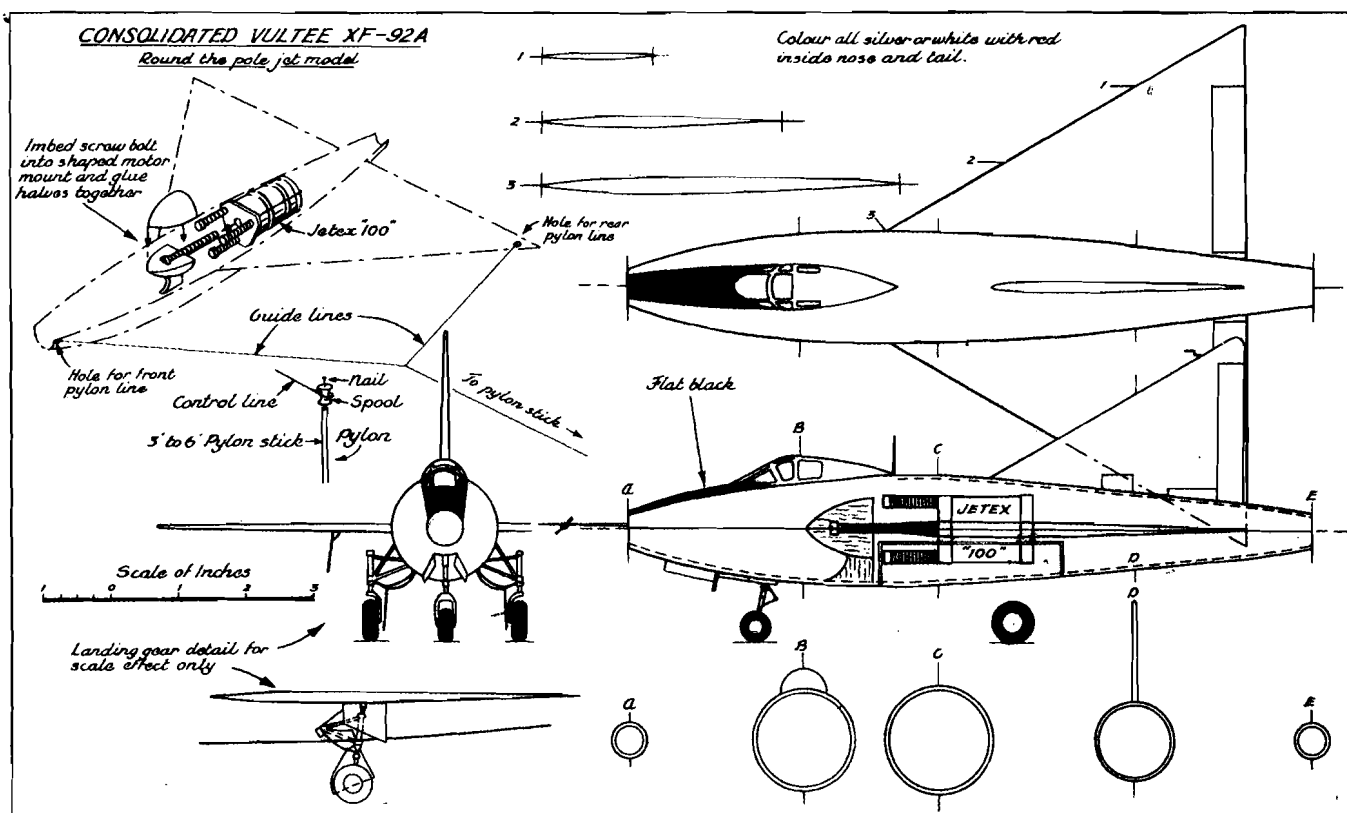
The actual construction is really elementary. The model shown took two hours to build and cost me about a dollar for everything but the dopes. Of course, a Jetex 100 or 200 motor is an additional investment, but you won't fly it out of sight.

Starting with the wings and tail, glue together two pieces of one-quarter-inch by three-inch soft or medium-hard balsa planks in the length desired in order to be able to cut out the triangles economi-

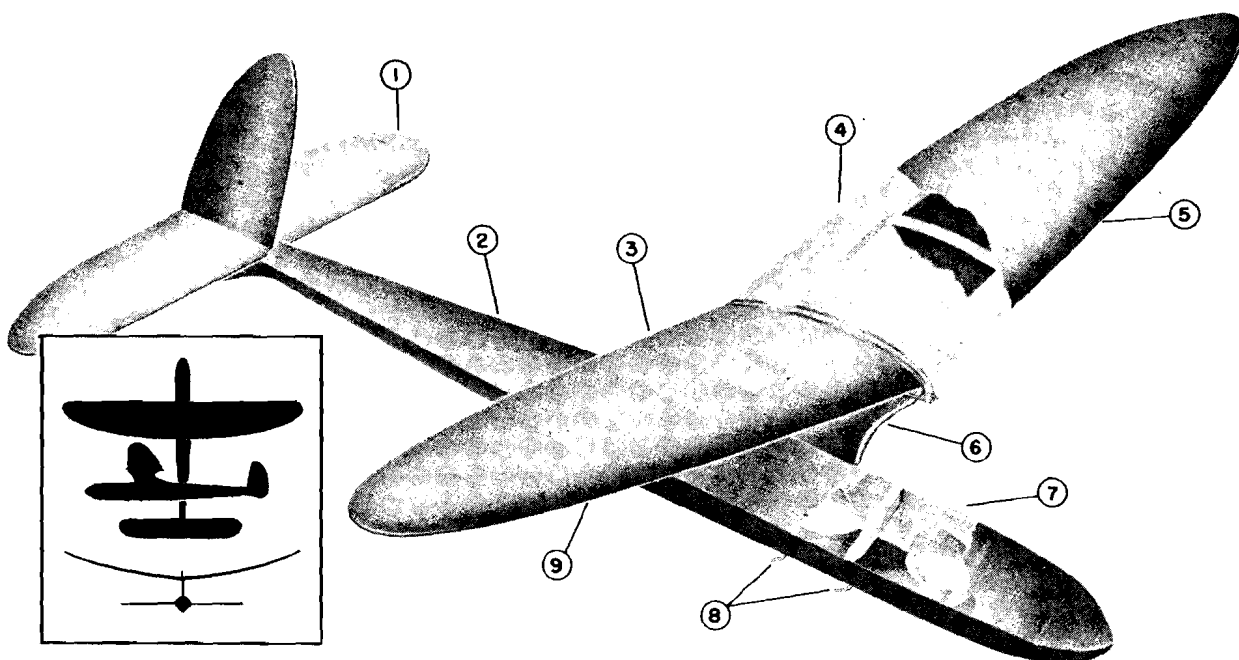
cally. Be sure to have the grain running away from the fuselage. When the glue is thoroughly dry, cut to size and proceed to shape the leading and trailing edges from a high point close to the fuselage. Use a sanding block for this operation in order to keep the knife edge straight. Run a pencil line down the middle of the edges of the blocks first to avoid a wavy leading or trailing edge.

These three units can now be given two coats of clear dope, sanding between coats, and then put aside until the fuselage is finished.

Spot-glue together the two  $\frac{3}{4}$ " x  $1\frac{1}{2}$ " x  $10\frac{1}{2}$ " soft balsa blocks for the body. (Continued on page 78)



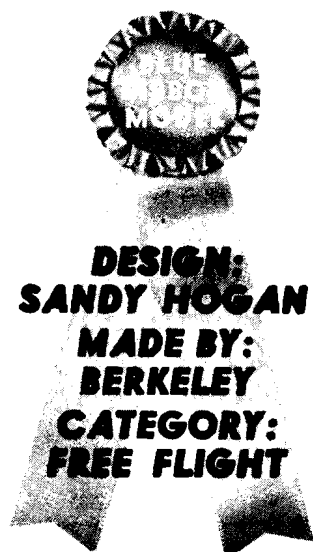
**Prefabbed glider for towline operation features "Ritz-type" wing with elliptical dihedral; two-foot Terror has plenty of performance for its size—provides good beginning for glider fans**



(1) Thirty-square-inch stabilizer; (2) tissue-covered fuselage; (3) wing has 76 sq. inch area, span of 24 inches; (4) one-piece wing

outline, ribs set in easily; (5) elliptical outline; (6) pylon wing mount; (7) "Circlematic" X-keel fuselage; (8) offset tow hooks;

(9) elliptical dihedral. Gerald Ritz of pre-war Chicago Aeronauts club is generally credited with the development of the wing.



■ Our first impression of this new Berkeley kit was one of awe—the box is more than 3½ feet long, and when we opened it there was enough balsa crammed in to stock a hobby shop! Yes, this latest Hogan is a big airplane; it has a wing area of 700 sq. in., which accounts for its alternate name of *Super Hogan 70*. To complete the statistics right here, the ship has a span of 67", weighs around

32 oz., and is designed for Class B-C use, with engines from .29 to .51 cu. in.

As with former Hogan kits, this one is marketed by Berkeley Models, Inc., West Hempstead, N. Y., and the plane is a design of West Coast modeler Denny Davis. The initial Hogan design to gain prominence was the *San De Hogan*, presented as a construction article in *Air Trails*, November 1949. It has been widely duplicated throughout the world.

There are eleven sheets of printed balsa, ranging in thickness from 1/16" to ¼", for such members as ribs, formers, tips and so on. All these parts are neatly die-cut. One item builders are sure to like is the shaped leading edges for wing and stab. Plywood is die-cut, and the landing gear wire is bent.

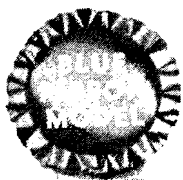
As deserves a king-size kit, the plan seems big enough for a tablecloth. It includes a full-size drawing of wing and stab halves, full-size fuselage drawing, plus many detail sketches.

The *Sandy Hogan* has won so many contest events that we couldn't possibly list them here. Not only is it a success on the Coast, but these ships have collected plenty of hardware at the Nationals, at the Plymouth Internationals, and just about everywhere free flight is flown.

The *Super Hogan 70* is very similar to the *Air Trails* job, differing mainly in some of the construction details. For example, the wing now features "Hoganamic" construction; the ribs are all set diagonally, producing a structure that is extremely rigid and warp-free. Sheet balsa is used at both leading and trailing edges, and together with the three spars and the nose ribs, you get a really rugged structure. The floating wing tab is retained, for Davis considers it essential in a ship of this size. He has had great success with it.

The stab is identical in construction, though without dihedral, while the rudder is built-up and symmetrical, with an adjustable tab at the rear.

The fuselage is made on a crutch and is completely sheeted. A parachute dethermalizer is recommended. The plans give full details for installation of this essential, and for motor mounting, motor cut-off, etc. While a K&B 29 with an Air-O 11" prop is recommended, other powerplant combinations can, of course, be fitted. They may require different degrees of down and side thrust from those specified on the plan, however. This is a well-engineered kit of a ship well known by now to every contest-goer. The new design has now become a "standard."



**DESIGN:  
TOWLINE  
TERROR**

**MADE BY:  
ENTERPRISE  
CATEGORY:  
T-L**

■ A proven towline glider design with the latest prefab ideas is a new kit release from Enterprise Model Aircraft and Supply Co., Inc., 5107 Avenue D, Brooklyn 3, N. Y. Designer Jerry Brofman first flew a glider of this general size and layout some 12 years ago; the little ship has been constantly flown and improved since. One of the intermediate designs set an unofficial

world record of 53 min. O.O.S.

This towliner differs from most other ships of this category to which we are accustomed. In the first place it is small—span is only 24"—and the area is 76 sq. in. The aspect ratio is also relatively low—only 6 to 1—but this rather stubby wing is extremely durable, and the little glider may be safely flown in weather that would be fatal to long slim wings. Another unusual feature is seen in the pylon wing mount; in fact, Jerry's latest looks a lot like a Half-A power job.

The airfoil is very similar to the famed McBride B-7; it has an extremely high lift coefficient, which means that it will produce ample lift at very low flying speed. This section also has a low stalling speed, and the plane will turn very tight circles without dropping off on one wing. The tow speed required is moderate and the glider can easily be pulled to almost directly overhead, utilizing practically all the allotted towline length. In really dead air, the *Terror* is said to average 1½ minutes per 100 feet of line length.

The wing is die-cut from two sheets of 3/32" x 4" balsa, and is of the so-called "Ritz" construction, producing a very thin but efficient structure. Two inches of dihedral are cemented in when the panels are joined. Covering will add 2" more of

curved dihedral, so that the finished wing is elliptical both in outline and dihedral, long recognized as an extremely efficient set-up.

The fuselage is a good example of really modern die-cut construction. There is a single horizontal keel into which is keyed a vertical half-keel on both top and bottom. Viewed from either end this assembly looks like a cross; the four edges of the cross are "tied" together with 1/8" sq. diagonal braces. It is easy to see why the designer refers to this fuselage as "Circlimatic" construction. Die-cut lightening disks are cut in all three keel pieces.

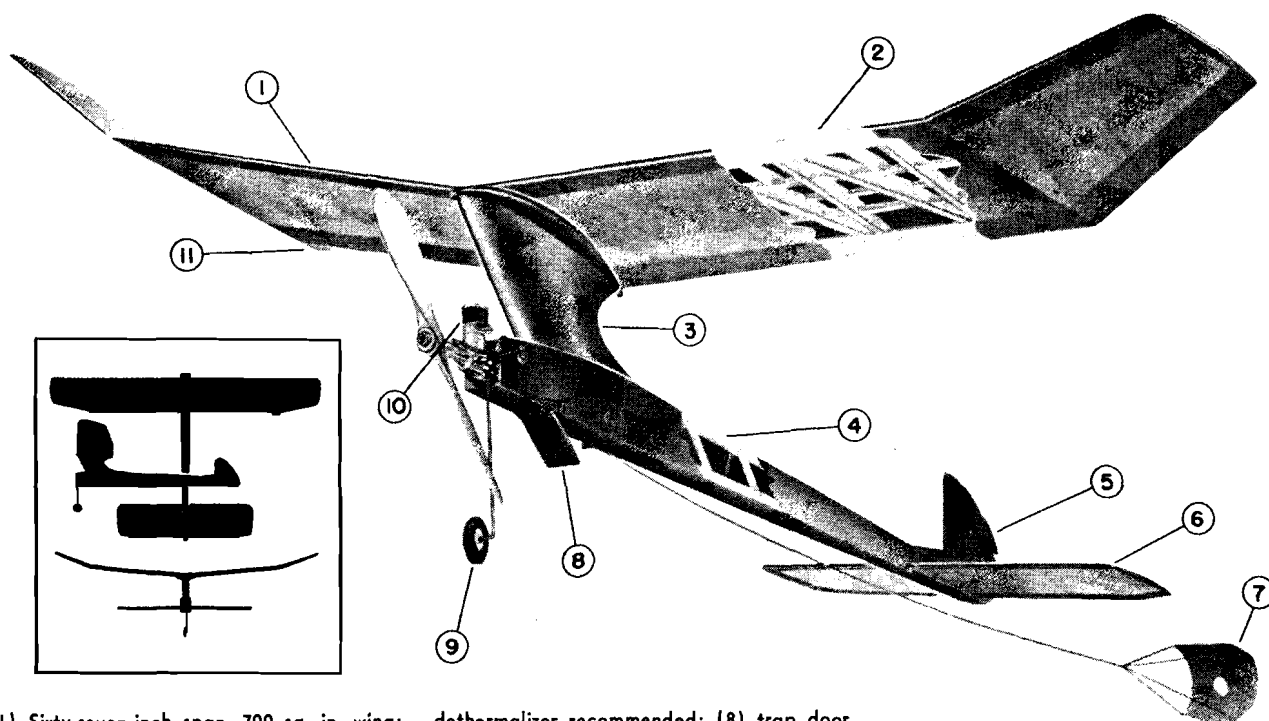
The two vertical keels are held firmly to the horizontal member by accurately matched notches, so they require no jigs for alignment while the cement is drying.

The nose is a solid balsa block and hooks are set so that a straight tow and circling glide may be had. When Skysail-covered, the assembly is practically indestructible.

Conventional die-cut tail surfaces of 1/16" balsa complete the very capable little ship.

Dyed-in-the-wool towline fans who believe that no towliner is a good towliner unless it is a gigantic job are urged to try a *Terror* before they pass judgment on this perky little soarer.

**Denny Davis' latest kit job by Berkeley features new "Hoganamic" construction**



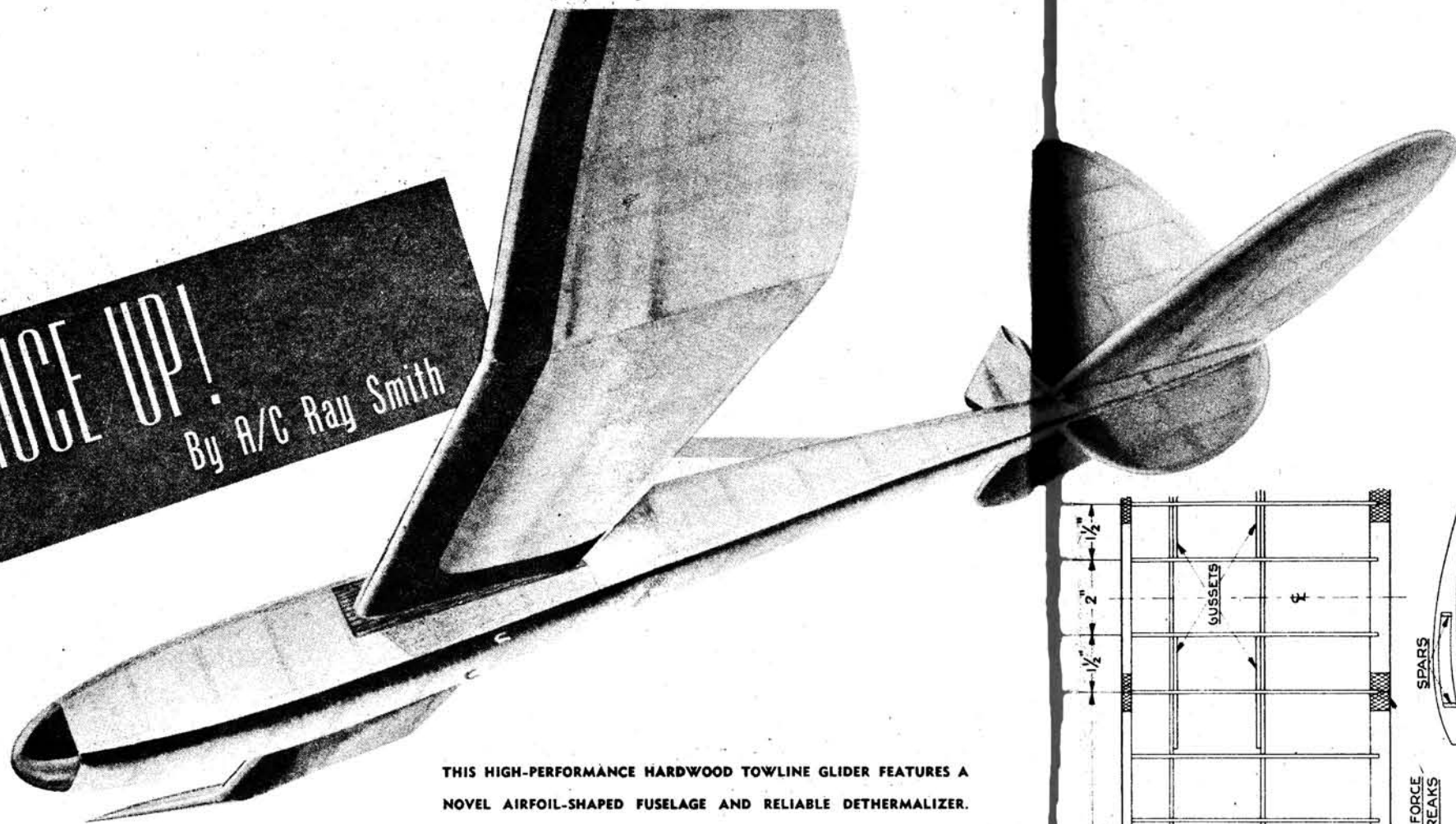
(1) Sixty-seven-inch span, 700 sq. in. wing; (2) "Hoganamic" W-set ribs; (3) built-up, 1/16" sheet covered pylon; (4) built-up sheet covered fuselage; (5) screw-adjust tab; (6) 342 sq. in. stab; (7) parachute

dethermalizer recommended; (8) trap door for chute; (9) fixed landing gear; (10) .29 to .51 engine; (11) free floating tab. Planform is typical Davis configuration which has made Denny's name a byword in post-

war free flight circles. The Hogan series has been widely duplicated here and abroad.

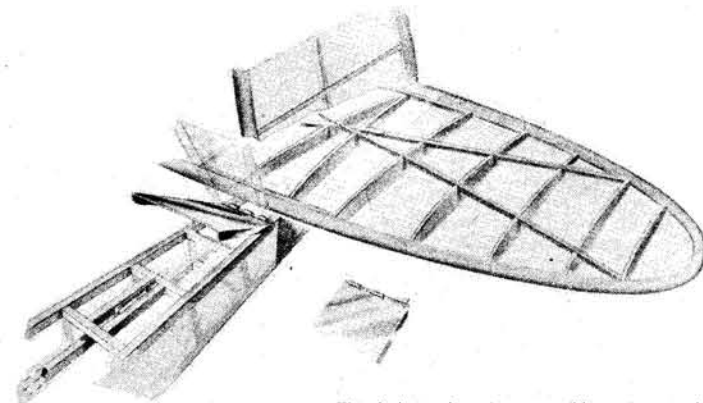
# SPRUCE UP!

By A/C Ray Smith



THIS HIGH-PERFORMANCE HARDWOOD TOWLINE GLIDER FEATURES A NOVEL AIRFOIL-SHAPED FUSELAGE AND RELIABLE DETHERMALIZER.

WHEN balsa first began to get scarce, I started to experiment with pine and spruce on rubber and gas models. I soon found that rubber was getting almost as scarce as balsa and in the very near future would be impossible to get; and gas models were too large and expensive for the mistakes that were bound to come. The towline glider, which had been the sport job at the ball park, soon began to be the guinea pig for hardwood construction. We proved that a towline could be just as much fun as the expensive contest jobs which took two and three times as long to construct. This glider is the result of constant experimentation in both construction details and efficiency. The glide is far above the average. When adjusted, no trouble was experienced in towing. We believe that is due to the



The dethermalizer is operated by a timer and a coil spring, to assure reliable operation.

