Volksplane

IT'S BEEN 20 years since Bill Evans first introduced the Volksplane. Since that time, literally hundreds of the VW-powered birds have emerged from basements, garages, and workshops around the world. Possibly no other design has done more to promote home-built aircraft than the Volksplane, prompting many a would-be home-builder to turn fantasy into reality.

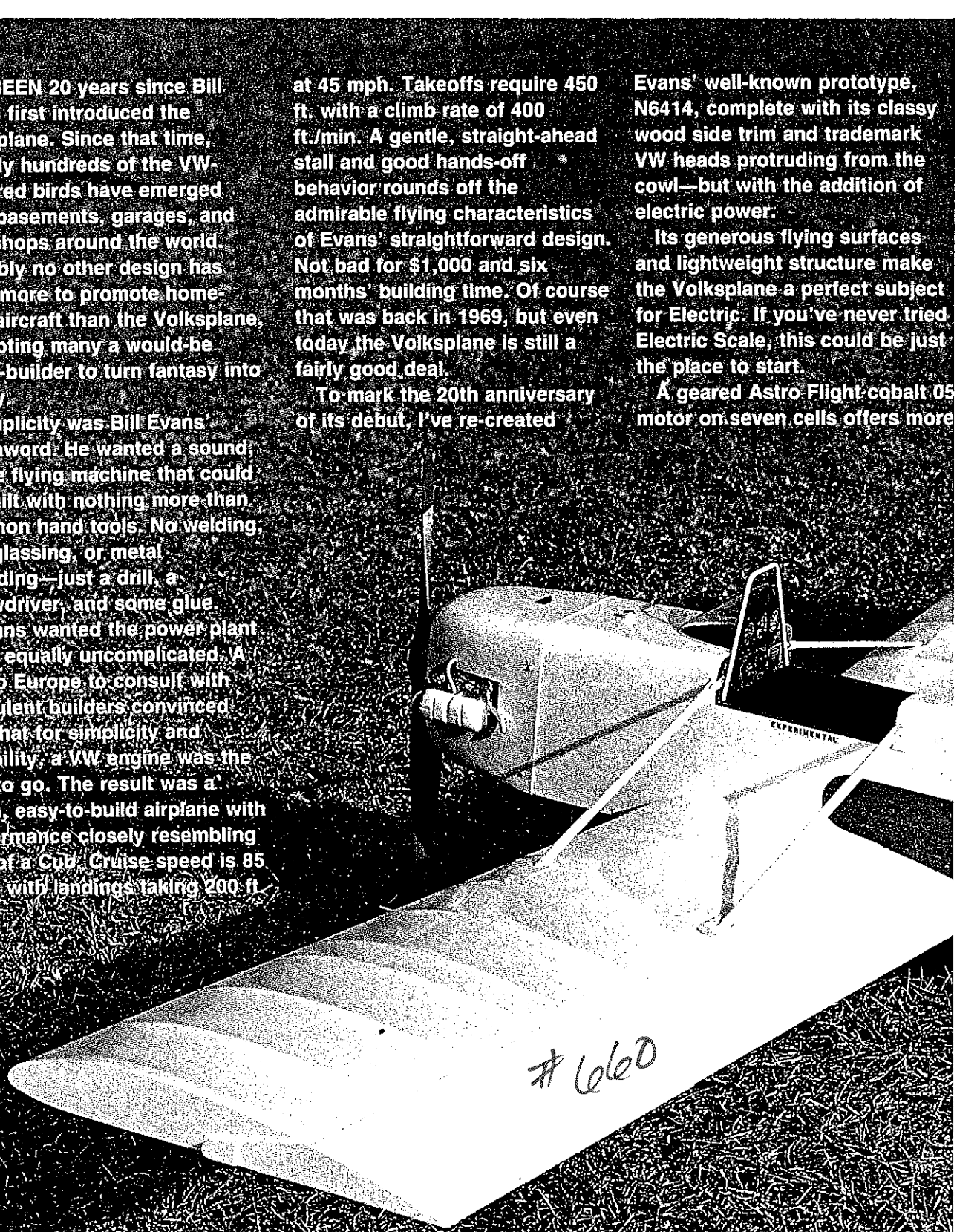
Simplicity was Bill Evans' watchword. He wanted a sound, stable flying machine that could be built with nothing more than common hand tools. No welding, fiberglassing, or metal pounding—just a drill, a screwdriver, and some glue.

Evans wanted the power plant to be equally uncomplicated. A trip to Europe to consult with Turbulent builders convinced him that for simplicity and reliability, a VW engine was the way to go. The result was a clean, easy-to-build airplane with performance closely resembling that of a Cub. Cruise speed is 85 mph, with landings taking 200 ft. at 45 mph. Takeoffs require 450 ft. with a climb rate of 400 ft./min. A gentle, straight-ahead stall and good hands-off behavior rounds off the admirable flying characteristics of Evans' straightforward design. Not bad for $1,000 and six months' building time. Of course that was back in 1969, but even today the Volksplane is still a fairly good deal.

To mark the 20th anniversary of its debut, I've re-created Evans' well-known prototype, N6414, complete with its classy wood side trim and trademark VW heads protruding from the cowl—but with the addition of electric power.

Its generous flying surfaces and lightweight structure make the Volksplane a perfect subject for Electric. If you've never tried Electric Scale, this could be just the place to start.

A geared Astro Flight cobalt 05 motor on seven cells offers more



than enough power for realistic 10-minute flights. No vertical maneuvers, mind you; but then, that's not the point of building a Volksplane. What you will experience is quiet, graceful flights. Watching the Volksplane lift off from the tarmac in a gentle climb, you can almost feel the wind crisp against your face from the open cockpit. Interested? Good, let's start building.

