

PIETENPOL, Corben, Huntington, Heath, Long, Wittman: names that recall the early days of aviation, that intoxicating era known in the lexicon of flight as the Golden Age. During the late Twenties and early Thirties, these pioneers of the home-built aircraft movement took to designing, building, and flying

Korea with the Wisconsin Air National Guard, organized a gathering of 33 home-builders at Curtiss Wright Airport in Milwaukee. From that meeting sprang the beginnings of what is now a world-class aviation organization. With its aviation center and museum at Oshkosh serving as a focal point for home-builders, the Experimental Aircraft Association has literally saved the movement from

Championships against the best from around the globe with their government-sponsored craft. Another U.S. home-builder, Henry Haigh, snared the 1988 championships, his Super Star with its own-designed and -built Akro mount outperforming rival factory-built models using more exotic materials.

Pea Patch was inspired by a magazine article published a few years ago describing Ed Heath's designs. It included pictures of his midwing and the kit parts. If

their own creations out of pastures, grass airports, and any fields that were available. They had many imitators, and the activity caught on quickly.

Air racing, too, was popular during those years. Aviation buffs are familiar with the Howard-designed Ikes, Mikes, and Mulligans, the Gee Bee series produced by the Granvilles, and others.

The early home-building movement came to a premature end during the mid-30s, unable to survive a weakened Depression economy and increasing federal legislation. Building a personal airplane and flying it out of a pasture came to be almost a thing of the past.

But home-builders had never lost enthusiasm for their hobby, and in 1953 a young aviator named Paul Poberezny took steps to revive it. Poberezny, a designer, builder, and flier just returned from aviator duty over

vanishing altogether.

A quick glance at Unlimited Aerobatics worldwide shows that home-building isn't restricted to small, low-powered personal aircraft. In 1980 the United States' Leo Loudenslager flew his home-built Laser 200 to win the World Aerobatics

memory serves, the kit was offered for a mere \$400. The picture of the midwing stuck (as do pictures of any midwing!) Someday says I, a model would be built to resemble that aircraft.

pea patch

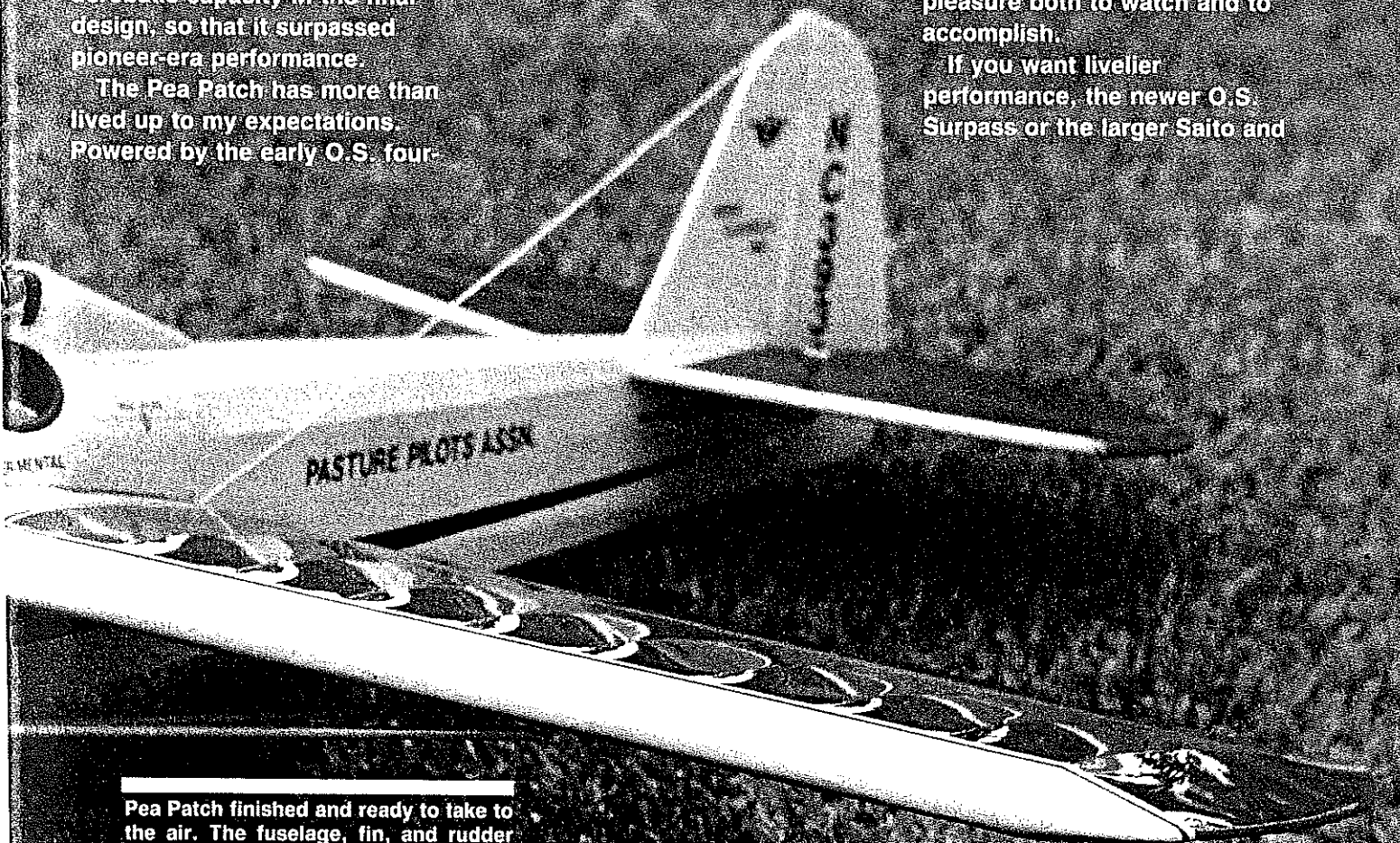
It happened to have an O.S. .40FS that was lying idle, a perfect choice to capture the looks and sound of the vintage home-builts. With no three-view to go by, I worked out some numbers based on the O.S. installation. I also incorporated aerobatic capacity in the final design, so that it surpassed pioneer-era performance.

The Pea Patch has more than lived up to my expectations. Powered by the early O.S. four-

stroke engine, it sounds much like one of those Harlequins that home-builders used to fabricate from Harley Davidson motorcycle engines—or possibly like a Henderson motorcycle engine. It does aerobatics with ease. Though a climbing four-

point is outside its ken, the model does loops with snaps, square loops, stall turns, inverted loops with outside snaps, Cuban eights, spins, and inverted spins. Spins are quite realistic—slow, graceful, and with instant recovery. They're a pleasure both to watch and to accomplish.