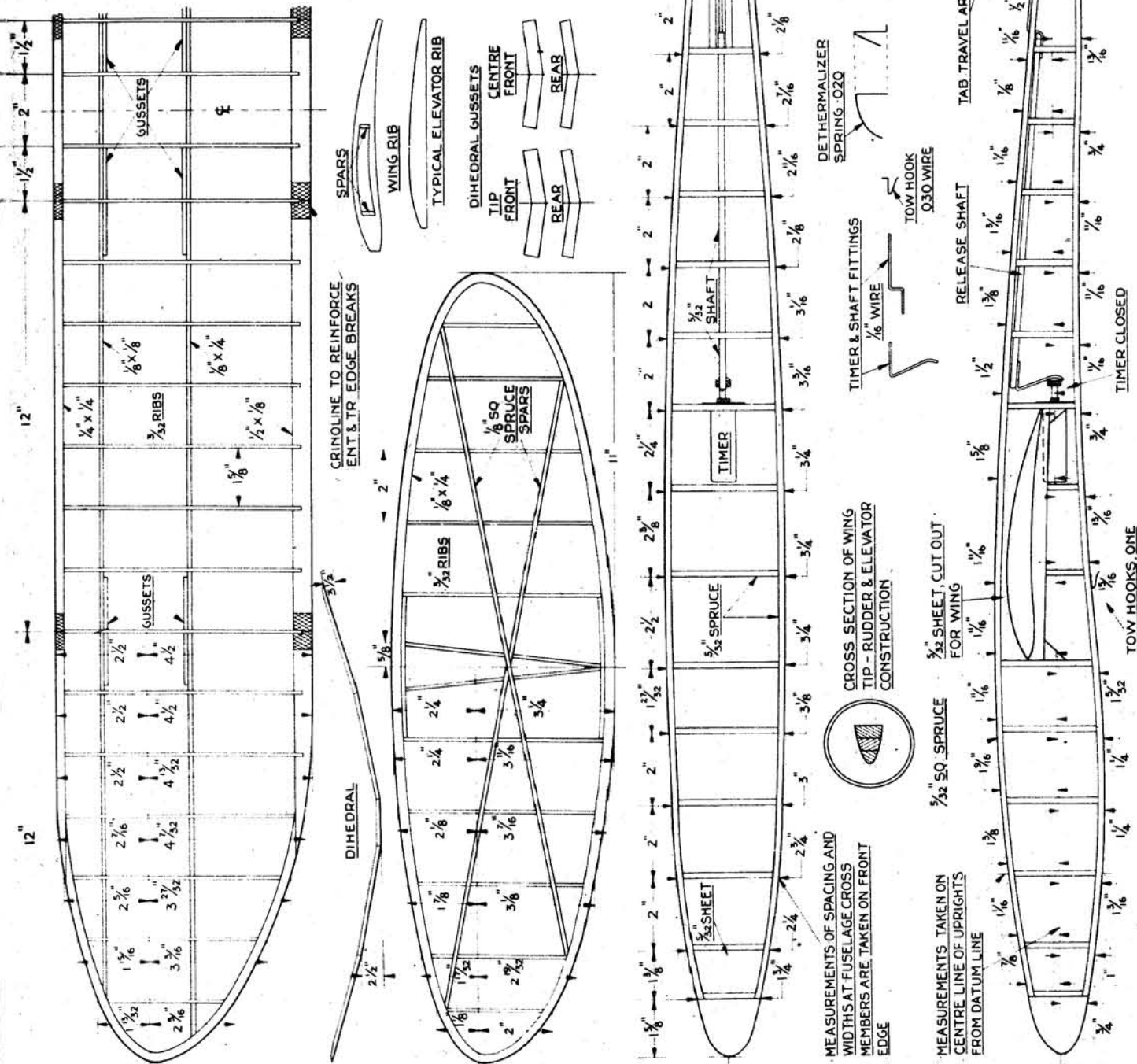
flat-shaped fuselage with tow hooks on the side. This model took less than a week to build, working on it each evening.

The first step in construction is to draw the plans to full size and get the pine and spruce strips cut to the sizes shown on the drawing. Then lay the fuselage out. Here is a very simple and quick way. Place the top longerons out first, both together. Then place two pins on the right hand side of where the upright should be. Take two sticks, put glue on one and place both up against the pins and the top longerons. Then cut both to the right length with a razor blade. Repeat the process until you have all the uprights in place. When this is completed, go along and put glue on the lower end of each upright. Then all you have to do is to pin both bottom longerons up against the uprights and the job is completed. I built five fuselages in one evening with this method.

When dry, glue in first all the cross braces which are the same size. There are six which are the same size under the wing. When they are dry enough, glue the tail end together and the first cross brace at the nose. Then it is just a matter of cutting and gluing as the curves come. Be sure all joints have a good fillet around them. Be especially sure that the gussets on the wing platform are glued well, for if they are not they will come apart under shock. The glue should be thinner than you usually use on balsa. If it is too thick the joints will not be as strong as they could be.

Installation of the dethermalizer is a simple job. Use an Austin or some similar timer mounted on stiff back; this is glued in back of the cross braces with the knob toward the rear. An arm bent from 1/16" music wire is soldered to the lug which fits between the jam nut and the knob. When this is installed add two strips, one on each side of the arms, so that when the fuselage is covered only a small slot will be uncovered. The fuselage has two doors: one over the timer knob to adjust the timer and one at the nose for weight. Cover the fuselage after you have finished carving the nose

(Continued on page 64)



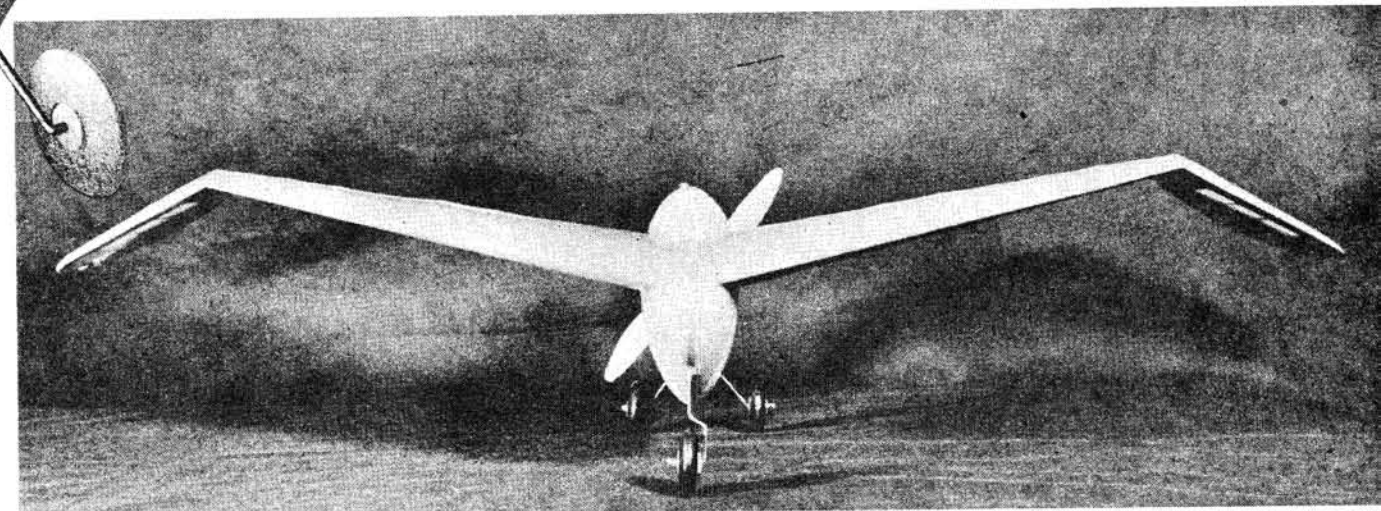




A FLYING WING BASED ON THE NORTHROP DESIGN. STURDY AND SIMPLE ENOUGH TO BE USED FOR SPORT FLYING OR EXPERIMENTING.

# EXPERIMENTAL "WING"

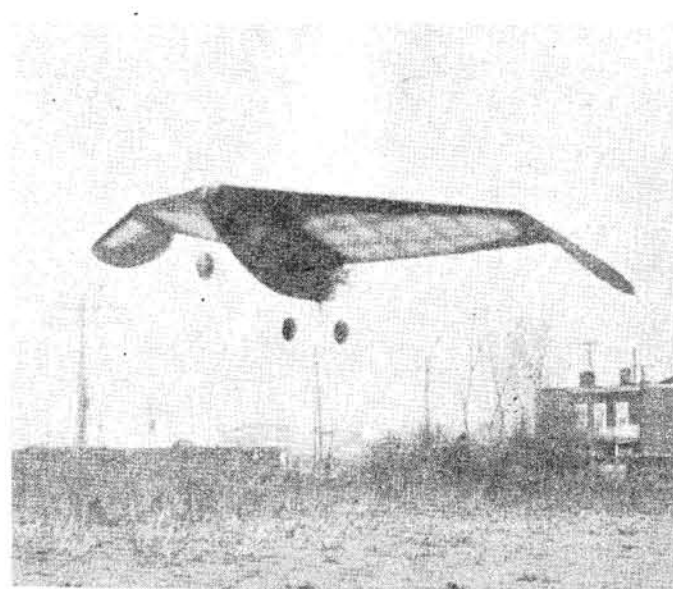
By Bernard Schoenfeld



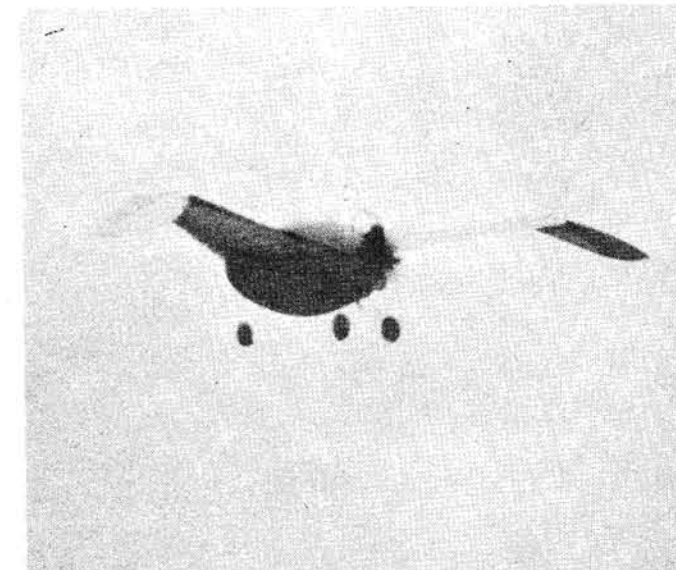
Drooped tips act as fin and rudder area. The downward slope helps make the tip more efficient by reducing spill of air outward over the tip.

THE model represented in this article is a true flying wing. The complete tail unit, including the rudder, has been totally eliminated, leaving only a wing and a pod-shaped body which houses the motor and necessary ignition system. As a full-sized craft, this body would probably be eliminated, providing the airfoil section were thick enough to house the motor and necessary crew for the craft. We have heard it mentioned that flying wings would have a greater wing loading in model work because the stabilizer unit which can be utilized to carry part of the weight of the craft has been eliminated. Actually, this is not true. When the tail assembly and long fuselage are eliminated, the over-all drag is greatly reduced so as to allow a higher speed and, thereby, greater efficiency and more lifting ability.

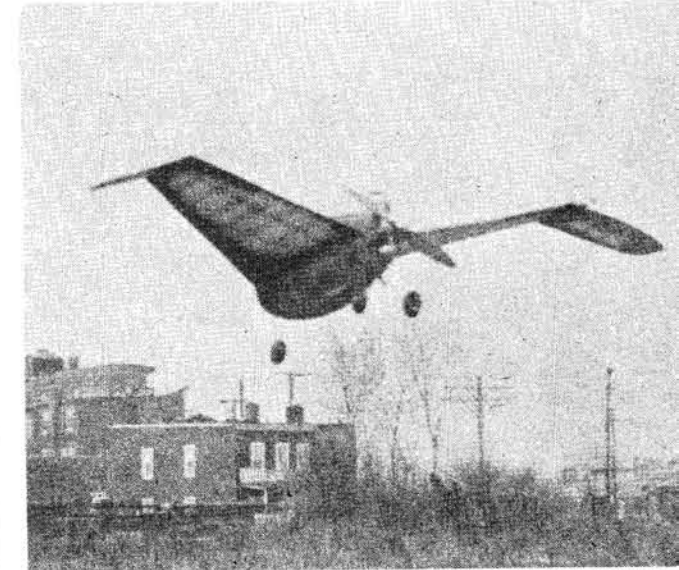
The model used in connection with this article is similar in outline to the Northrup Flying Wing. There are really few changes made except for the change in airfoil necessary because of the great difference in size, wing loading, and speed. By virtue of its outline, I suppose it could be considered a semi-scale gas job but, nevertheless, a job that is capable of turning in good performances. The airfoil, one of the Davis series for model work, was used with favorable results. In order to maintain the proper contour of the airfoil along the leading edge, where it is most important, a thin sheeting was used which also supplied additional strength to the sturdy wing construction. Basswood spars and ribs make it almost indestructible.



The tricycle landing gear keeps model steady until it leaves the ground



An Atom engine will really move this ship along in a smooth, steady flight.



Transition from power to glide lacks abrupt stall usually found in model

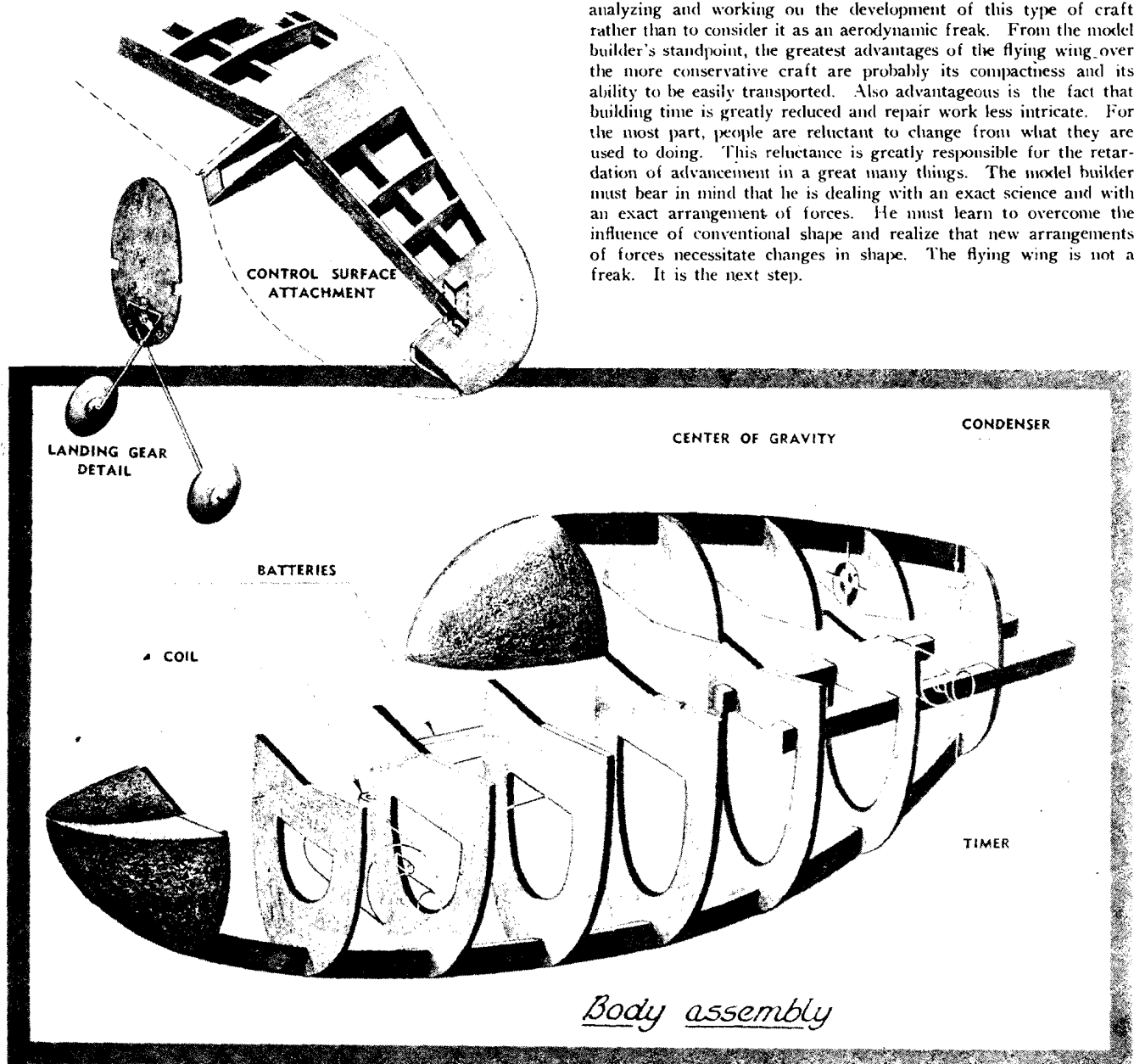
The fuselage, although of balsa because of the planking, is well capable of withstanding the most severe shocks encountered by a model in its test flight period. Actually, balsa wood, if obtainable, could be used throughout without suffering any noticeable loss so far as strength is concerned.

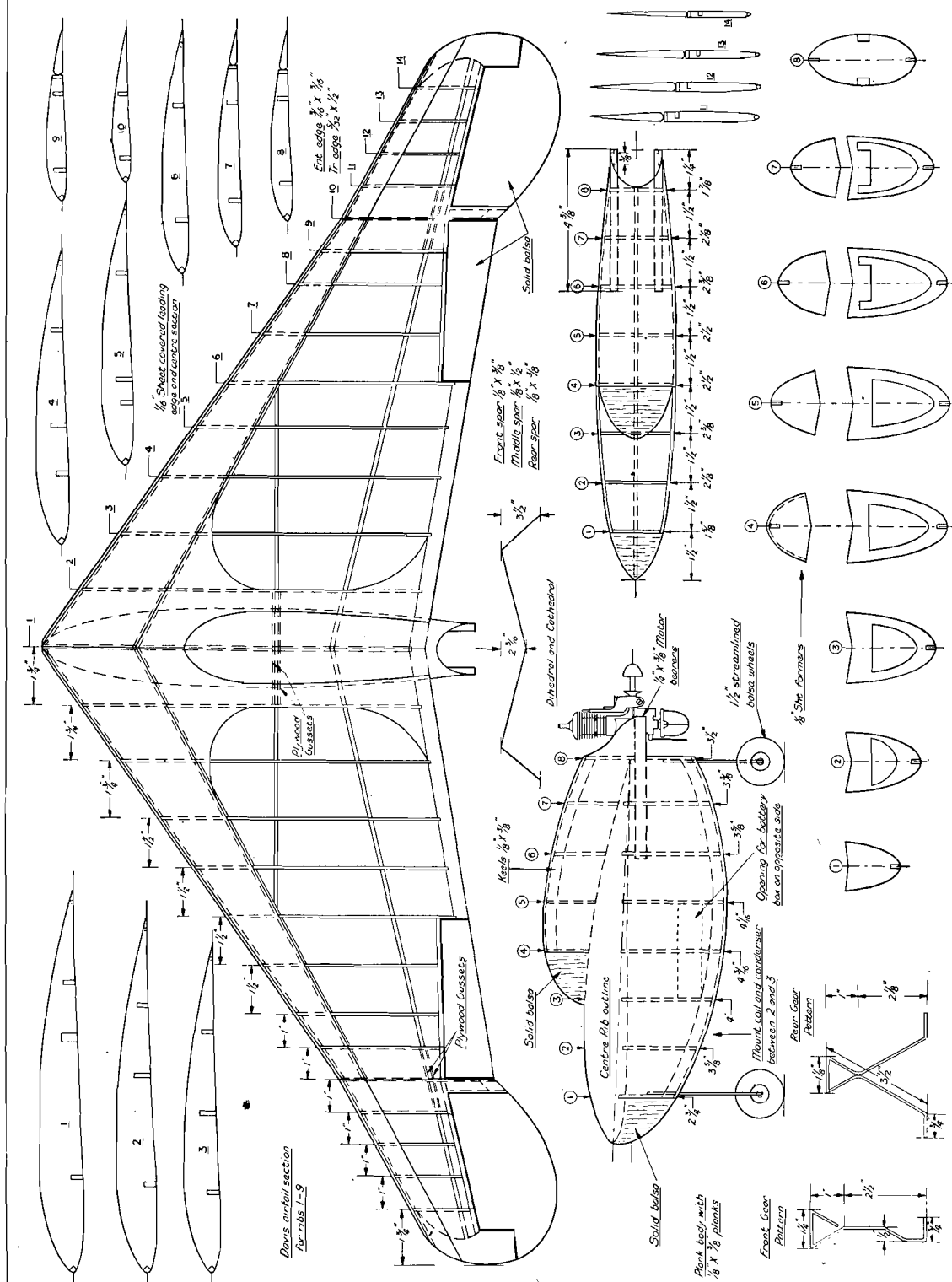
Although the wing loading of the model greatly exceeded that required by A.M.A. regulations, there was no indication of its interfering with the ability of the model to perform well. The only thing that some model builders might consider detrimental would be the speed, to which they are unaccustomed—but which actually greatly increases the efficiency of the airfoil. One of the most noticeable differences in this model, as compared with the average flying wing model that we see, is the absence of gaudy, over-emphasized, sweepback and rudders. The inner ailerons are moved to supply bank and turn, coupled with side thrust of the engine, while the outer elevators are operated in a manner similar to the elevator of a normal tail assembly. It is to be noted that for all practical pur-

poses, the center of gravity should be located at about the 30% mark on the chord of the center rib. This keeps the center of pressure fairly uniform and allows for effective utilization of the control surfaces.

This model was not designed for contest work although it could probably be developed. It is an experimental job whose major purpose is to give the model builder the opportunity to observe for himself the flight characteristics and aerodynamic reactions that take place in a flying wing. Most model builders do not have enough experience with flying wings to start off by building a contest job. What they do need is a firm little baby that can take it. This model serves that purpose. Its reactions to variation in control are definite while its inherent stability is great enough so that even a poor adjustment will not produce a disheartening effect.

Today sees us at the beginning of the flying wing era. Although the flying wing was conceived much before the type of craft that utilizes stabilizers, it was not considered practical for a long time; therefore, stress was put on development of craft along those lines that we see today. Now we are really beginning to put effort into developing flying wing craft. It is today's preview of the future. It would be wise to take cognizance of this fact and start seriously analyzing and working on the development of this type of craft rather than to consider it as an aerodynamic freak. From the model builder's standpoint, the greatest advantages of the flying wing over the more conservative craft are probably its compactness and its ability to be easily transported. Also advantageous is the fact that building time is greatly reduced and repair work less intricate. For the most part, people are reluctant to change from what they are used to doing. This reluctance is greatly responsible for the retardation of advancement in a great many things. The model builder must bear in mind that he is dealing with an exact science and with an exact arrangement of forces. He must learn to overcome the influence of conventional shape and realize that new arrangements of forces necessitate changes in shape. The flying wing is not a freak. It is the next step.





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# To work... to play... to school...

## let's pool together, America!



A Public Service of This Magazine, the U. S. Department of Transportation  
& The Advertising Council

### Spruce up!

(Continued from page 59)

block and have sanded the fuselage well. It is best to double tissue the fuselage, thus adding resistance to rips. It will only puncture, not tear. The first covering is put on with the grain of the tissue running lengthwise of the fuselage. Water dope the first covering and give it one coat of dope. Now add the second covering with the grain running perpendicular to the first. When this is finished, give the fuselage several coats of dope to shrink the covering drum tight.

After you have finished covering the fuselage, you can complete the dethermalizer. Take the pattern given in the plan and trace it on thin aluminum. Cut it out and bend over the top of the fuselage so there is an equal amount on each side. The hinge of the dethermalizer flap should be about 1/2 inch away from the rudder. The arm on the timer goes over the flap and keeps it flat against the fuselage. When the timer disengages from the flap, the compressed spring raises the front end up about 3/4 inch, which is enough for the wind to catch it and push it against the rudder. This blankets out the rudder and causes it to descend. I have never had a broken model from the shock of landing. We believe that this is the simplest and surest dethermalizer yet.