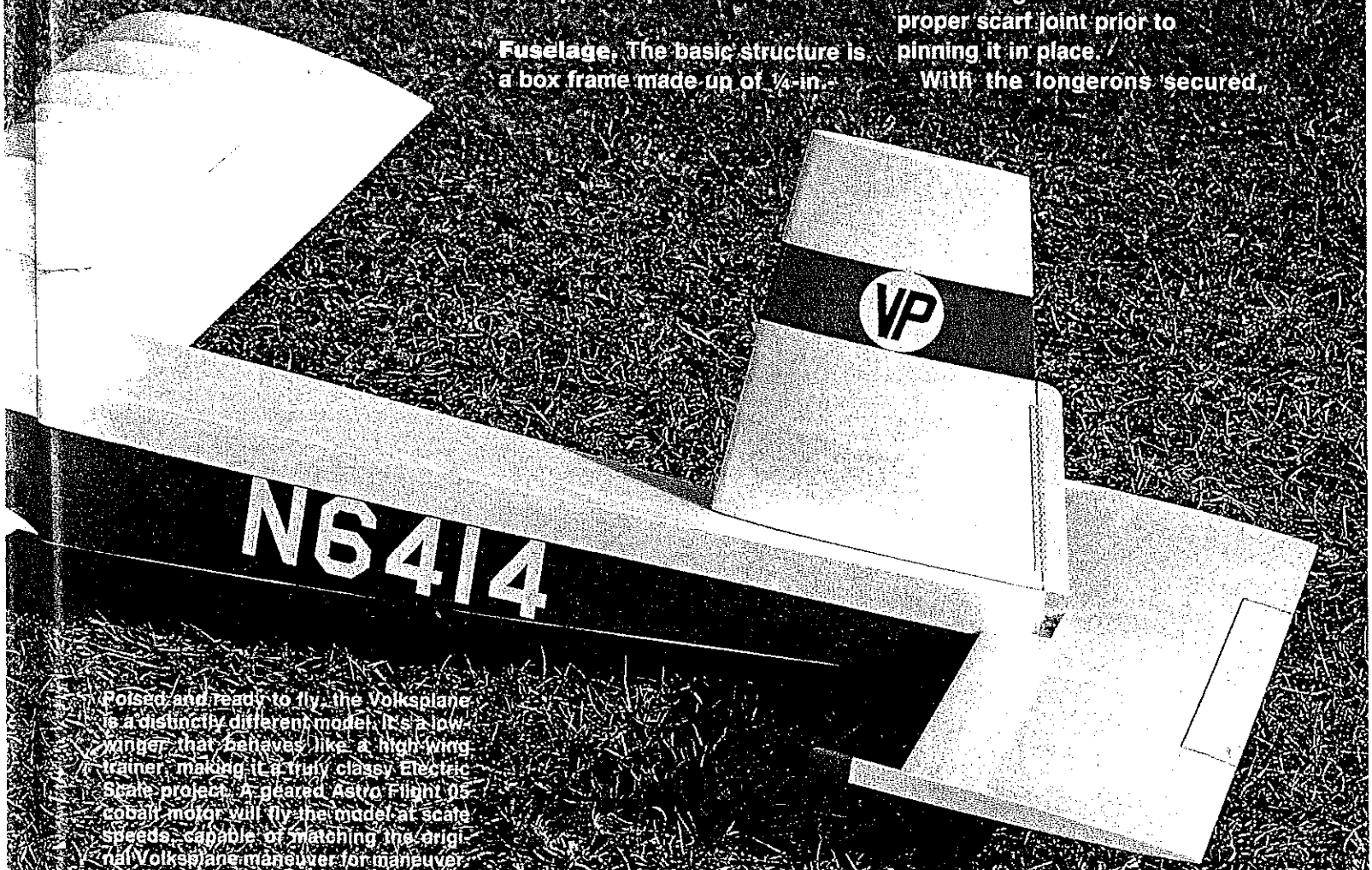
Construction

The Electric Volksplane builds much like a large rubber-powered model. With special care given to wood selection, the use of vacuum-formed plastic for the cowl and turtledeck, and lightweight radio gear, an all-up weight of 48 to 50 oz. should be an easy mark. This yields a wing loading in the neighborhood of 15 oz. and flying characteristics that simulate the full-size Volksplane's performance.

Fuselage. The basic structure is a box frame made up of ¼-in. sq. balsa. Start by selecting stiff pieces for the top and bottom longerons, matching them for weight and strength as far as possible. The better matched your pieces, the more even the contour when you draw the two sides together at the tail.

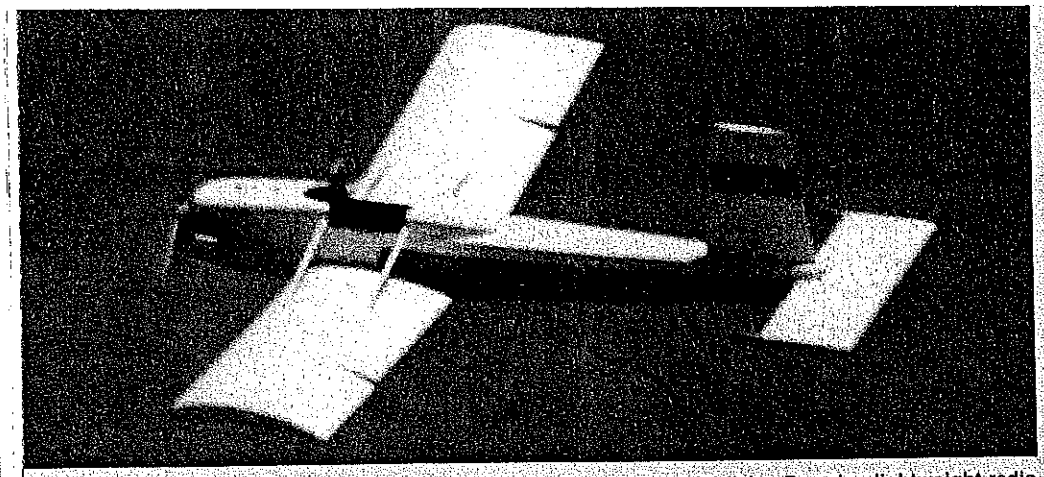
Begin the first side by laying out and pinning the top and bottom longerons on top of the plans. You may need to splice the bottom longeron aft of section C in order to achieve the desired angle. If so, cut the proper scarf joint prior to pinning it in place.

With the longerons secured,

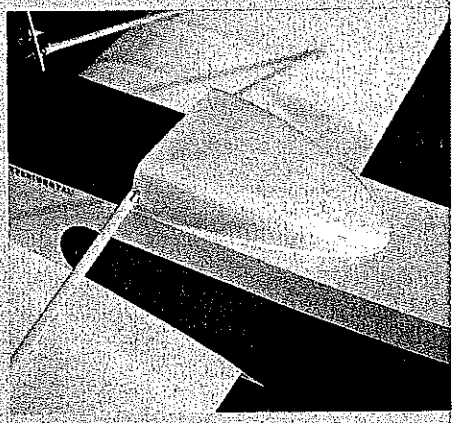


Poised and ready to fly, the Volksplane is a distinctly different model. It's a low-winger that behaves like a high-wing trainer, making it a truly classy Electric Scale project. A geared Astro Flight 05 cobalt motor will fly the model at scale speeds, capable of matching the original Volksplane maneuver for maneuver.