If you want livelier performance, the newer O.S. Surpass or the larger Saito and

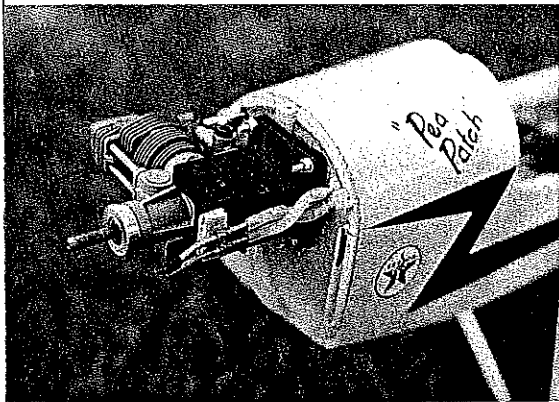


Pea Patch finished and ready to take to the air. The fuselage, fin, and rudder are covered with Sig Koverall and nitrate dope. The wing and stab/elevator are covered with plastic film. The model was then spray-painted with Red Devil polyurethane in almond. The plastic film covering was also spray-painted and has held up well over many flights.

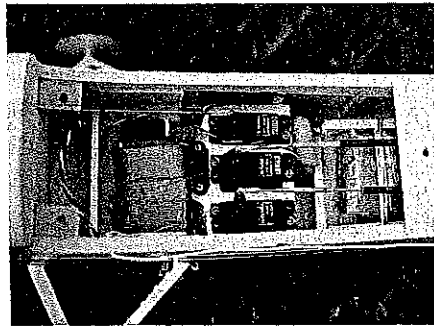
Enya engines would probably add considerable muscle. But I don't recommend exceeding the .40 to .50 size range, since that would destroy the original concept.

As part of my attempt to recreate the essence of an old-timer home-built, the balsa jug on the left side of the cow!

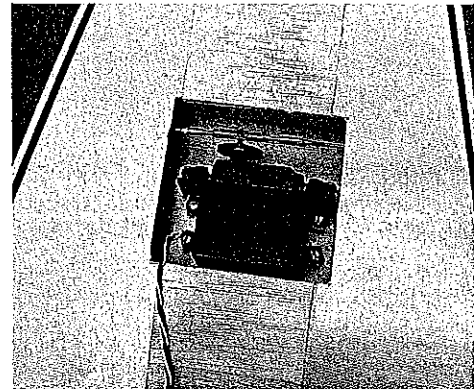
Patterned after a 1930s home-built midwing design by Ed Heath, this sprightly .40-.50-powered RC sportster realistically duplicates the flight characteristics of its Golden Age counterpart—and does them one better with aerobatic capabilities. ■ Brad Shepherd



The author's early O.S. .40 FS engine side-mounted in a Hayes mount. Note the vent and fill tube extensions to fill the tank through the front cowl opening. Also note the tablike flanges for attaching the cowl.



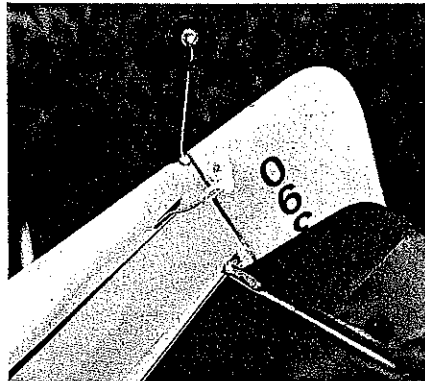
Radio gear installation is straightforward, and there's plenty of room. Here you can see the Futaba throttle, rudder, and elevator servos, the on/off switch, and the foam/duct-tape-wrapped receiver (left) and battery.



The side-mounted aileron servo in the bottom of the wing. Because the opening is inside the fuselage, a hatch is unnecessary.



This aileron crank-and-link installation allows covering before installing the link. The horn flange has been removed and the horn set with CyA into a slot cut in the aileron.



The rudder pushrod exit and installation. The Klett aileron fitting fits nicely into the fuselage for a clean tail wheel steering system.



The fake gas cap is detailed in the plans. The fake left engine jug was fashioned from balsa, painted aluminum. The exhaust stack is a 1/4-in. dowel. "Pea Patch" is hand-painted with Sig Skybrite enamel. Note the clean, flush fit of the cowl to the fuselage.



The old-timer pilot is modified from a Williams Bros. 2 1/2-in. Sportsman pilot. The 1920s-style hat was made by dabbing on baking soda mixed with thin CyA until a reasonable facsimile was achieved. The goggle strap is simply a small piece of rubberband.

simulates the original two-cylinder Harlequin installation. The exhaust stack is made of 1/4-in. doweling for the same reason. Construction techniques are straightforward enough that even a builder with limited experience should have no problems.

It's a good idea to familiarize yourself with the plans by making patterns and cutting out parts as a preliminary step. Make master ribs for the wing using 1/32 ply to en-

sure accuracy when building the panels. Tracings can be made of the formers, glued to the wood with spray contact cement, and peeled off after the formers are cut out.

Wing. Pin a 1/4-in.-sq. stick in place over the plans, to be used as a jig. Pin another 1/4-in.-sq. stick under the bottom spar, and pin the spar to the board. Position the ribs on the spar, and pin them to the jig and spar. Position the top 1/4-in. spar, slide the 1/8 x 1/2-in. trailing edge in place, then slide the 1/4 x 1/2-in. rear spar through the ribs.

Check the panel with a yardstick or a Sig straightedge. If it looks accurate, apply thick CyA (cyanoacrylate glue) on all the joints. Glue the 1/8 x 1/2-in. leading edge piece to the ribs, and sand a bevel to conform to the rib shape. Cover the leading edge with 1/16 sheet balsa.

Cut the rear spar to length. Unpin the panel, turn it over, and pin it back down on the jig and at each rib. Sand a bevel in the leading edge, and install the bottom sheeting. Glue 1/16 verticals to the spars while the panel is still pinned down.

Glue the 1/16 tip pieces together, and install them on the center of the W-2 leading and trailing edges. Install the braces, spar extensions, and sheet tip. Sand a bevel on the edge of the 1/4 x 3/4-in. balsa aileron spar, and pin it to the plans. Position the aileron ribs onto the 1/8 x 1-in. trailing edge. Pin this assembly in place over the plans, and glue with CyA. Install and glue the 1/4-in.-sheet horn mount flush with the bottom.

For wing assembly, draw a straight line at least 65 in. long on your workbench. Place the dihedral jig at the outboard W-2 position to align the spar mark with the bench line. Put plastic wrap or waxed paper under the center section, then check the fit of the spars and the leading and trailing edges. When you're satisfied that they're square, place shims under the trailing edge and pin the panel down.

Install and epoxy the DB pieces to the spars, and the SJ pieces to the rear spar. Glue a 1/4-in.-sq. piece to the front edge of the trailing edge halves. Sheet the center section while the wing is still on the bench.

After sheeting, remove the wing and install aileron cranks on each mount. Glue the mounts to the cutouts in the W-3A ribs. Connect the 1/16 music wire pushrods to the aileron cranks. Sheet the bottom center section. Glue the 1/8 x 1/2-in. leading edge cap in place, and sand it round.