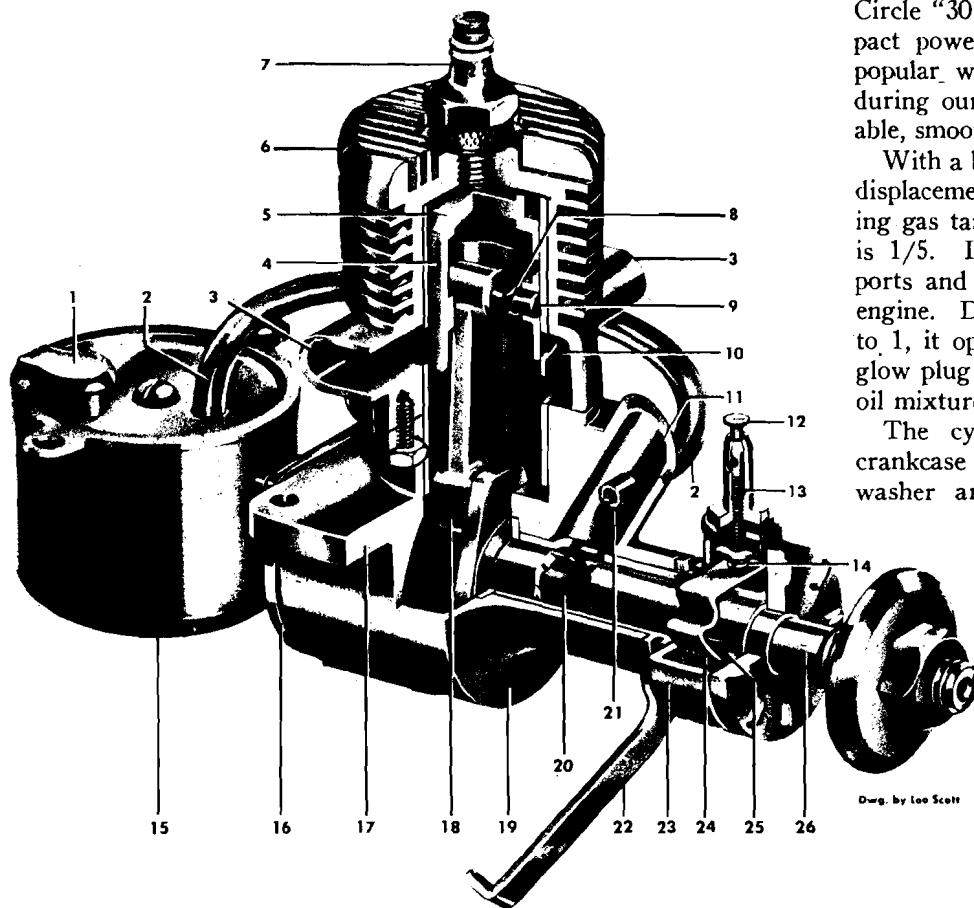
Let's build the tail next and get it attached to the fuselage. The outlines of the rudder, elevator, and wing tips are built by bending thin strips about a form cut from an old board or plywood. The form is just 3/16" smaller all around than the finished outline. Soak the 5/32" x 1/16" strips in hot water for a few minutes. Take them out of the water one at a time and bend them around the form. When finished, you should have an outline 5/32" x 3/16" all around. Pin them and let dry. Then take apart and glue them together, putting them on the form again. Do not sand any of the outlines to shape before the ribs and spars are glued in. Cut out the elevator ribs from 3/64" sheet and glue them in. Cut notches in the top side of the ribs to accommodate the "X" spar. The "X" spar in the stabilizer is very essential. Take the rudder outline which you completed at the same time you formed

the elevator and wing tips outline. Place it on the plan and cut the ends off exactly. Do not cut trailing edge at all. Mark the point where it joins on the fuselage; pin it on the fuselage and add the ribs and spar. A rib of 1/32" sheet is bent to the shape of the elevator rib and glued on the elevator over the covering. When you have finished putting the ribs in, sand the outline and cover it. If desired, a small tab of aluminum may be glued on the rudder for circle.

The wing is rather unusual in construction. Be sure you understand the drawings and instructions before you start construction. The first step is cutting out the ribs. The 3/64" ribs are not so difficult to cut as may seem. First, an accurate metal template should be made. Trace around the template on the 3/64" spruce sheets. Cut them out and sand them. The width of the hole should be just as nearly as possible to 3/8" at the front and 1/4" at the rear. This will prevent the ribs from cracking if the hole is too small and the spars are forced in. The 1/8" x 1/2" trailing edge is notched 1/16" to receive the ribs. This is very necessary, for it would crack away from the ribs if it were butt jointed. Pin the trailing edge down and glue all the ribs in except those at the tip, and put the spars in. Don't glue the spars in as you go along. Put both spars in, line up the ribs and then glue in the spars. Glue the tips on and add the tip ribs. When dry, take it up and cut the joints where the dihedral starts. Give the butt joints a priming coat of glue and rub it in. This will give the glued joint more strength. Cut out the dihedral gussets and glue them in. When you have sanded the wing, glue small pieces of crinoline over the dihedral joints. When the wing is covered the cloth is unnoticeable, but the strength added is amazing. Cover the wing with tissue and the center section with bamboo paper over the tissue. This prevents rubber bands from puncturing the tissue. We covered the original model with yellow on the wing and elevator and black on the fuselage and rudder. This color scheme together with its clean lines give it a very snappy appearance.



# INSIDE STUFF: CIRCLE "30"



## KEY TO NUMBERS

- 1—Filler cap. 2—Fuel line. 3—Exhaust stack. 4—Piston. 5—Cylinder sleeve. 6—Cylinder head. 7—Spark plug. 8—Spring retainer. 9—Wrist pin. 10—Intake bypass. 11—Intake. 12—Push button (for solderless wire connection). 13—Spring. 14—Timer points. 15—Fuel tank. 16—Back cover. 17—Mounting Flange. 18—Connecting rod. 19—Crankcase. 20—Rotary valve. 21—Needle valve body. 22—Timer arm. 23—Timer housing. 24—Cam follower. 25—Cam. 26—Crankshaft.

Draw. by Leo Scott

FRONT

TOP

BORE .750 IN.

STROKE .678 IN.

DISPLACEMENT .299 CU. IN.

CLASS B UNDER AMA FREE-  
FLIGHT AND CONTROL-LINE  
COMPETITION REGULATIONS

SIDE

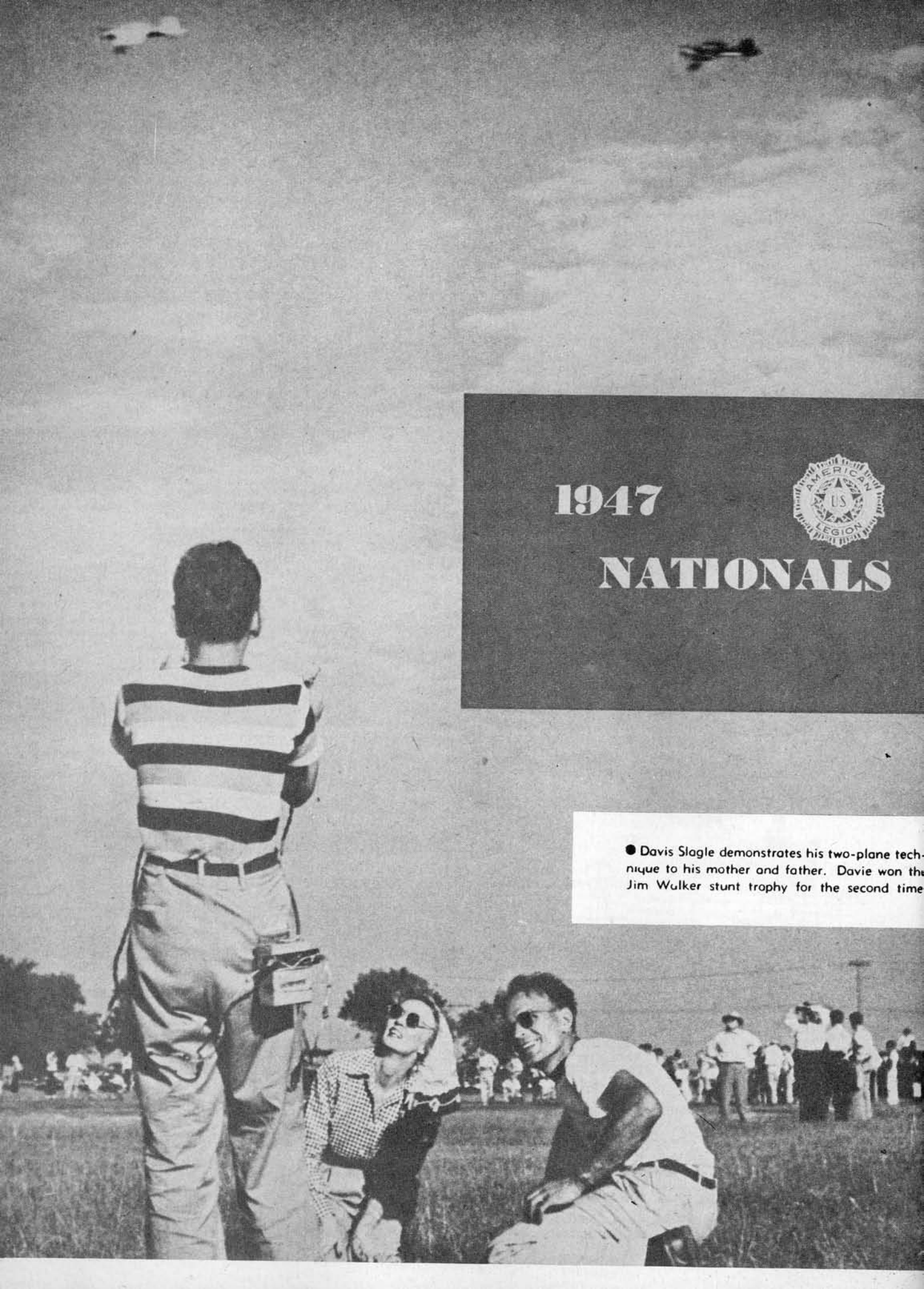
CIRCLE 30

SIDE VIEW IS FULL SIZE FOR POSITIONING ENGINE  
IN MODEL—VIEWS ABOVE ARE EXACTLY HALF SIZE

A NEW entry into the field of miniature gasoline engines is the Circle "30." It is manufactured by the Laskin Manufacturing Co., of Baltimore, Maryland, and was designed by Gene Laskin, formerly an NACA research and development powerplant engineer. The Circle "30" is an exceptionally light and compact powerplant and should prove extremely popular when it becomes better known. All during our tests we found it to be a dependable, smooth running engine, very easy to start.

With a bore of .750 and a stroke of .678, the displacement is .299. The bare weight, including gas tank, is only 6 oz. Rated horsepower is 1/5. It features twin intake and exhaust ports and is a crankshaft rotary-type, 2-cycle engine. Due to its high compression ratio, 9.5 to 1, it operates equally well with ignition or glow plug using a regular 3 to 1 gasoline and oil mixture.

The cylinder, crankcase, connecting rod, crankcase rear cover plate, and propeller thrust washer are aluminum alloy



1947



NATIONALS

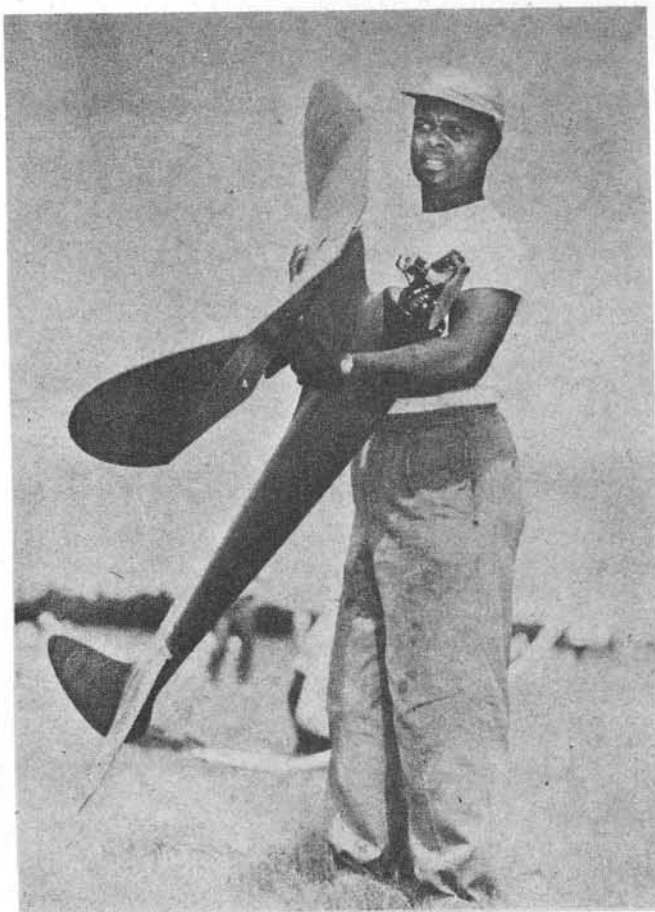
● Davis Slagle demonstrates his two-plane technique to his mother and father. Davie won the Jim Walker stunt trophy for the second time.



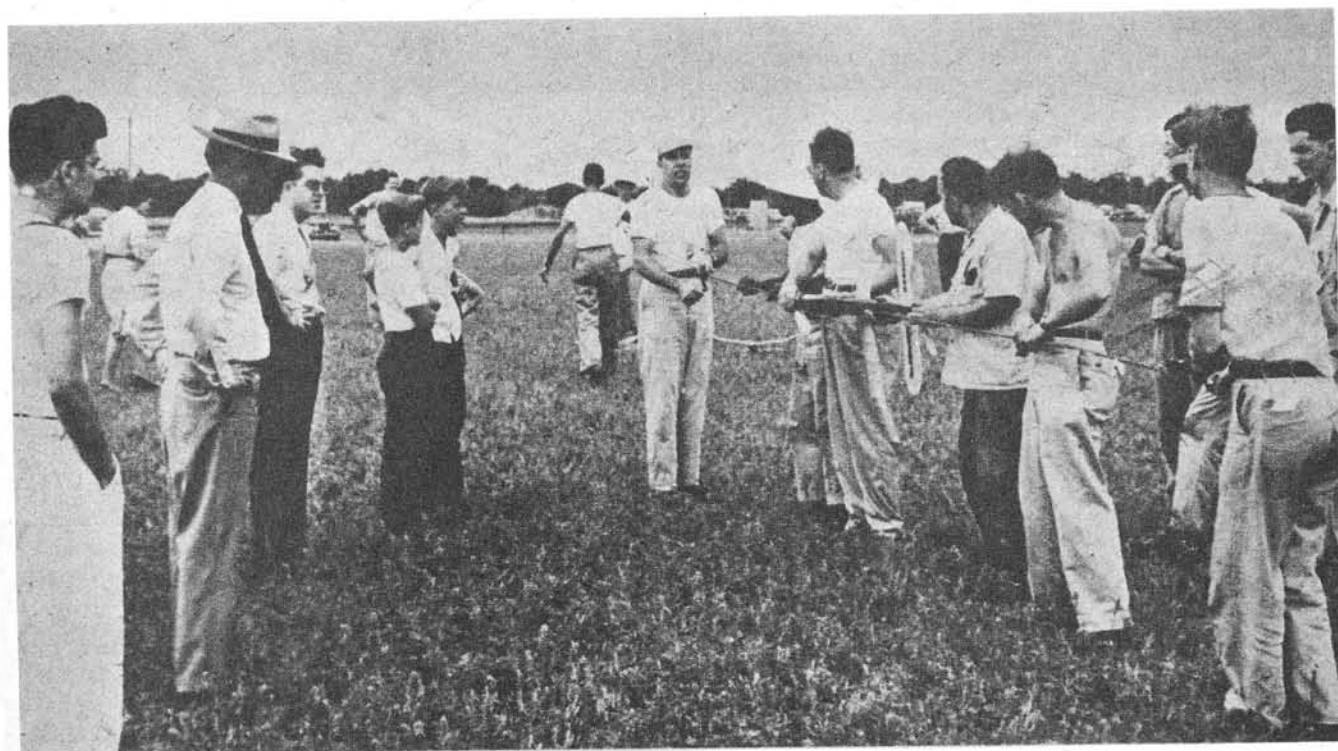
● Dick Korda's getting older and his planes are getting smaller. Here he is with his CO 2 Powerhouse.



● Jim Walker, a believer in the phrase "the pause that refreshes," takes time out from his radio-control work.

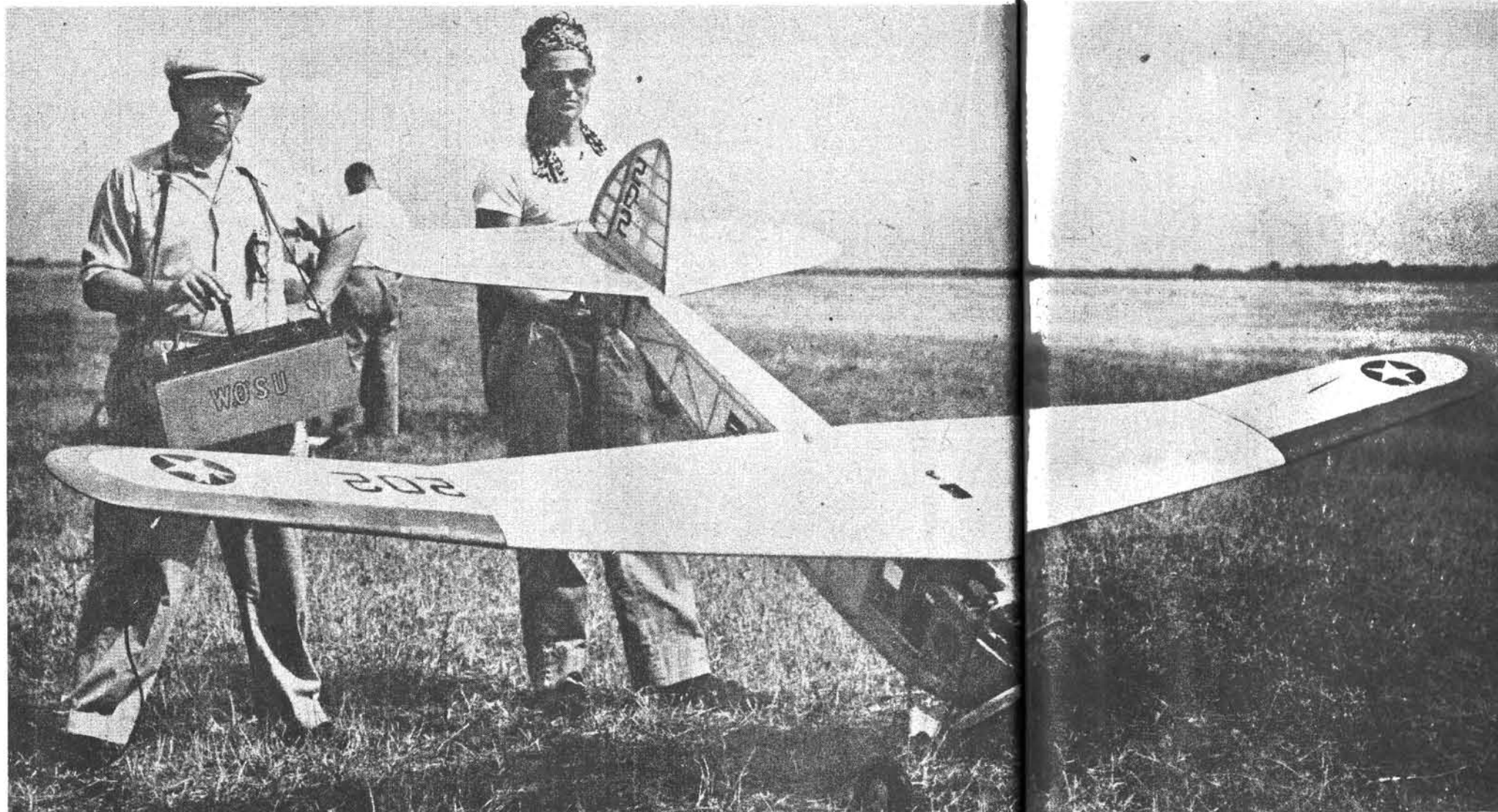


● Frank Cummings and his Atwood-powered sailplane. Frank was outstanding in the indoor and outdoor rubber events.

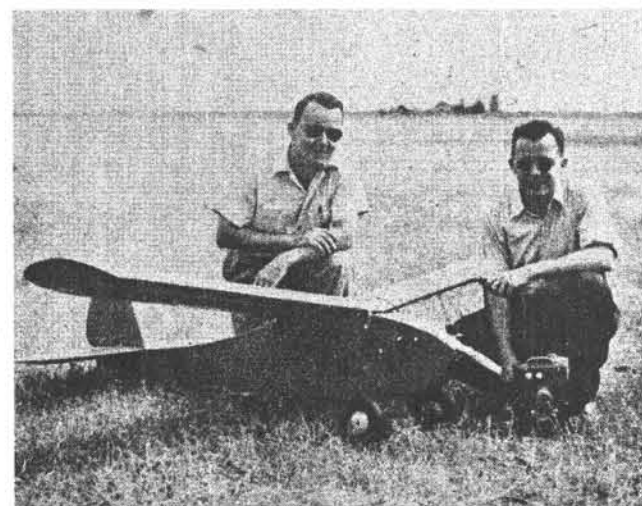


● With the help of all the old-timers he could muster, Ed Lidgard prepares his "Push Pull-Quick Quick" model for flight.





● No Nationals would be complete without Charlie Siegfried (at the control) and his beautiful Forster "99"-powered radio-control entry.



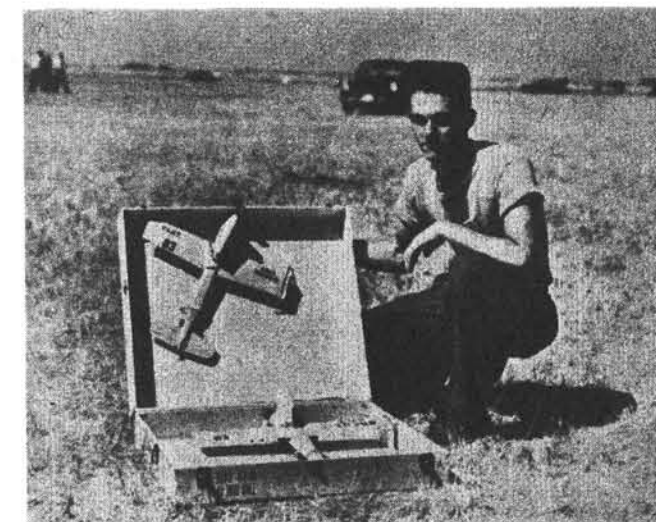
● Perennial winners, Walt and Jim Good, and their Ohlsson "60"-powered Guff. This same ship won Radio-Control event in 1939, 1940, and 1947.



● Johnny Clemens and his irresistible smile from deep in the heart of Texas. Johnny put on a swell show with his beautiful stunt job.