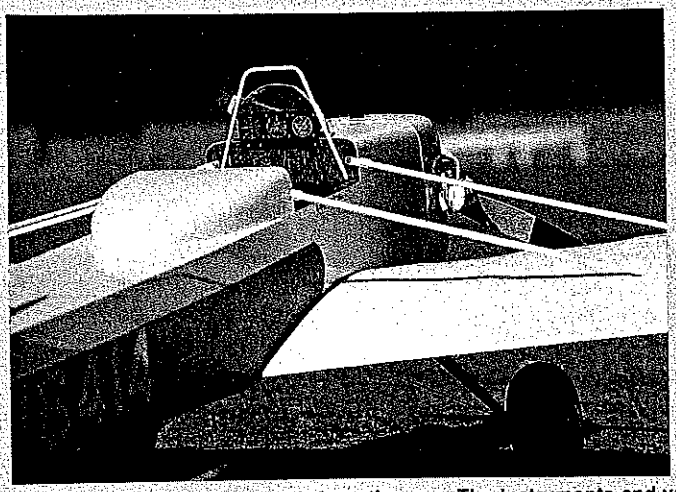
Want an excuse to try RC Electric? This 20th-anniversary model of Bill Evans' VW-powered Volksplane couldn't be a better one. Set up for a geared 05 cobalt motor on seven cells, the 54-in.-span airplane is as lightweight, soundly constructed, and stable in flight as Evans' original design. ■ Jeff Kelety

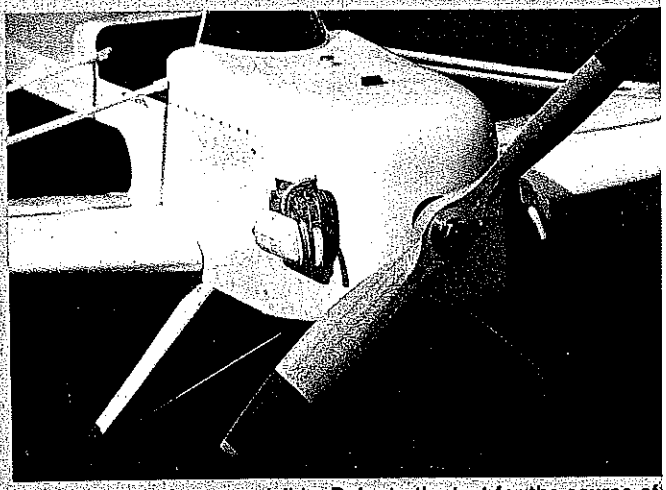


In its element, Volksplane soars past in a slow and graceful flyby. By using lightweight radio gear and first-rate building materials, the model should come out weighing 48 to 50 oz., giving it a wing loading of about 15 oz./sq. ft.—an ideal combo for scale flight characteristics. The model's finish duplicates that of Evans' original full-scale Volksplane prototype, N6414.

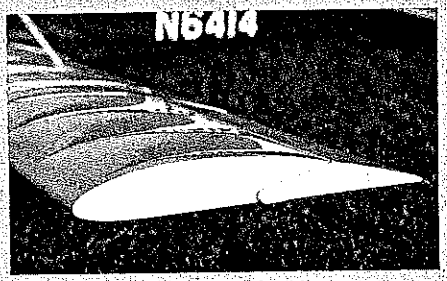


The turtledeck can be vacuum-formed or carved from balsa (with a weight penalty). Note the strut attachment in the turtledeck.

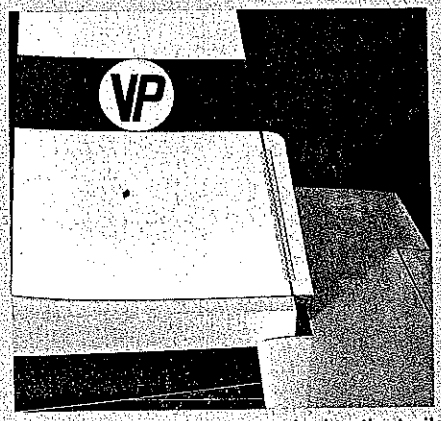




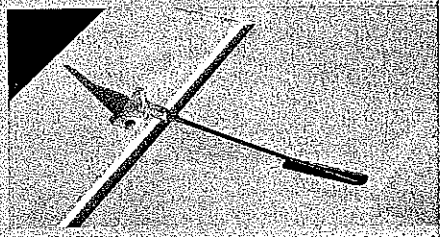
Left: Looking into the cockpit from the rear. The instruments and vacuum-formed windscreen are visible. Refer to the text for the source of an excellent article on vacuum forming plastics. The process offers a significant weight reduction. The adhesive-backed mahogany trim on the fuselage is available from Walnut Hollow Farm (address in text). It adds pizzazz to the finish and duplicates the original. Right: Close-up of the simulated VW engine heads. They were built up from balsa, using .015 plastic for the fins and aluminum tubing for the manifold and exhaust pipes. Though time-consuming, it's well worth the added effort. The prop, a Rev-Up 12 x 8, is larger than recommended but works great.



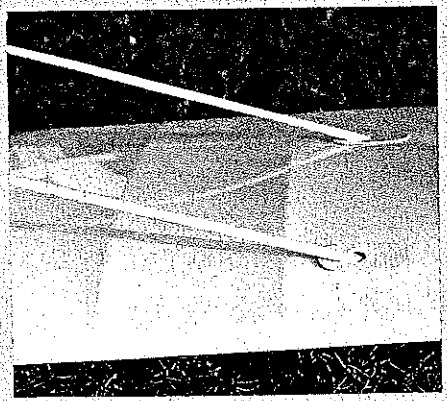
Wing tip detail showing the aileron counterbalance made from scrap 1/16 sheet balsa.



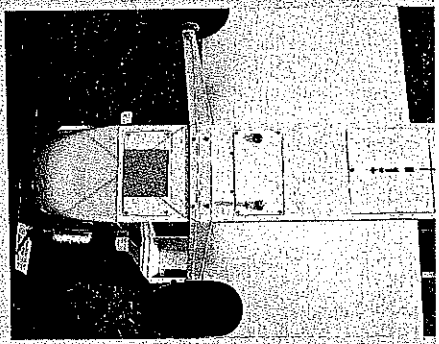
Close-up of the trim tab attached to the trailing edge of the rudder. A piece of miniature piano hinge from Micro-Mark and a dab of Wilhold RC 56 glue holds it firmly in place.



The aileron linkage is quite straightforward. It's made up from small Goldberg horns and bellcranks. The model flies quite slowly, so crank in maximum throw in both directions.



