

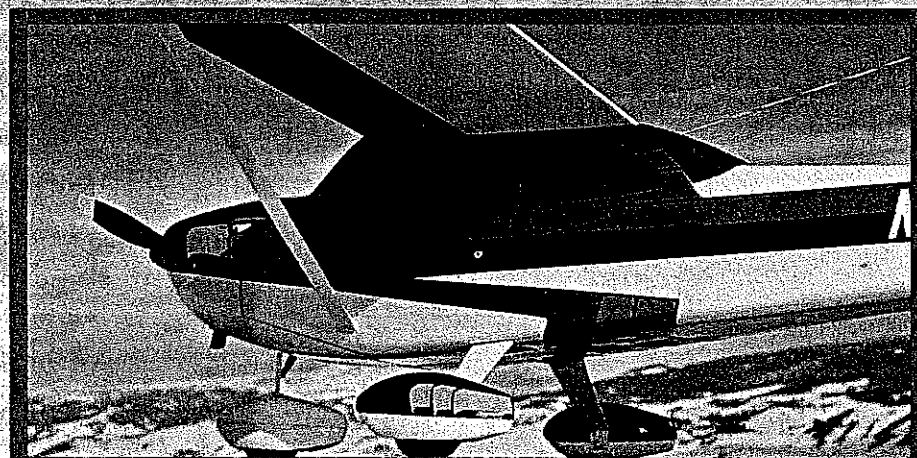
CESSNA 172 ²⁶⁹

Presented as realistic sport job, this 40-powered gem can serve as an intermediate trainer to help landings and use of throttle techniques, providing hours of easy stick time. ■ Fred Reese

Editor's Note: Although the ever-popular Cessna has often been modeled, this exceptional project was too much to resist—especially because of the designer's reputation for skillfully crafted birds with superior handling characteristics.

TEN years ago I built a Cessna Skyhawk designed by Jess Krieser and it was with that airplane I learned to fly RC. I had previously built several machines that lasted a couple of flights or attempts at flight, but it was the Skyhawk, starting with an Enya 15 and rudder only control, progressing to a KB 19 with rudder and elevator Galloping Ghost control, to finally a KB 35 and my

first proportional radio using rudder, elevator and throttle controls that saw me through that difficult period. I flew the Skyhawk for at least two years, logging hundreds of flights, before I gave it away to another fledgling pilot. That man flew my Skyhawk for a year before he, in turn, passed it on. That original Skyhawk was rebuilt several times and has had at least two other owners that I know about and just last year I heard that it was still flying.



Driving by the Long Beach Airport in California, Fred was inspired by the custom paint scheme on this Skyhawk-Hawk XP. His version is authentic—projected 3-view on the wall for tracing, etc.

The flying capabilities of that original Skyhawk has had considerable influence on many of my later designs. As time passed, I knew that someday I would build another Skyhawk. One day back in '77, while driving around the Long Beach Airport in California, I saw a custom-painted Skyhawk-Hawk XP and knew that was the one I'd build. I took a roll of photographs from every angle to record the unique paint scheme for my model. But it wasn't until '79 that I actually designed and built this model. The model outlines are accurate as I enlarged a slide of a 3-view in a projector to the size of the model on the wall, then traced the outlines on paper. The model spans 60 inches and weighs 4¾ pounds ready to fly. With a 40 for power, the model could be equipped with floats and still have plenty of

SKYHAWK

powers.

The full-size Cessna Skyhawk is the most popular airplane ever built with over 30,000 sold, more than any other airplane. It seats four people and cruises at 140 mph with a range of 485 miles at 8000 feet. The wing span is 35' 10", giving the model a scale of 1:67 inches equal to one foot.

Wing Construction: Prepare four 9" x 27" x 1/16" balsa wing skins from 36-in. sheets and cut the wing ribs from the 9-in. sheet ends. Cut two wing skins to the outline of the wing and pin down over the plan. Glue the 1/4" x 1/2" bottom spar to the bottom sheet. Glue each rib, except the end rib W-2, in place using the marks on the plan to position. Add the 1/8" x 1/2" sheer webs between each rib. Use two pieces of 1/4" x 1/2" between W-2 and the first W-3.

Glue the top 1/4" x 1/2" spar in place. Glue the two halves of W-2 in place leaving a 1/8-in. gap between the rib and the spar for the spar joiners. The W-2 ribs are glued to the bottom sheet at a slight angle to match the dihedral angle of the joint. Glue the 1/8" x 3/8" leading edge strip in place.

Sand the wing for high spots and bevel the top edge of the leading edge strip. Trim the top wing skins 1/4" oversize along each edge and glue down to the ribs, spars, leading and trailing edge with white glue. Use lots of pins and weights, starting at the root and work

towards the tips. When dry, trim off all excess sheeting and set aside while building the center section of the wing.

Begin the center section by pinning down the bottom sheeting over the plan, followed by the bottom spar. Over the spar, add two more pieces of 1/4" x 1/2" filler blocks, and then add the top spar. (See the wing cross section on the fuselage side drawing for details.) Trim the spar ends even with the sheeting,

then epoxy the two 1/4" plywood joint pieces W-10 on each side of the spars.

Add the wing ribs, W-1 and W-23, the 1/8" x 1/2" leading edge, the 1/4" x 1/2" dorsal support blocks behind the leading edge, and the 1" trailing edge stock. Glue the 1/4" x 1/16" plywood top trailing edge sheet in place, and then add the remainder of the top 1/4" x 1/16" sheeting.



Shades of the Curtiss Hawk P-6E and its taloned gear! But this stylistic Hawk and its browns and yellows speaks of the great southwest and Indian mythology. The model scales to 1.67 in. to a foot.



The "Cessna look" accentuated by the sharply raked tail is a great modeling inducement. Over 30,000 real Skyhawks have been built.

Allow to dry and trim all excess sheeting.