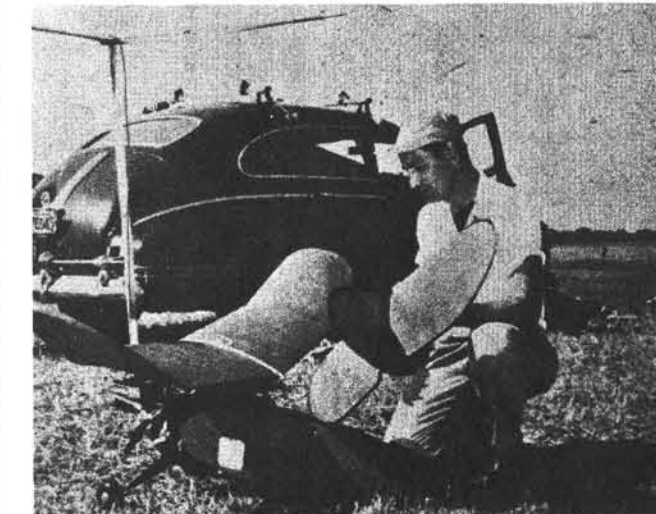
● Tex Russel modified his Vampire (Air Trails—May, 1947) and placed high in the open control-line speed events.



● Keith Storey, a consistent winner at all control-line contests, opens his Pandora box of McCoy-powered speed ships.

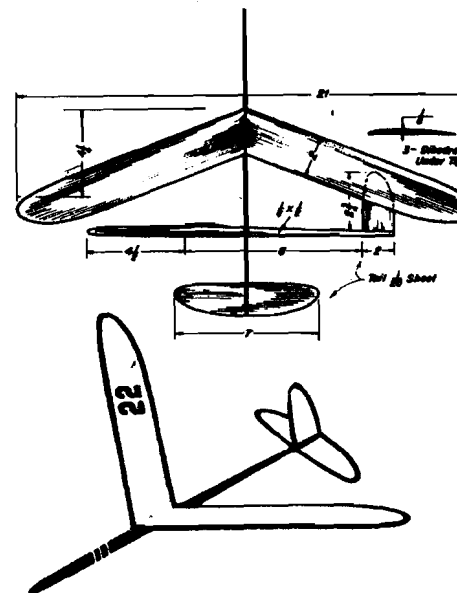
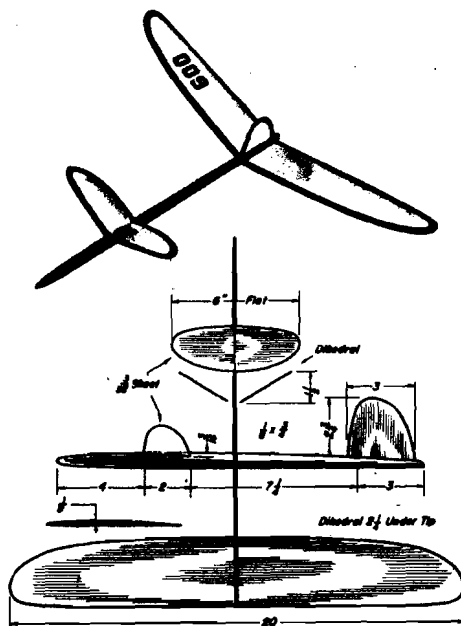
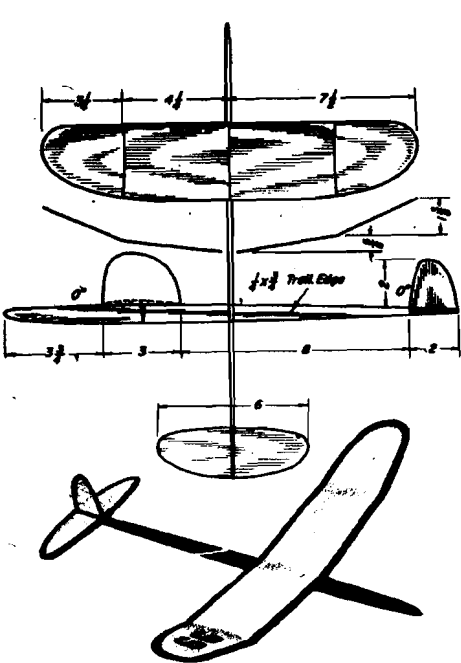


● Here is a really high aspect ratio job by Carl Goldberg. This pylon job incorporates many of the Goldberg features.



● An old-timer becomes a newcomer in Radio Control, Chester Lanzo and his Ohlsson "60"-powered radio control entry.





# Air-Model Design Competition:

## AT's "A-M-D" Contest

You are not required to build a model in this contest! All you do is submit detailed 3-view drawings of your favorite "brain-child." These should be not less than 8 by 10 inches and must contain information on wing areas, spans, fuselage length, center of gravity, weights, power used and the like. AT will select 8 outstanding designs to be presented in 3-view form. Payment of \$5 will be made for each one published. The top design in each special category will be built and test-flown by AT's design research team; upon completion of the tests the model will be given to the winner. The category until May 1, is .19-.35 stunt models; until June 1, Half-A Speed.

■ Be you a newcomer or an old-timer, balsa gliders will give you most fun for your time and money. About a half hour of work, and you can be out there, hunting for thermals.

Some might say that power ships get up much higher than gliders. Have you ever tried a true catapult glider? Using 20 strands of 1/4" wide and 60" long rubber, you will need some sort of smoke indicator to show the glider's path

and its position when it gets up there. It just about disappears from sight. There are many ways in which you can duplicate power model performance with gliders.

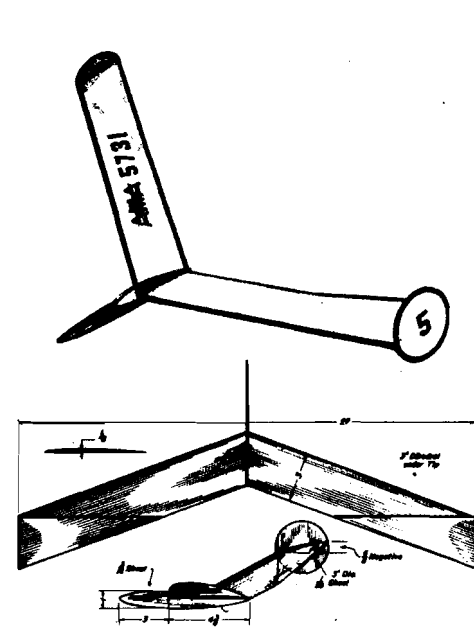
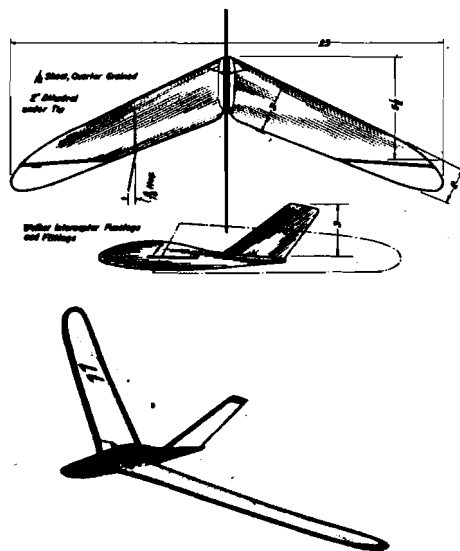
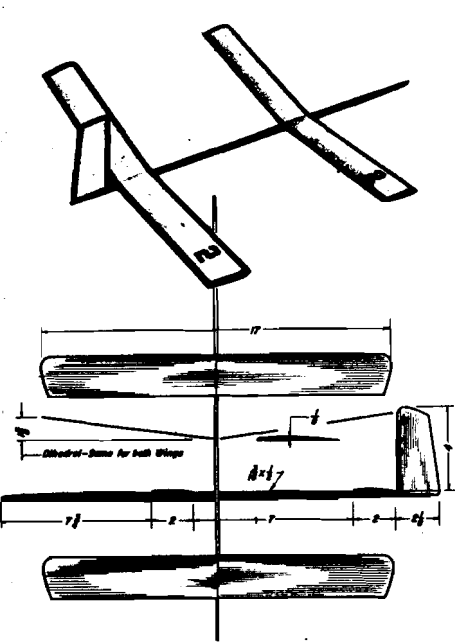
And a field which has not even been touched by the model builders is the building of scale gliders of proposed models. As long as the C.G. on the scale glider is in a similar location as the C.G. on the finished power model, the flight characteristics will be similar. The angular setting of the wing and stabilizer will thus be automatically determined on the scale glider, although the airfoil may not be similar. This may work out for glide conditions, you may say. How about power? Very simple; just launch it at a higher speed. And to duplicate the torque, place clay weight on left wing tip.

Shown here are nine glider variations representing practically every known configuration for balanced flight. By trying them, you may get an idea what to expect from each type. You will find that you can launch the standard 0-0 design (wing set at zero, stab set at zero) and it will take all the power you can concentrate on your fingertips. But try the same thing

on the flying wing model, and you'll quickly see the difference. While 0-0 will climb like a rocket, the flying wing will shed wings or loop several times. Right here sense the lesson: if you are planning a flying wing, do not use as much power on it as you would on an 0-0 design.

The history of the contest of hand-launched gliders goes back to around 1927; a 17-second flight was practically a record, and many contests were won with time even lower than this. As the model building and flying movement became geared to the general aviation upheaval after Lindbergh's flight, the glider event was one of the most popular features of the day. And so, by sheer number, the design of the hand-launched glider gradually began to change until now we have the long moment arm and the 0-0 setting.

What really gave the hand-launched glider a major boost was the development of the basic launching procedure. The pre-1927 system was to hurl the glider into the air somehow and hope for the best. The New York Aero-nuts did probably more than any other group to develop the basic



# Balsa Gliders

Here's most unique contest in aeromodeling; you don't have to build a model to enter—amazing, no?

launching technique. The idea was to have left turn adjustments on the glider, and then launch it into a right turn. This allowed a powerful side arm throw. By holding the model almost vertically, the initial high speed was dissipated in a climbing right turn instead of a loop. The left turn adjustment tended to open up the right turn, and so produced a safe climbing condition instead of spiral dive. Once the model reached the peak of the momentum, the left turn setting took over.

In the early days thermal flights were rare because we did not get the gliders high enough. So, any kind of a system that would get the models higher, helped in raising the records. The "sidearm" launching system helped us attain altitude, and it is still used, in a modified form.

In the early days we tried all sorts of wing and stabilizer layouts, looking for something that would work better than what we had. Any time a certain design showed a promise, it was thoroughly explored. Some tried the canard type. This type of model had a very flat glide when launched gently, but it could not be thrown

high without rolling into a spiral. It had too much looping action. Thus, the initial inertia was not converted efficiently into height. Any model having angular difference between wing and stabilizer will differ under power and in a glide. The glide may be smooth, but power may produce looping.

At one time the tandem glider was seen more often than now. But that was when contest times were not so high. Two wings seem to offer more lifting area. But the model itself does not lend itself to high power. Perhaps too much total drag, or some other aerodynamical condition. Also, it required fairly large circles. It would tend to spiral-in on small-circle adjustments. Therefore, a tandem may give you fairly decent time in a calm weather. But for thermal flying, a tight circle glider is needed.

The first real thermal hunter was the sweepback glider developed by the New York Aeronuts. Using the side launch, this glider gained about 30 feet. But it was capable of very tight turns, and thus picked up whatever ground thermals may have been around. Now that we know more about

model aerodynamics, we can more or less analyze this design.

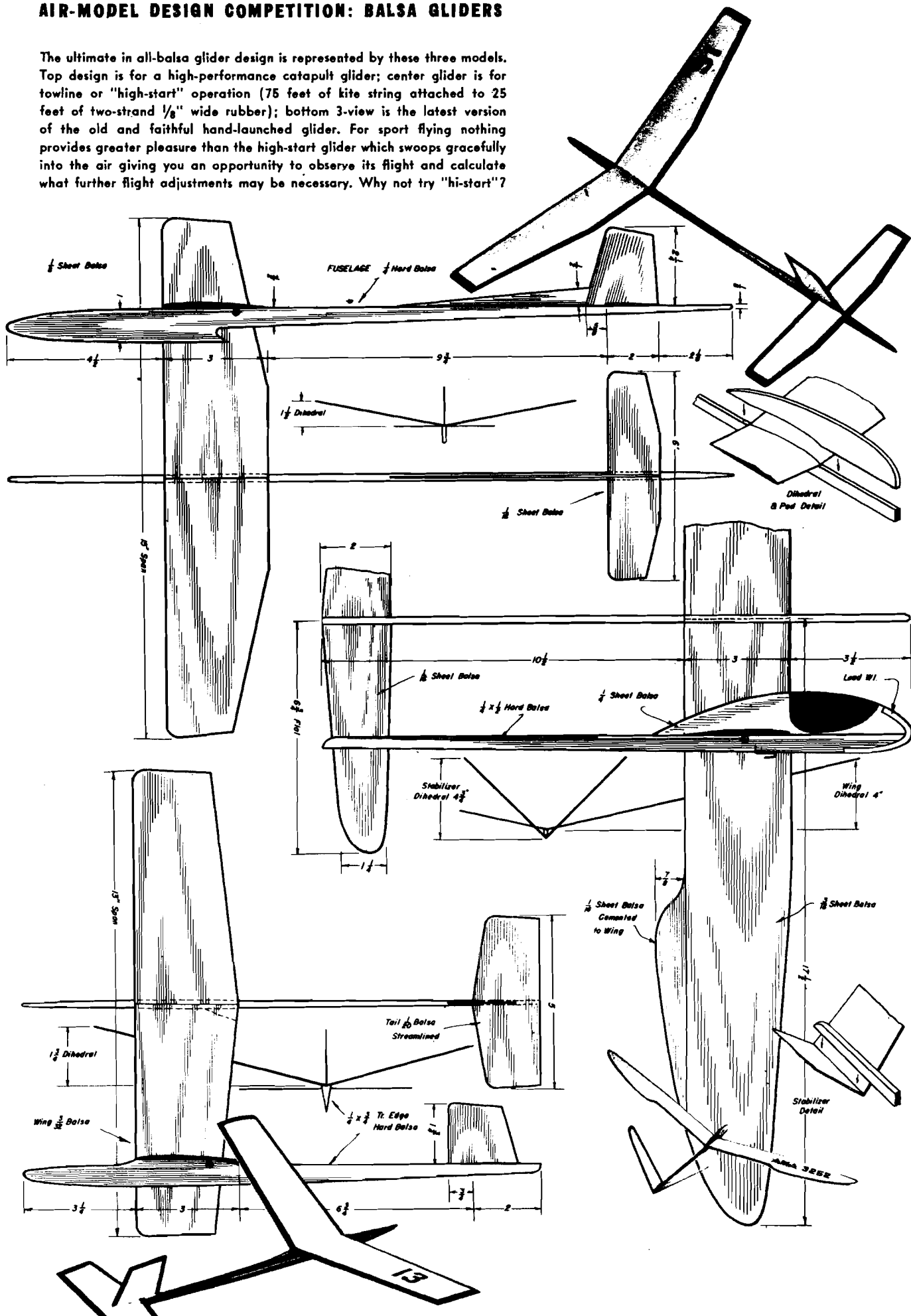
At that time we gave the sweepback the credit for this tight circling characteristic. Why we had the impression, we do not know. What the sweepback actually did was to make the model very short coupled. This short coupling, and using angular difference between wing and the stabilizer, are a perfect set-up for tight turning. The glider retains a certain amount of stability in the circle, and it is not sensitive to upsets. But this design is not recommended for modern contest flying. What can you do with 30 feet?

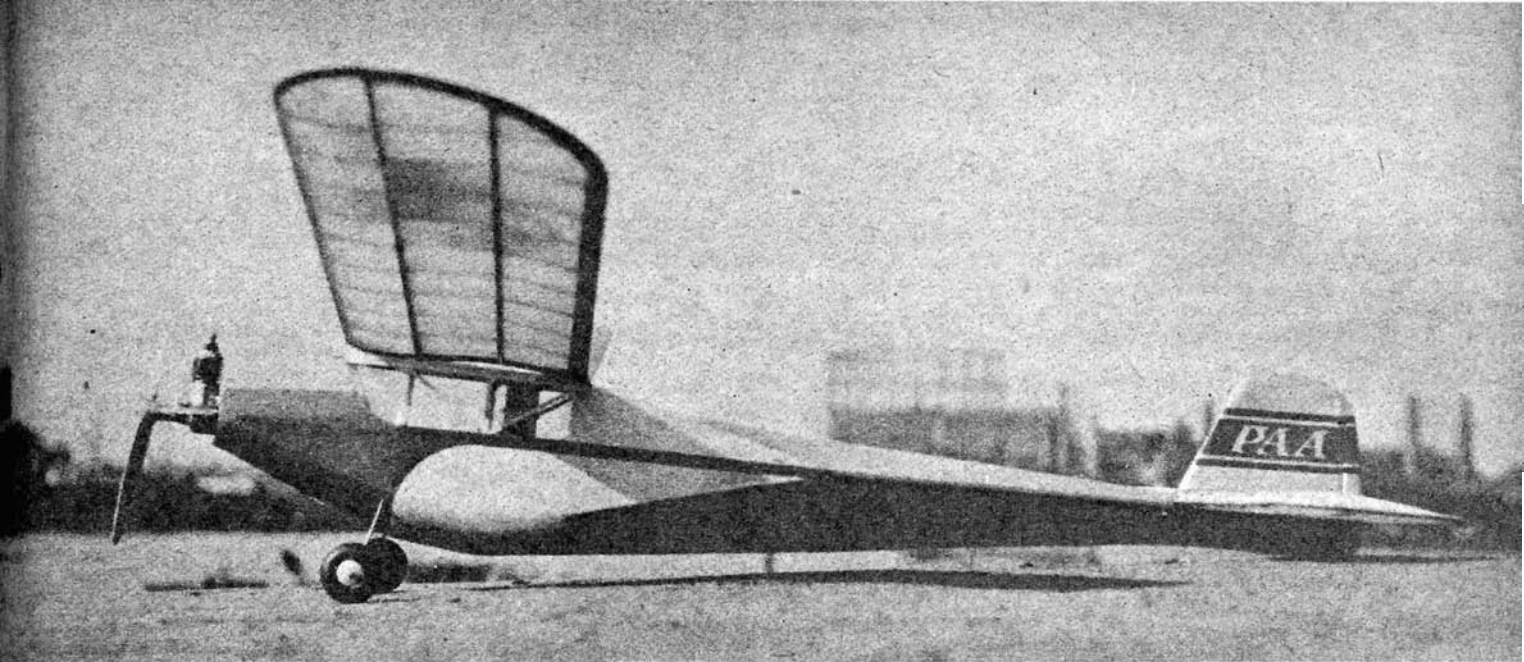
Flying wing gliders always intrigued the model builder. If you have a slope in the back yard, try a flying wing while a gentle breeze is blowing. The trick is to find a wing which will just rise on the slope wind. The flying wing definitely cannot take any kind of accelerated launching. That is, unless we can somehow fold its wing.

It is surprising that so many model builders by-pass Jim Walker's folding wing mechanism without giving it a try on their own design. A flying wing version is shown. (Continued on page 79)

# AIR-MODEL DESIGN COMPETITION: BALSA GLIDERS

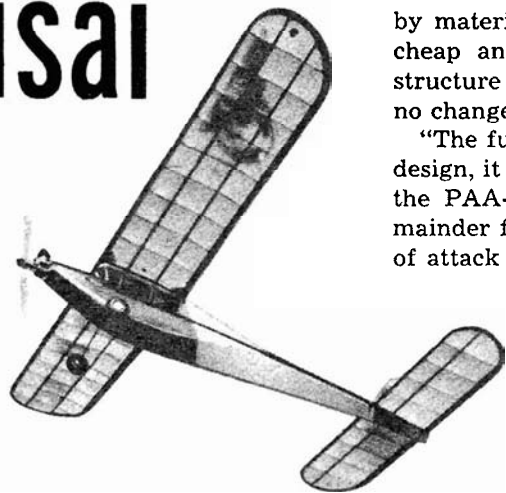
The ultimate in all-balsa glider design is represented by these three models. Top design is for a high-performance catapult glider; center glider is for towline or "high-start" operation (75 feet of kite string attached to 25 feet of two-strand  $\frac{1}{8}$ " wide rubber); bottom 3-view is the latest version of the old and faithful hand-launched glider. For sport flying nothing provides greater pleasure than the high-start glider which swoops gracefully into the air giving you an opportunity to observe its flight and calculate what further flight adjustments may be necessary. Why not try "hi-start"?





The first *Clipper Chisai* built by the Iwata Brothers in Tokyo; *Chisai* is the English pronunciation of the Japanese characters meaning "tiny."

# Clipper Chisai



By **DALLAS B. SHERMAN**

**From far-off Tokyo comes a  
new contender for PAA-LOAD  
honors designed by the man  
who originated Pan American  
World Airways' model event**

■ When word filtered through from Tokyo that Dallas B. Sherman, the poppa of Pan American World Airway's PAA-Load event, had designed a model for the '51 payload competitions, great interest was evidenced over what "ole DB" had produced.

Here is the outstanding PAA-Load design by the man who dreamed up the event. It has been successfully flown by various Japanese modelers and comes in time to make the U.S. meet this summer. Mr. Sherman's own comments on the model follow:

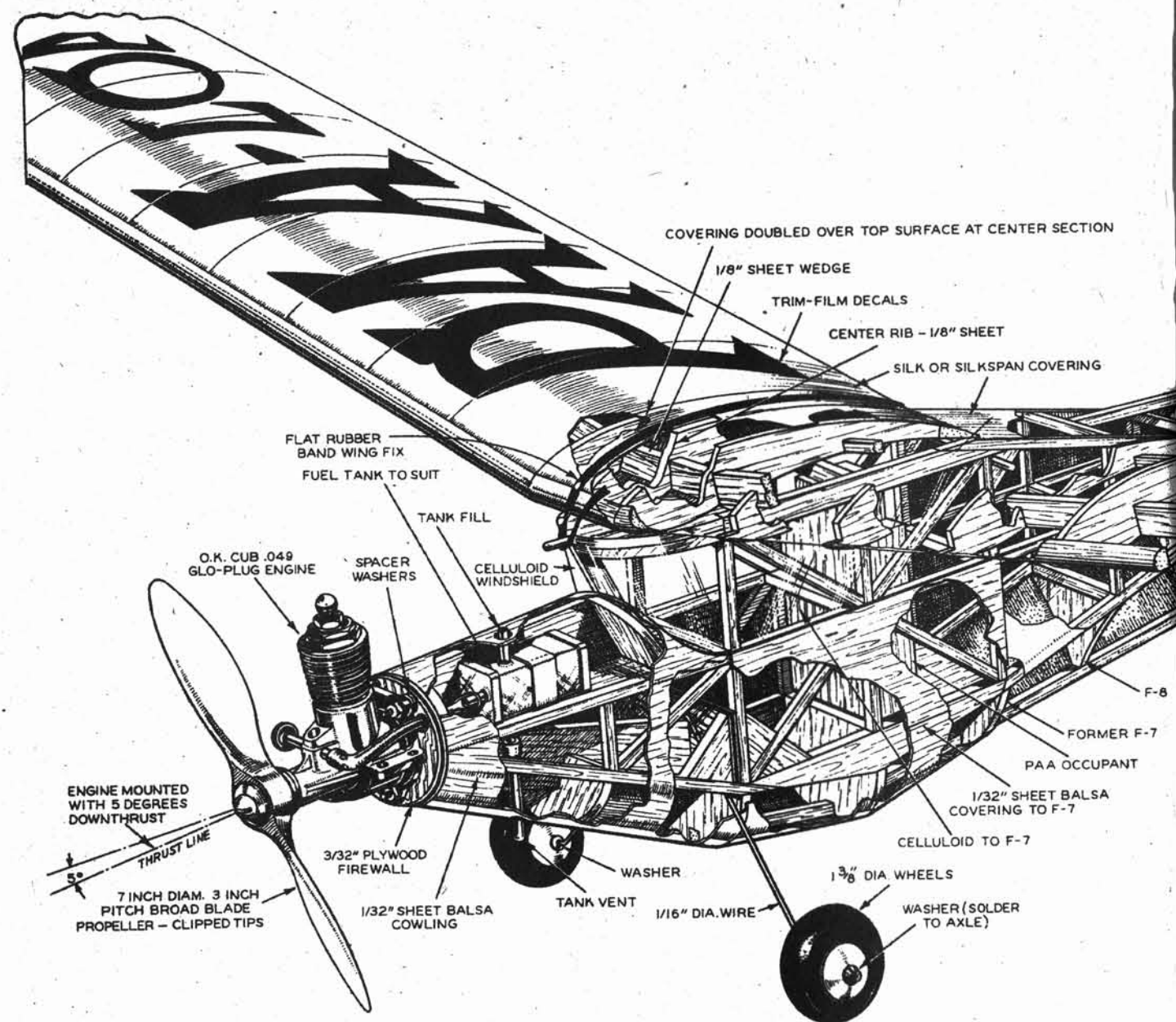
"Wing, stabilizer, and rudder are entirely conventional and need no explanation beyond the drawings. They may be covered by materials at the builder's option. We used silk because it is cheap and plentiful in Japan, and adds strength. The frame structure is strong enough to take it. Test flights have indicated no changes at all that should be made in these surfaces.

"The fuselage is a little different from the run-of-the-mill. In design, it is an attempt to get the rectangular section required for the PAA-Load 'occupant' and at the same time 'fade' the remainder fuselage into a shape more streamline at the high angles of attack at which the model actually flies. It is assumed that a free-flight model in competition never actually flies 'level' and therefore 'straight line' streamlining is of little or no real merit. More effective 'climb and glide' streamlining of the fuselage is theoretically possible, but here we compromised for structural simplicity and lightness plus a deepened belly to assist in anti-spiral characteristics.

"In building, construct the crutch first. Leave the crutch on the working surface and build on the bottom of the fuselage inverted. The top of the cabin may be built separately and glued on as a unit. Then fill in the top fuselage structure from cabin back to front of stabilizer position. Note that the landing gear is installed while fuselage is being built in order that the lower center nose brace may be attached to the landing gear plywood mount.

"A desirable refinement is to trim all of the intermediate triangular bulkheads to concave shape; this gives a more pleasing cover appearance by preventing the cover from sticking to the bulkheads and also cuts some structural weight. Silk covering is recommended for the fuselage because (*Continued on next page*)





of the curved-to-flat transitions involved and also for strengthening purposes.

"The 'paper or thin wood' covered sections at front of fuselage were actually covered on the test model with 1/20" balsa sheet, which has proved satisfactory. Other fuselage details and procedures are routine practice. As expected, the crutch is sufficiently wide at the rear so that no stabilizer rest as such is required.

"Decoration as shown on the drawings and photos is quite attractive and, together with the overall lines of the model, gives a most realistic appearance both at rest and in flight. It is pleasing to note spectators referring to the

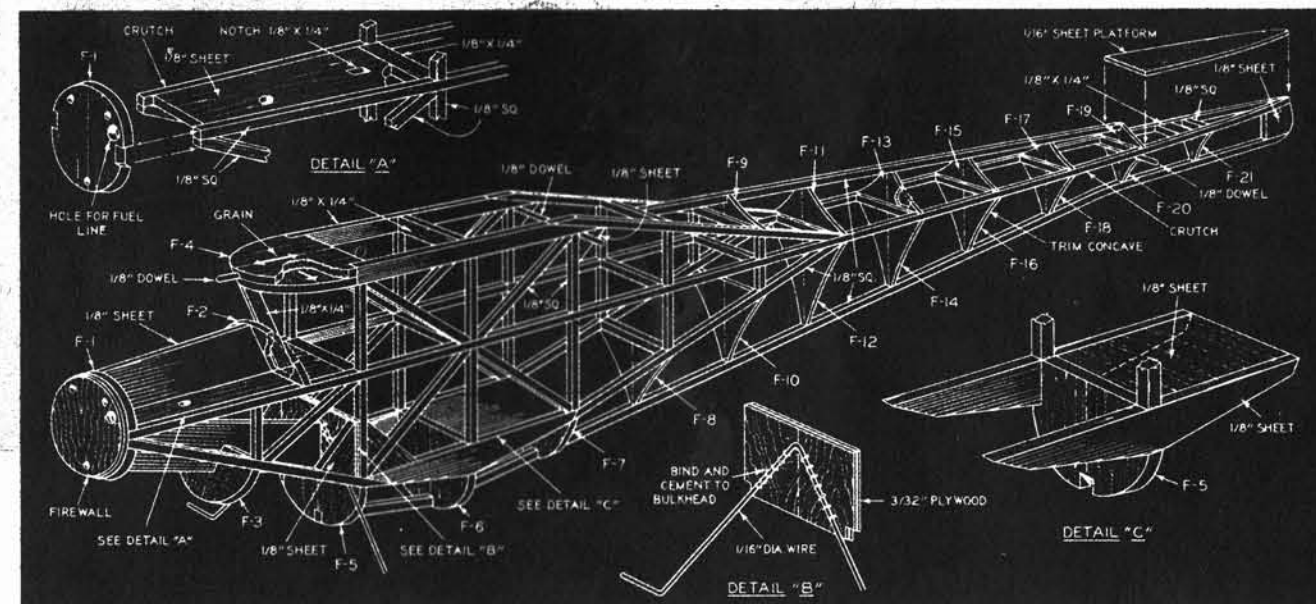
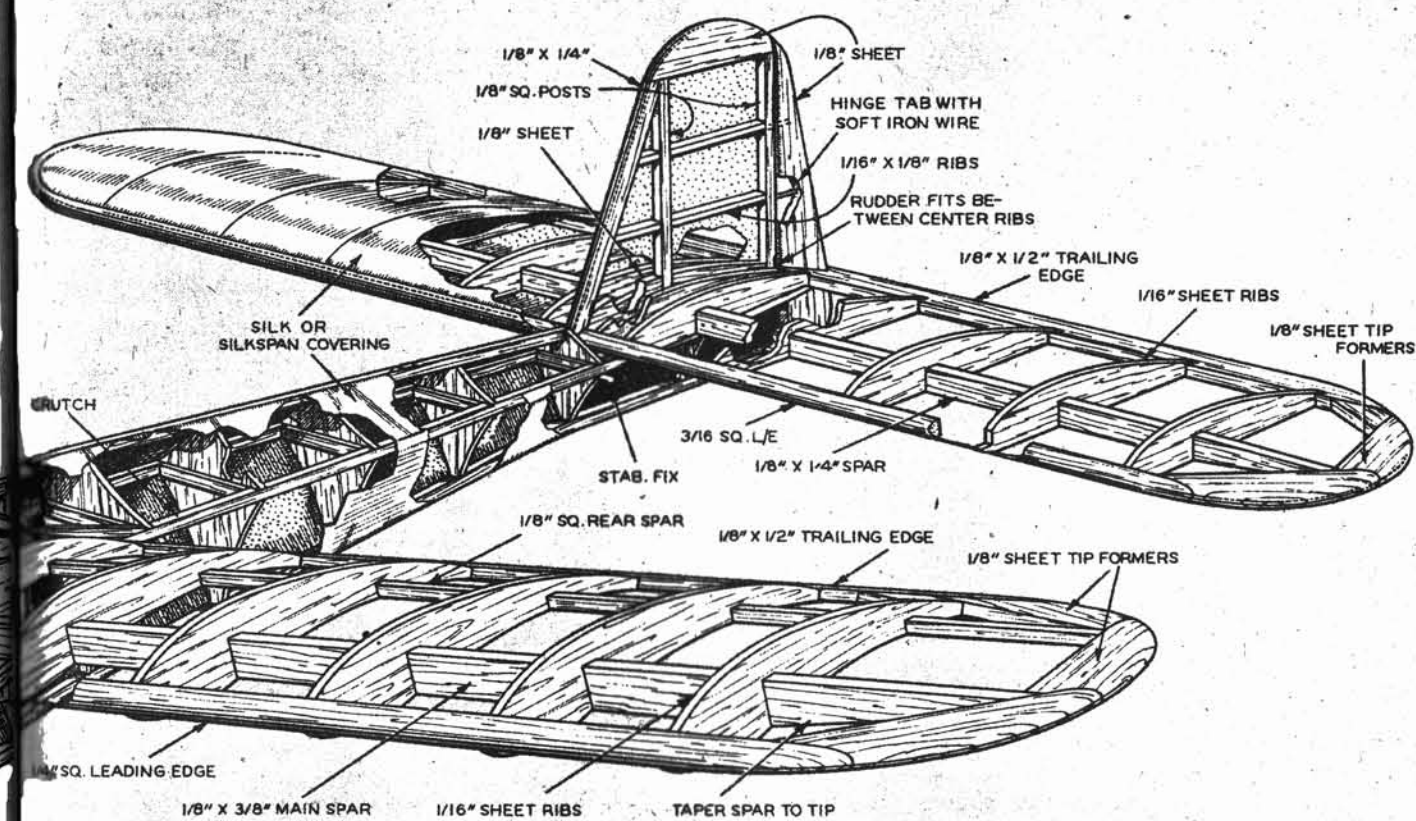
*Clipper Chisai* as 'that little airplane' instead of 'that model'. Generous hot fuel proofing is recommended.

"The test model uses standard OK Cub .049 glowplug engine. No timer was employed, the engine run being determined by clocking full tank and releasing for flight with the desired number of seconds yet to go. (For tests in the small fields of Japan, we use 15 seconds R.O.G.; a larger tank would be required for the U.S. standard 20-second run). Propeller is a 7-inch-diameter, 3-inch-pitch broad blade type, with tips trimmed down about  $\frac{3}{8}$  inch each.

"Testing should be in four phases: (1) glide without payload:

(2) glide with payload; (3) power without payload; (4) power with payload. Being a little prejudiced in favor of payload, I skipped phase (3).

"(1) *Glide without payload.* This is to determine proper C.G. location for best glide possible without any stalling tendencies and to check for proper alignment of all surfaces. The test model was slightly nose heavy for best glide without payload, so weight was strapped to top of fuselage at front of stabilizer. Individual models will vary slightly in best C.G. location; on the test model it falls a bit in front of the rear spar. The built-in wing incidence (4 degrees) and stabilizer incidence (zero degrees)



were O.K. on the test model, but these settings also may vary in other individual models.

"(2) *Glide with payload.* This is a little tricky and should not be rushed. The payload occupant should be placed temporarily (but firmly!) in position that will hold C.G. at position previously determined. A satisfactory method is to use two pinpoints projecting about  $\frac{3}{8}$  inch from bottom of occupant so that he can be firmly pinned to the floor, then wedge him in about the shoulders with scrap balsa and

secure the whole works in place with a rubber band. Remember, if he slips some damage is almost sure to result. Remember also that wing loading has gone up with the occupant aboard and this calls for higher gliding speed, so the old heave-ho must have more zip.

"Be sure the nose is pointed level or slightly below when you turn loose. The landing will be faster with payload aboard. It's pitiful how many props are busted (and even engines knocked out!) in glide testing when the propeller

rotates to vertical position and is therefore the first thing to hit. A simple solution is to loop a rubber band around each prop blade and back of the cylinder to hold the prop in a horizontal position. Glide-test withn payload until the best glide possible is obtained (this may call for incidence adjustments in wing or stabilizer on individual models) with just the least indications of a steady left turn.

"(3) *Power without payload.* Sorry, no tests have been run in this category. (Continued on page 77)



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## Clipper Chisai

(Continued from page 79)

"(4) Power with payload. First test flights should be made by hand-launching over soft ground, preferably grassy. This is to reduce damage in event of power-on stalls near the ground. If the model shows this undesirable tendency, correct with downthrust (we put about 5 degrees into the test model by adding spacers back of the two top mounting bolts) or by increasing left turn (the rudder trim tab is sufficiently effective for this), or a combination of the two. The model should climb in left circles about 100 feet in diameter and glide in left circles of considerably larger diameter.

"When satisfactory flights are secured by hand launching, bring the model back to hard surface for R.O.G. Raise the tail and push; if it will roll fairly straight (or preferably with a tendency to turn right) for as much as 6 feet, take-offs will be no problem and no fudging is necessary.

"The original model was tested in solid overcast weather (no thermals) with light variable breeze and temperature about 45 degrees F. Fuel was Power Mist in the tank, but a special Japanese brand of kickaboo juice was squirted here and there into the openings just to get things started. The model is extremely stable and makes snap recovery from unusual positions; it actually did a couple of tail slides in power stalls (before we got around to the downthrust and left turn settings) with no tendency to fall off on a wing or enter a power spiral.

"The one surprise of the tests was the appetite for downthrust which the design on paper did not seem to call for. The one dangerous attitude was determined to be a steep right turn, which does bring the nose down into a power spiral headed for trouble.

"Unfortunately, we were a little stingy with tank capacity, so no data on 20-second engine run flights is available. With 15 seconds engine run, R.O.G., payload aboard, the total endurance clocked in at about 75 seconds each for a half dozen consecutive flights. Clipper Chisai has been lots of fun to develop, and she's even more fun to fly."

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## XF-92A

(Continued from page 55)

The body could be turned on a lathe. However, as it is rather small, too much difficulty should not be encountered if done entirely by hand. If lathed, be sure to use high speeds and sharp gouges and skewers, otherwise tearing of the wood will result. Sand and clear-dope while still on the lathe and don't forget to use fine grades of sandpaper at all times. Number 350 or 400 Durex wet or dry is all that is necessary on soft balsa. Before splitting the blocks for hollowing out, be sure that the two coats of clear dope are thoroughly dry. This will keep the thin walls strong and they will have less tendency to warp. Carefully gouge the inside to a thickness of about one-eighth of an inch. Hold the shells up to a light now and then to be sure you are not getting it too thin in places. Now sand the inside and give one coat clear dope. Note the shape of the Jetex mounting screw holder. Carve from a medium or hard block of scrap balsa. Split the block on a straight line along the side and imbed the mounting screw, making sure it is perfectly straight in all directions.

Glue the top half over it and when dry, glue the completed block in place on lower shell. Now glue the two shells together and set aside to dry. The plans show this installation for the Jetex 100. If you are going to use the 200 Jet, lower the mounting screw line one eighth inch as shown on the plans. Also glue mounting block further forward one-half inch. You will have to fly without the hatch in place when using the larger jet.

You can now very carefully cut the three slots to take tail and two wings. Cut wing slots so that top of wing-slot is just at glue joint of the two shells. Give tail slot a two or three-degree offset; or if you wish, you can glue the tail dead on and put a quarter inch offset on rudder.

You can now assemble entire model, checking frequently that the three units are in line. Add bubble canopy. I have used solid balsa ones on mine as this particular size is not available ready-made in Canada. Give all joints a second coat of glue, then let dry before sanding all over lightly. Fill any nicks with filler material and sand again.

Now, for a super-gloss finish. Any high finish, as you probably know, is impossible without a smooth base, so let's start with six good coats of Duco Primer. When dry, sand this with #350 or #400 wet or dry paper, using water. You should continue sanding until it looks like dull glass. Now apply at least fifteen coats of silver dope. This is much easier and quicker than you may at first think. Because the dope should be the consistency of water, it will dry almost immediately. In fact, you will find it will take at least four coats before you can cover the primer coats to a point where you can see the change in color! Therefore, your dope should be mixed to a minimum of 40% color dope and 60% thinners.

It will dry very quickly but be sure it is dry between coats or it will never dry properly. It is, therefore, wise to wait about five minutes between coats. Apply with a good quality half-inch brush. Mask off the portions that are painted dull black in front of bubble canopy and give one or two coats. Apply decals. The secret of a high-gloss finish when using silver dope, is to apply three or four coats of clear dope at this point and to rub down these top coats instead of rubbing the actual silver dope. Do this rubbing down after letting the clear top coats dry for at least 48 hours. Using a fine rubbing compound, bring to a super-gloss finish. Automobile wax (silicone type) may now be applied, highly polished, and the painting job is finished.

With a sharp knife, carefully remove engine hatch underneath and try your Jetex engine. The model can be flown with or without hatch in place, if using

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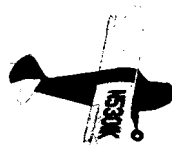
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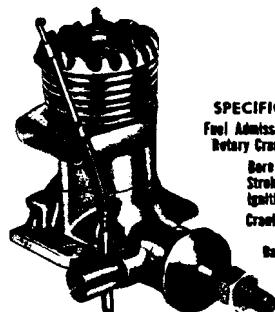
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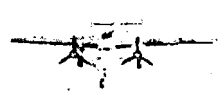
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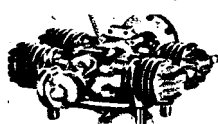


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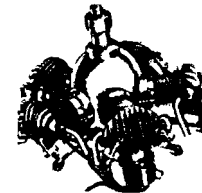
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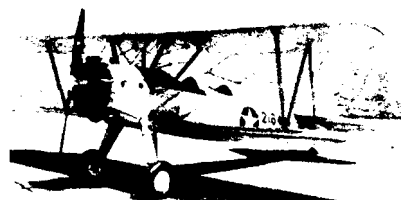


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the Jetex 100. In that case, hold it to the fuselage with two strips of Scotch Tape. Use one strip in front for a hinge and after lighting the fuse, quickly close the hatch, and seal the second strip over the rear portion. Be very careful when lighting the fuse not to burn the fuselage; a cigarette is an easy way.

To fly pylon style, punch or drill a hole near the wingtip (not too close to the point or loss of strength here will result) and another about one-quarter inch back from the nose. Tie securely one piece of strong linen thread about a foot long from one hole to the other. Take the nine foot cord from the pylon stick and tie it to the other cord at a point where the model will hang in a perfect triangle when the cord is held at this point.

Place a drop of cement at these points so the cord will not slip. Now one person can hold the stick high above his head while the other can light the fuse. As soon as smoke streams from the rear of the model, the first operator can whip the ship a bit to get it started. From then on, stand back! It will pick up speed quickly and the operator just has to hold the pylon stick with both hands straight up and down. The run will be short and sweet. It is best to whip the jet around a few times after the run to help cool it and also to give your helper a chance to catch it as you slow it down. Be careful at this point not to touch the jet engine as it stays hot for about five minutes.

I have used wheels on a couple of models and also tried a dolly take-off, but as the run is so short I found these additions hardly worthwhile. Scale fans can add these details to this model using paper-wrapping wire and small rubber wheels.

Weight complete, less details, should be about two ounces. By making the body slightly larger through the middle, you can use the Jetex 350, if you so desire.

## Balsa Gliders

(Continued from page 72)

The original body was used, shaped to fit individual need. This means that only the original wings have to be removed from the fittings. Thus the mechanism will work at all times. Since sweep-back wing brings the C.G. further back, a larger rudder is used. The wings themselves are cemented in the metal fittings. Launching the folding wing model may be a bit difficult because the rudder must be held between the wings to prevent opening.

To get real high altitudes without any sort of folding wing device, the catapult glider is "the thing." O-O setting of the wing and stabilizer, long moment arm, and small stabilizer contribute to give it arrow-like trajectory. No matter where you point it, that is where it will go. The height achieved will naturally depend on the amount of rubber used. Start with low power and gradually increase. But be sure you have plenty of launching area as well as a lot of running space.

Of course, this arrow launch also means that you cannot have any kind of turn setting. And the glide is more or less at the mercy of the winds. If you try catapult gliders, make sure that the wing and tail are well constructed, that the incidence is O-O, and moment arm long. Any deviation will mean big loops that are liable to catch up with you.

The trouble with towline gliders is that the builder usually has to run with the towline, and thus cannot see what goes on. A cure for this situation is to use a combination of regular towline and catapult. By using about 75 ft. of kite string and 25 feet of 2-strand 18" wide rubber, enough power is supplied by the rubber to give the model almost normal towline pull. This system makes it possible for you to fly

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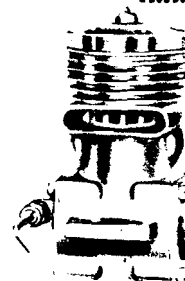
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In the case of the hand-launched glider, you will notice that no matter how it is launched, the climbing path is curving. In some cases, it may be an open helix, while at other times, just a half spiral will bring the model to the top. In case of sweepback, the setting was not O-O. To obtain low lift at high speed, it had to make small or tight circles or loops.

The trouble is that the very setting which gets the O-O glider up, prevents it from having glide turns tighter than we now have. In fact, the glider should be adjusted with the wing flying as level as possible. It is the banking that brings about the downfall. You can experiment with very small dihedral and rudder so that skidding turns could be obtained, or use a flexible stabilizer. The problem is now clear; reduce lift during the high power launch, and bring it back to regular glide angle after the model reaches the top.

You can see why the glider can make only one certain size circle. If you try to tighten it, it will spin in. Fiddling with adjustments will only give you hairline stability which may pop the wrong way in a thermal. The best cure is to find and be satisfied with a bit larger circle.

**Construction Hints.** A great deal of flight performance will depend on the balsa used. Lightness, of course, is important, but strength should not be sacrificed. Stress loads during the hand-launching period are very high. Of course, it differs from one man to another.

All stock should be quarter-grained. Other grains tend to produce warps after the model is made, and especially under damp conditions.

Airfoil shape is important. Not so much as to lifting qualities as to the importance of having a uniform surface, and so reduce drag to a minimum. Lift and drag determine how long the model is going to stay up. If you increase lift and reduce drag, you are doing the right thing.

While assembling the glider, be liberal with the cement. Not only at the junction point but for a distance away from it to form a cement skin. The major launching load is at the root. By having a cement skin extend about an 1" from the center, you form a socket-like construction for the wing, and transfer pin-point loads over much greater area. This same reasoning applies to tip dihedral joints. In fact, if you want to be sure, use bandage over the joints. This may be especially desirable if you are just starting gliders.

**Finishing.** The balsa surface definitely needs some sort of a finish. Without a finish, the balsa will be subjected to all atmosphere changes. On a damp day, balsa will actually rise in spots. Another fact is that "fuzz" must be removed or "plastered" to the wing. The finishing will depend on how much extra weight can be used for finishing.