The wing struts attach to the wings via small loops of music wire set in the main spars. Note the .015 plastic fairings over the wing strut openings. These are held in place with a dab of contact cement for ease of removal.



The three hatches shown here provide ac cess to the speed controller, aileron servo and main radio gear. The aluminum sheet j the forward hatch is a heat sink for the Jo mar speed controller. The bracing wire seen on the landing gear are quite functional Their construction is explained in the text

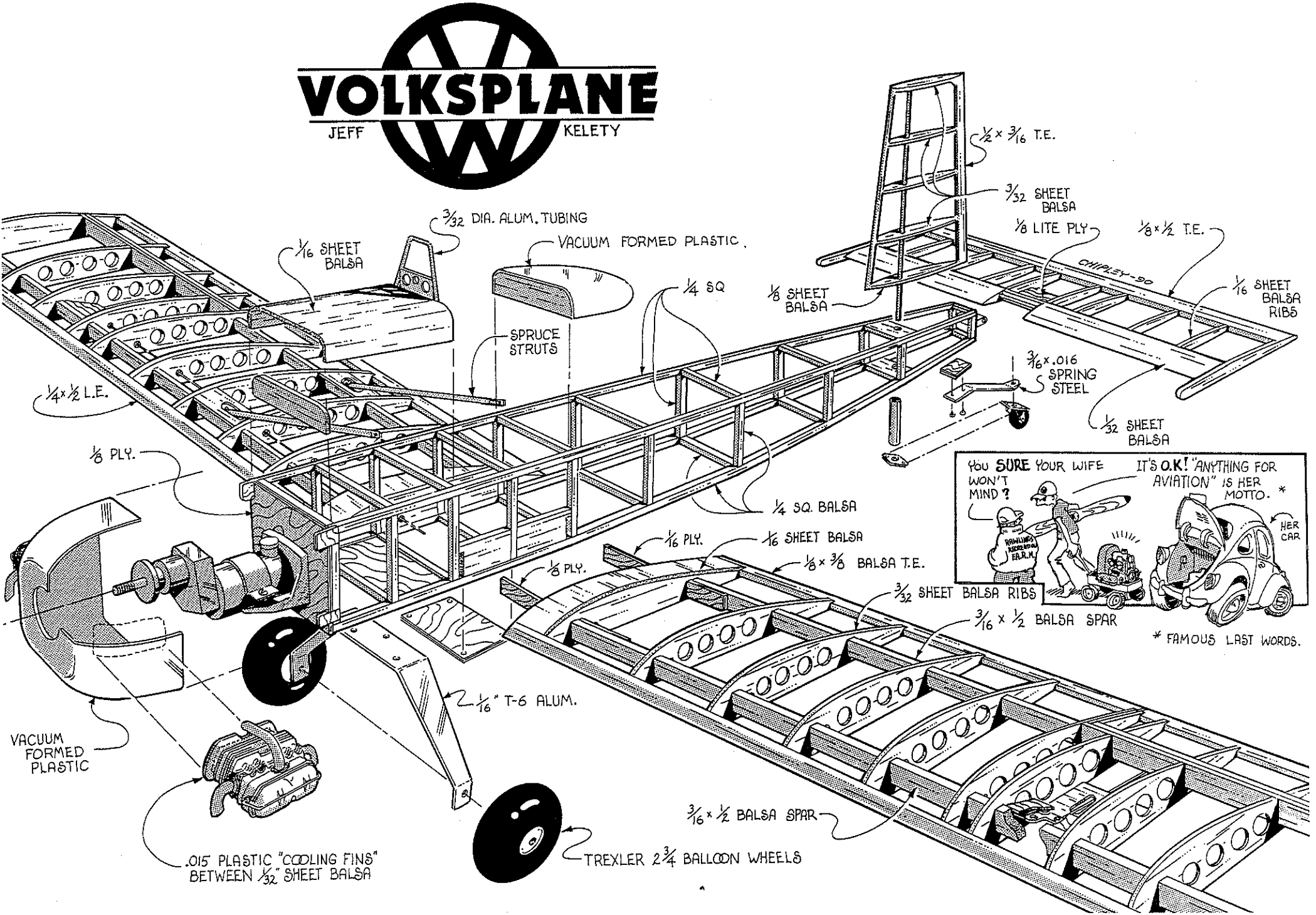
cut and fit all the vertical fuselage members. Glue everything in place along with the ¼-in. sheet fill. Allow this assembly to dry, then remove from the plans. Construct the second side in the same fashion.

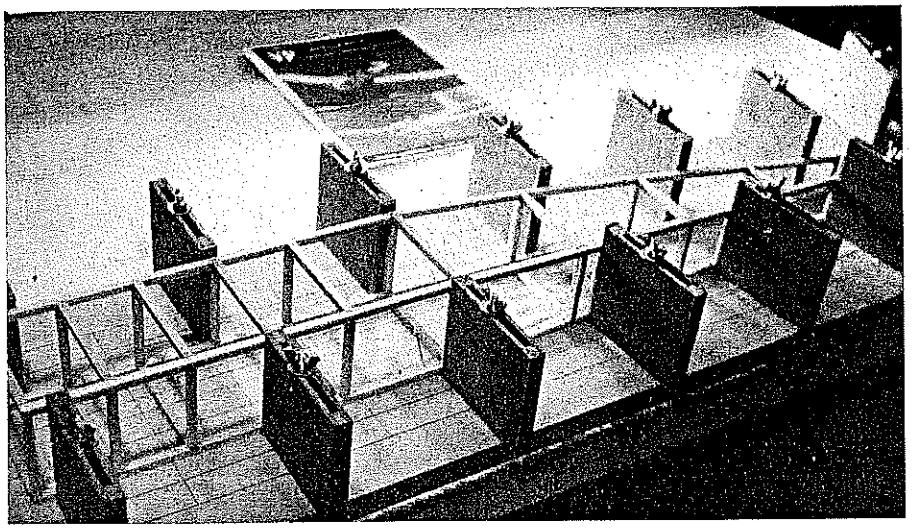
I strongly recommend using a fuselage jig to ensure that the sides fit together straight and true. A very simple but accurate jig is described in the February 1972 issue of *RC Modeler* magazine.