Trial fit the wing panels to the center section and then epoxy the wing panels to the center section, blocking up each wing tip 2 inches. If building in ailerons, the dihedral can be reduced to 1 inch per tip. After the wing is joined, add the $\frac{1}{4} \times \frac{1}{2}$ " leading edges and the wing tip blocks. I used a razor saw to rough shape the blocks and a plane to shape the leading edge. Finish shaping with sand paper. Some filler will be required on the center section behind the front window block.

Fuselage Construction: Begin by cutting out the firewall, mounting the engine, muffler or manifold, and nose gear, and drill the holes for the pushrods and fuel line. Make the fuselage sides from $\frac{1}{8}$ " balsa. Glue the auto doublers F-2 and F-3 in place leaving a $\frac{1}{4}$ " air space at the top of F-3. Contact cement $\frac{1}{8}$ " balsa vertical grain doublers from the back edge of the nose doublers to the rear bulkhead F-7, again leaving a $\frac{1}{4}$ " air space above the doubler back to the edge of bulkhead F-6. Contact cement the $\frac{1}{16}$ " plywood doubler F-1 over the balsa doubler. Glue the $\frac{1}{8}$ " plywood landing gear supports F-9 in place.

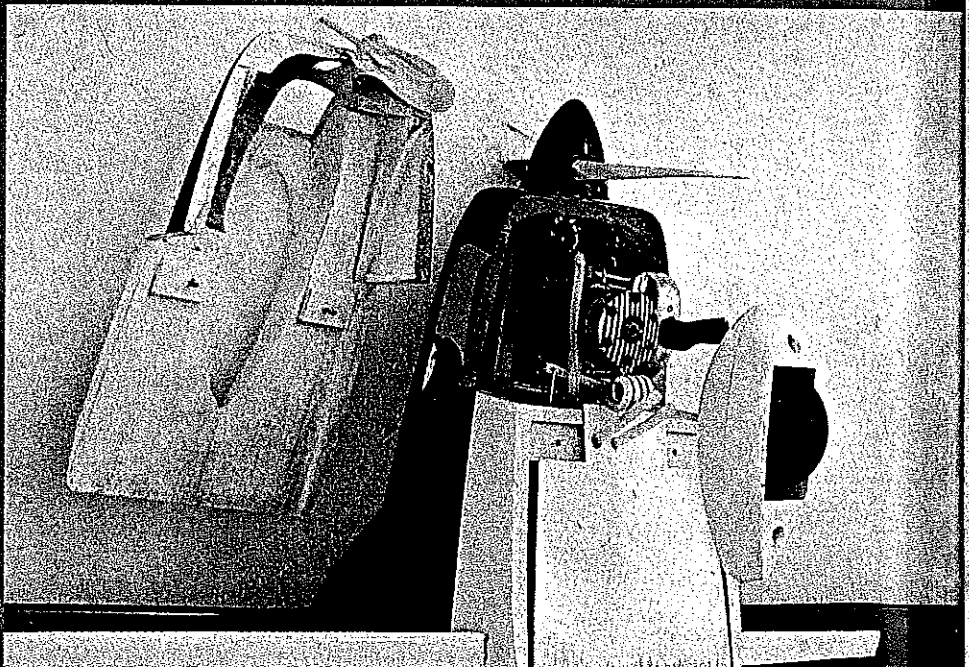
Add the $\frac{1}{4}$ " sq. rear stringers and the $\frac{1}{8}$ " stabilizer support. Cut out the two halves of F-8 and glue together. Mark two lines on bulkhead F-6 (the dotted lines on the plan) and glue F-8 to the bulkhead using a square and the lines to align. Epoxy F-8 and F-6 to one of the fuselage sides. Epoxy the other fuselage side in place. Roll the tail together and glue bulkhead F-7 in place and then glue

the tail together. Add the top and bottom $\frac{1}{4}$ " sq.

Epoxy the firewall in place. Epoxy the landing gear mount F-10, and the wing hold

just forward of the firewall.

Glue $\frac{1}{8}$ " sq. along the bottom sides and back edges of the tank compartment, then epoxy F-5, the hatch hold-down plate, on top of the $\frac{1}{8}$ " sq. and against the firewall. Mark the fuselage outline and the firewall outline on the top of the hatch block. Cut the block along the fuselage outline marks and make the cut-out for the engine cooling duct, using the top view of a wheel pant for size and shape. Glue $\frac{1}{16} \times \frac{1}{2}$ " balsa strips along