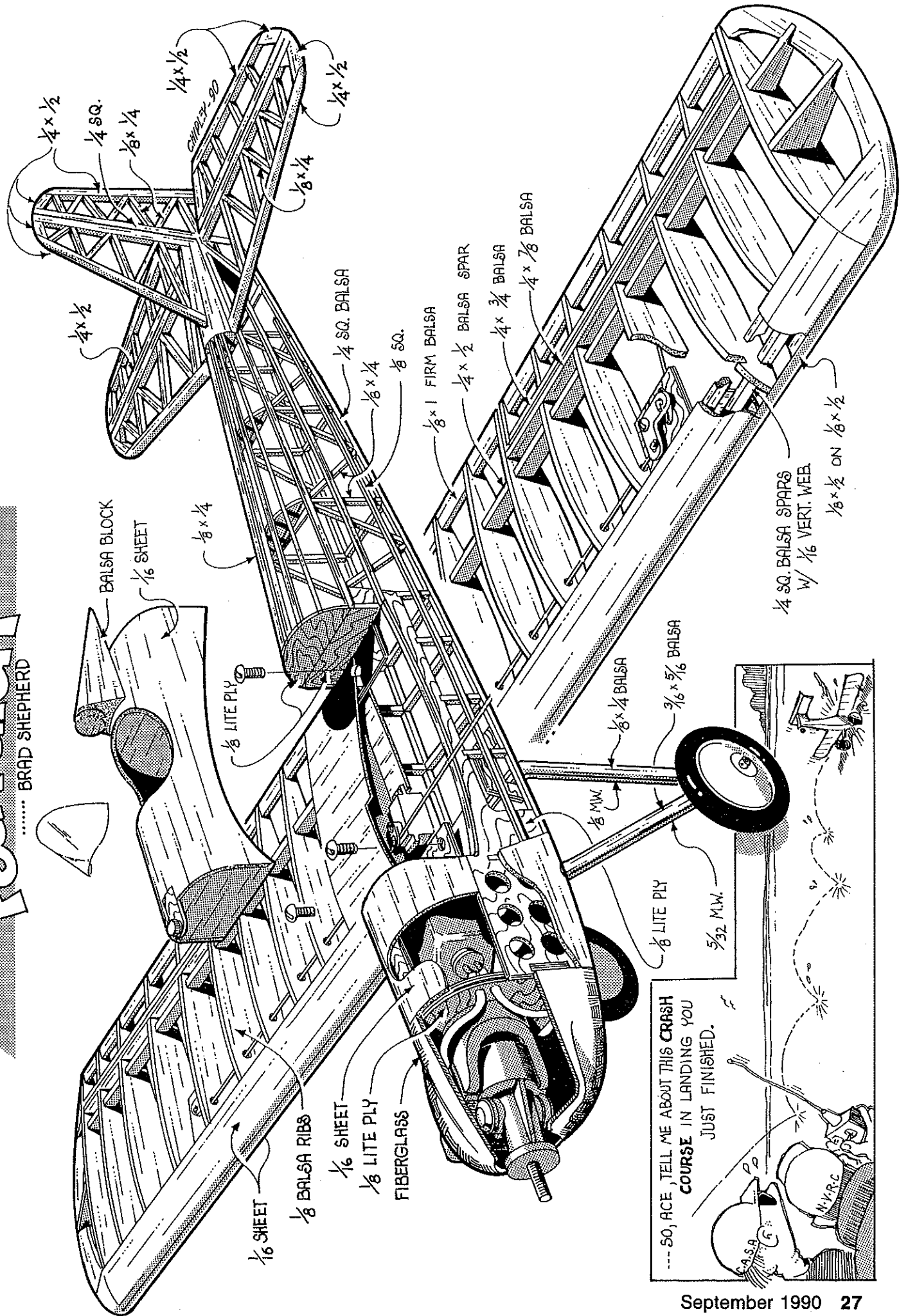
Build the stabilizer, elevator, rudder, and fin over the plan. Make the elevator tie bar, then epoxy the elevator halves together.

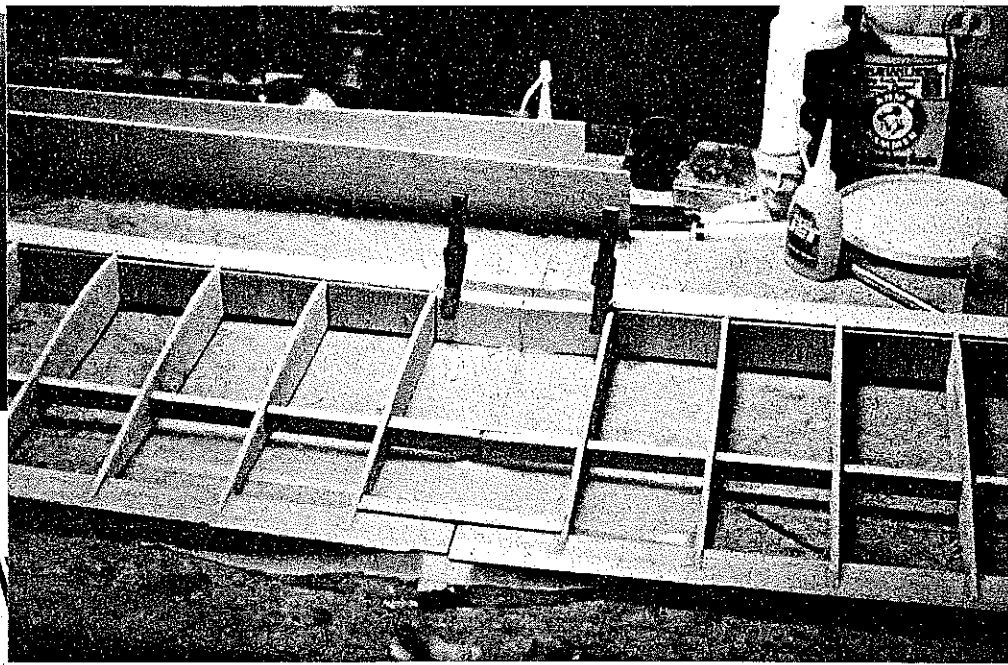
Fuselage. Glue the Lite Ply doublers and 1/8-in. balsa sides together to make a right and left assembly. Take care that you don't assemble both sides the same way; the balsa must be on the outside of each piece.

Pin the right side over the plan, then finish building it with the balsa sticks as indicated. Cover the glue joints on the top and bottom of the right side with strips of waxed paper. Position the left side doubler assem-

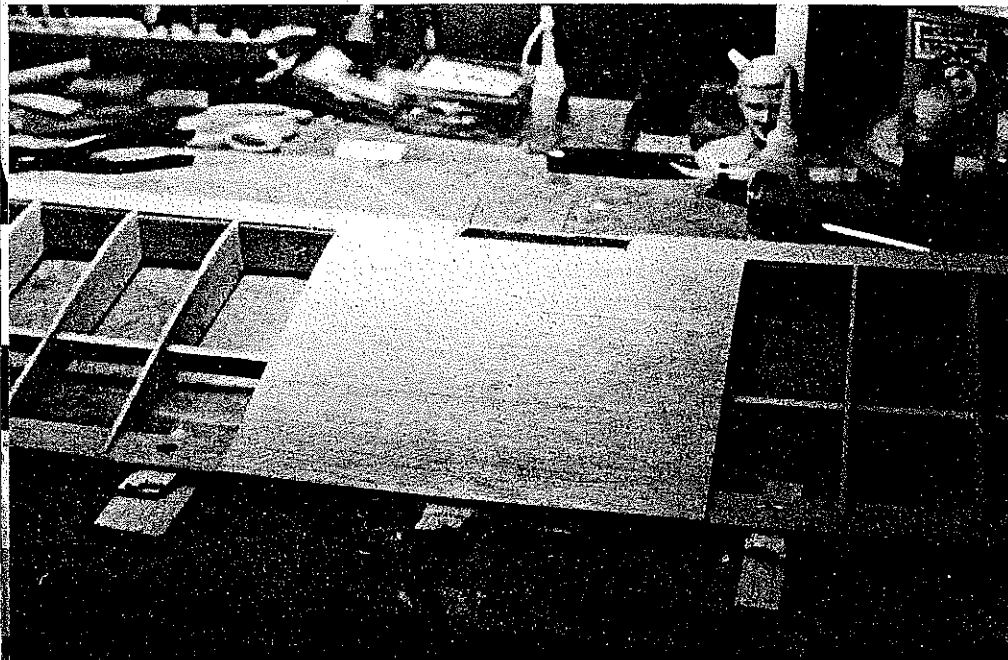
Pea Patch

..... BRAD SHEPHERD



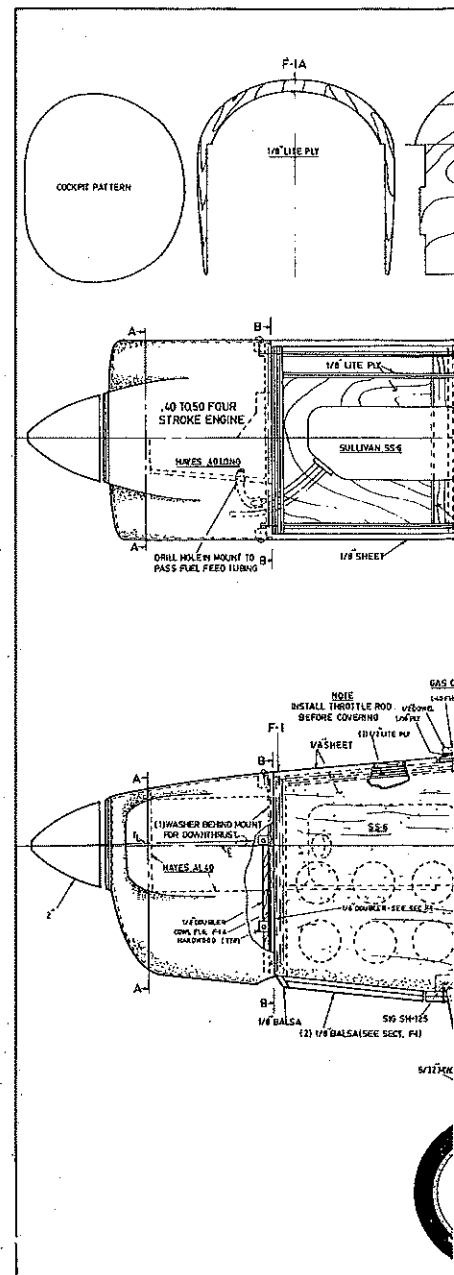
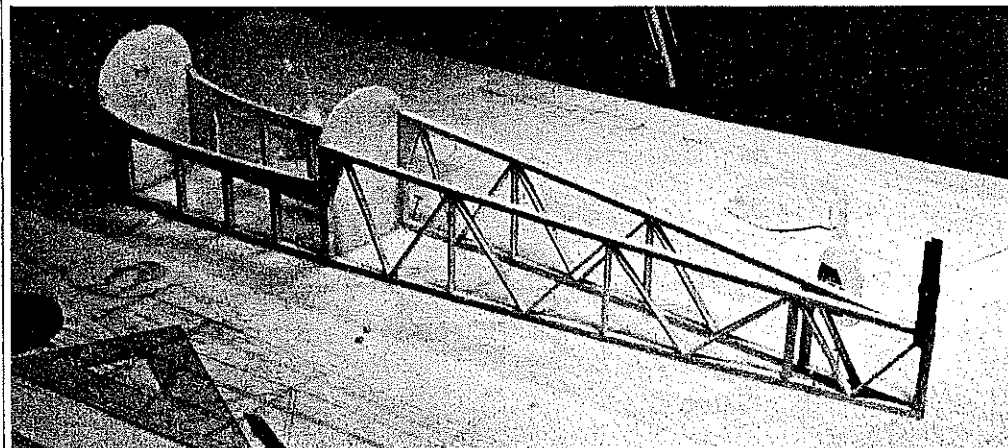


The wing panels are being joined at the center. Note the trailing edge shims. One of the rear spar braces has been glued in place. The main spar filler has been epoxied in place, and the double dihedral ply braces are glued on and held in place with clothespins until they're set.



The top center wing sheeting is installed after the joining operation is complete. Note that the trailing edge has been shimmed farther outboard to allow for installation of the top sheeting.

The fuselage begins to take shape. Formers F-2 and F-3 have been glued in place. The completed sides are pinned over the waxed-paper-covered plan, and a clothespin holds them together at the tail post. A triangle is used to ensure that the sides are square at the tail post.