Whether or not you use a jig, start by plac-

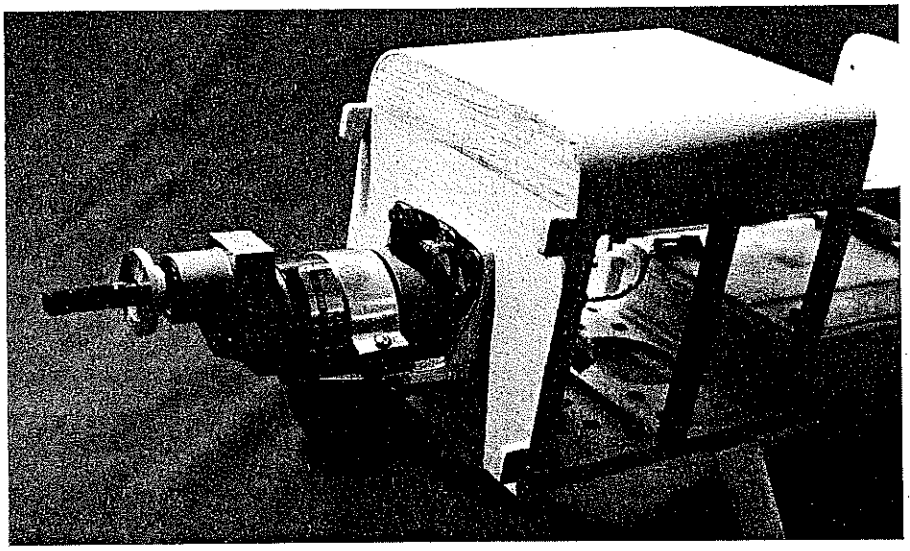
VOLKSPLANE

JEFF KELETY

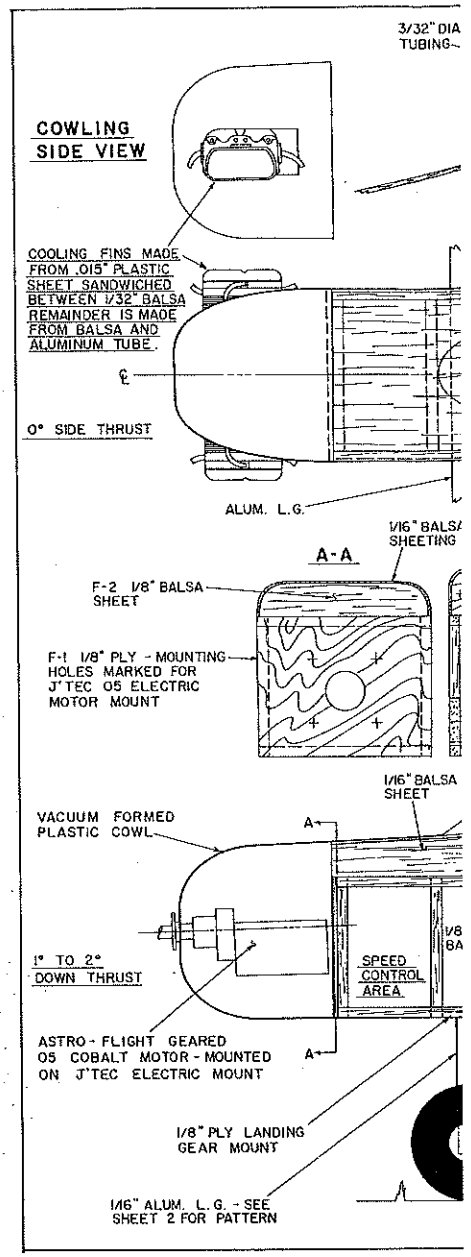




The fuselage begins to take shape. This jig, described in the February 1972 issue of *RCM*, makes it easier to build a straight and true fuselage. However, it isn't absolutely necessary.

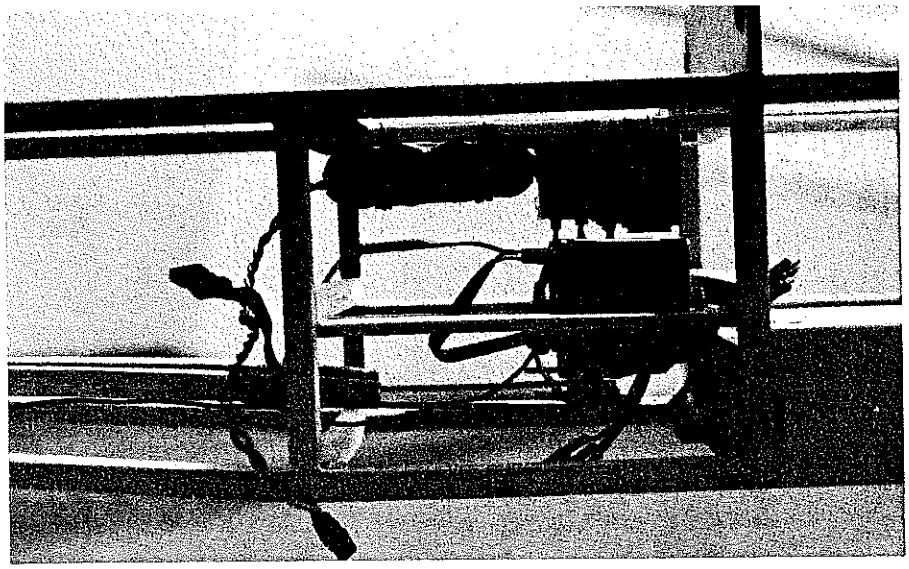


A close-up view of the Astro Flight geared 05 cobalt motor installed on the firewall in a J'Tec aluminum mount. A direct-drive 15 cobalt motor can be easily installed and will probably drive the Volksplane with a little more authority. The drilled tabs are for attaching the cowling.

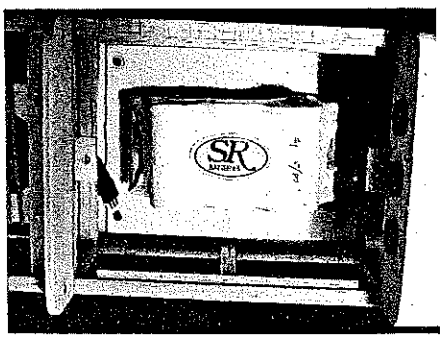


ing both fuselage sides upside down at 90° to the building board. Glue in the crosspieces from section A to the station just aft of section C. When dry, draw the two sides together at the tail and glue in the end crosspieces. To ensure a straight fuselage, mark centerlines on the end crosspieces and align them with a centerline drawn on the building board before gluing them in. Fill in the remaining crosspieces and glue them in place.