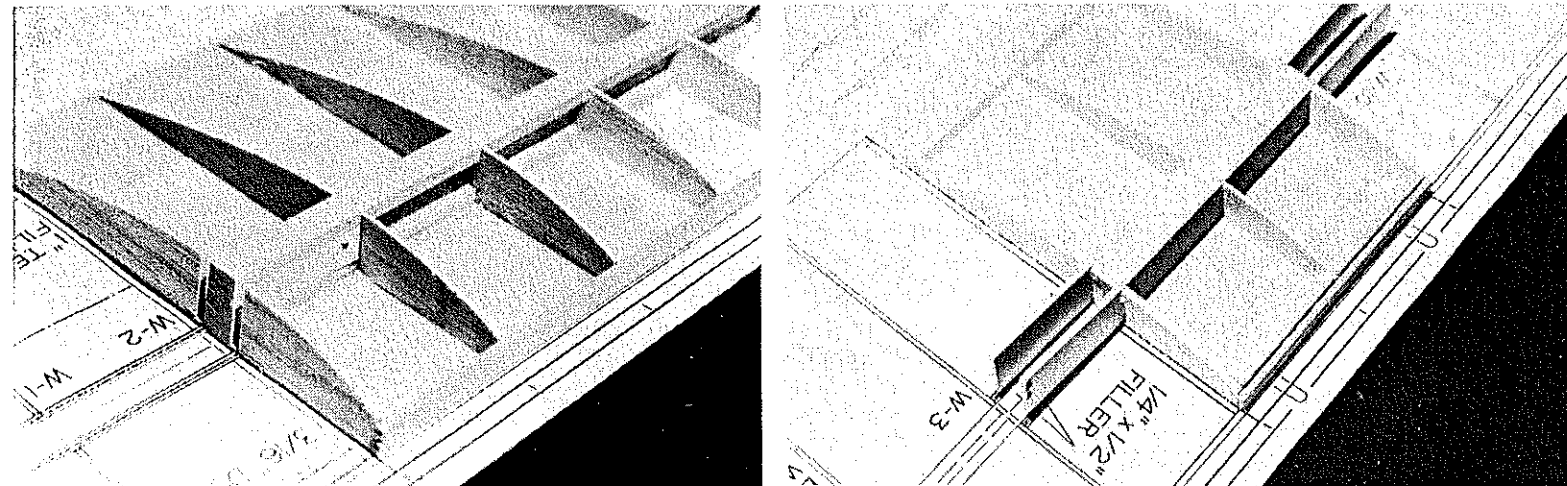


Tightly cowled engines are the bane of our existence, but the designer makes this inverted installation look easy. Everything fits neatly and is accessible. Note how the air flow is ducted by the cylinder. Tatone seems to have an answer for any muffler problem; this one is simple, compact.

down plate F-11, in place. Glue the rear top and bottom sheeting in place leaving cut-outs over the landing gear mount for the aluminum landing gear. Glue the $\frac{1}{4}$ " top cowl sheeting in place and add the $\frac{1}{8}$ " sq. along the top sides inside the engine and tank compartments. Mark the fuselage sides where the cowl will be cut out and make the cutouts.

Against a background of blue skies and white clouds and snow-capped peaks, Fred's noble bird looks excitingly real. Ten years ago Fred built an earlier Skyhawk. It had multiple owners, and as late as last year it was still flying.





Left: Wing panel ready for top sheeting. Shear webs between the spars and all outer ribs are $\frac{1}{8} \times \frac{1}{2}$, with $\frac{1}{4} \times \frac{1}{2}$ between spars at root. Right: Wing center section ready for top sheeting. The two spar joiners on each side of the spars are cut from $\frac{1}{8}$ plywood.

the side edges of the hatch block; they act as spacers for the $\frac{1}{16}$ " plywood F-13 which seals the tank compartment from the exhaust oil.

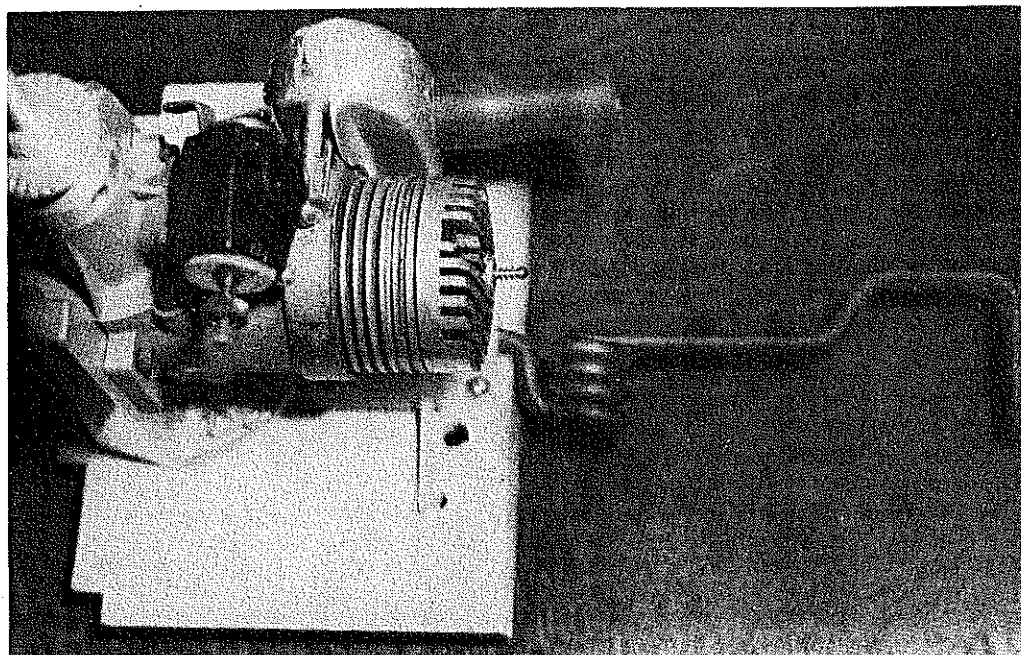
Glue pieces of $\frac{1}{16} \times \frac{1}{4}$ " balsa strips over the firewall marks on the hatch block. Epoxy the two $\frac{3}{16}$ " plywood F-15s onto the hatch block against the $\frac{1}{16}$ " balsa side and firewall strips. To install the hatch-mount bolts and blind nuts, drill a $\frac{1}{8}$ -in. hole through the center of each F-15 down through the hatch block. Put the hatch in position on the fuselage and drill back through the holes with a $\frac{1}{8}$ -in. drill, and through the F-5 in the fuselage. Remove the hatch and enlarge the holes in F-5 to $\frac{5}{32}$ " and epoxy a 4-40 blind nut into the holes. Enlarge the holes in the balsa hatch up to the plywood F-15s with a $\frac{1}{4}$ " drill. Check the fit and glue the hatch block only to the fuselage sides forward of the firewall and bolt tightly together. Glue the front blocks in place, then finish cutting the hatch outline.

Place the wing on the fuselage and drill the two $\frac{3}{16}$ " holes for the dowels in the leading edge of the wing, using the holes in F-6 to guide the drill. Glue the $\frac{3}{16}$ " dowels into the wing. Drill two $\frac{3}{16}$ " pilot holes for the nylon wing mounting bolts through the trailing edge of the wing and F-11 at a slight angle, so that the heads of the bolts will be flush with the wing. Enlarge the holes in the wing to $\frac{1}{4}$ -in. and tap the holes in F-11 with a $\frac{1}{4} \times 20$ tap.