On indoor gliders, the finish should be light. One way of doing it is to run a stream of castor-oil-treated dope along the span, and then spread it with fingers as much as possible. Keep on rubbing with fingers until the dope dries up. In this manner, the solution is forced into the pores. Also, the surface remains smooth after application,

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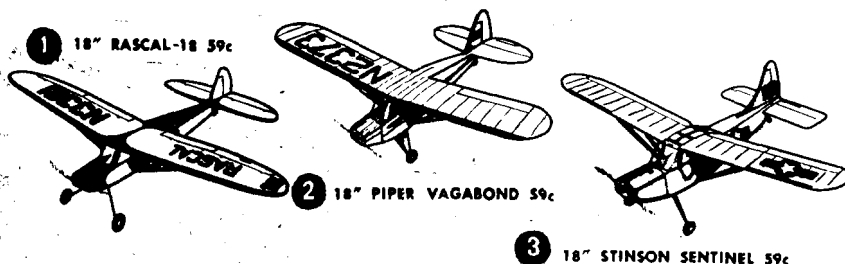


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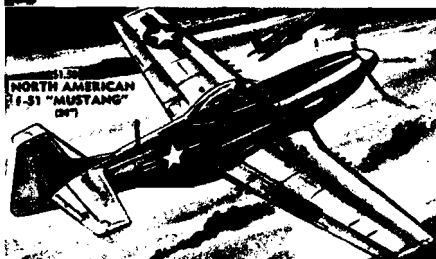
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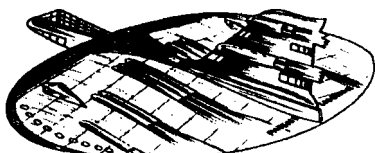


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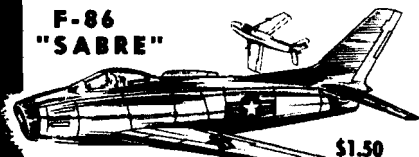


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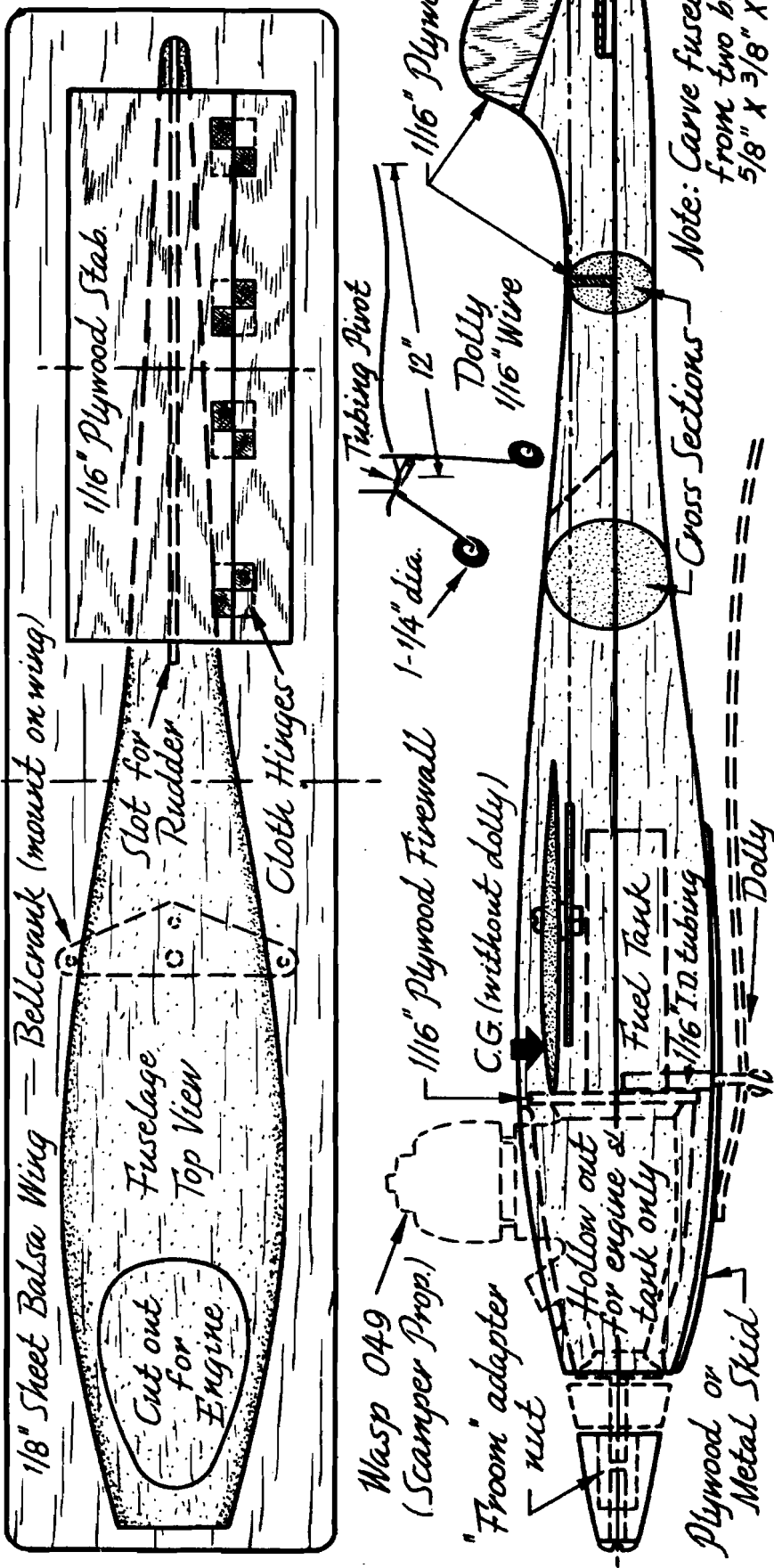
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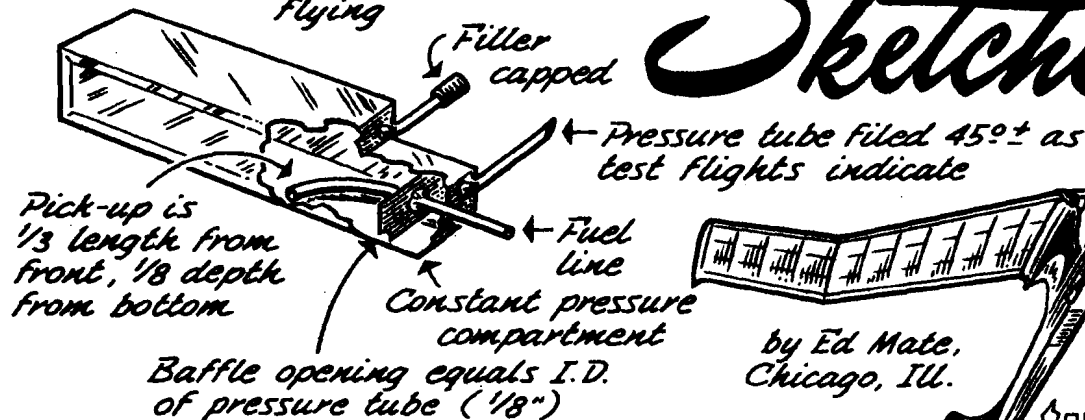


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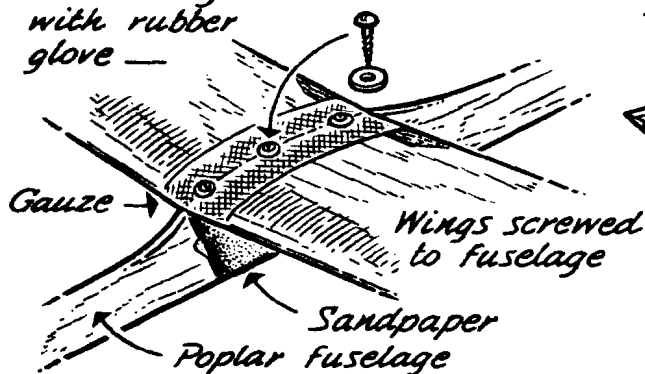
"Constant Pressure" tank used  
by Tony Grish (137 m.p.h., cl. B)  
... shown for counter-clockwise  
flying



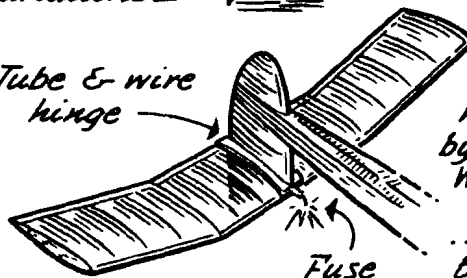
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from bottom

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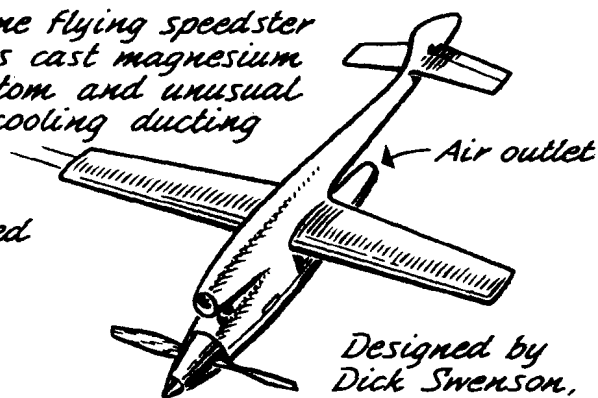
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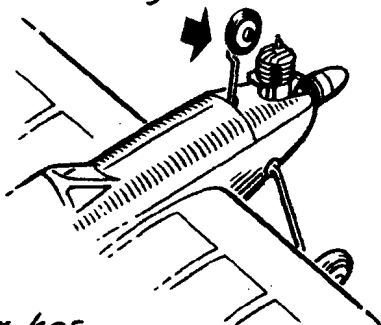
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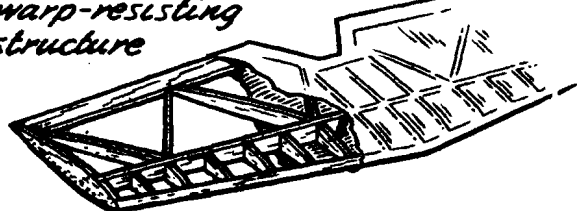


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Little Rock, Ark.

Stunt model seen  
with emergency inverted  
landing wheel

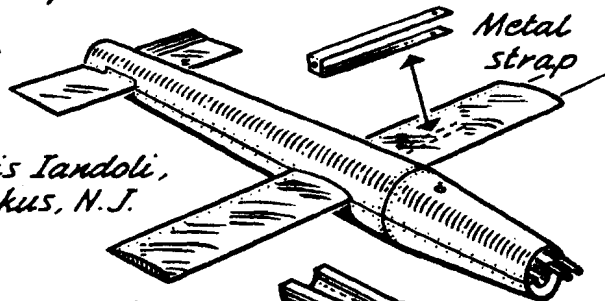


Gas model stabilizer has  
warp-resisting  
structure



by Douglas Taffinder,  
Brooklyn, N.Y.

Enclosed-engine jet has done 150 mph  
... placed 3rd. at Nationals—



Lewis Iandoli,  
Hoboken, N.J.

All metal

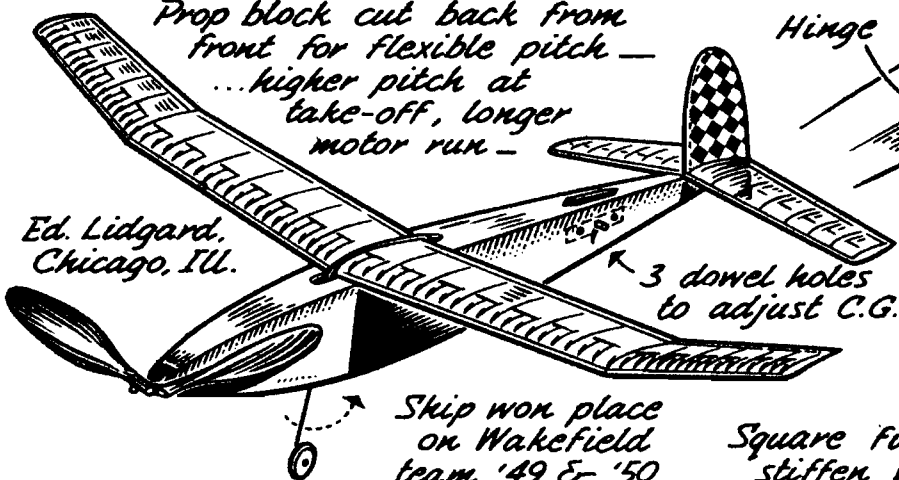
"U"-section tank

# Sketchbook

# at the NATIONALS

Prop block cut back from front for flexible pitch —  
... higher pitch at take-off, longer motor run —

Ed. Lidgard,  
Chicago, Ill.



Hinge

Fuse

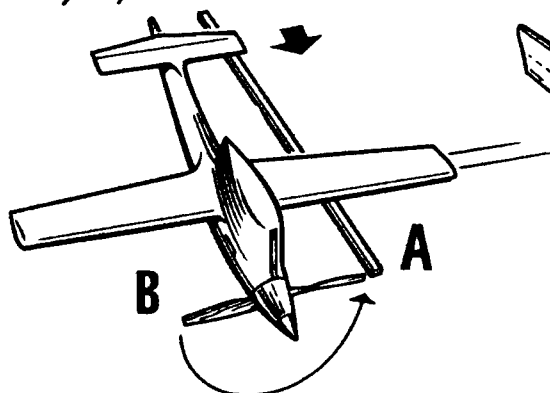
Toy plastic boat holds parachute dethermalizer —

K.D. McCall, Winnipeg, Canada

By R.E. Lux,  
Inglewood, Calif.

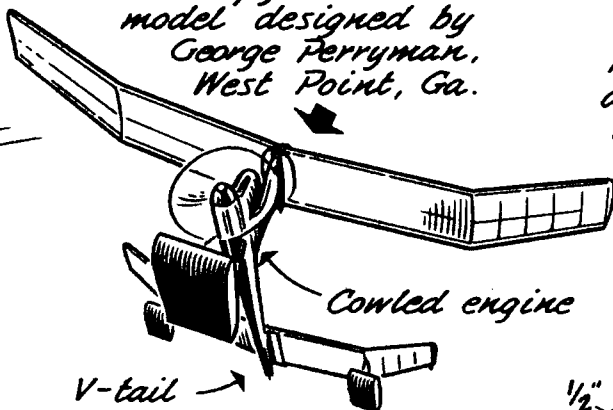
Square fillers stiffen wing trailing edges and ribs

A reminder to check propeller "track"

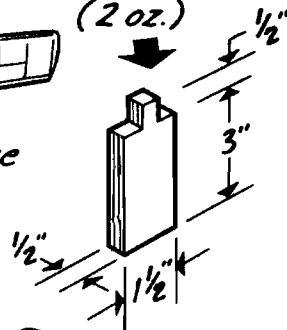


Hold strip against wing & tail, check tips A, B against end.

R.O.W. pylon model designed by George Perryman, West Point, Ga.

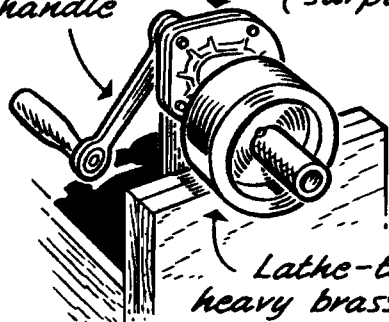


"Half-A" PAA payload dummy used at Nationals (2 oz.)



80:1 ratio ball-bearing gear box (surplus)

Ratchet wrench handle

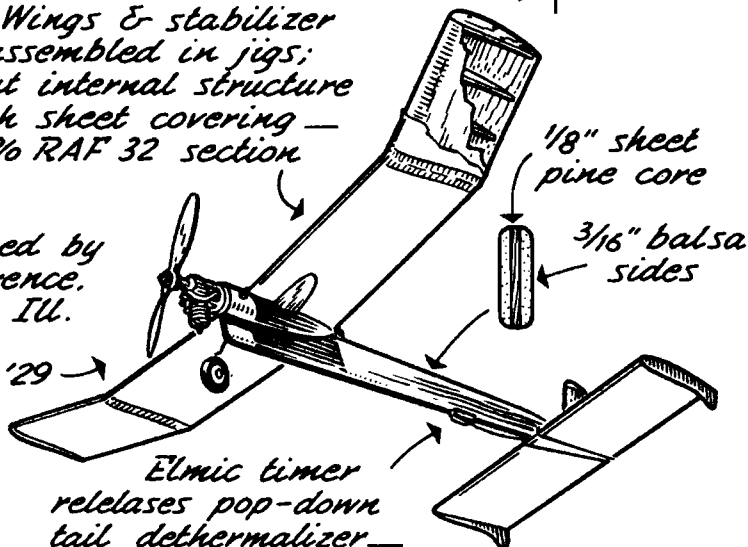


Excellent manual starter, by Rowland Grow, Los Alamos, N.M.

Wings & stabilizer assembled in jigs; light internal structure with sheet covering — 10% RAF 32 section

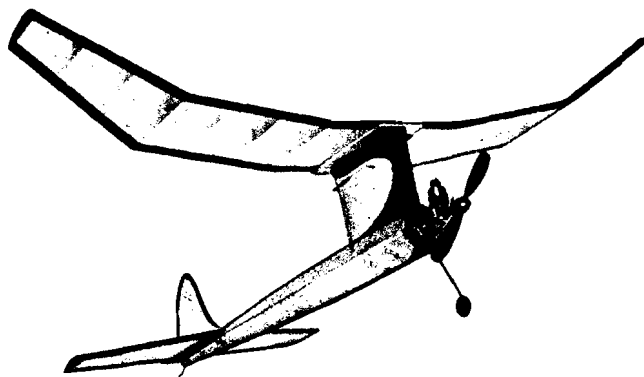
Designed by Bob Lawrence, Rockford, Ill.

Torpedo '29

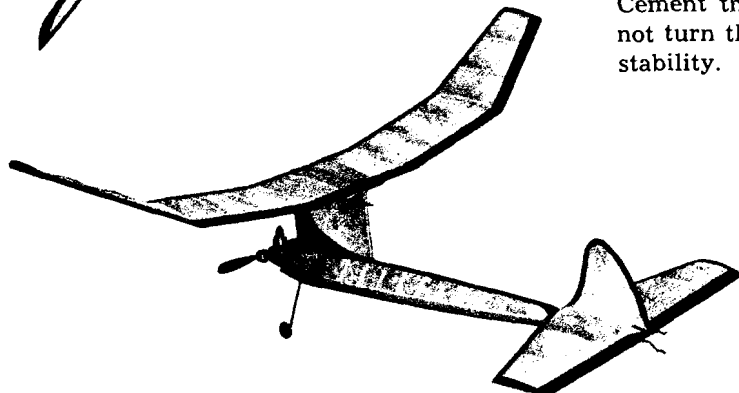
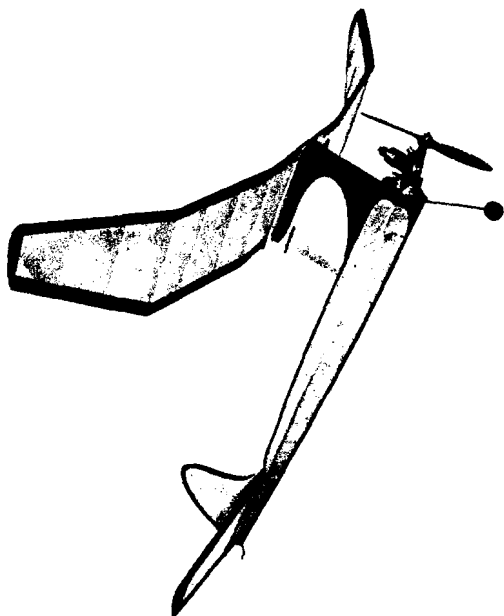
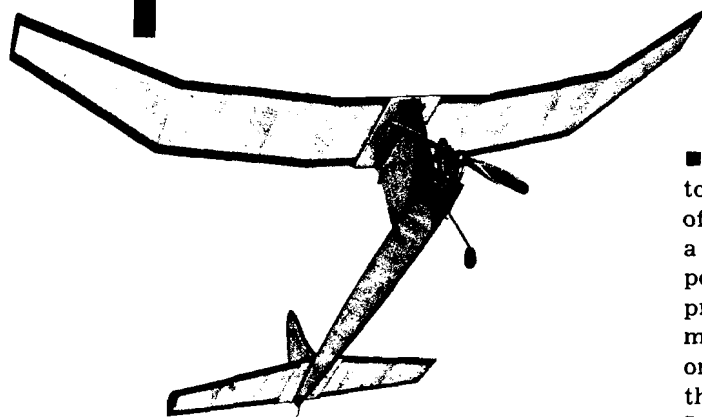


# Little Twister

By FRANK EHLING



**Prediction for 1951: This model will capture many first places, set numerous A/2 records**



■ Most of the flight adjustments are built into the Twister to make flying easy. A model with the wing and tail out of line that flies well is nothing unusual these days. It's a lot easier to make a model turn in the glide and under power by tilting the stab than by other adjustments. The proper amount of tail tilting must be determined for each model since a wing may have been warped a little to help or retard the turn. This shows up in the glide. A model that has a stalling turn will rarely spin under power. Instead it will climb well and then stall in the glide. This can be taken out with "turn." You can get the most out of your Twister with true surfaces, a tight turn in the glide and a little offset in the thrust (if the model doesn't climb in a definite pattern).

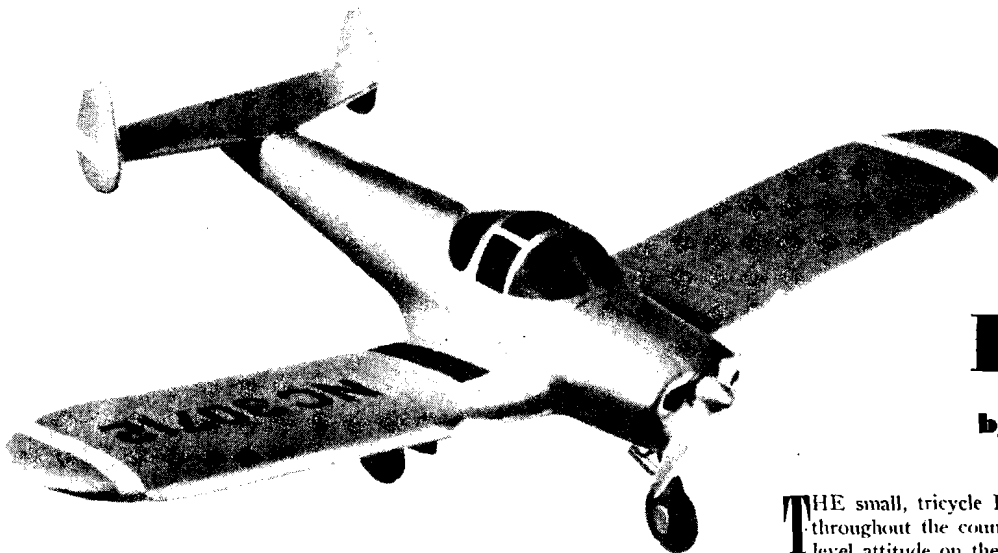
Start by building two fuselage sides. Cut out pylon, cement on wing platform. Add cross-pieces to sides, omitting those at top, right front. Cement pylon in place. Add remainder of cross-pieces and fill-in sheet. Add firewalls with landing gear in place. Fuel-proof this thoroughly. Cement stab platform in place with the wire parts; re-cement when dry.

Cut the wing ribs from "C" stock balsa to keep them from warping. Shape leading edges and cut to length along with trailing edges. Lay these down first, cementing gussets, then the ribs in position. Use light balsa for the tips. Sand wing parts, then re-cement joints again to prevent warping.

The stab is made the same as the wing. Cut the rudder to shape; sand leading and trailing edges. Cement the rudder in straight, as it does not turn the model but gives it directional stability.