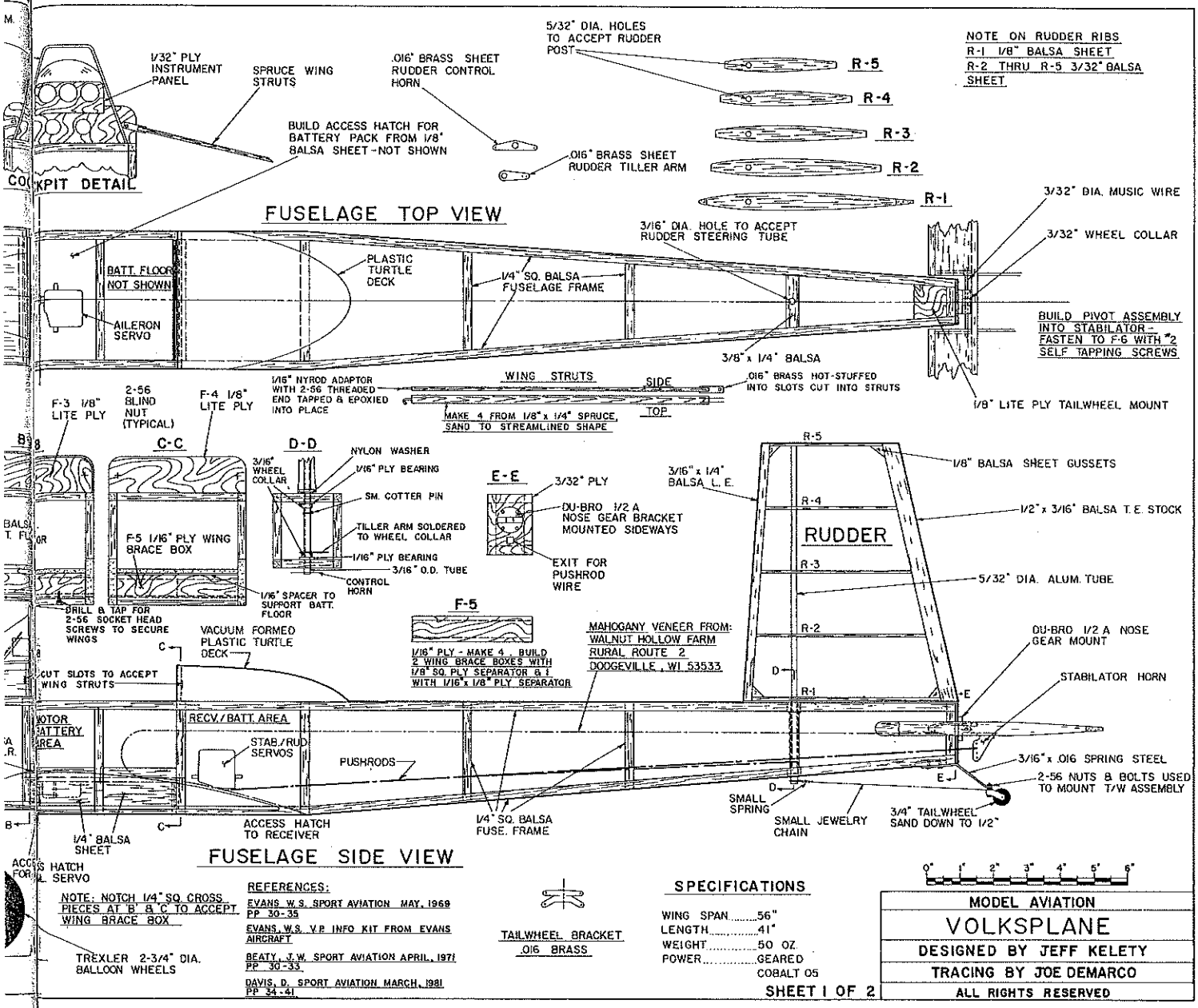
Before adding any of the formers, drill the 3/16-dia. rudder post holes. These run di-



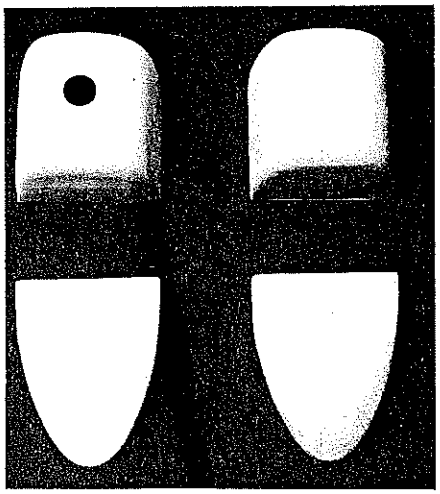
All the radio gear except the aileron servo fits neatly in the fuselage bay aft of section C. The 1/8-in. Lite Ply receiver-and-battery tray is removable for ease of installation and service.



The seven-cell, 1,200 mAh battery pack is secured to the floor of the compartment with adhesive-backed Velcro strips. Its exact location must be shifted fore or aft to achieve the correct CG (center-of-gravity), which should be 25% to 30% of the wing chord.



rectly through the center of the top and bottom crosspieces at section D. Care must be taken to align these holes exactly 90° to the top of the fuselage to ensure a perfectly vertical rudder. I placed the fuselage upside down in a small drill press, then drilled from the bottom crosspiece through the top one.

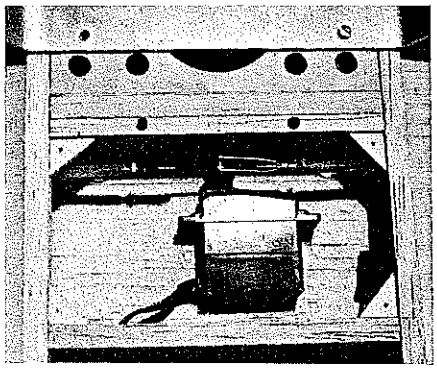


Seen here are the balsa plugs (right) and the resulting vacuum-formed cowl and turtledeck (left). This process takes some work, but the weight you save is worth the effort.

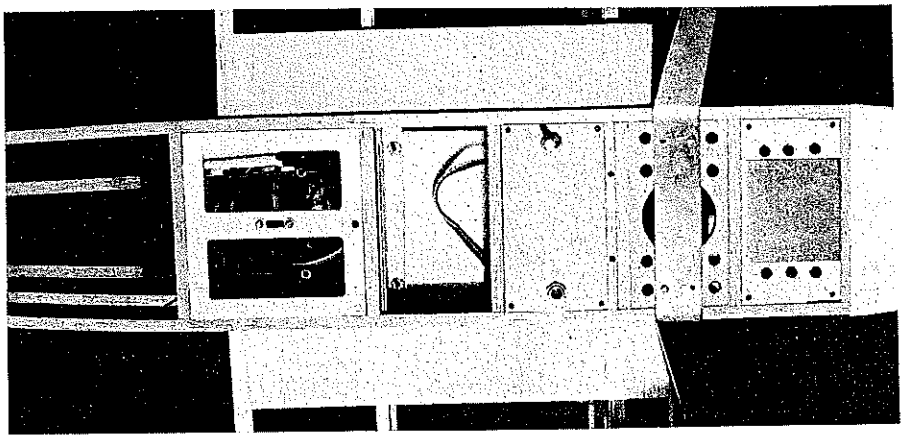
Formers F1-F6 should be prepared and added at this time. Before installing formers F3 and F4, drill and glue 2-56 blind nuts in the locations indicated. The blind nuts will be used to secure the wing struts to the fuselage.