Rough shape the window blocks, hollow out, then glue into place. The fuselage is now complete and ready for carving. Get pictures of a Skyhawk (especially the cowl) or visit an airport for cowl details and contours. I used a sanding block with very coarse #50 grit sandpaper to shape the fuselage, followed by #100 sandpaper and finally #220 sandpaper to finish.

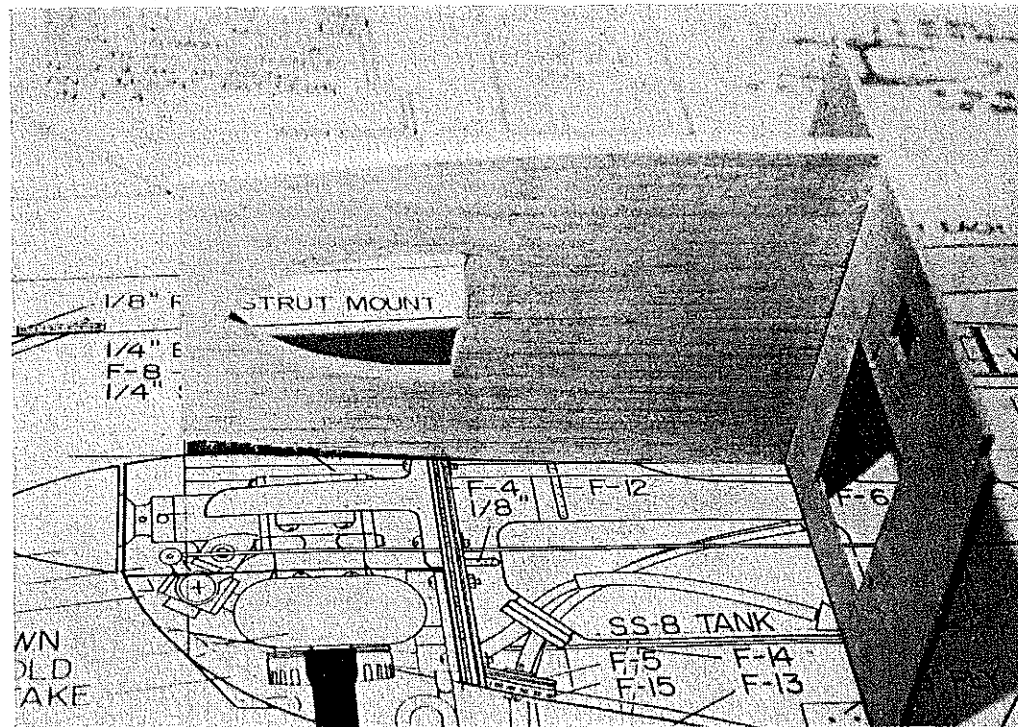
Add the $\frac{1}{4}$ " balsa tail surfaces after the fuselage is all shaped and sanded. You may even wait until the fuselage is glassed before gluing in the stabilizer as I did.

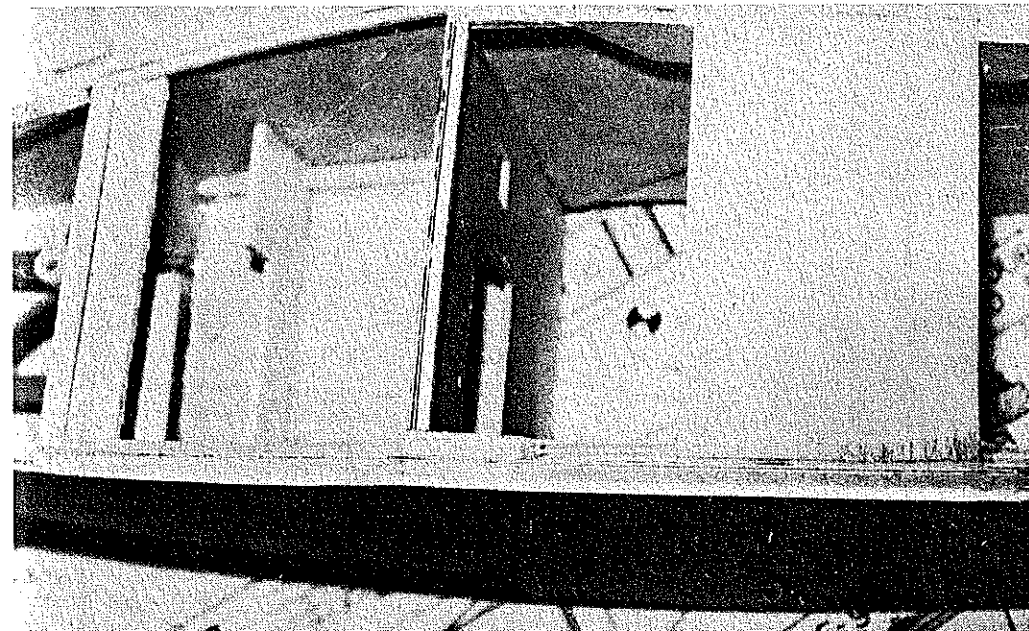
Wheel Pants: To me, wheel pants are necessary on a Cessna, but they are also a nuisance as they often break, fall off over the corn field or just rotate 180° in flight. Having experienced all of these things over the years, I continue to make changes that