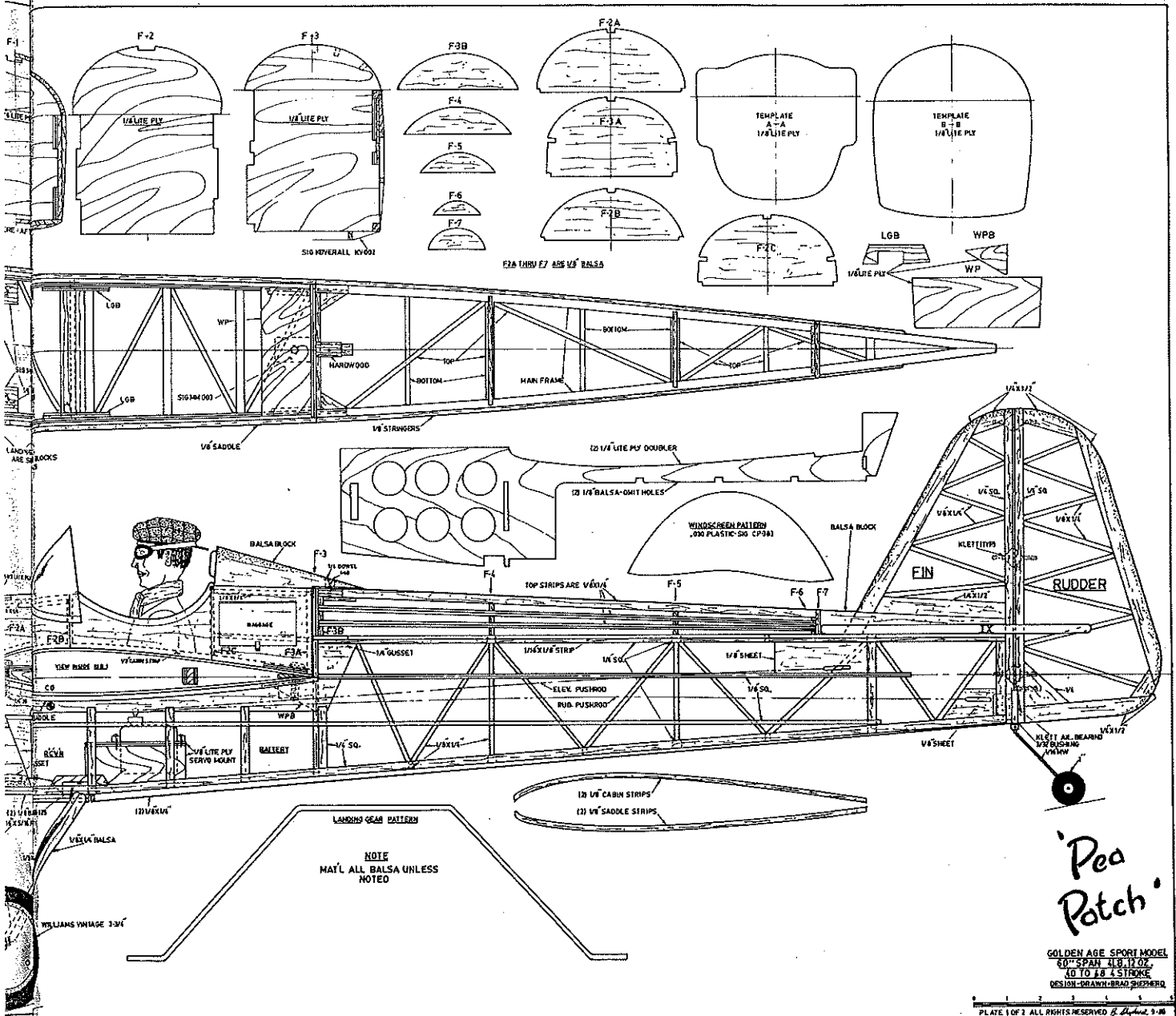


bly over the right side. If the Lite Ply isn't quite $\frac{1}{8}$ in. thick, you'll need to shim up the left side till it's flush with the outside edge of the $\frac{1}{4}$ -in.-sq. longerons and verticals. Cardboard or thin scrap ply is good for this job. Build up the left side to match the right.

Remove the assembly from the plan, and separate the sides. Sand bevels into each side at the tail post as shown in the top view.

For final assembly, install former F-3 into the slots on the doubler, and pin down the sides over the top view. Bring the tail posts together, and clamp the unit with a clothespin while setting it up 90° to the bench. Install F-2 in the slots, shimming under the sides at this location to keep the former in place.

Epoxy the formers to the doublers, using blocks and pinning firmly to hold the forward sides in place while doing so. Glue in the top and bottom crosspieces. Pin the top formers aft of F-3 temporarily in place, and check to see that they all meet the $\frac{1}{8}$ x $\frac{1}{4}$ -in. stringers. Shift the positions of the formers

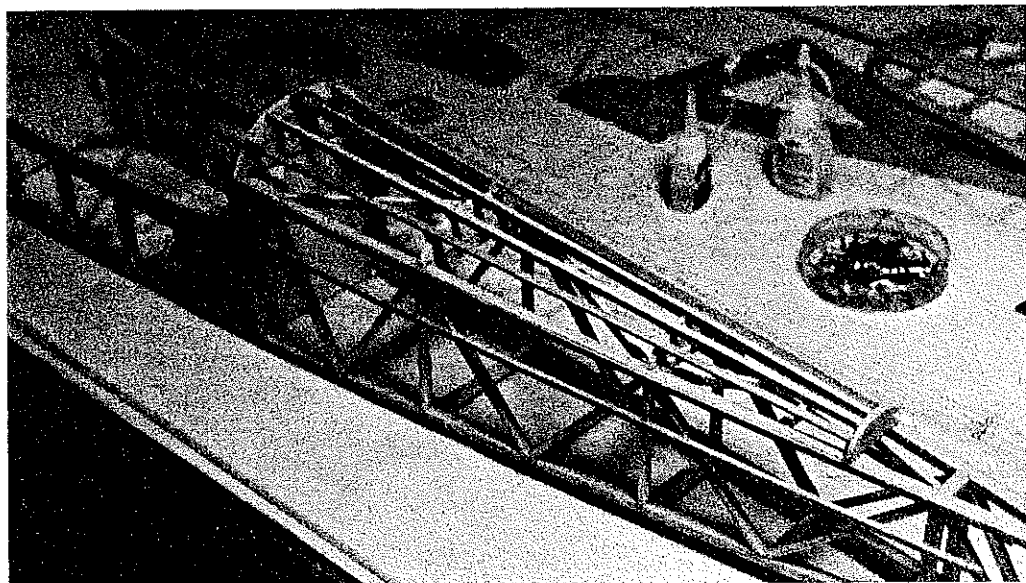


as necessary, and glue them in place. Glue the hardwood block to the top of F3B, then glue the balsa scrap underneath. Pin the top stringers to the formers to accurately position them before applying glue.

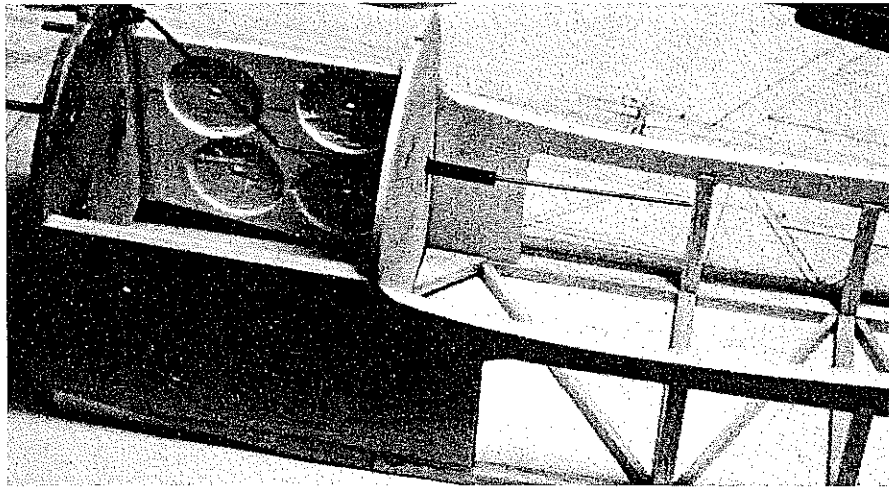
Mark off and drill holes for the engine mount on the F-1 firewall. I used 6-32 bolts through the firewall, epoxied to the back side with lengths of wire in the head slots. Install the firewall, and epoxy it to the doublers.

Install the pushrod for the engine throttle at this point. The picture shows the installation for an O.S. .40. Install the Lite Ply mounting in the tank compartment and the vertical piece to isolate the throttle pushrod. Install the tank, and pack foam around it. Glue the top doubler 1/8 x 1/2-in. Lite Ply pieces to slots in F-1 and F-2. Glue on the 1/8-in. sheet top.

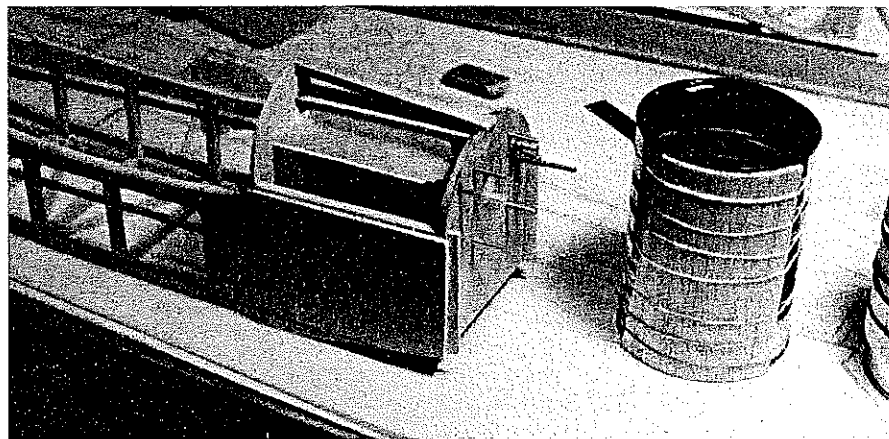
For the cabin section sheeting, cut six pieces of 1/8-in. sheet balsa at least 4 1/2 in. long from three wide sheets of A-grain balsa. This type of balsa will curve easily



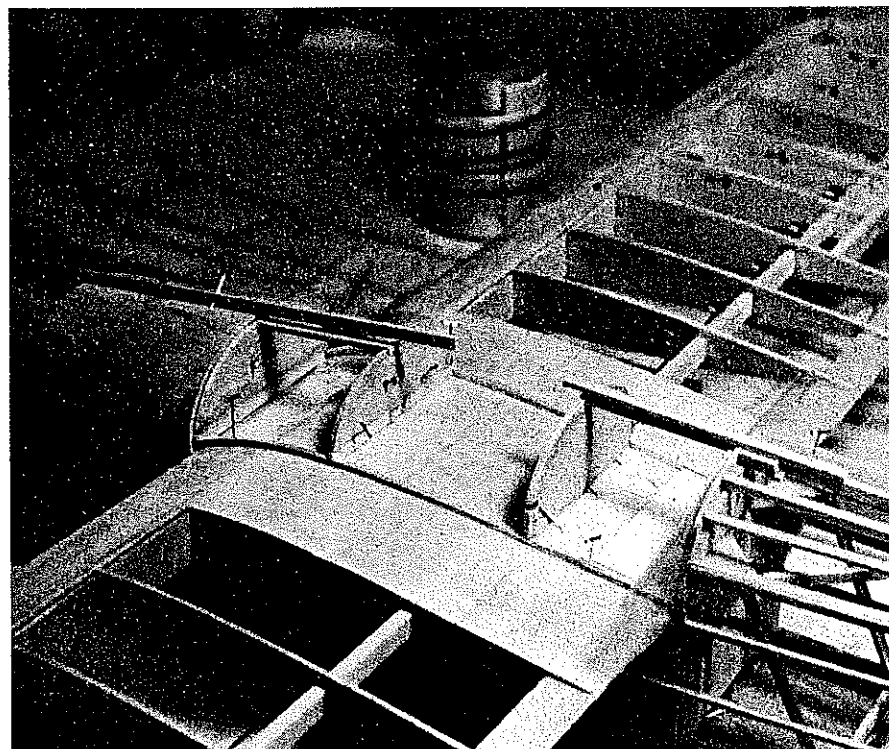
The top and bottom cross braces have been glued in place. The top formers and stringers are secured. Note the small hardwood block epoxied to F-3 which is used to secure the hatch.



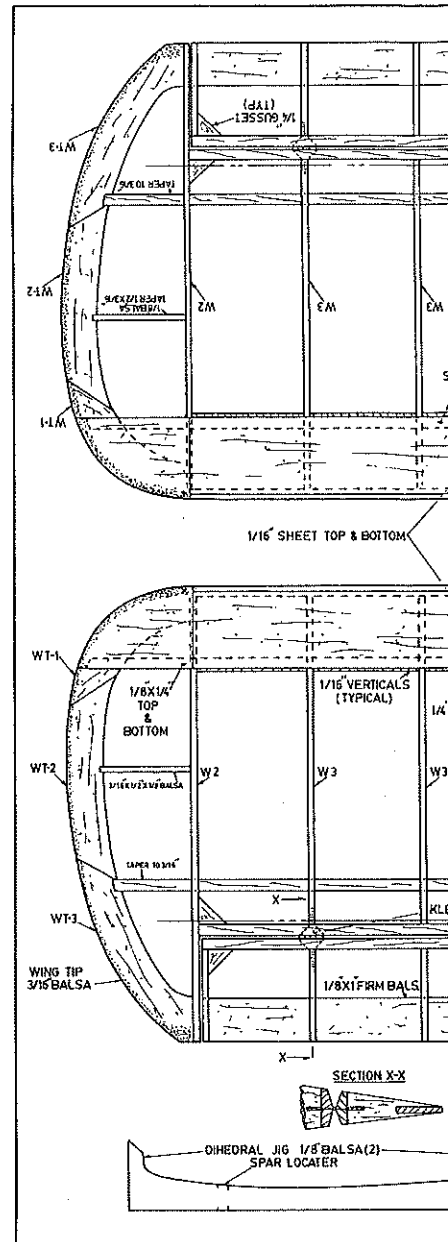
A clear view of the throttle pushrod installation. A threaded link rod is used to keep it stiff enough for positive engine control. Note the engine-mount attachment screws epoxied to the backside of the firewall. Also note that lightening holes are cut only in the ply side doublers.



The fuel tank and the vertical ply section isolating the tank from the throttle pushrod have been installed. The balsa cabin sheeting is soaked and then wrapped and rubberbanded around the cans to dry and assume their curved shapes.



The cabin section begins to take shape over the wing. Note the 1/4-in. strips pinned across the wing that will form the base of the cabin structure. The Lite Ply plate glued across the wing center trailing edge will serve as the reinforcement around the wing rear hold-down bolt.



along its length—or better said, with the grain. Soak the pieces in water, then wrap them around coffee cans liberally secured with rubberbands until they're dry. Glue in the 1/8-in. balsa side doublers, the 1/8-in. side stringers, the saddle strip, and the 1/16 x 1/8-in. strip on the top longeron.

Epoxy the Lite Ply WP in the cutouts on the ply doubler and against F-3. Epoxy the WPB reinforcements in place. Cut three lengths of Sig maple engine mount stock to size, and epoxy in place as per the plans.

Position the wing in the saddle, then sand away any high spots in the saddle so that the wing fits snugly on the fuselage. Pin the wing at the trailing edge, squaring it up with the tail post. Drill down through the wing ply plate, WP, and the maple block with a 3/16 drill. Install a short piece of 3/16 dowel in the hole. Drill one of the front holes through the ply plate and maple block, and install a second piece of doweling. Drill the remaining hole.

After removing the wing, tap the blocks for 1/4-20 and enlarge the holes in the wing to 1/4 in. Bolt the wing in place, and lay plas-

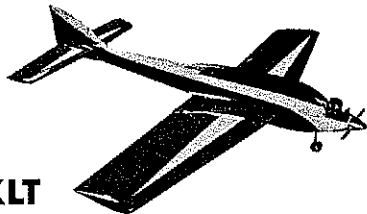
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ESCAPE SPECIFICATIONS:

Wing Span	62½ inches
Wing Area	770 square inches
Engine Size	10 cc
	90 or 120 four stroke

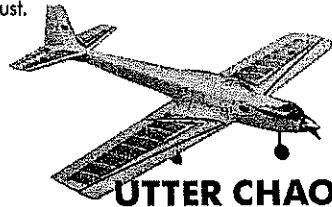
Designed for AMA for the FAI Turn-around pattern. Foam wing and stab with 3-32 Balsa sheet covering. Tricycle or conventional gear, fixed or retracts. Rear or side exhaust, fiber glass canopy. Very positive and maneuverable.



XLT SPECIFICATIONS:

Wing Span	65 inches
Length	65 inches
Wing Area	845 square inches
Recommended Engine Size	10 cc
	90, or 120 four stroke

The XLT is designed for tuned pipe and retract landing gears. Capable of the A.M.A. or Turn-around pattern. Rear or side exhaust.



UTTER CHAOS SPECIFICATIONS:

Wing Span	63¼ inches
Wing Area	700 square inches
Engine Size	.50-.60 (Glow)
	.90 four stroke

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C.O.D.

Pea Patch/Shepherd

Continued from page 32

used to form the shape of the cowl. Cut the block to the inside dimensions of sections A-A and B-B. Epoxy the B-B pattern to one side, and draw alignment lines on the foam to properly position the A-A pattern. Glue A-A in place as shown in the picture. Glue the foam nose block to A-A, and use 80- or 100-grit sandpaper to shape the foam around the patterns.

When you're satisfied with the shape, lay fiberglass cloth over the foam, securing it here and there with five-minute epoxy to achieve snugness when the final one-hour epoxy is used. You'll need to cut darts into the cloth for a good fit over the form. Try to keep these as smooth as possible to avoid excessive sanding after the epoxy is applied.

Mix up a batch of Sig one-hour epoxy, and let it soak into the fiberglass cloth using a throwaway brush. A heat lamp or hair dryer will speed up the epoxy cure. When the first coat is dry, knock off the bumps and rough spots with coarse paper, then mix up and apply a second coat of epoxy. Sand with 180-grit paper when dry. Use Sig glass beads and epoxy, or Epoxilite if you have some handy, to fill in the low spots.

When the part is smoothed to your satisfaction, cut away B-B and "hog out" the foam with a screwdriver. Cut away A-A using a Dremel-type tool with a router or sanding drum.

Glue F-1A to the front of the firewall along with the small hardwood blocks, and trial fit the cowl, trimming to get a flush fit with the fuselage sheeting. Install the engine, and begin cutting away the cowl to fit over it. When the fit is accurate, screw the cowl in place. Cut a 2-in. ring from Lite Ply, and epoxy it to the front of the cowl so that it's centered on the engine shaft. Glue in the rear block over the stab, and sand it to shape. Assemble the tail wheel fittings, and epoxy the tail wheel into the slot in the tail post.

Covering and finishing. The fuselage, fin, and rudder were covered with Sig Koverall using nitrate dope. The wing and stab/elevator were covered with plastic film. Dope

was brushed on the framework where the covering contacted the wood. Stre the covering over the fuselage with grain running crosswise, not lengthwise then apply the dope through the covering contact the wood. After tightening with heat iron, the fabric was given three cc of nitrate clear.

Red Devil polyurethane in the almond shade gives the original its cream color. The paint, which was also sprayed on film, is holding up very well after many flights. The black pinstriping is the ¼ size from Coverite. Vinyl stick-on letters from an office supply store was used.

The Pasture Pilots (PPA) logo on the was strictly a tongue-in-cheek addition. brought me a smile or two and seem amuse others who notice it. The logo made from Coverite Graphic Sheet and painted.

The old-timer in the cockpit was from a Williams Bros. 2½-in. Sportsman lot. To simulate a 1920s-style cap, I dal on baking soda with a small brush and ed thin CyA, repeating the process until had an artful facsimile. I made the from a piece of ½ ply, and glued it to back of the cap. A rubberband was used the elastic on the goggles.

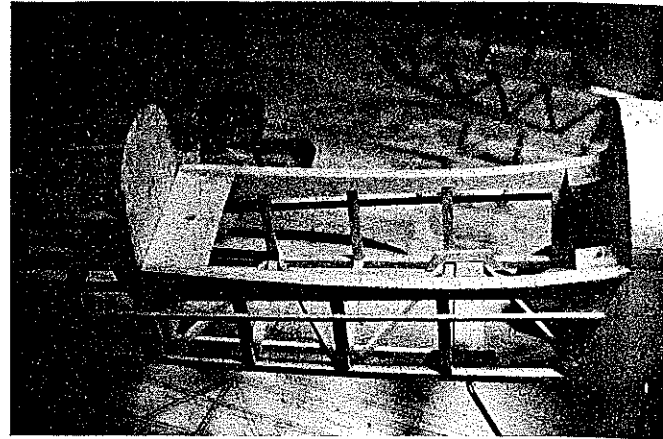
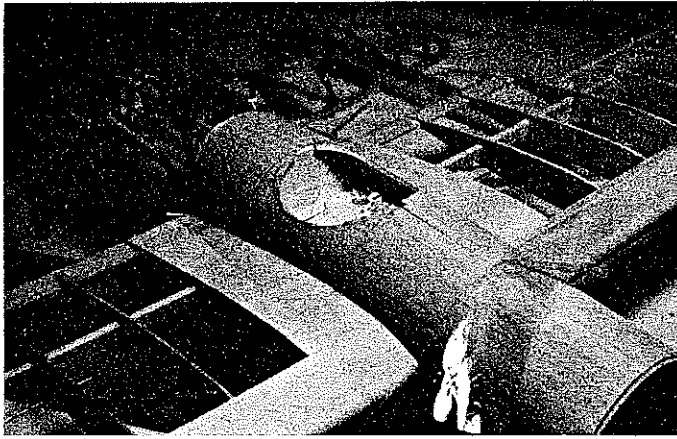
After pinning the windscreen in place traced around its front with a ball-point then carefully cut away the covering with #11 X-Acto knife, leaving approximately ½ groove in the wood. I glued or screen with Testors clear household ment. The aluminum flange for the screen is made from two strips of Cover tape which I painted silver.

From the initial inspiration, to the covering and building stages, and finally to releasing its talents as a flier, I've received hours of pleasure from this airplane. realistic-looking model and carries that realism into the sky. If that's your way of enjoying RC, Pea Patch should satisfy you. epoxy touch-and-goes!

Radio Technique/Myer

Continued from page 36

You can estimate the current drawn by an electric motor by dividing the measured battery



Left: The cockpit sheeting is in place, and the opening has been rough trimmed. Small pieces of balsa will be cut to fit the visible gaps. Right: The rear wing mounting plate has been glued to the recesses in the doublers. The forward Sig maple hold-down blocks are drilled, tapped, and epoxied in place. Note that the forward cabin mount is recessed to achieve a flush cabin tab fit. Also note the braced landing gear mount.

wise substitute your own favorite method for securing a hatch. Glue a 1/4-in. dowel into the headrest as shown, then drill and tap for a 4-40 hold-down screw.

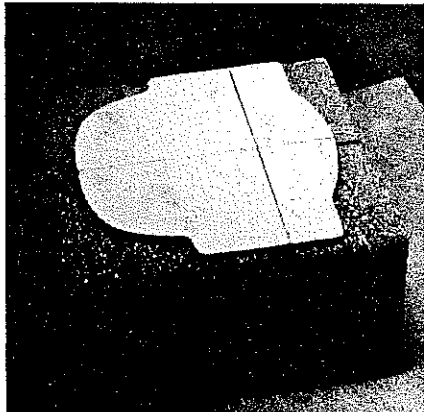
Cut Sig landing gear blocks to length, and epoxy them in place together with the gear block reinforcements. Refer to the section drawing of the bottom sheeting, then glue the sheeting in place as per the plan. Bend

the landing gear wires, and clamp them into the blocks. Build the removable section under the landing gear the same way the bottom sheeting was attached, then secure it with wood screws to the landing gear blocks. Glue in the bottom stringers and the 1/8-in. facing to attach the covering. Install servo mounting pieces suitable for the equipment you're using. Install pushrods for the

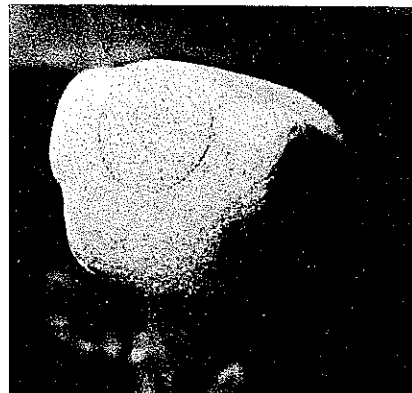
elevator and rudder; Sullivan Gold-n-Rods were used in the prototype.

Fabricating a cowl is relatively easy using the two templates shown on the plan. Foam blocks, available from a craft store or the craft department of a variety store, were

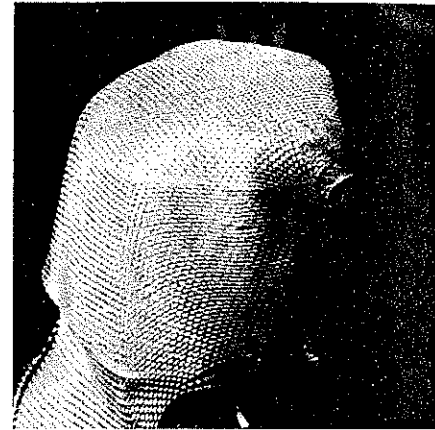
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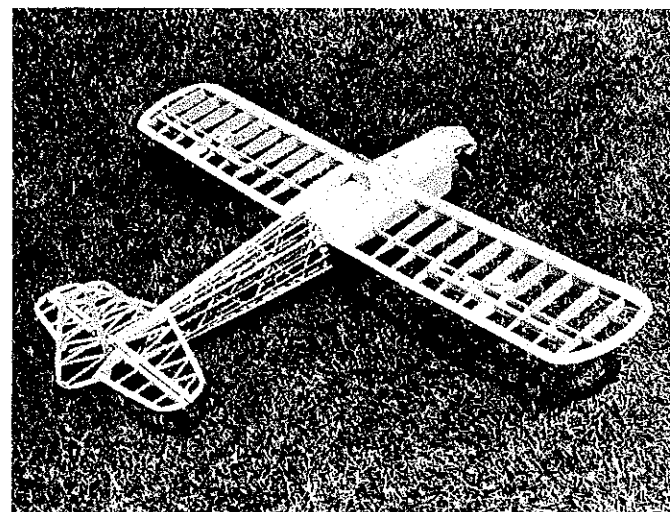
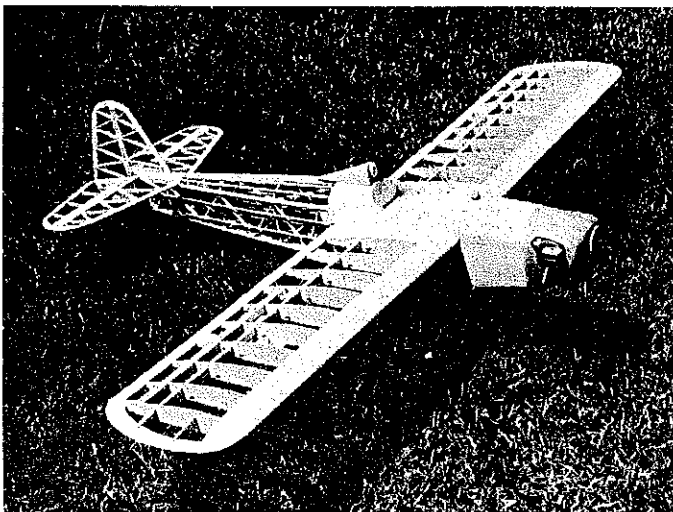
Template B-B has been glued to a foam block to begin cowl construction. Center and thrust lines have been scored on B-B and the foam block. Template A-A has also been marked and epoxied to the foam block.



The foam nose piece has been glued to A-A, and the entire cowl plug has been sanded to its correct shape. Notice how it has been shaped to blend smoothly into the contours of the templates A-A and B-B. The circle roughly marks the spinner ring position.



Fiberglass cloth being fitted over the finished foam plug. The cloth used here is quite heavy. Make the dart cuts around the cheeks with a slight overlap. Use Sig Kwik Set 5-minute epoxy or an equivalent product. Keep any overlaps as smooth as possible to avoid a lot of sanding and filling later.



Two views of the finished airplane in its bare bones. It's almost too pretty to cover, but once covered it'll be even prettier and fly much better! That perfectly flush-fitting cowl may take a little effort to make, but it's really worth it for its appearance, strength, and light weight.