# ERCOUPE

by H. A. THOMAS

(What favorite lightplane would you like to see included in this series? We will appreciate your letters, telling us of your choices, together with comments on and criticisms of this series of models.--Ed.)

THE small, tricycle Ercoupe is a familiar sight on most airports throughout the country. Its distinctive, clean lines and its low, level attitude on the ground make it easy to recognize. Equally unusual, though not obviously so, is the Ercoupe's simplified, two-control system. With ailerons and rudders coupled, it is said to be driven rather than flown. A steerable nosewheel combines with the craft's unusual visibility to make taxiing safe and easy.

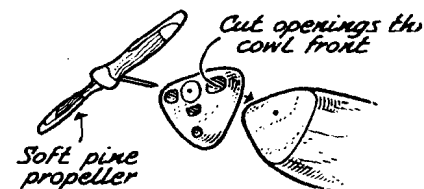
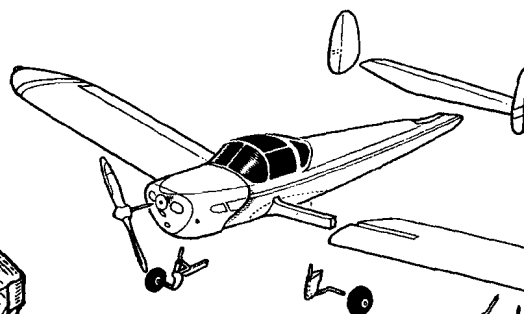
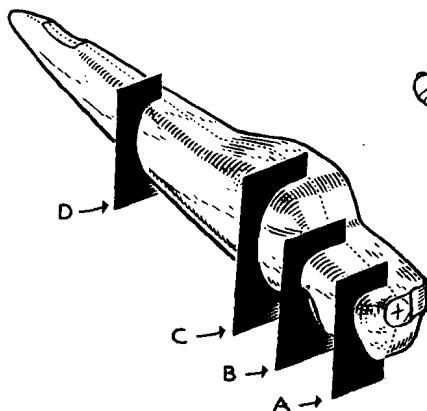
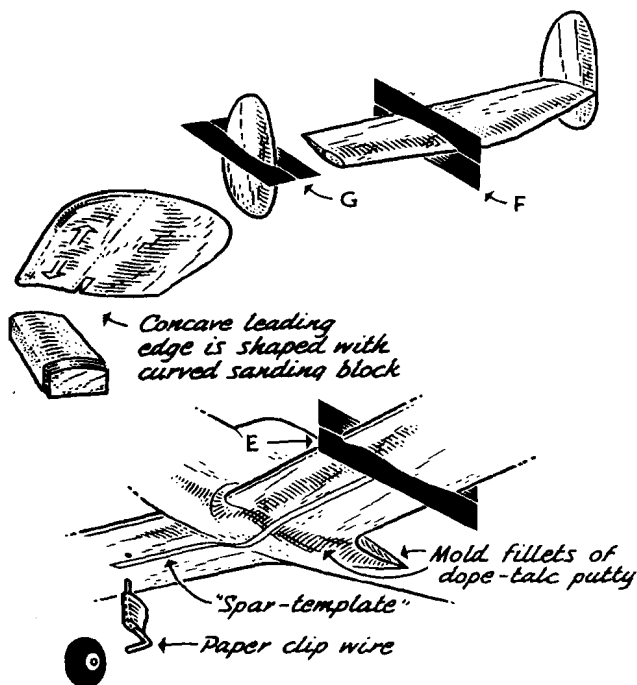
To sum up a few of the Ercoupe's many noteworthy features, we will add: The ship can be mastered by the student in something like half the dual instruction time ordinarily required; classified as "spin-proof," the Ercoupe is also virtually stall-proof; operating economy and flight performance, together with passenger comfort, make it the favorite of many flyers.

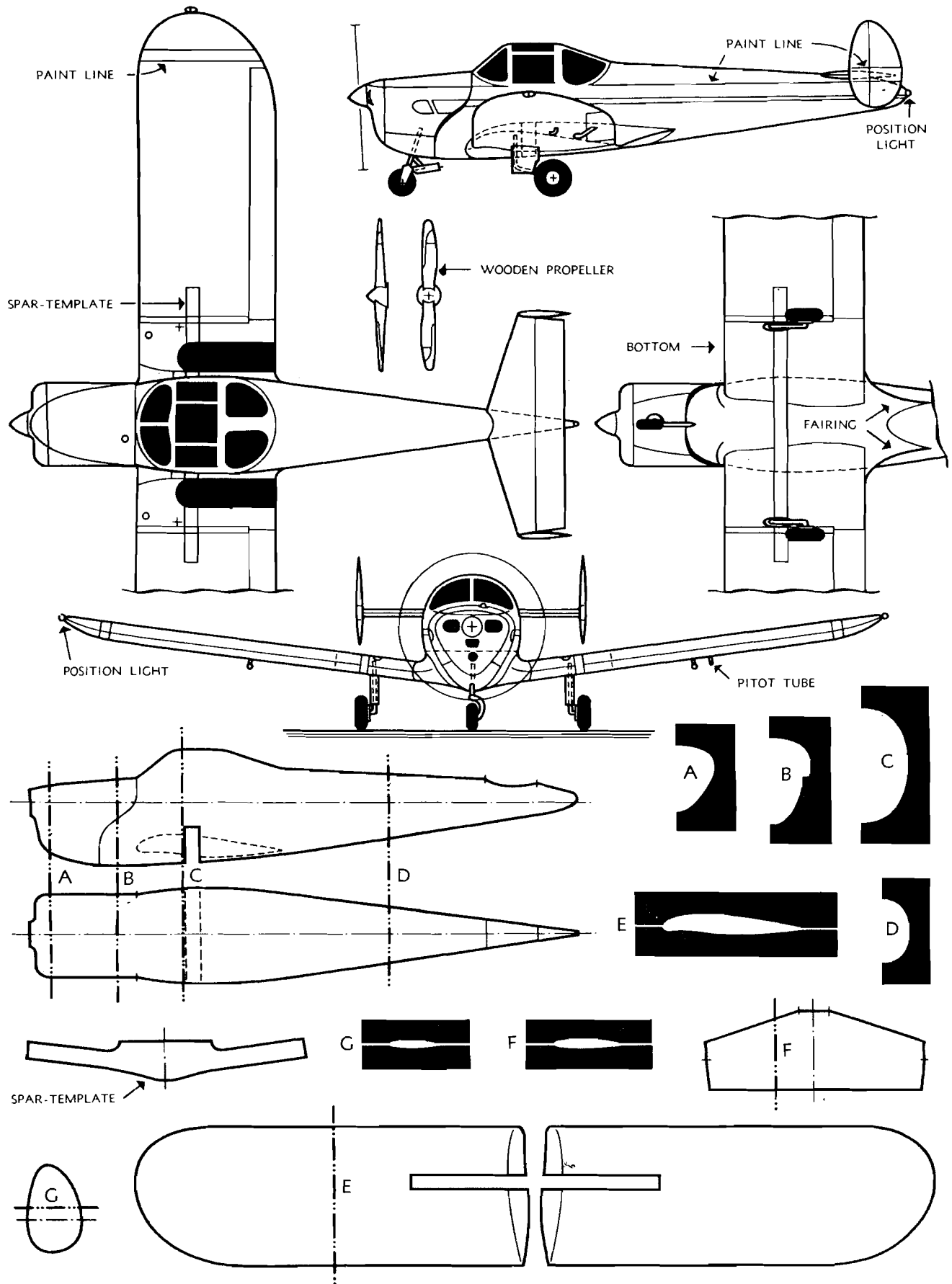
A little extra time spent in selecting balsa of firm, uniform texture is justified before starting the Ercoupe model. Saw the parts to outline shape after tracing the patterns to the wood with a soft, well-sharpened pencil. Shape the fuselage by frequently checking the templates at their respective positions. Wing and tail parts should be carefully tapered in section to sharp trailing edges. Check alignment carefully during assembly.

Make the nose section separate, if you wish, to facilitate recessing the air intakes in the cowl front. To make sure the model will rest on all three wheels, ballast of lead or solder may be added inside the fuselage nose. Wheels and propeller are best made of bass or pine. The landing gear struts of paper clip wire are forced deeply into wings and nose for a firm base. Balsa fairings are added later.

Build up the wing fillets of talc-dope putty and sand smoothly. As a primer to the wood filler, dope the entire model lightly. Use successively finer grades of sandpaper to achieve an over-all smooth, grainless finish before applying the silver dope.

Mask the cockpit windows with Scotch tape and paint them flat black; the top panel green. Add the trim lines in color, again using strips of Scotch tape for masking. CAA registration numerals may be added to upper right and lower left wings and vertically on the outer surface of each rudder.





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**...WORTH A LOT MORE!**

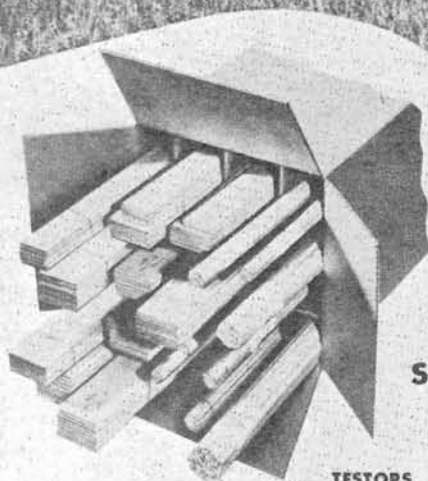


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ENGINE FUEL



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ROCKFORD, ILLINOIS

# AIR YOUTH GLIDER NO. 2

By W. F. Tyler

**A WELCOME CLASS PROJECT IS THIS PROFILE-TYPE  
GLIDER MADE OF BRISTOL BOARD AND HARDWOOD.**

**T**HE second project in this series of classroom designs has a more authentic resemblance to full-scale gliders, though it retains the simple construction of the first hand-launched project because of the easy-to-build profile-type fuselage. Two-ply Bristol board and pine replace the usual balsa-and-tissue construction, but the additional weight does not handicap performance. The plans are reproduced in full size.

Make accurate tissue patterns of all surfaces; then, using carbon paper, transfer all surface outlines onto ordinary two-ply Bristol board (obtainable in any art supply store). Use shears to cut out these outlines. Remember that there are two sides to the fuselage and two wing panels. Now cement the pine framework in place as shown by the plan, using plenty of cement on all joints to assure adequate strength. When thoroughly dry, cement the other fuselage side in place, and complete by adding the cockpit cover (Cellophane from a cigarette package) and tow-line hook (an ordinary paper clip). For details of fuselage construction see Fig. B.

The wings are made by bending back the additional area shown on the leading edge of the wing and cementing it in place; this serves to reinforce the wing structure. Using  $\frac{1}{16}$ " pine, cut out the wing ribs from the full-size templates and cement into their proper locations as shown on the drawings. Use straight pins to hold the Bristol board in position during this procedure; Scotch tape is handy for holding the edges in place. Note that the end rib (A) is set with a slight bevel to correspond with the one-inch dihedral angle. Figs. A and B illustrate wing construction.

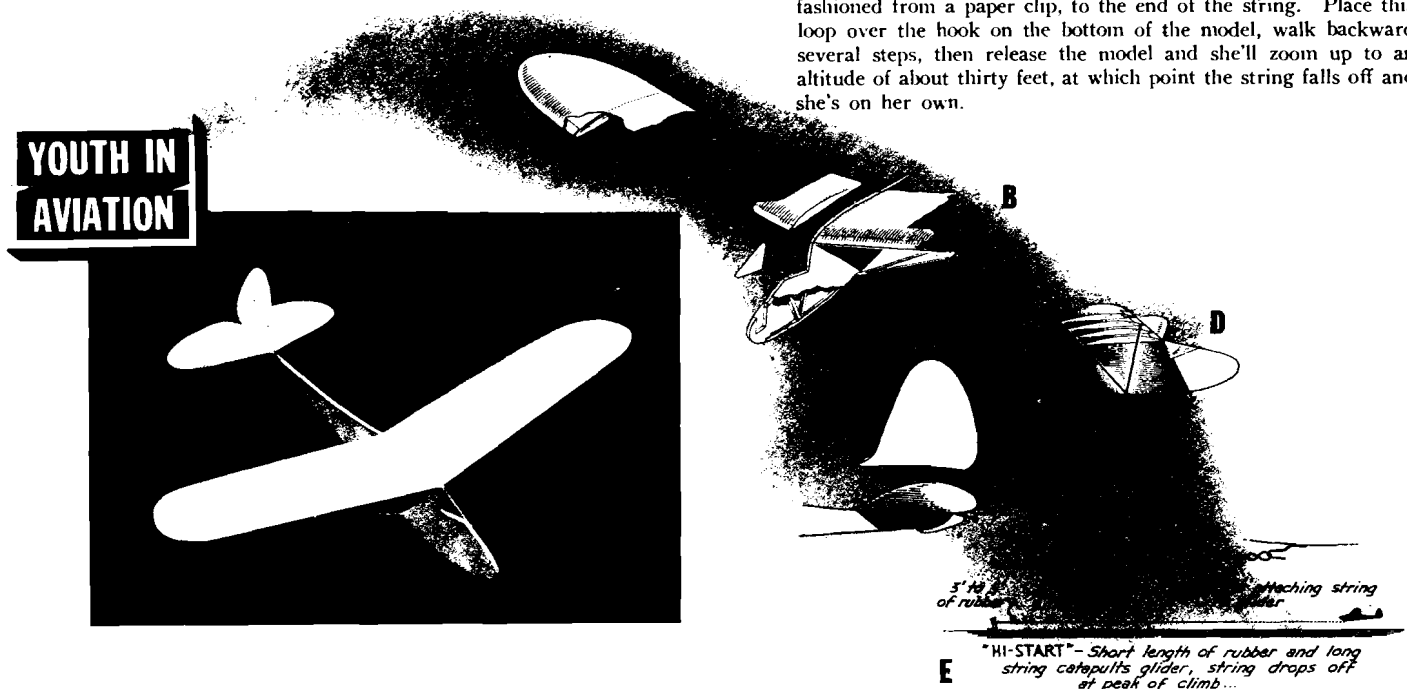
While the wings are drying, cement the stabilizer into position on the fuselage. Note that the fuselage has, at the point of attach-

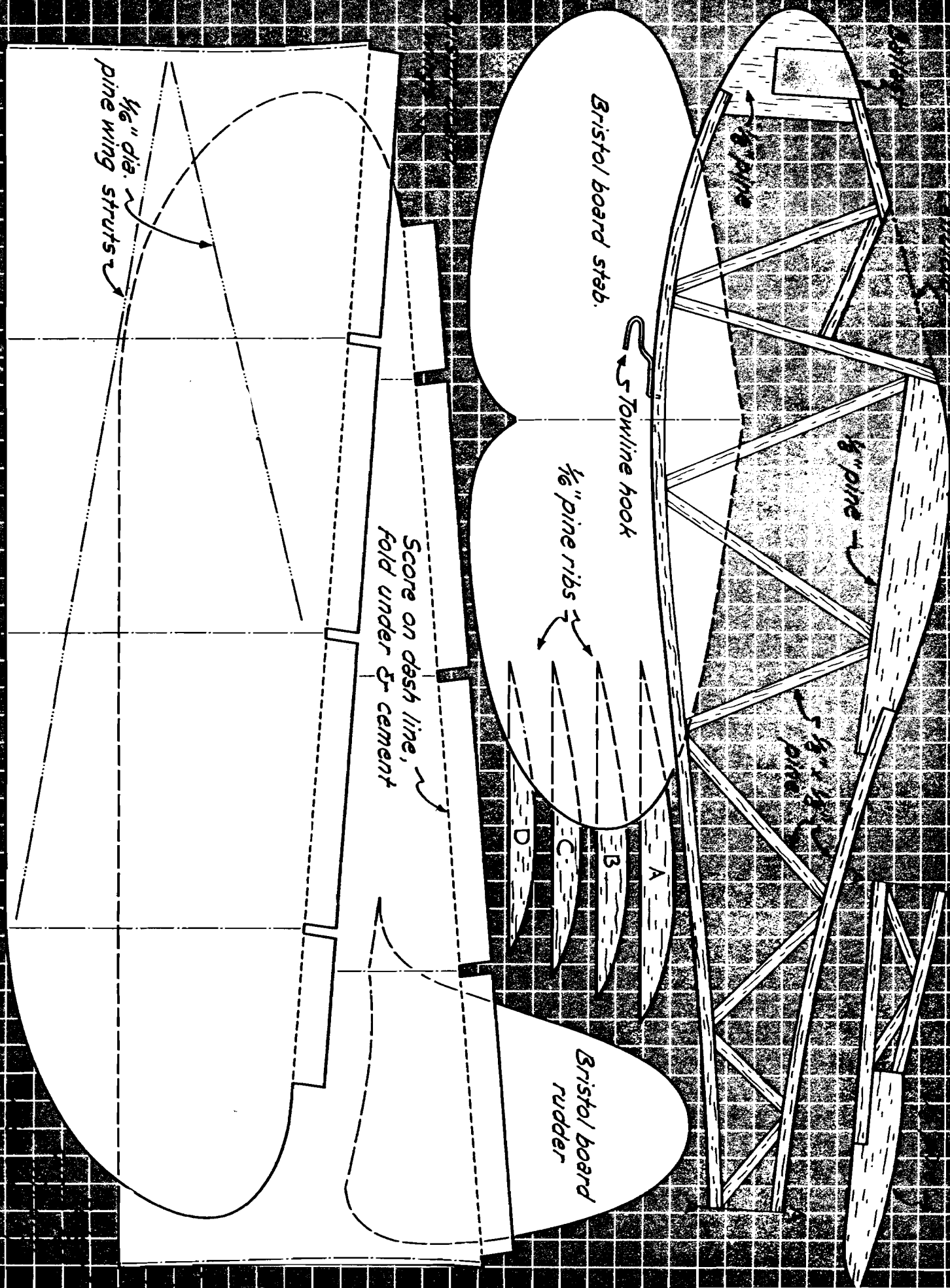
ment, a convex contour, which is transferred to the stabilizer (giving rigidity) when the latter is cemented in place. See Fig. C. If this does not stiffen the stabilizer sufficiently, fashion two pine struts from  $\frac{1}{16}$ " pine, cementing one end of each strut to the bottom of the stabilizer and the other end to the bottom of the fuselage. After the stabilizer has dried thoroughly, add the rudder, taking care that it is cemented in line with the fuselage when viewed from the top of the fuselage and along the front. Again, if the rudder seems too flexible, correct by attaching pine struts from the middle of the rudder to the stabilizer. The grade of Bristol board used will determine the necessity for using struts.

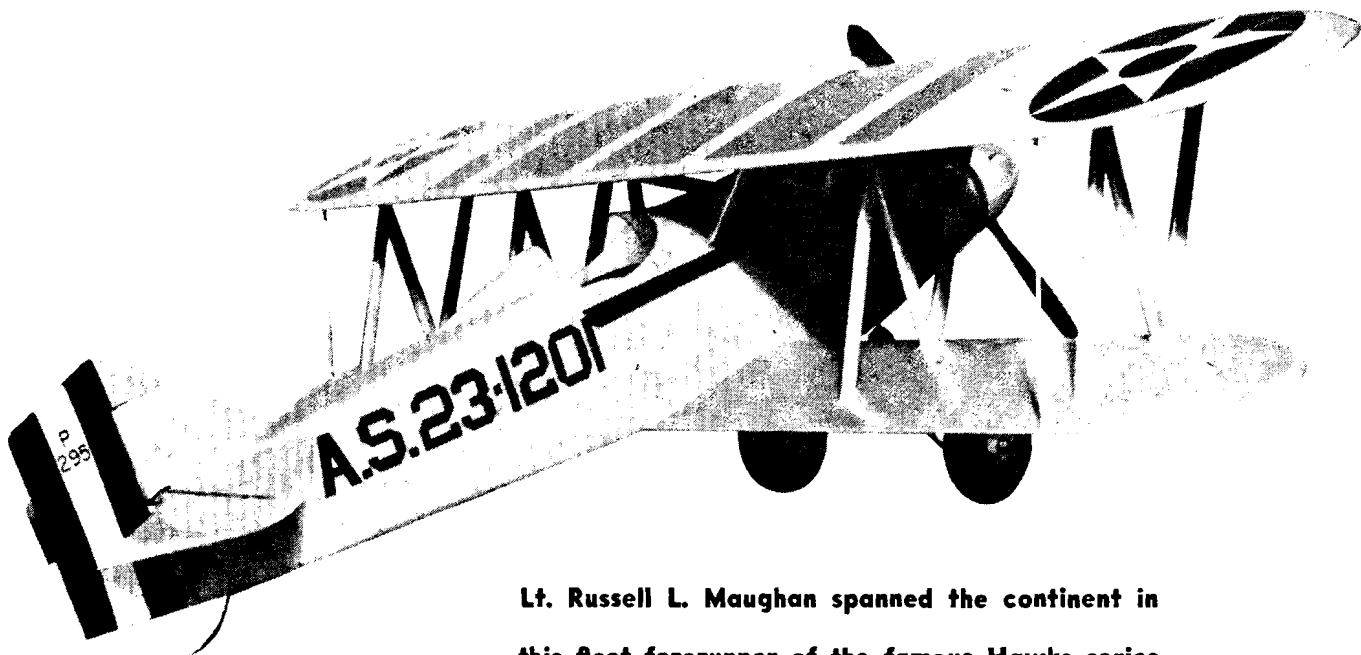
Cement one wing panel in position and add the two pine struts (Fig. D). While this is drying, sight along the leading edge of the wing to make certain the wing panel is not warped; any such warping may be corrected by adjusting the struts at the point where they attach to the wing. Complete the model by adding the other wing panel.

The model should balance at a point approximately one third of the distance back from the leading edge of the wing. To obtain this adjustment, weight (solder scraps are ideal) must be added to the nose of the model. Now try gently launching the model from the hand to the ground. If the model stalls, more weight should be added to the nose until an even glide results. If it seems nose heavy, part of the weight must be removed; experiment with several trial glides to get the correct balance. If the model tends to be heavy in either wing, correct by slightly bending down the trailing edge of the heavy wing.

After these preliminary adjustments, thrilling flights can be made by using a catapult launching method. Drive into the ground a stake to which is attached a short length of  $\frac{1}{8}$ " rubber band tied to about thirty feet of string. See Fig. E. Tie a small wire ring, fashioned from a paper clip, to the end of the string. Place this loop over the hook on the bottom of the model, walk backward several steps, then release the model and she'll zoom up to an altitude of about thirty feet, at which point the string falls off and she's on her own.







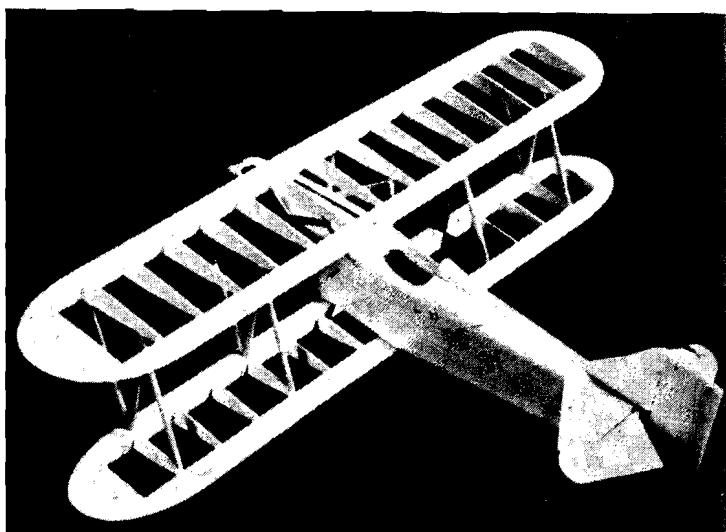
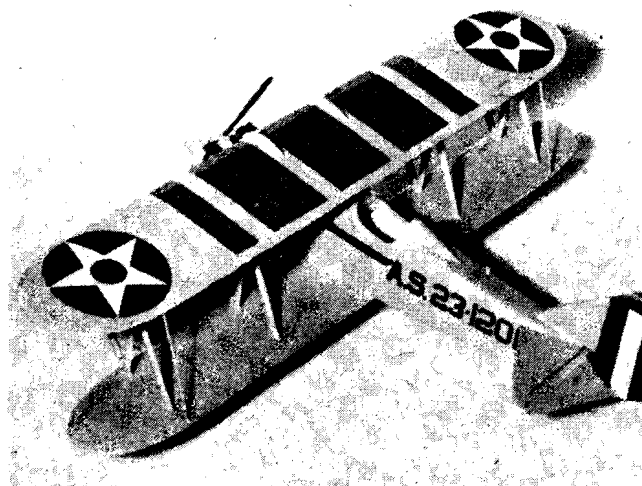
Lt. Russell L. Maughan spanned the continent in this fleet forerunner of the famous Hawks series

## Curtiss XPW-8

By WARNER FRAKE

**D**URING the years immediately following the end of World War I, the military services of the United States encouraged the development of racing planes and the Pulitzer Trophy Race resulted in some keen competition between the Army and Navy.

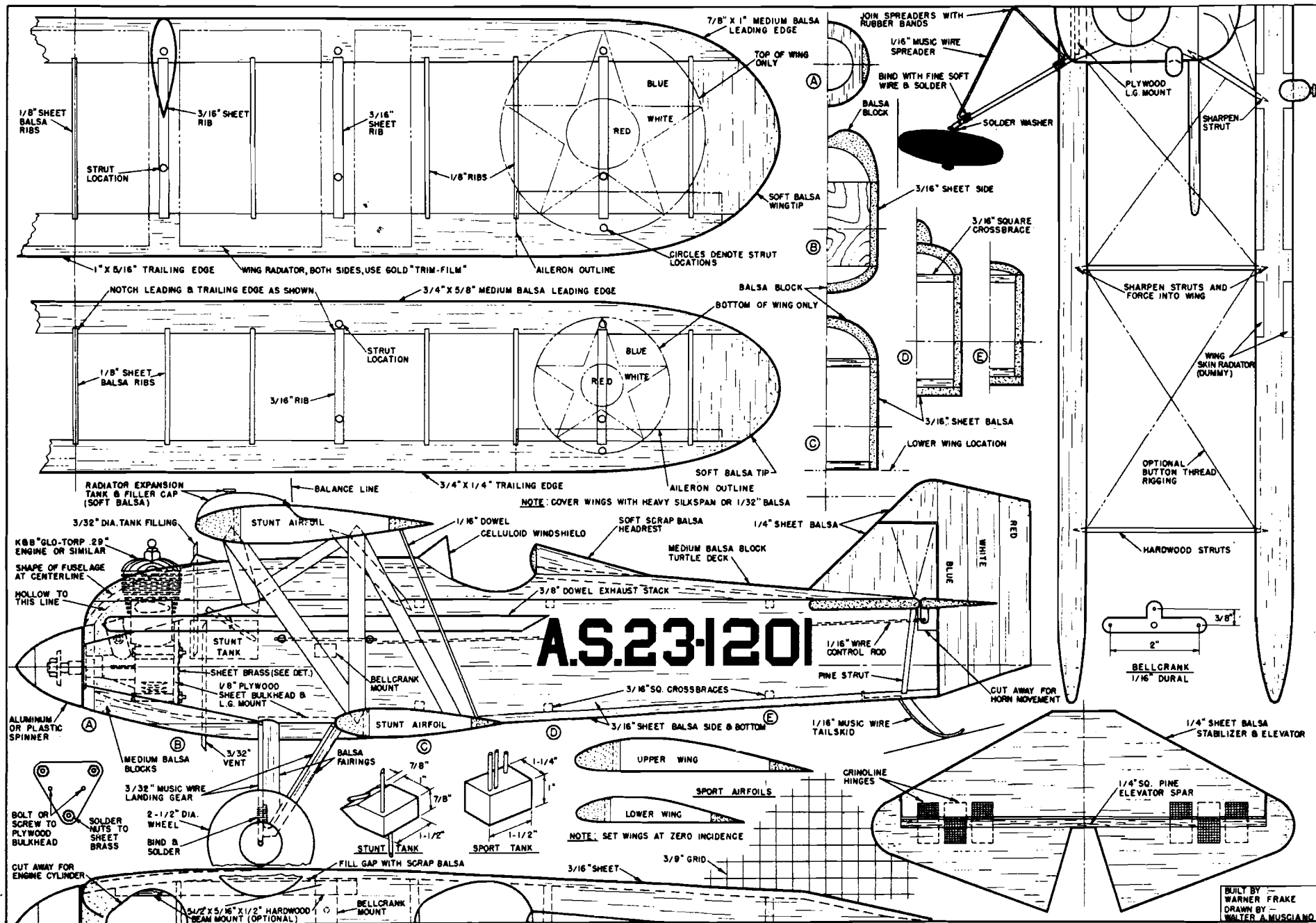
Considerable design experience was gained from the Navy Curtiss R2C and R3C racers while the Army learned much from its Curtiss R-6 and R-8 racers. The results of this experience were incorporated in a newer Army model in 1923. This plane was the Curtiss XPW-8 and was powered with a Curtiss D-12 "V" type liquid-cooled engine of 440 hp. Although only three planes of this type were built, the U. S. Army ordered twenty-five slightly modified



● Construction is a cinch: sheet slab sides, wings have no dihedral or sweepback. Goes low 'n' slow on a .19; hot as blazes with a .49.

● Choice of airfoils is offered—stunt fans should use the symmetrical section; Sunday flyers will probably stick to the sport section.





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WARNER FRAKE  
DRAWN BY  
WALTER A. MUSCIANO

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### 1950 CLASS "HALF-A" AND "A" LEADERS



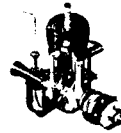
All Complete with Glow Plug

.049—for indoor flying, sports flying and free flight.....	\$4.95
.074—for stunting and speed flying.....	\$5.95
.099—the high output value leader in the A Class.....	\$5.95
<b>Special Combination Packages—OK</b>	
Cub .074 or .099 plus propeller, switch type gasoline tank and neoprene tubing.....	\$6.75
.049 Combination Package.....	\$5.75

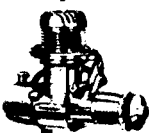
### 1950 CLASS "A" SPECIAL

**"OK" Bantam Glow Plug Model**—A better-than-ever edition of the famed record breaker. Designed by noted engine designer Ben Sheresaw. Weight 3 1/4 oz. with range from 2,500 to 11,500 rpm. Complete with glow plug, less tank..... **\$7.95**

**Spark Plug Model**—Complete with plug and tank..... **\$9.95**



### 1950 CLASS "B" LEADERS



**"OK" Hot Head Glow Plug Model**—New features include ebonized cylinders, gold anodized high-compression cylinder. Complete with glow plug and tank..... **\$9.95**

**"OK" Super 29 Spark Plug Model**—Complete with aluminum tank and spark plug..... **\$11.95**



### 1950 CLASS "B" BARGAIN OF THE YEAR

**"OK" Mohawk Chief Glow Plug Model**—A high quality precision engine in the low price field. Superbly engineered—features high grade metals and alloys. Block tested with full 60-day guarantee. Complete with glow plug and tank..... **\$8.50**

**Spark Plug Model, with plug and tank.....** **\$9.50**



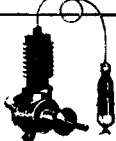
### 1950 CLASS "D" LEADERS

**"OK" Super 60 Glow Plug Model**—With new ebonized cylinder, gold anodized cylinder head, aluminum crankcase, large ball-bearing. Complete with glow plug and tank..... **\$9.95**

**Spark Plug Model, with tank and plug.....** **\$11.95**



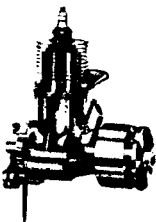
### 1950 "OK" CO2 IGNITIONLESS



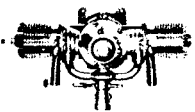
A cinch to mount. Complete—ready to run—without plug, coil, condenser, battery, booster, wiring, timer or needle valve to worry about. Simple, safe, it runs on compressed carbon dioxide. Weighs only 3/4 oz.—up to 7,000 rpm..... **\$4.95**

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designs which had the cooling radiators under the nose instead of being built into the top wing. These aircraft were designated PW-8 and became the standard Army pursuit plane until the Curtiss Hawks were evolved.

Lt. Russell L. Maughan (the Pulitzer Trophy Race winner in 1922 at Detroit) flew 2,670 miles from Mitchel Field, Long Island, to Crissy Field, San Francisco in his XPW-8. This flight took 21 hrs., 48 mins., 30 sec. and attracted world wide attention because he had spanned the American continent from dawn to dusk, on June 24, 1924, thus setting a transcontinental record. As a matter of fact, Lt. Maughan is known as the "dawn to dusk flyer" because of this flight.

Armament of the XPW-8 consisted of one .50 caliber machine gun and one .30 caliber machine gun both firing through the propeller arc. The maximum speed of this design was 168 mph.

With 285 square inches of wing area, our XPW-8 model performed stunts beautifully, and a sport airfoil has been included on the plan for those modelers who do not wish to stunt. We used a K & B Glo-Torp .29 engine. However, any engine from .19 to .49 can be used although the .49 installation is recommended for the experienced builder only.

Begin construction by cutting the fuselage sides from 3/16" medium balsa sheet. Make certain you cut out for the lower wing and stabilizer. Join the rear of the fuselage sides and cement the 3/16" cross braces in place at station E. Add the remaining cross braces and plywood bulkhead B. While this is drying, the wire landing gear can be bent to shape and joined together. This assembly is then wrapped to the plywood platform with crinoline and cemented well. The plywood platform can now be securely cemented to the fuselage sides.

Cut the tail surfaces from 1/4" sheet balsa and sand to a streamline cross section. Attach the control horn in place and hinge the elevator to the stabilizer. Cement the stabilizer to the fuselage. Mount the dural bellcrank to the 3/8" x 1/2" pine block and attach the .025" music wire lead-out lines. Glue the bellcrank assembly to the fuselage and install the control rod. The engine is now bolted to the plywood bulkhead. Although we used a radial mounting, a beam mount can be installed as the plans show. On the radial mount we suggest soldering the nuts to a sheet of tin or brass and bolting it to the rear of the bulkhead in order to prevent the nuts from dropping off inside the fuselage where they are not accessible.

Install the fuel tank, either stunt or sport. Cement the nose former A in place. Apply the 3/16" sheet bottom covering as well as the turtledeck and nose blocks. Select soft balsa blocks and use very little cement on them because they must be removed later. Carve the blocks to shape when the cement has dried and sand smooth. Do not neglect to cut away for the engine cylinder and exhaust. Carefully cut off the blocks and hollow as shown. Remove the engine and cement the blocks securely back on the fuselage. Bend the tail skid and cement to the fuselage bottom. Add the headrest and fin. Sand the fuselage and clear dope twice, sand again lightly.

The wings are the picture of sim-

plicity, no taper, dihedral or sweepback. Both are made in one panel from tip to tip. We suggest notching the leading and trailing edge for greater strength. First cut the ribs to shape and sand smooth, then notch the leading and trailing edges. Make these notches about 3/32" wide so the 1/8" ribs fit snugly. Insert the ribs into these notches and apply plenty of cement. Cement the soft balsa tips in place. When the structure is thoroughly dry, using a sharp knife or razor blade, cut the leading and trailing edge and wingtip to shape. Sand well. Both wings can be covered with either heavy Silkspan or 1/32" sheet balsa. In view of the fact that the full-scale plane had plywood-covered wings, the sheet balsa provides an exact scale appearance. We used heavy Silkspan on the prototype model with good results. Dope the Silkspan or Sky Sail with three coats of clear. Cement the lower wing to the fuselage.

Cut the pine struts to shape and sand smooth. Four sets of interplane struts are required (these are all the same length) and two sets of cabane struts must also be made. Clear dope, sandpaper and apply wood filler to the struts. Sand again.

Wood-fill the fuselage and empenage twice with intermittent sandings. Paint the entire plane before final assembly. The color should be aluminum throughout. Several coats of thin dope bring better results than a few thick coats. Sanding lightly between coats with finishing paper, we applied eight coats of aluminum dope. Rub down with rubbing compound.

Cement the struts to the lower wing and fuselage and be sure they are pushed into the balsa about 3/16" for added strength. The soft balsa radiator expansion tanks and filling caps are now painted and cemented to the top of the upper wing. The flush brass radiators on both sides of the top wing can be painted in place or, as we did, use sheets of gold Trim-Film. The upper wing can now be cemented in place. Add the celluloid windshield and black colored exhaust stack of dowel. The rudder stripes, star insignie and all lettering are made from Trim-Film. Add the stabilizer struts and 1/16" dowel aileron pushrod. All rigging is made from heavy grey carpet or button thread. A "Froom" aluminum spinner fits the model perfectly, but a balsa or plastic spinner of the correct shape will do. Slide the wheels on their axles and solder a washer to the axle to hold the wheels in place. Bend the control line guide from .032" music wire and attach securely to the interplane struts close to the wingtip.

A thin coat of transparent fuel proofer should be brushed on the entire model, including the cowl interior, to protect the finish from any "hot" fuels you may use. We found Comet Hot Fuel Proofer covers the model with a transparent, durable coating. A removable hatch should be cut in order to obtain access to the engine.

The model XPW-8 should balance at the point indicated on the plans. Strips of solder or lead shot can be firmly attached to the nose or tail to remedy any nose or tail heavy condition that may develop. Flight lines should be at least .012" thick and can vary from 35 to 60 feet. Long lines are suggested for performing stunts. Although it is not an absolute necessity, we do all our flying with a Jim Walker "U-Reely" control handle-reel combination.

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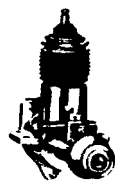
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### .049 "OK" CUB

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Complete with glow plug, less tank

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### .099 "OK" CUB

In the "A" Class it's... lightest in weight... highest in output... lowest in price!

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5<sup>95</sup>



### .19 "OK" BANTAM

Champion of champions—holder of more records than any other engine. Has disc rotary valve! Highest weight-power ratio. Weighs only 3 1/4 oz.

Complete with glow plug, less tank

7<sup>95</sup>

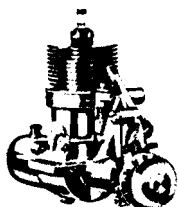


### .29 "OK" MOHAWK CHIEF

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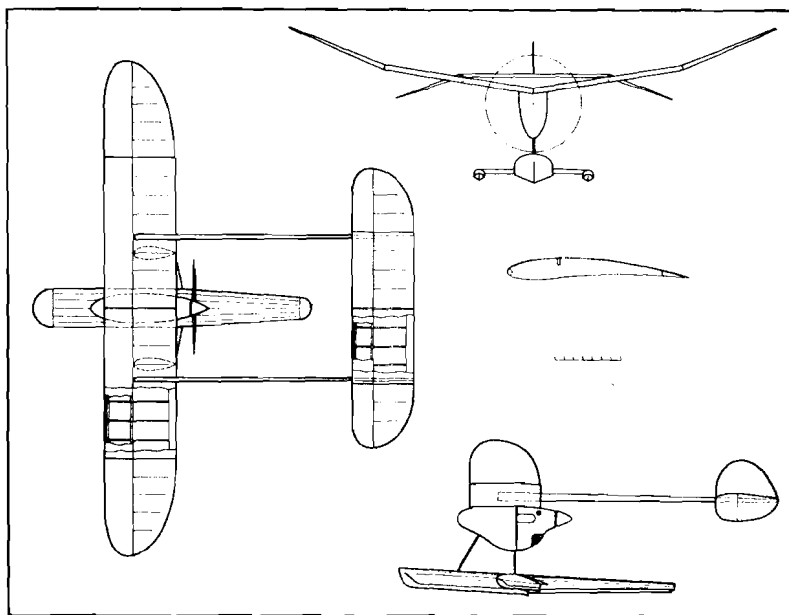
106 Harter St., Herkimer, N.Y.



# Performance



Henry Cole, now Ensign Cole, is one of the few builders who can truthfully say, "I designed it that way." Henry is not a "looks pleasing to the eye" artist, but has a legitimate reason for each line of his designs. Perhaps the reason is that "Hank" studied aeronautical engineering at the University of Washington, though, unlike many textbook theorists, he practices what he preaches. Even now, when on leave from the Navy he finds time to fly models with his chum "Chuck" Hollinger and the Tacoma gang.



**T**HE "Dry Duck" came into existence as a result of watching tractor-type hydros make like submarines. And once a motor gets dunked it takes time and patience to get it into running shape once again. An inspection of the model will reveal that the motor on Dry Duck will remain high and dry regardless of the position of the plane on the water (with one exception: the plane's turning upside down).

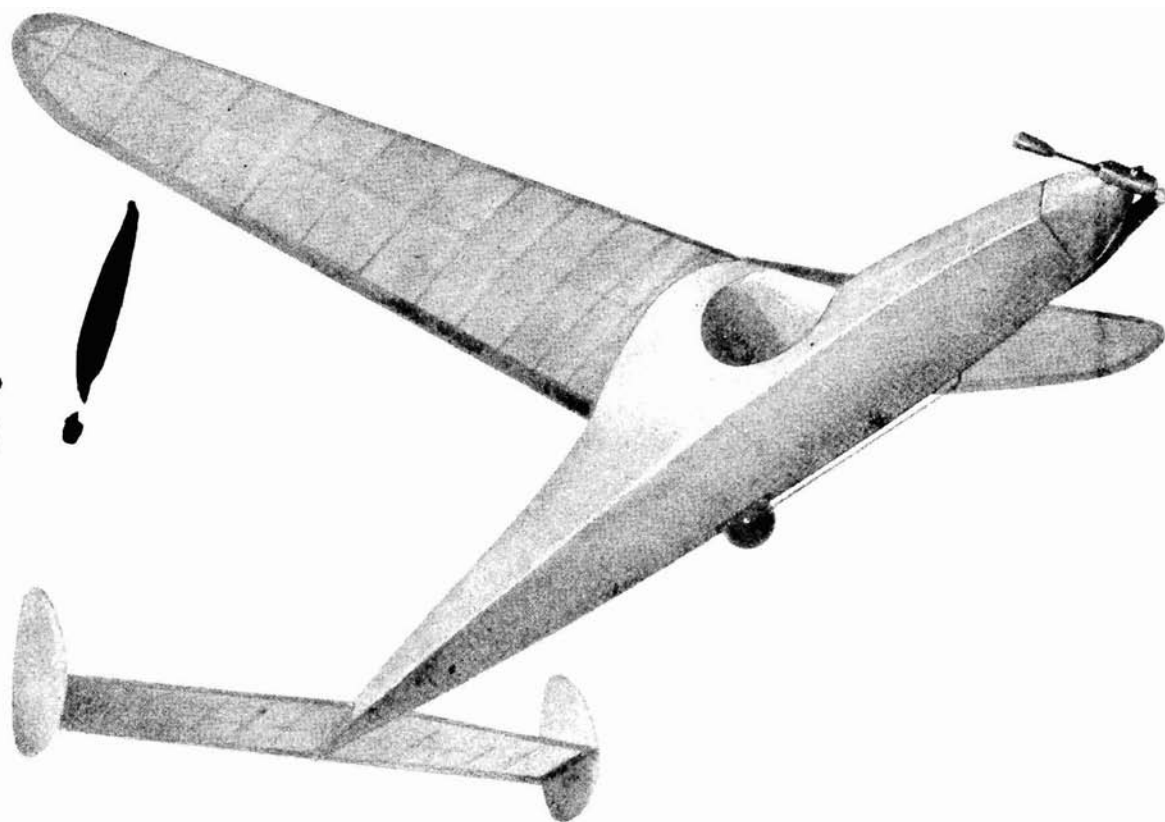
From a design standpoint, the pusher arrangement, which neces-

sitates placing the motor to the rear, induces a rearward placement of the center of gravity. To remedy this, a large lifting stabilizer is needed. While this arrangement gives an excellent glide, the climb is slightly slowed down due to the extra drag.

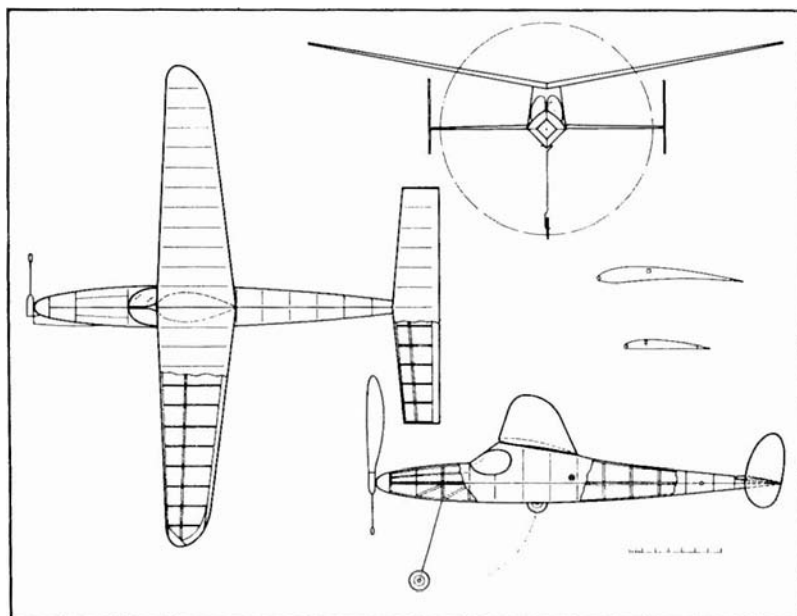
On the actual model the sponsons were a bit unstable on the water. Very likely twin floats would be better if you wish to build them. Span, 52". Wing and tail section NACA 6409. Powered by an Ohlsson "23."



Plus!



IT'S NOT ENOUGH JUST TO BUILD MODELS  
THAT FLY. LIKE REAL PLANES, WINNING  
MODELS ARE DESIGNED FOR A PURPOSE.



THE "Cirrus Cruiser" was designed primarily for a low sinking speed. To appreciate this design you would have to see it glide. The sinking speed is so low that one would suspect the model of being underweight. Calculations indicate that the minimum sinking speed would occur at a lift coefficient of 1.2 which for this wing is set at an angle of 10 degrees. The importance of this setting lies in the fact that the fuselage faces directly into the airstream thus offering its minimum resistance. This feature

alone reduces the drag of the model by about 15 percent.

The tapered wing and twin rudders were used to reduce the induced drag and a super finish served to reduce skin friction. This streamlining, combined with simple construction to obtain a high power-weight ratio, results in a tremendous climb and an extremely low sinking speed.

Wing span 36", NACA 6409 used. Prop 16" diameter, powered with 16 strands of 3/16", 30" long. Over-all length of model, 30".

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