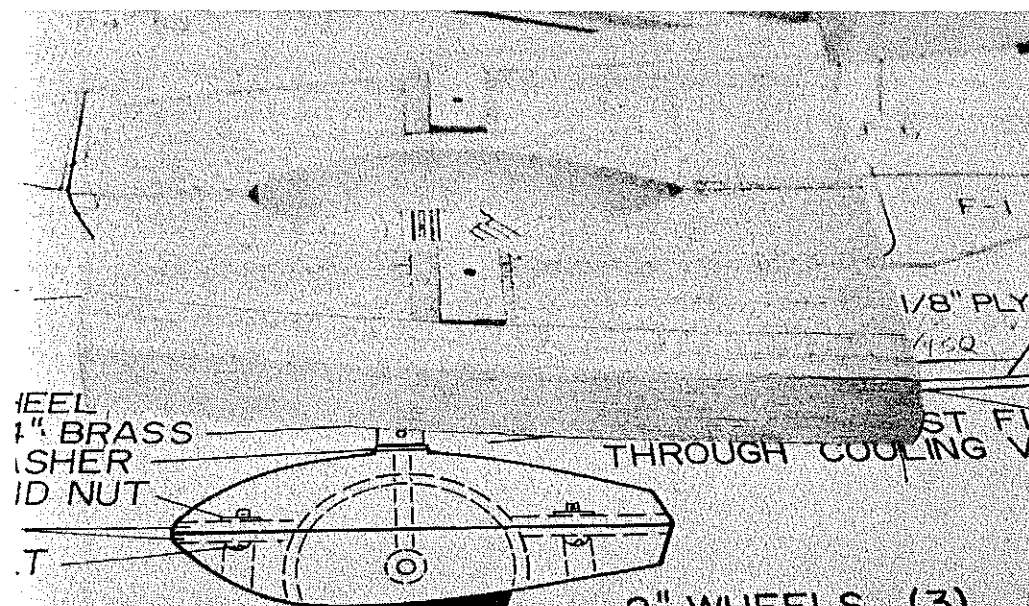
Everything is mounted on the firewall, then holes drilled for pushrods and fuel line. Nose gear wire bent with propane torch to center both strut and steering arm over the wheel. Engine and strut are easily removed before firewall is epoxied into the fuselage structure.

To begin fuselage join F-8, top of cowl, and first bulkhead F-6. Cut-out in F-8 is for engine crankcase, those in F-6 for fuel tank and battery wires—small holes for pushrods. The fuselage sides are then glued to this structure. Note compact location of the engine, muffler, and tank.



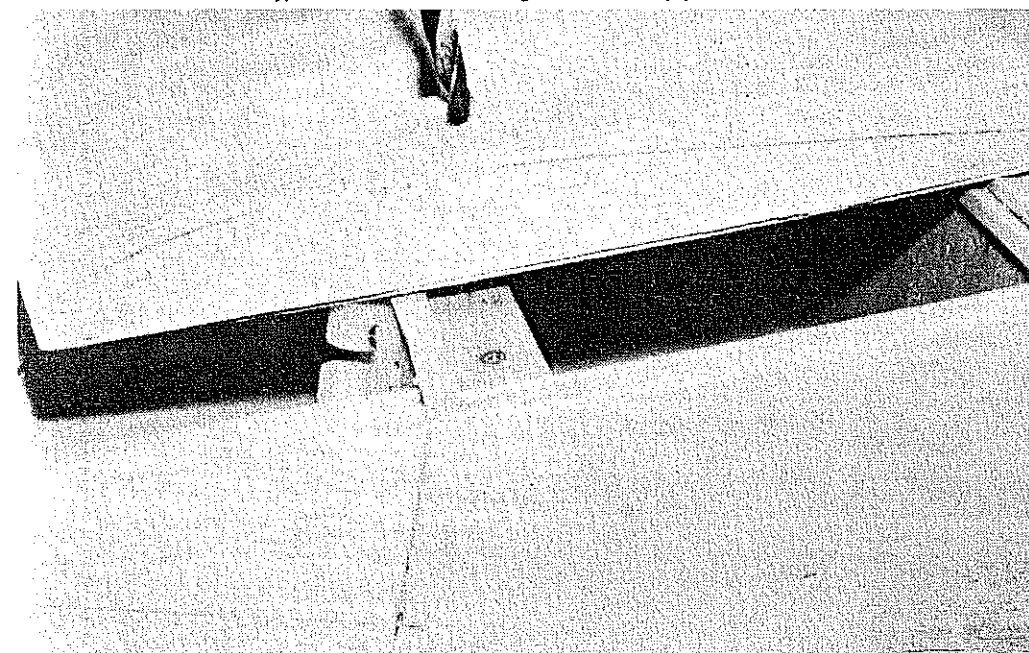


Bottom view of the fuselage before sheeting. From L to R: hatch mount plate F-5, tank support F-12, bulkhead F-6, landing gear supports F-9, and landing gear mount F-10.



Hatch block before carving. Cooling duct must be large enough to go over nose-wheel pant. The $\frac{1}{8}$ " holes for hatch mounting bolts drilled through F-15's with 1/16 spacer strips glued around edges, and in front of, F-15's to seal off firewall and to act as spacer for 1/16 ply cover, F-13, which seals off the tank compartment from the exhaust oil.

The $\frac{1}{8}$ " holes in hatch drilled back through hatch mounting plate F-5, enlarged to 5/32 and blind nuts installed. Finally, holes in hatch are enlarged $\frac{1}{4}$ " down to plywood F-15's for 4-40 heads.



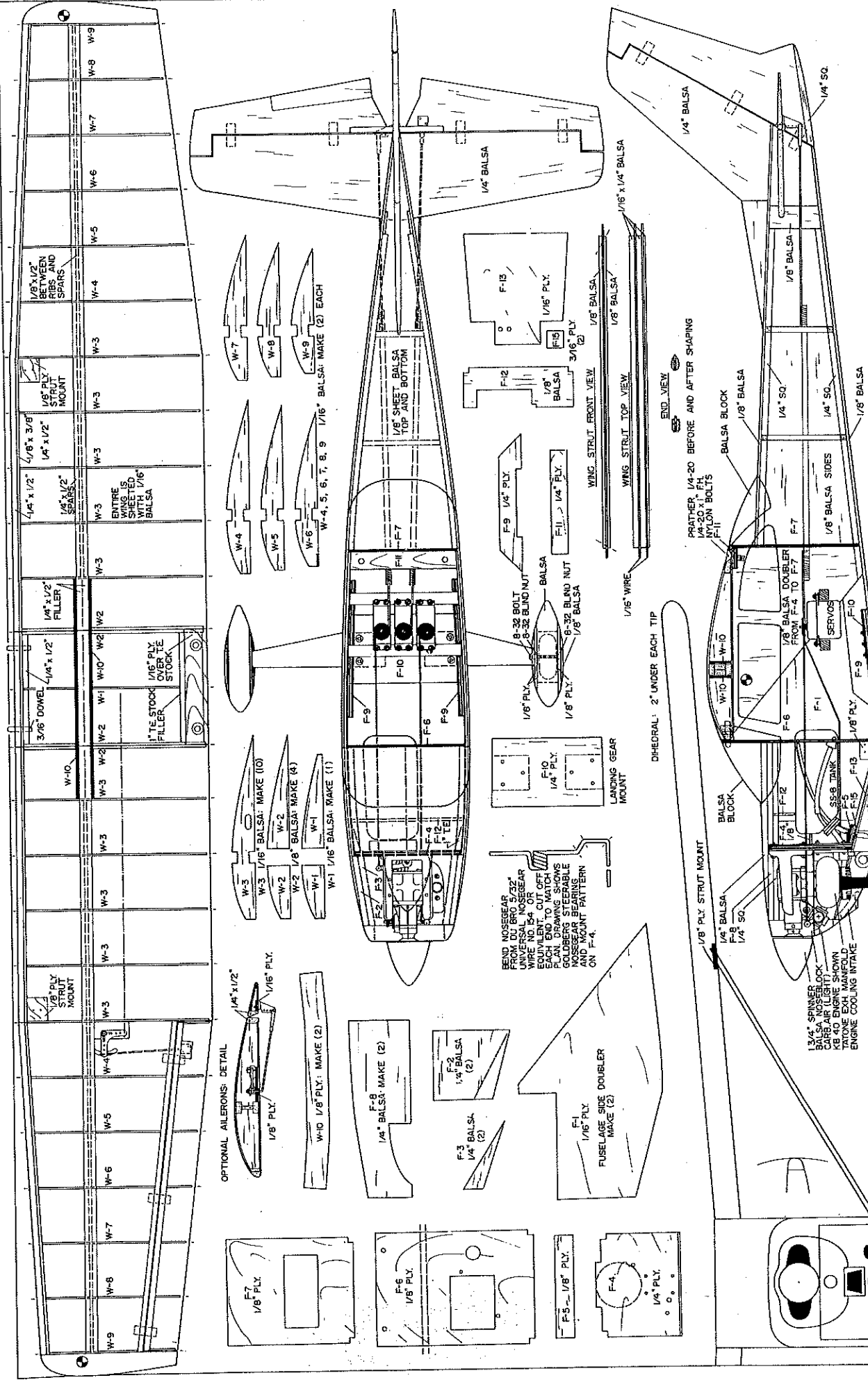
usually help some of these problems. I like the laminated balsa and plywood pants, covered with light fiberglass cloth for sport flying, for their durability. The wheel pant must have a notch that fits the aluminum landing gear so the pant can not rotate. The single bolt (axle) is similar in concept to the Formula One racer wheel-pant system, which is almost trouble-free, but does not require special parts. By leaving the gear side blind nut long enough to pass through both the plywood side of the pant and the aluminum gear, the axle bolt can be tightened down hard, then set with a drop of Hot Stuff.

To make the main gear pants, first cut out the inner balsa cores and epoxy on the $\frac{1}{8}$ " plywood sides. Drill a hole through both sides for the axle and epoxy in the blind nuts. I used 8-32 blind nuts and bolts but I am sure 6-32 would work as well. The length of the threaded center will have to be filed down flush with the plywood on the inside of the pant, and flush with the outer surface of the aluminum gear on the other. Enlarge the hole in the aluminum gear to fit over the end of the blind nut. Align the aluminum gear on the pant using the side view on the plan. Cut another piece of $\frac{1}{8}$ " plywood to fit around the gear and epoxy in place. Glue on the $\frac{1}{8}$ " balsa outer lamination to conceal the other blind nut. When dry, finish shaping and sand smooth. The Prather Products Formula One landing gear, or any other brand, must be cut in half in order to match the 6-in. wide fuselage. Note the outline and mounting bolt pattern on the landing gear mount F-11.

For the nose wheel pant I have tried to achieve both realism and serviceability. The full-size nose gear is centered over the wheel and pant, rather than along the side of the pant the way standard commercial nose gears are bent. Use a propane torch to bend the 5/32" wire nose gear. Heat the wire red hot, then bend. When finished reheat the entire wire and quench in cold water. If you want to make the nose gear knee as shown on the plan, the 5/32" wheel collars and the brass strip must be on the strut before bending. (I forgot.) After the wire is bent, the brass strip can be soldered to the wheel collars.

The nose gear pant must be split to install the wheel and gear if it is to be removable. It could be one piece if it were built around the wheel and gear wire and be permanently attached. First assemble the bottom half of the wheel pant with a notch on the inside left for the 5/32" wire and a 3/8-in. wide notch on the other side that just fits a 5/32" wheel collar. These notches should extend down from the top of the pant only as far as the center of the wheel so the blind nut and wire bottom out against the plywood. The two halves of the pant are attached the same as the cowl and the fuselage, with 4-40 blind nuts in the top and 4-40 $\times \frac{1}{2}$ " bolts in from the bottom.

First drill $\frac{1}{8}$ -in. holes through both plywood plates. Enlarge the holes in the bottom to $\frac{1}{4}$ " up to the plywood. Enlarge the holes



CESSNA 172 SKYHAWK
 DESIGNED AND DRAWN BY FRED REESE

WING SPAN 60"
 LENGTH 42 1/2"
 ENGINE 40
 3 OR 4 CHANNEL RADIO

0 1 2 3 4 5 6 7 8 9 10

WING SPAN 60"
 LENGTH 42 1/2"
 ENGINE 40
 3 OR 4 CHANNEL RADIO

WING SPAN 60"
 LENGTH 42 1/2"
 ENGINE 40
 3 OR 4 CHANNEL RADIO

WING SPAN 60"
 LENGTH 42 1/2"
 ENGINE 40
 3 OR 4 CHANNEL RADIO

WING SPAN 60"
 LENGTH 42 1/2"
 ENGINE 40
 3 OR 4 CHANNEL RADIO

WING SPAN 60"
 LENGTH 42 1/2"
 ENGINE 40
 3 OR 4 CHANNEL RADIO

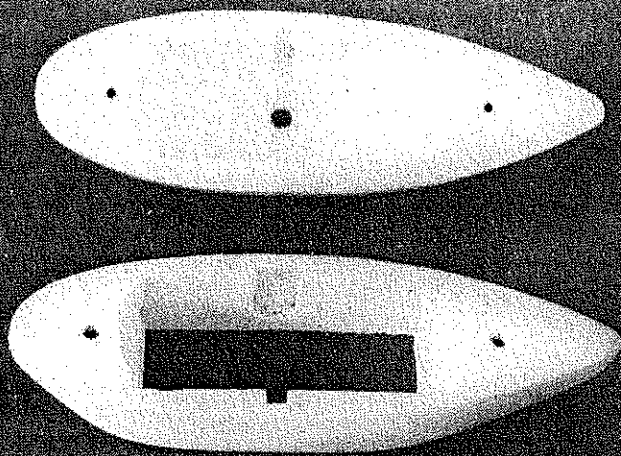
WING SPAN 60"
 LENGTH 42 1/2"
 ENGINE 40
 3 OR 4 CHANNEL RADIO

WING SPAN 60"
 LENGTH 42 1/2"
 ENGINE 40
 3 OR 4 CHANNEL RADIO

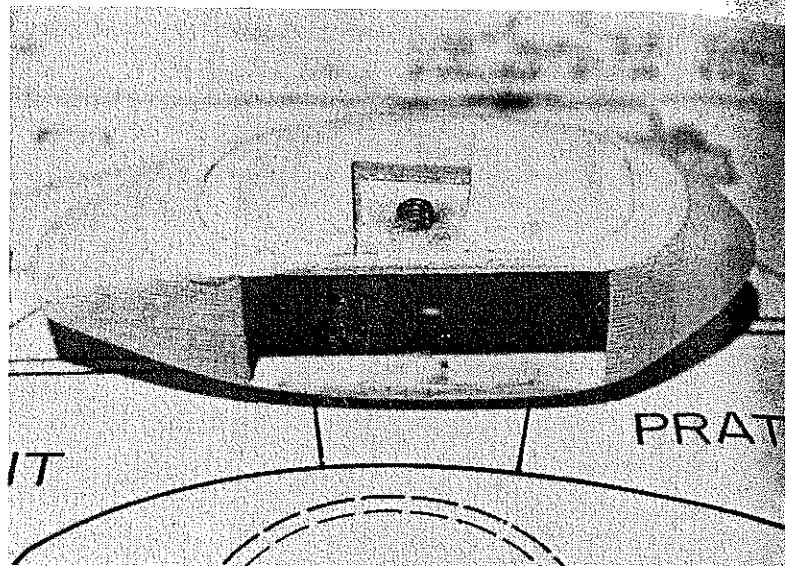
WING SPAN 60"
 LENGTH 42 1/2"
 ENGINE 40
 3 OR 4 CHANNEL RADIO

WING SPAN 60"
 LENGTH 42 1/2"
 ENGINE 40
 3 OR 4 CHANNEL RADIO

FULL SIZE PLANS AVAILABLE .. SEE PAGE 128



Large notch in side of balsa/plywood pant is for aluminum gear. End of 8-32 blind nut passes through hole in gear. Second blind nut inside pant secures bolt axle on other side of pant. Right: Finished pant split, held together with 4-40's and blind nuts. Narrow slot in side is for gear leg, wide slot in other side of bottom for wheel collar. Wheel pant clamps tightly around the nose gear wire when bolted together.



in the top plywood pieces to $5/32''$ and then epoxy in blind nuts from the top. Bolt the top plywood plates to the bottom half of the pant, and continue building the top half of the pant. When complete, rough shape only, and then fit the wire to the inside. There needs to be a $5/32$ -in. notch on the wire side of the top half, only as far up as the first bend of the wire. Drill a $3/16''$ hole in the top of the pant for the nose gear. Carefully fit the wire nose gear into the pant. The center of the pant will need to be hollowed as shown by the dotted line on the side view of the nose gear pant to prevent splitting the wood. Epoxy a $5/32''$ washer over the hole in the top and finish shaping.

Finishing the Model: If you choose an iron-on covering, I suggest you first apply a

Finished engine and fuel tank installation. Two holes (not shown) drilled in F-13 for fuel fill vent lines to match holes in F-8. Battery fits in with tank, but was located back with receiver to balance the model. Pack foam around the tank for support.

coat of Balsarite over all of the surfaces to prevent future wrinkling. Due to the complexity of the paint scheme I chose, I decided to paint my model. First I used KB $3/4$ -oz. glass cloth and surfacing resin over the entire model, followed by one coat of KB Superpoxy primer. When applying surfacing resin over the super-fine glass cloth, it may be necessary, or desirable, to dilute the resin, after adding the catalyst, 50/50 with acetone. The diluted resin brushes much easier and the glass cloth will lay down, wrinkle-free, without excess globs of resin.

To remove excess resin before it sets, unroll a roll of toilet tissue over the surface, pushing down on the roll to act as a blotter. Tear off the dampened tissue from the roll

With the hatch bolted in place, F-13, the tank compartment can be seen at the bottom of the cooling duct. Both fuel lines end at top rear of tank so fuel will not run out in any position.

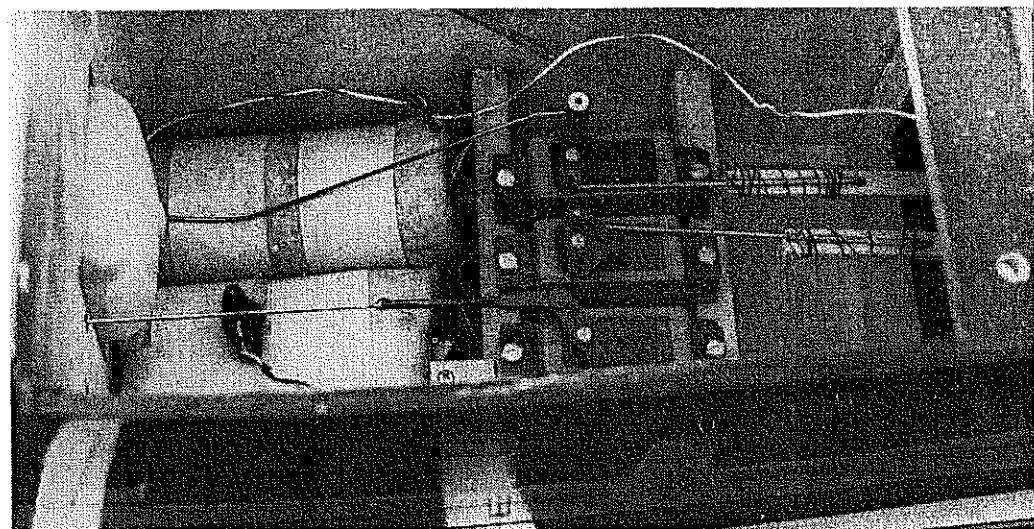
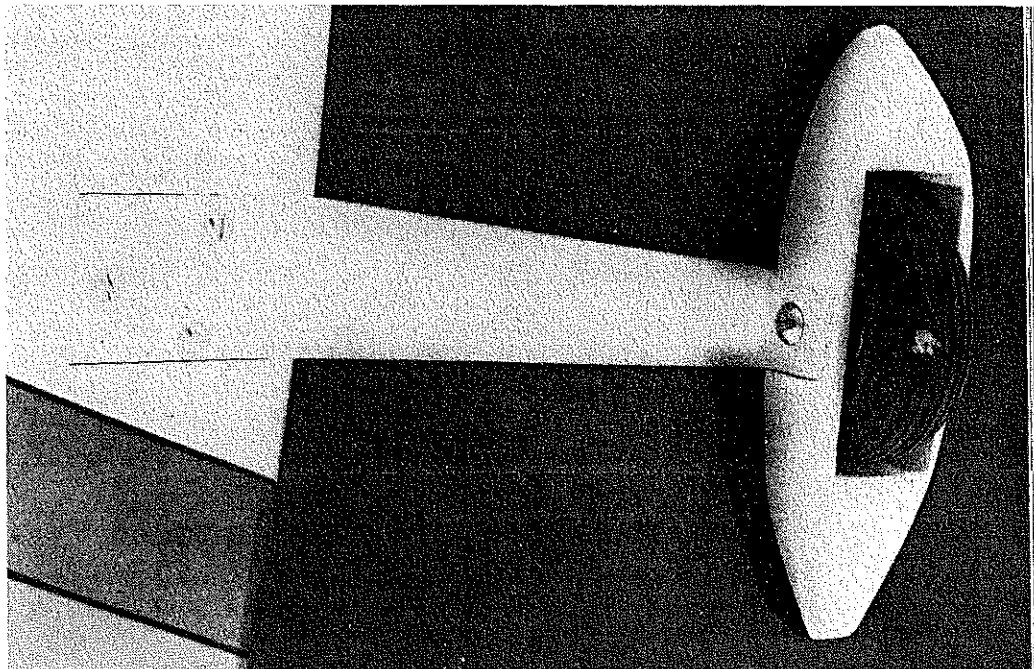
Prather Products Form. I gear is correct size but must be cut in half to fit 6-in. wide fuselage. Blind nuts on inside facilitate removal. Single 8-32 is wheel axle and secures the wheel pant.

and immediately peel it back off the surface. By following this procedure, there should be no excess resin on the model to be sanded off.

To match the unusual paint scheme of the full size Skyhawk I saw in Long Beach, I used automobile touch-up spray cans for the final finish. I used white, two browns, black, and blue for the windows. If you use different brands or types of paint, first check the compatibilities on scrap before spraying on the model. The hawk's head was hand painted using a contact paper mask with Pactra Formula U paint. The head and bottom stripes are a mixture of yellow, orange and a little black. The beak and talons on the wheel pants are yellow with a little orange. 1/16" black Goldberg Color Stripe was used to separate all colors, and the entire model was sealed with Perfect Paint gloss clear spray.

Flying: The model flies much like the real airplane, easy. In order to keep the model flying at slower, more realistic speeds, I use an 11 x 4 prop rather than the usual 10 x 6. I did not put ailerons on my model because I have found that most high-winged models will roll as well with rudder and increased dihedral. Takeoffs are a breeze, just point it into the wind and when flying speed is reached, a touch of elevator will lift it off. Landings are also easy as the Cessna will fly slow and steady at reduced power around the pattern. Just chop the power on final approach and the Cessna will settle right in.

The Cessna Skyhawk model presented here was designed as a realistic sport model and can serve as an intermediate trainer which will help landing and use of throttle techniques while providing hours of easy stick time.



Space is barn-like. Rear of fuel tank supported by hole in bulkhead. Wing hold-down plate tapped for 1/4-20 nylon bolts—drop of Hot Stuff will harden wooden threads. Radio switch mounted on plywood, then screwed to servo rails. Push-pull wire actuates switch through the side of the fuselage with a wheel collar for a knob.