Construct the forward and aft wing brace boxes with F5 pieces. The forward box is built with 1/8-in.-sq. hardwood separators, while the aft box uses 1/16 separators. Be sure to position the wing brace boxes exactly as shown on the plans in order to ensure proper wing alignment. Note that you will have to notch the bottom crosspieces slightly at sections B and C. Locate and drill the mounting holes in former F6 for the ½A nose gear used to attach the stabilator.

Add the 1/8-in. balsa or Lite Ply battery floor which rests on top of the wing brace boxes. Sheet the forward section of the fuselage between formers F2 and F3 with 1/16 balsa, then add the 1/8-in. plywood supports for the main and tail landing gear. This is also a good time to install mounting supports for the radio.



The aileron servo shown mounted in the bottom of the wing with servo mounting tape. Notice how the two control rods are connected to one servo arm by removing one arm and the pin from one of the clevises.



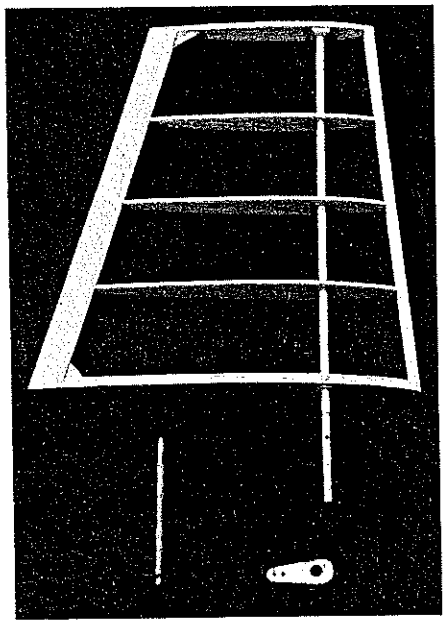
Looking at Volksplane's belly shows all three of the access hatches. The hatch forward of the landing gear has an aluminum speed controller heat sink. The ply landing gear mounting plate has lightening holes cut in it, the center hatch accesses the aileron servo, and the aft hatch accesses the radio gear. Control switches and jacks are best installed as shown. The two small holes just forward of the center hatch leading edge are for the wing mounting bolts.

Complete the fuselage by cutting slits in the ¼-in. balsa fill to accept the wing braces and aileron pushrods.

Cowl, turtledeck, and windshield. The cowl and turtledeck can be made of hollowed-out balsa or vacuum-formed plastic. The latter offers a significant weight reduction, and the parts can be painted directly without any special preparation. An excellent "how-to" article on vacuum forming is offered by Steve Gray in the March 1987 issue of *Model Builder*.

Speaking of the cowl, don't chicken out on the dummy VW heads and valve covers. They make all the difference. The ones shown in the prototype were constructed from balsa, with .015 plastic for the fins and aluminum tubing for the manifold and exhaust pipes. Doing it right takes a bit of time, but it's definitely worth it in the end.

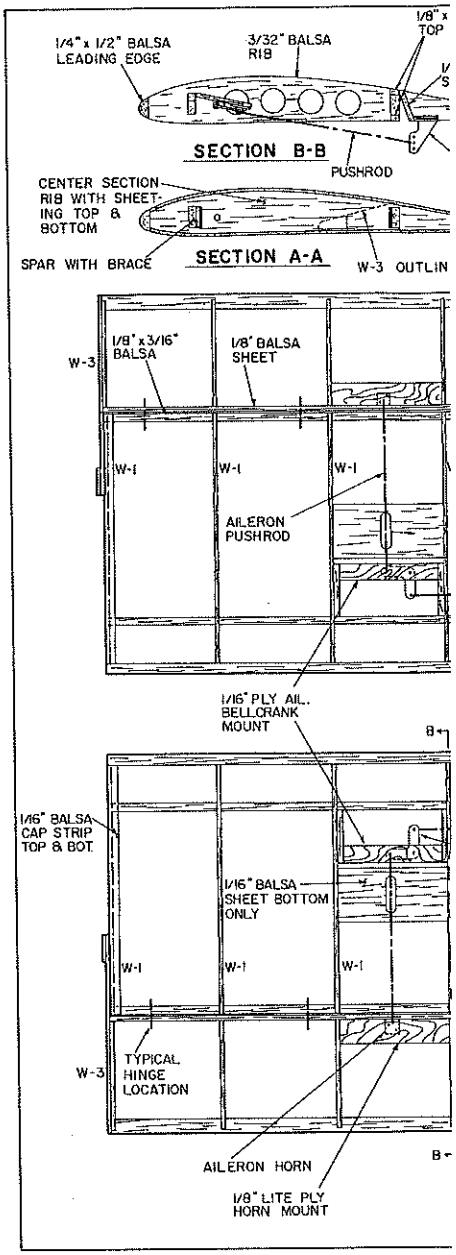
The windshield can also be vacuum formed. An alternative is to make the acetate pliable with a heat gun, then "stretch form" it over a balsa mold.



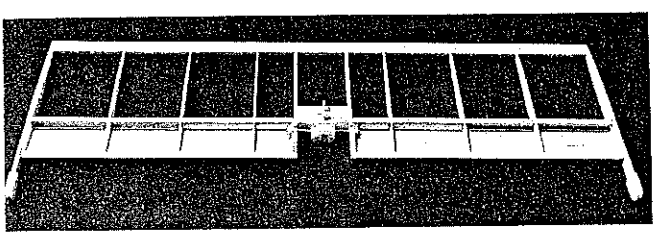
Rudder components ready for final assembly. Construction is straightforward. The rudder pivots on the 5/32 aluminum main spar. The rudder post sleeve is 3/16-in.-O.D. brass tubing. The control horn and tiller are made from .016 brass sheet. Note the small nylon washer that acts as a bushing in the base of the rudder. Two 5/16 wheel collars and a small cotter pin complete the parts list. Complete construction details are in the plans and text.

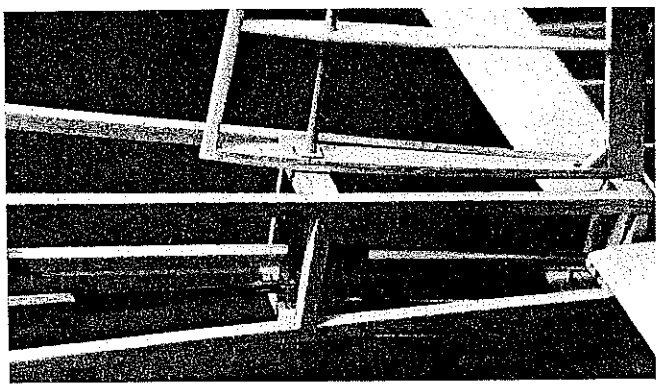
Rudder post assembly. Begin by cutting the control horn and tiller arm from .016 brass sheet. Drill the necessary holes, then cut the rudder post sleeve from 3/16-O.D. brass tubing and the rudder post from 5/32-O.D. aluminum tubing. Slip the rudder post sleeve over the rudder post. Center and drill a hole just large enough to accept a small cotter pin through both pieces of tubing at the position indicated. Set the rudder post aside for later rudder assembly.

Solder the control horn to the sleeve as shown. Solder a 3/16 wheel collar to the tiller arm. Cut the 1/16 plywood bearings, drilling the necessary 3/16 holes. Carefully glue the bearings to the crosspieces at section D, shimming up the lower bearing slightly so that it rests 90° to the rudder post. After testing for fit, set the rudder post assembly aside until you're ready for covering.

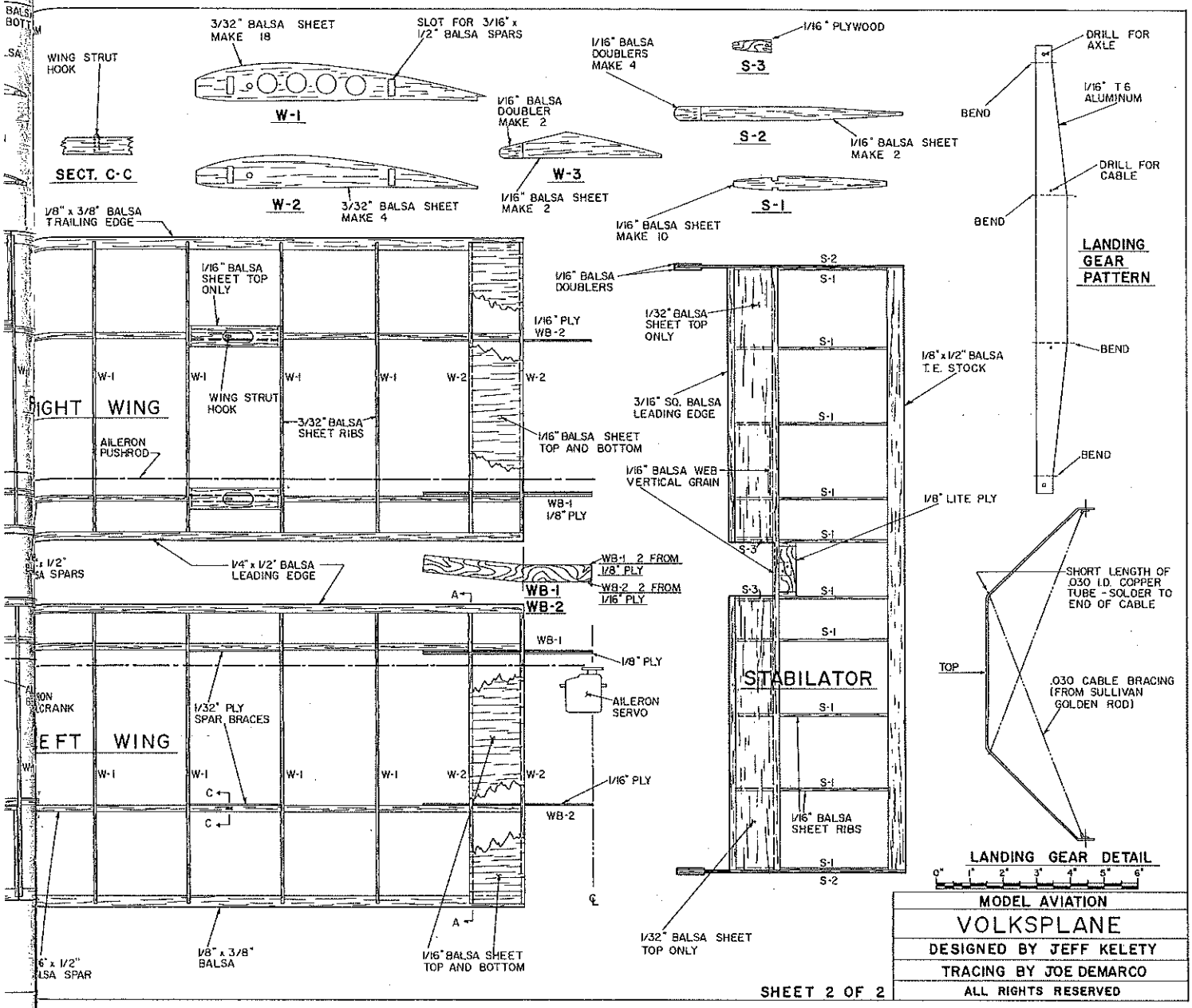


Rudder. Cut out ribs R1-R5. Mark and cut out the 5/32 holes in the locations shown on the plan to accept the rudder post. Slide the ribs over the post, making sure that the hole you drilled earlier to accept the cotter pin is





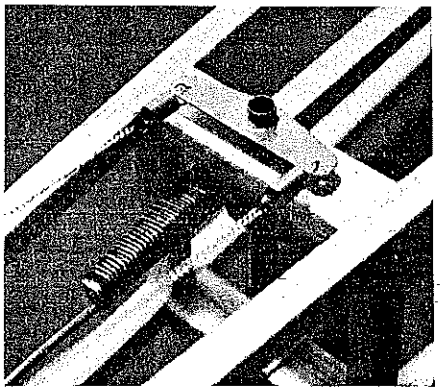
Above: The structurally complete stabilator. The pivoting system is made up from a ½A nose gear mount, a length of 3/32 music wire, and a 5/32 wheel collar. Right: The rudder pivot system shown installed and the servo pushrod attached. A wheel collar soldered to the rudder sleeve secures the control horn. The small cotter pin is not installed in this photo. