



Sherry Sievers proudly showing off Al's Air Cabin, Jr.

AIR CABIN JR.

As the designer, Al Sievers states, why not rediscover how much fun and how relaxing it is to fly low and slow instead of high and fast. This will give you the ultimate relaxation which we all can use.



ABOUT THE AUTHOR

Al Sievers began his modeling activity about 25 years ago, starting with U-control and later into free flight. He was first introduced to R/C in 1967 while attending college. After graduation, he began designing his own R/C aircraft and will admit that his first design was a disaster. As time went on, subsequent designs were more successful. Several even won minor club contests. Al is self-employed in the landscape service, serving the greater Portland, Oregon area.

By Al Sievers

How would you like to break away from the super high and fast approach to our fascinating hobby? I don't know about you but I'm a bit tired of the guided-missile approach. Shaky palms and sweaty arm pits are reserved for those who don't seem to mind working at play! Why not rediscover how fun and relaxing it can be to fly low and slow instead of high and fast.

The Air Cabin Jr. is the product of over fifteen years of modeling, most of that in R/C and several months of doodling on paper. You know what I mean, letting your imagination wander in a meaningful way of course. Certain perimeters were kept foremost during the design, they are as follows:

1. Cabin type, attractive with a touch of realism.
2. 15-18 oz. per sq. ft. wing loading.
3. .29-.35 power.
4. Tail dragger for soft or grass fields.
5. Different looking tail section.
6. Forgiving, stable design, good for training new pilots.
7. Functional door for added realism.
8. Strong yet lightweight.
9. Name and design capable of Quarter Scale.
10. Modified Clark Y airfoil for super lift at slow air speeds.

The Air Cabin Jr. was designed for three channel control, making it an ideal trainer. If one wishes to include ailerons, I suggest the strip type as the barn doors tend to produce snap rolls into Mother Earth, unless coupled with rudder and/or differential movement. Furthermore, with the rudder area as designed, she turns on a dime and gives you the change ... for more balsa wood!

If you are looking for that ideal airplane and a hint of nostalgia, capable of low and slow flight to please the crowd and yourself, the Air Cabin Jr. will more than fill the bill. Perhaps you are looking for the lost art of relaxation—then you will thoroughly enjoy this unique airplane. The

prototype has been flown on calm days, four to eight feet above the ground. (Four feet for straight flight, climbing to eight feet on the banking turns.) I believe they call this flying uki style! One or two wheeled touch and go's are a snap. If that's not enough, try hopping fence posts; the ample elevator makes pitch changes quick and easy. Since it's still early spring here in Oregon, I can't try out the Air Cabin Jr.'s thermalling ability. However, with her large wing area and light wing loading, I am certain she will keep pace with the Cloud King and Buzzard Bombshell. As for her ability to perform aerobatics, in a word, I doubt it. Someone will undoubtedly stuff a 60 in her nose and send her screaming through the heavens; but she will never whisper sweet nothings if you treat her like that. Instead, why not let her fly the way she likes to be flown, on her wing not the engine.

In summary, the Air Cabin Jr. is a fun and pleasant flying R/C model aircraft. If built as per the plans and directions, she will surpass your expectations while providing you with loads of relaxation and enjoyment. I am confident you will agree after building and flying yours. Good luck, good building and happy flying!

Prior to beginning the construction portion, I would like to express my appreciation to John Evans, Portland, Oregon, for his professional, calligraphic touch in lettering the name of the fuselage.

Now let's stop gabbing, clear the



AIR CABIN JR.

Designed By:
Al Sievers

TYPE AIRCRAFT

Sport Trainer

WINGSPAN

65 Inches

WING CHORD

11 Inches

TOTAL WING AREA

715 Sq. In.

WING LOCATION

High Wing

AIRFOIL

Flat Bottom

WING PLANFORM

Constant Chord

DIHEDRAL EACH TIP

2 1/4 Inch

O.A. FUSELAGE LENGTH

45 Inches

RADIO COMPARTMENT SIZE

(L) 11 1/4" x (W) 3 3/4" x (H) 5"

STABILIZER SPAN

25 Inches

STABILIZER CHORD (incl. elev.)

7 Inches (Avg.)

STABILIZER AREA

175 Sq. In.

STAB. AIRFOIL SECTION

Flat

STABILIZER LOCATION

Top Of Fuselage

VERTICAL FIN HEIGHT

9 Inches

VERTICAL FIN WIDTH (inc. rud.)

6 3/4" (Avg.)

REC. ENGINE SIZE

.29-.35 Cu. In.

FUEL TANK SIZE

6 Oz.

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

3

CONTROL FUNCTIONS

Rud., Elev., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

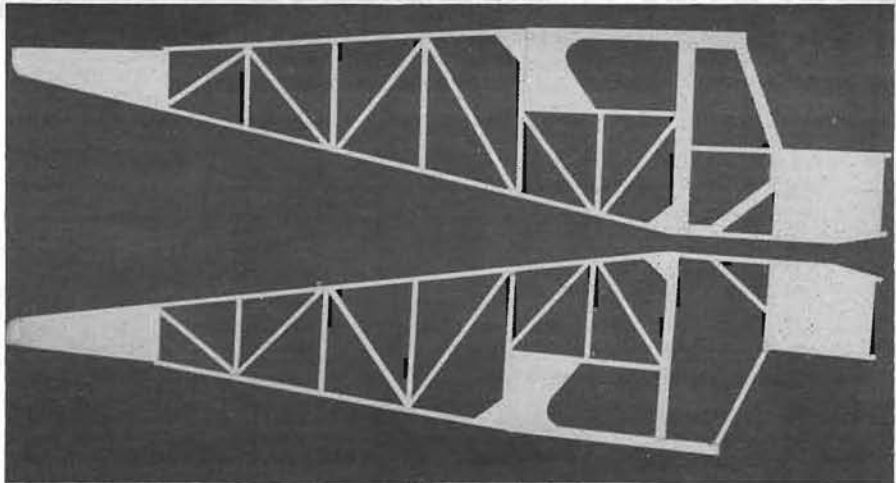
Fuselage Balsa, Spruce, Ply
Wing Balsa, Ply & Spruce
Empennage Balsa
Wt. Ready To Fly 80-88 Dz.
Wing Loading 16.1-17.7 Oz./Sq. Ft.

workbench and start building a most exciting and unique airplane . . . the Air Cabin Jr.

CONSTRUCTION

Fuselage:

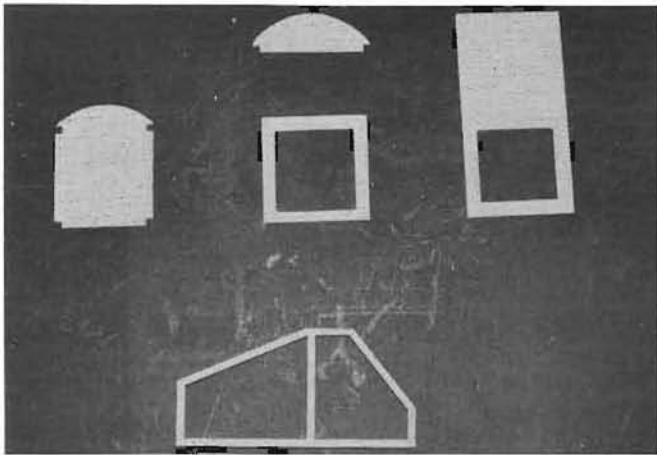
Begin by laying waxpaper over your plans. We don't need to stick the plans to our fuselage. Furthermore, plan paper makes poor covering! Cut to length the 1/4" sq. balsa forming the longerons, uprights, diagonals and functional door frame. Pin these pieces over the plan to assure proper fit. Use hard balsa for the fuselage corners, door frame and uprights under wing saddle. All other uprights and diagonals are soft balsa — especially in the tail section. Cut soft 1/4" sheet balsa for fill behind the side windows. Cut soft 1/8" sheet balsa for the tail post — fill to the front of the fin area. Cut soft 1/4" sheet balsa for the dowel, gusset, checking grain. Cut the 1/4" x 1/2" and 1/4" sq. spruce for cabin top area. Begin gluing all parts



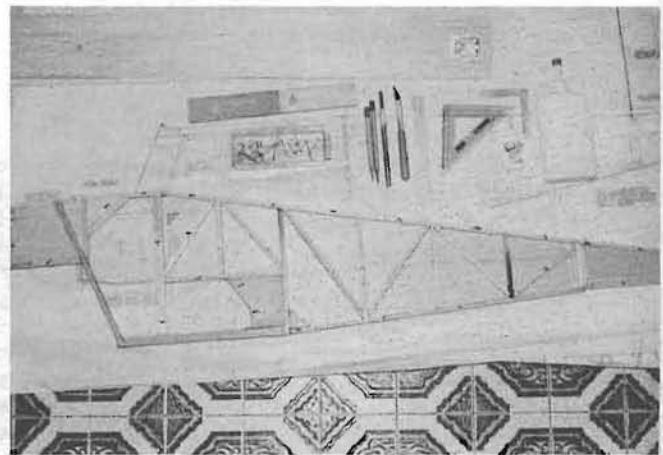
Both right and left fuselage sides complete in the first step.

and closure. Now check the grade of balsa between right and left sides selected for longerons; they must be the same if the fuselage is to go together at the tail post without

install the 1/4" soft balsa side filler from F-1 to, and including, the door frame. Do not fill under the side windows as this receives only 1/8" balsa sheeting on the outside. Note —



Ply bulkheads and hard balsa door frame.



Next step is to sheath the fuselage sides. Again, be certain you have done a right and left. Left side has the door cut out.

together. I used Zap/CA for all balsa to balsa parts and Devcon's Epoxy (5-minute) for spruce to balsa parts.

Check the fit of the functional door. It should have approximately 1/32" gap or a bit more, to assure opening

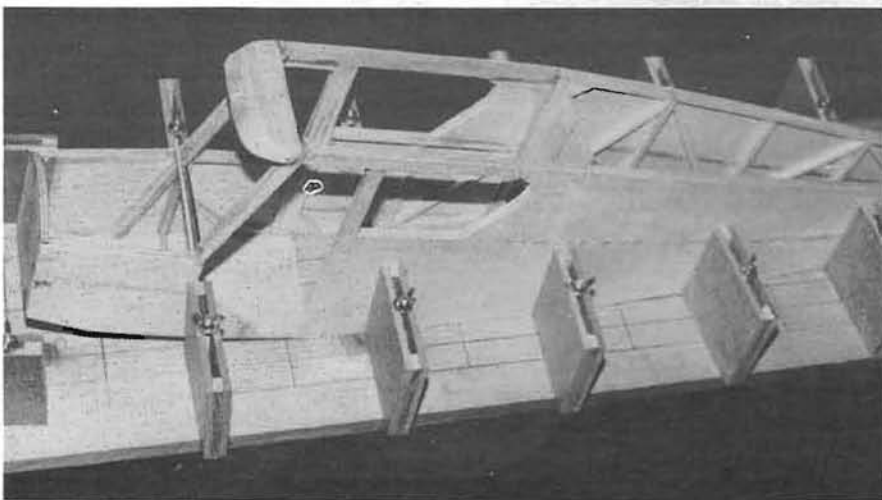
warping. Build the right side over the left side — this assures a perfect match between both. Remember to lay waxpaper between the sides to prevent sticking.

With both fuselage sides framed,

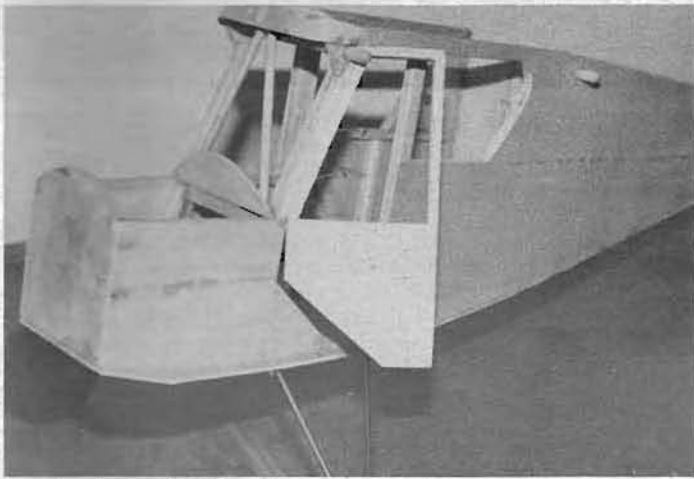
omit the right side fill until F-1 has been installed. Now pin both fuselage sides flat to the building board. Glue the 1/8" balsa sheeting to the "outside" of the fuselage. I used soft, contest grade in the tail section, medium balsa forward of the wing T.E. Note the grain direction when sheeting the uprights between the windows. I used Titebond glue for all sheeting areas.

Cut out the bulkheads F-2, F-2A and F-3 from 1/8" light plywood. F-1 is cut from 1/4" plywood. Set aside.

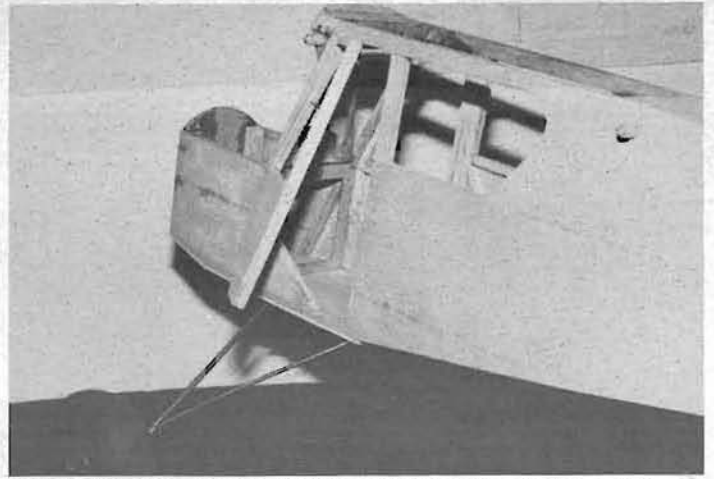
Install the 1/4" sq. spruce cabin brace to the 1/4" sq. balsa cabin frame upright. This member is vitally important because it provides structural support for the wing hold-down and cabin front area. Don't substitute balsa here. The 1/4" sq. spruce overlaps the 1/4" x 1/2" spruce wing support and extends to the cabin floor. Use slow setting epoxy and lightly clamp. Lay the fuselage sides on top of each other, checking the 1/4" spruce alignment. Allow to cure overnight.



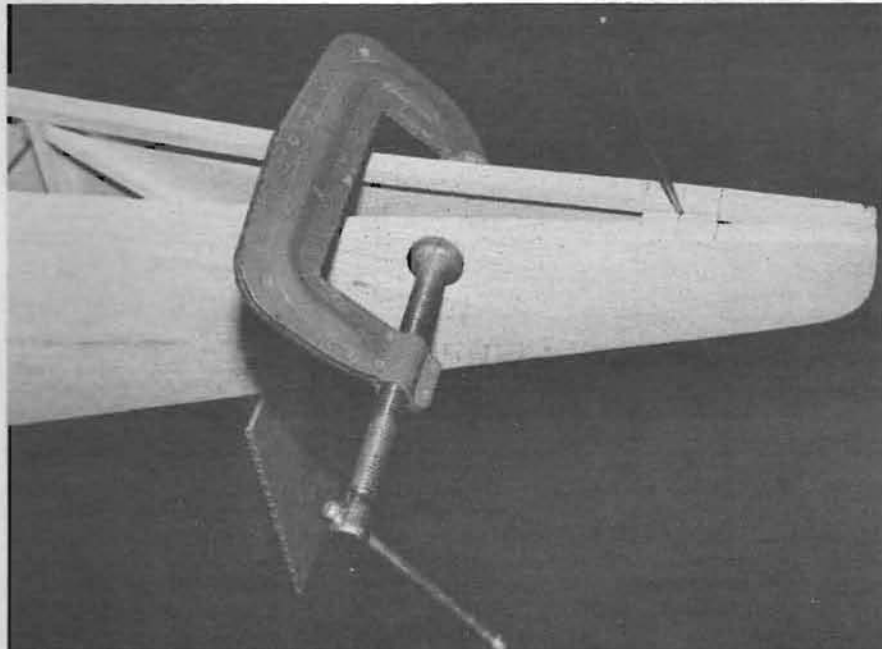
Fuselage is assembled on author's RCM Fuselage Jig. Makes for a straight fuselage.



Fuselage out of jig with door pinned in place.



Aft shot of door opening. At this point, we get anxious to start bench flying.



Tail wheel blocks are drilled for 3/32" wire.

Trial fit F-2. The notches at the top must be beveled to assure proper fit against the 1/4" sq. spruce cabin brace. Set bulkheads F-2 and F-3 in place, keeping the fuselage over the top view. With the alignment checked, epoxy both bulkheads in place.

At this time I would like to say a word about RCM's Fuselage Jig (Feb. 1972 — reprint \$1.00). This, in my opinion, is the most valuable tool in my shop in terms of building warp-free fuselages. I built mine from the RCM article for under \$10.00, using scrap lumber and hardboard. I strongly recommend building and using one because with the door cut out, the fuselage has a tendency to warp with the door-side bowing more than the opposite side.

Now cut the 1/4" sheet balsa floor from F-2 to rear of landing gear area and epoxy in place. This step is extremely important because as mentioned above, the left side of the fuselage is weakened due to the

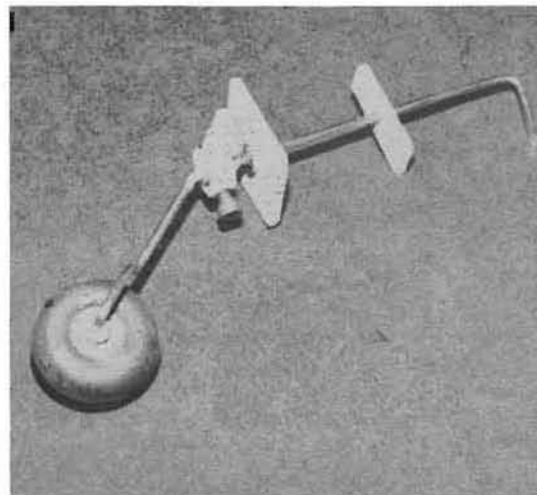
cut-out for the functional door. If the nose is pulled together to install F-1 without the floor in place, the left side will warp under the door jamb. Install the 1/4" sq. balsa cross members under F-3, also under the side window section.

With the fuselage pinned over the top view or clamped in RCM's Fuselage Jig, install F-1, pulling the sides together evenly. The 1/4" sq. balsa longerons extend through the holes in F-1, making alignment easier. Use slow cure epoxy allowing to cure overnight. Pull the rear of the fuselage together and epoxy. If balsa of similar hardness was used on the sides, any warping tendency should not be a serious problem. Install the 1/4" sq. balsa fuselage cross members, top and bottom. Make the cut-outs for the pushrod exits at the rear of the fuselage. Now decide on the type of pushrods to be used. I used Sullivan Gold'N-Rod, simply because it is easier to install and make connection

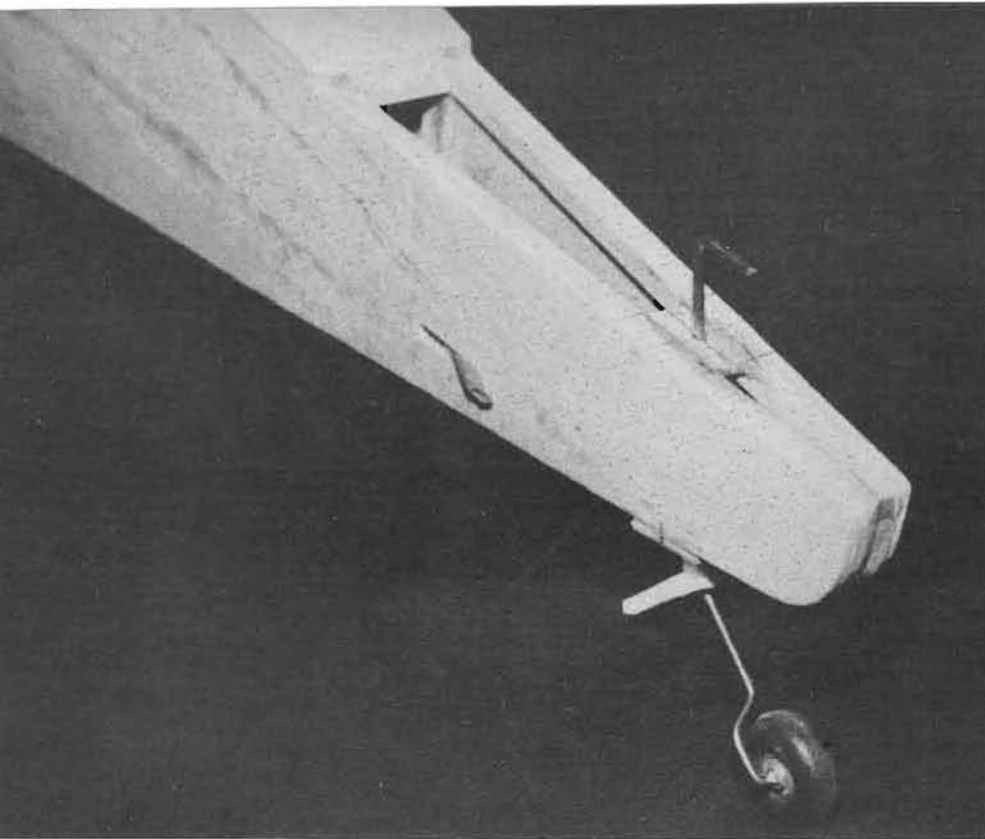
at the elevator and special rudder horn. The outer tube was epoxied to at least four points inside the fuselage. Roughen the tube with sandpaper at the glue points prior to applying epoxy.

Next, plan your throttle linkage. I prefer the steel cable inside a nylon sleeve. Use a metal clevis to attach the throttle. Don't use plastic inside a cowled engine area. I have seen the heat and vibration literally destroy plastic Gold'N-Rod, resulting in a runaway engine.

Shape the wing L.E. rest, W-T from a 1" balsa block. Attach to the 1/4" x 1/2" spruce with slow setting epoxy. Add the 1/4" balsa support behind W-T. Install two 1/4" birch dowel cabin supports. These are set in 1/4" holes drilled in W-T. The lower ends butt against the corner of F-2A and the 1/4" sq. spruce. Note — F-2 has a 1/8" x 1/2" wide ply doubler added on the front side, providing a 1/4" wide surface for resting the lower ends of the dowels. Install the 5/16" x 6" front and rear, wing hold-down dowels. Next glue the 1/4" balsa gusset under the front dowels. Install the 1/2" triangle stock behind F-1.



Tail wheel wire is completed with ply blocks and ready to be installed.



Completed tail wheel assembly glued in place.

The measurements must be the same. Do not omit this because it will affect ground handling.

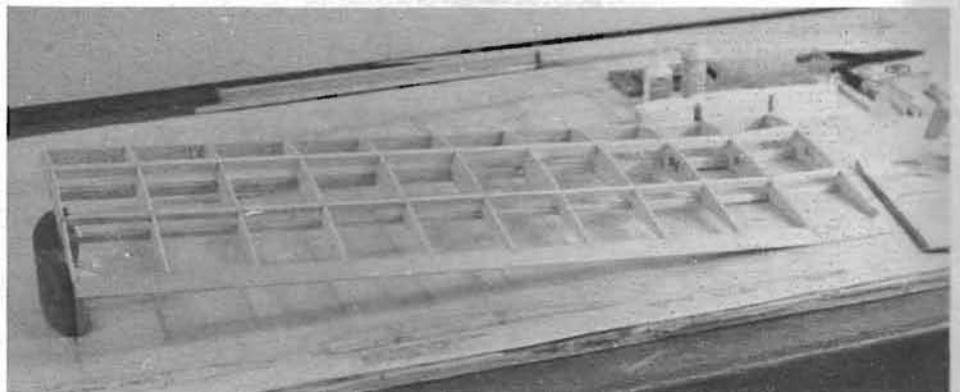
The rudder/tail wheel assembly is made from 3/32" music wire. The rudder control horn is Du-Bro's small nosewheel tiller arm. This worked quite well. Cut out the 1/8" plywood pressure plates through which the 3/32" music wire must pass. The top plate is recessed to allow the stab/elevator to rest flat. The bottom plate spans the width of the fuselage. With the plates held temporarily in place on the fuselage, drill a 3/32" hole in the exact center of both upper and lower ply plates. Insert a straight length of 3/32" music wire. Check for proper angle and alignment, making certain the wire is plumb, otherwise the rudder will be forced out of line. Remove the wire and ply plates and make all bends in your vise. Now install the metal thrust washer and Du-Bro tiller arm, soldering the washer in place. Slip the ply pressure plates over the top bend and epoxy to the fuselage. Check freedom of movement and alignment of complete assembly.

Trial fit the fuel tank and fuel tubing. Drill the holes in F-1 half undersized for passage of tubing. This discourages fuel bleed into the fuselage.

Install engine mount and bolt through F-1. If the homemade mount is too much work, a commercially available mount such as Kraft-Hayes can be substituted, however, the engine position may have to be brought forward if the prop is to exit the cowl correctly.

Cut out and epoxy in place the 1/8" ply fuselage bottom.

Make the main landing gear from 5/32" music wire; the rear support is 1/8" music wire. Wrap with bare copper wire and solder. Attach L.G. to fuselage with Goldberg's nylon landing gear clamps. The axles are towed in 3-4 degrees and have

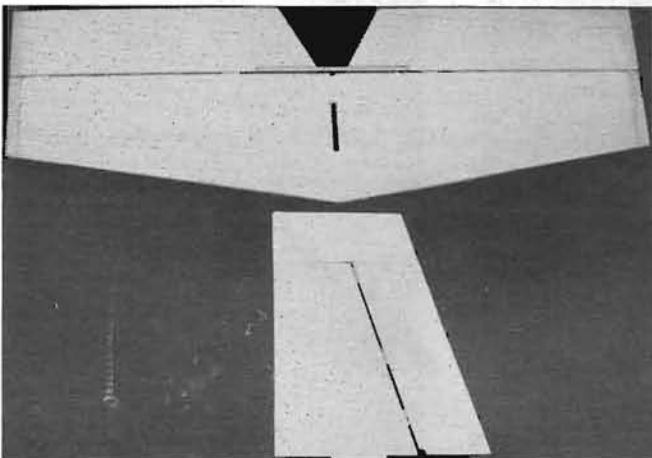


Left wing panel framed up and being attached to center section.

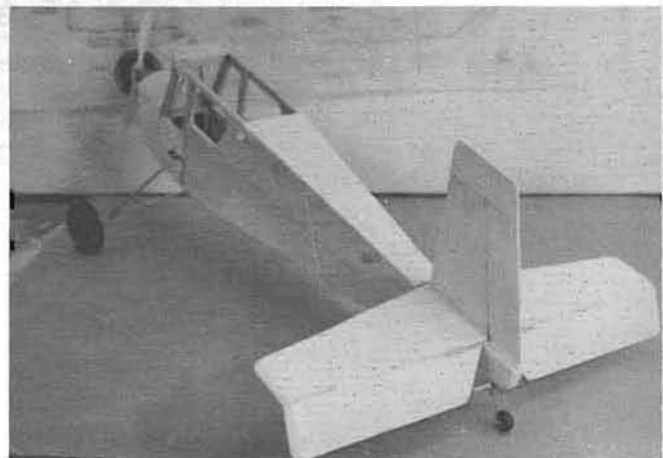
negative camber of 5-6 degrees. Make certain the wheels are square to the fuselage centerline. Use a string from one axle tip to the tail post of the fuselage. Repeat for the other side.

Sheet the top and bottom of the fuselage using 1/8" balsa cross grain. I used light contest grade here to reduce weight — especially in the tail section.

Install the hinges in the door and



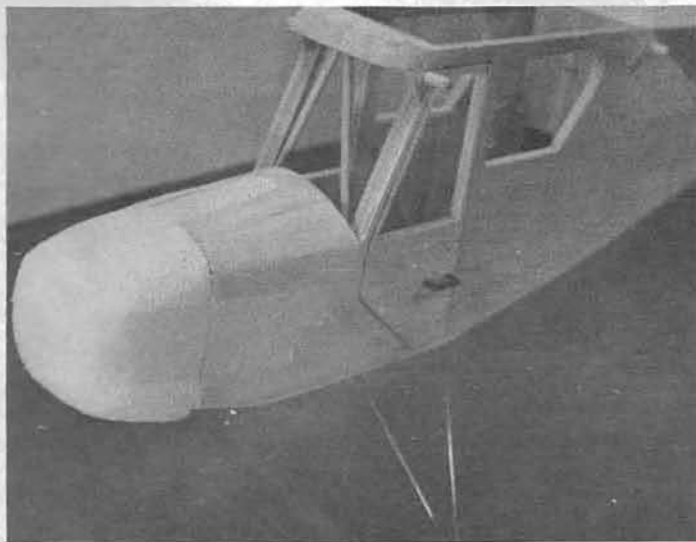
Tail group completed and ready to be hung on fuselage.



Lots of moving surfaces for good response.



Engine is fitted to firewall. Prototype had an old O.S. 30 and it performed great.



Foam block carved for the making of the glass cowl.

check for proper clearance. A door stop can be made by gluing a 1/16" x 1/4" plywood strip to the inside edge of the door jamb. This will prevent the door from closing inwards. To hold the door closed, a rubber band is secured to the inside of the door then hooked to the other side of the fuselage. A door handle is made by bending a piece of soft 3/32" wire as shown on the plan. Next, cut a piece of 1/8" black rubber fuel tubing and slip over the handle. Epoxy the handle into the door. You may wish to defer gluing until painting is completed.

Empennage:

Cut out all parts from contest grade, 1/4" sheet balsa. The grade is important because an ounce saved in the tail means 3 ounces less weight needed ahead of the C.G. Cut out and glue the 1/4" x 1/2" hard balsa for ends of the stab, front of fin and rudder insert. Install the 1/4" dowel elevator joiner. Drill out the rudder insert to accept the 3/32" music wire and install your favorite hinges. I used Du-Bro hinges throughout. Fill the tail post area under the stab with 1/8" scrap balsa. Check the function of all control

surfaces, especially the rudder. Hinges must be perfectly aligned to prevent binding. Make sure the elevator does not bind. The area under the elevator tie will have to be hollowed out slightly to allow sufficient down elevator movement.



Epoxy the stab to the fuselage, checking for square with the centerline. The rudder has a tab which is inserted into the stab. This tab keeps the rudder aligned with the centerline of the fuselage, provided the stab is correct. Double check to make certain everything is aligned correctly before attaching. Everyone has seen the guy who has to fly with a

quarter rudder trim from neutral, because he forgot to check the stab/rudder alignment before gluing.

Wing:

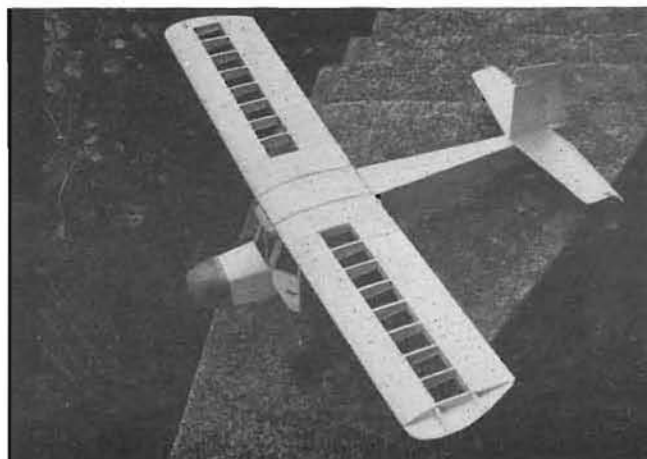
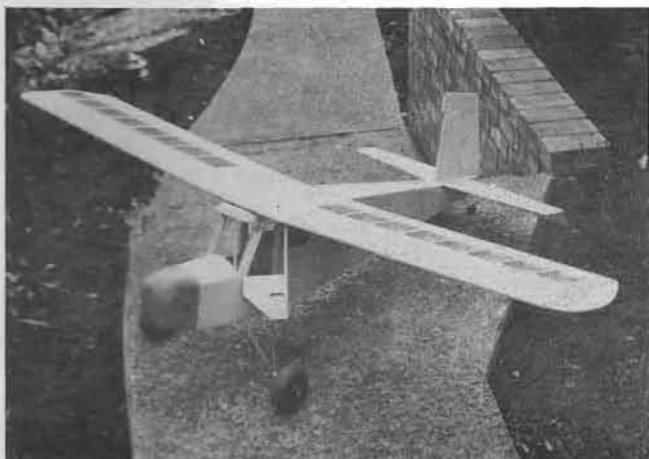
The wing is constructed with two dihedral breaks, one on each side of the fuselage. The portion of the wing which covers the top of the fuselage remains perfectly flat, creating a tight seal against fuel contamination — especially if a thin layer of silicone rubber is used at the wing saddle.

Begin by cutting (4) W-1 and (18) W-2 ribs from 3/32" balsa sheet. The sections W-1 and W-2 of each wing panel are joined and remain flat on the workbench, making a warp-free wing.

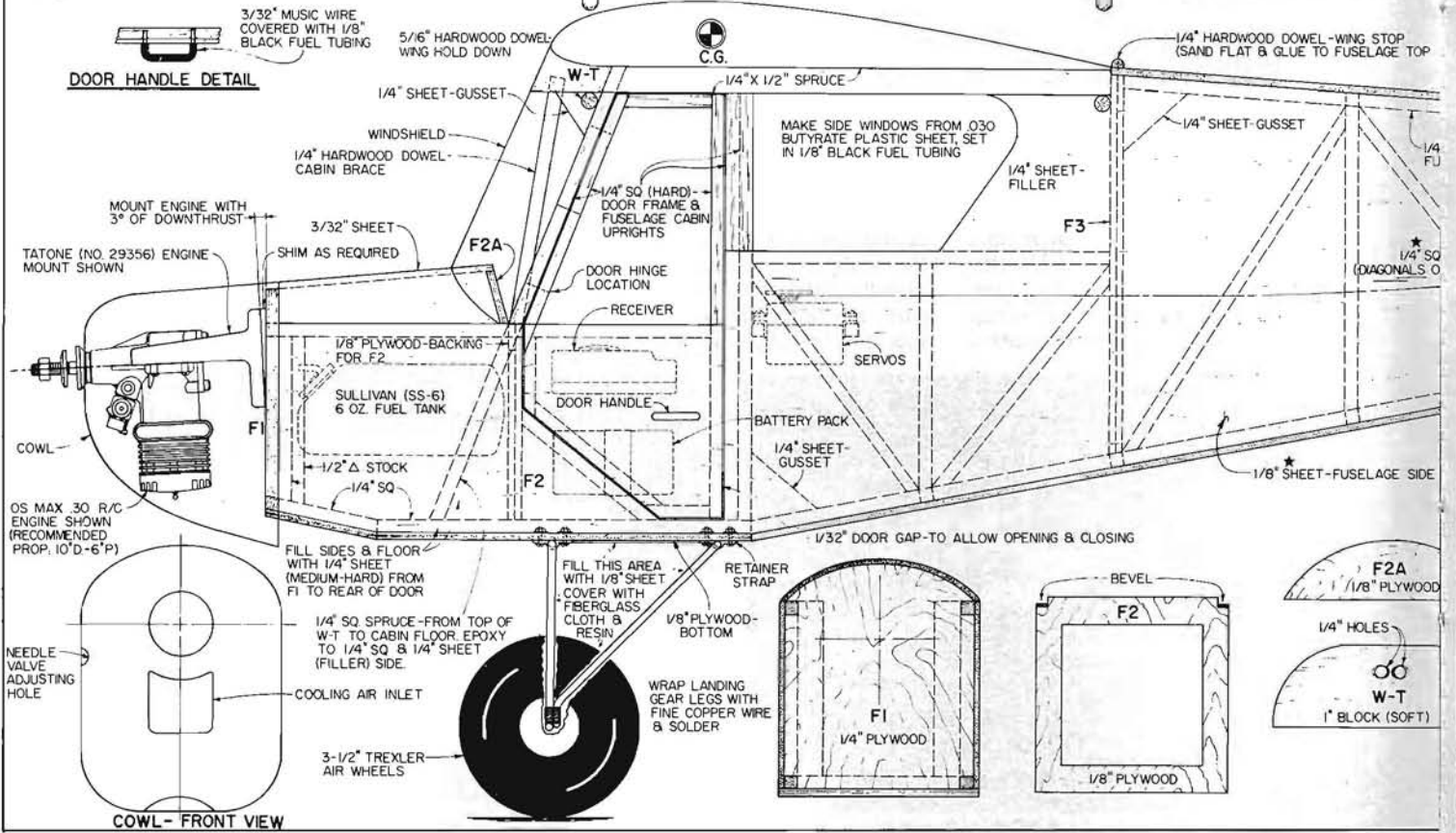
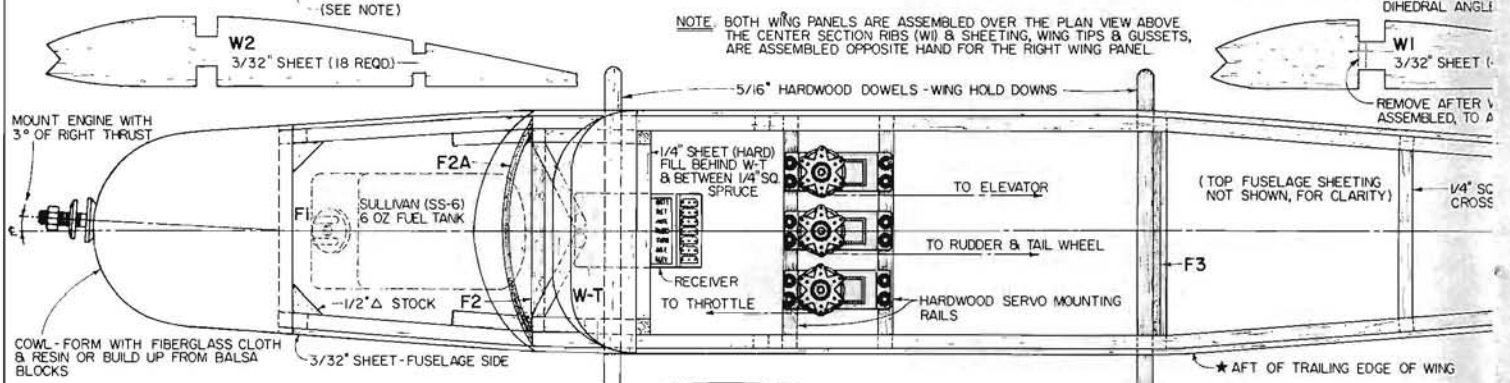
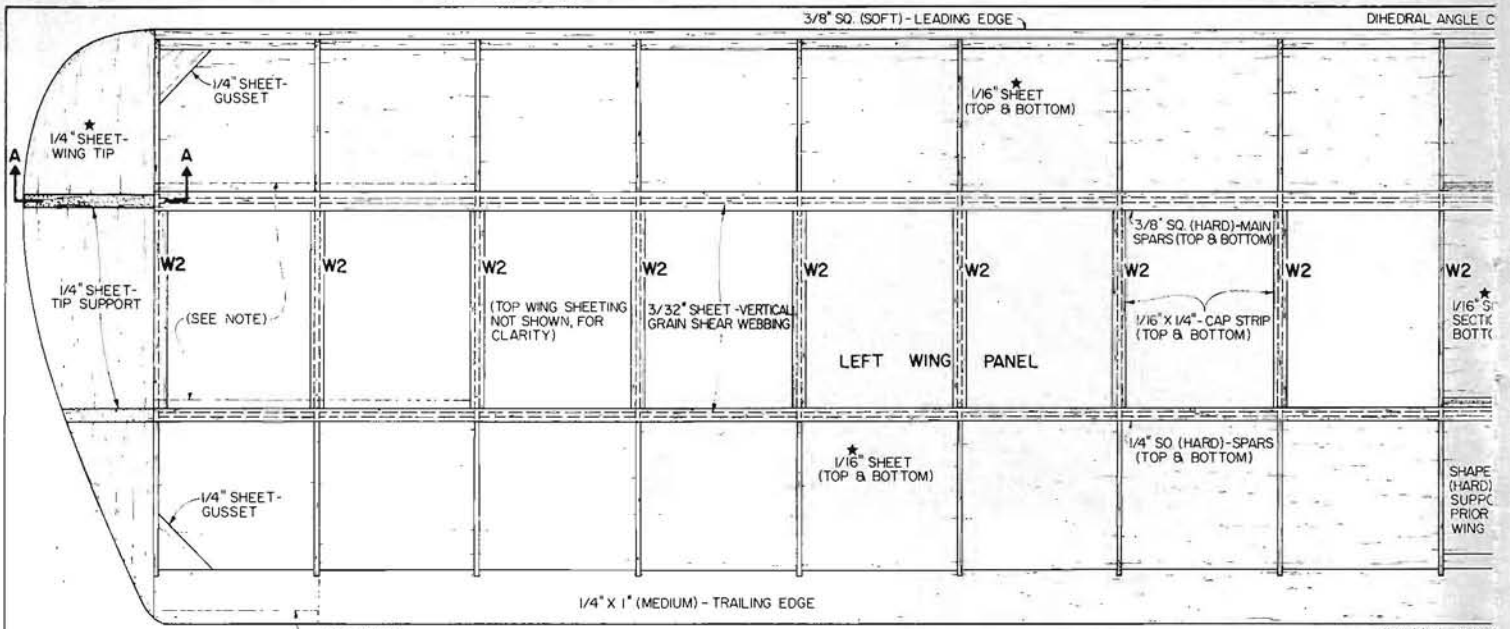
Now cut 1/8" deep notches in the T.E. at each rib juncture. I made these slightly less than 1/8" to assure a press-fit. All rib L.E. and T.E. joints were glued with Zap/CA. I made a notch cutter by gluing two X-Acto saw blades to both sides of a 1/2" x 3" plastic scrap that was the correct thickness to give me a tight fitting, 3/32" notch.

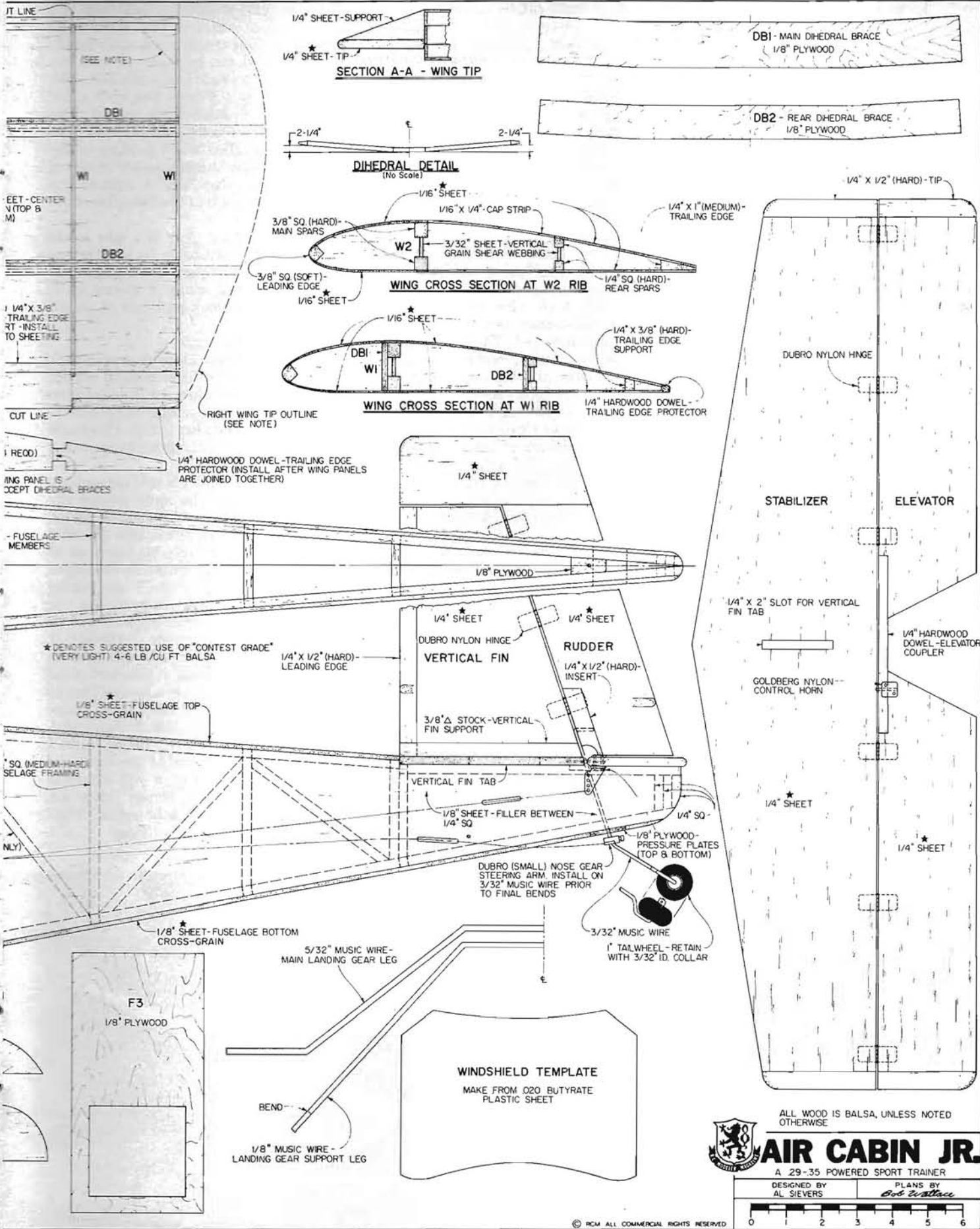
Next, lay the lower main and rear spars over the plans. Begin assembly

text continued on page 66



Air Cabin Jr. ready for your favorite covering material and colors.





ALL WOOD IS BALSA, UNLESS NOTED OTHERWISE

AIR CABIN JR.

A 29-35 POWERED SPORT TRAINER

DESIGNED BY AL SIEVERS

PLANS BY *Bob Wallace*



PLAN NO. 937

by gluing the ribs to the L.E., T.E. and lower spars. Add the top spars, wing tips and corner gussets. Note — the prototype used a formed leading edge, however, the application of the wing sheeting became a problem without reducing the size of the W-1 ribs — thus the 3/8" sq. balsa L.E. substitution which facilitates easy application of sheeting and subsequent shaping of the leading edge. Now join both wing panels at the centerline. When dry, cut each panel at their dihedral breaks with a razor saw. With both panels separated, pin the W-1 sections firmly to the workbench, blocking the tips of each wing 2 1/4", measured from the work surface to the wing tips. Use slow cure epoxy and allow to set overnight. Install the 3/32" balsa sheet webbing between the main and rear spars.

Cut out the 1/8" ply dihedral braces. With the tips blocked up, install the braces with epoxy. The centers of the W-1 ribs will have to be cut out with a razor saw to accept the dihedral braces. Install the shaped T.E. support, cutting the ends of the ribs to accept the support. If desired, 1/8" ply scraps can be epoxied behind each dihedral joint in the L.E. and T.E. If you are a beginner in the hobby, and rough use is eminent, I would go the extra strength in this area. The added weight is well-worth it!

Sheet the center section, L.E., T.E., top and bottom with 1/16" balsa. Sand the L.E. to shape. Cut out the T.E. to accept the 1/4" hardwood dowel trailing edge protector. If omitted, the rubber bands will bite into the wing T.E. Install the 1/16" x 1/4" cap strips, top and bottom.

Check the wing for balance by placing it on a straightedge clamped in your vise. In spite of careful selection of balsa for each wing panel, I found one tip to be 1/8 oz. heavier. If not corrected, the airplane will tend to

bank — requiring rudder trim. The heavy side can be sanded or the wing tip hollowed slightly.

Finishing Procedure:

The entire fuselage is sanded using 180, then 300, finishing with 400. The entire front of F-1, inside the fuel tank compartment and inside the cabin, receives two coats of fiberglass resin. This prevents fuel soak which I have found occurs even to doped wood. The additional weight is well-worth the added life to your airframe.

The paint used on the prototype was Pactra Aero Gloss Dope, red and yellow. The scallops were made using Contact shelf paper. The fuselage and wing were covered with heavy silk span and the old fashioned hand-sanding and rubbing method were employed. The finish came out satisfactorily, however, I noted a substantial weight gain of 8 oz. I would strongly recommend using one of the lightweight, iron-ons such as Solartex or Coverite. The fabric look will complement the spirit of the Air Cabin Jr. The total weight of the prototype was 5 3/4 lbs. If iron-ons are used, the weight should be about 5 lbs., giving a wing loading of 16 oz./sq. ft.

The fiberglass cowl was made by shaping a styrofoam plug. The plug was coated with white glue and strips of wet newspaper (three layers). Then I coated the plug with epoxy to fill all holes, voids, etc. This seals the foam against the fiberglass resin. A stand was made for fiberglassing, using a 1/2" x 8" dowel with a 5" sq. hardwood block base. The dowel is epoxied into the foam. Next, apply four coats of fiberglass cloth and resin. When cured, sand the plug with 100 wet/dry used wet with a bit of dishwashing liquid. Now sand the plug with 200 used wet. Apply a final coat of fiberglass resin (no cloth). When cured, remove the stand from the plug

and drop into a can of gasoline. The foam will dissolve, leaving the fiberglass exterior. The white glue and newspaper now stuck to the inside of the cowl can be removed with hot soap and water. Sand with 240, 320, followed by 400 used wet with a few drops of dishwashing liquid. The fiberglass should now appear like burnished glass when held up to the light. Make the necessary cut-outs and paint. Use Zap/CA around the cut-outs to prevent the fiberglass from chipping.

The landing gear fill was made using 1/8" hard balsa secured to the gear with fiberglass cloth and resin. This method worked quite well, creating the look and feel of an all metal gear.

Flying Details:

With the large elevator and rudder, total movement from neutral should be 3/4". When balancing the Air Cabin Jr., I used 4 oz. nose weight, because of all that paint on her fanny. This made her hang slightly nose-down when balanced at the C.G.

The Air Cabin Jr.'s real personality came through the split second she became airborne. The thrill of seeing your own design climb into the wild blue yonder can only be described as euphoric! The Air Cabin Jr. displayed no bad tendencies. Stalls are mushy before she breaks, so it warns you ahead of time. The take-off run is achieved with a very old and tired O.S. Max 30, in 25 feet. Her tail goes up almost immediately at the start of the roll out. Landings are a breeze! Simply let her down with throttle and a nudge of elevator; her flair is beautiful. Loops are slow, and inverted flight a nightmare. If you treat her right and gentle, she will give you hours of pleasant, relaxing flying. After all, isn't that what this hobby is all about? Good luck and happy flying.

□

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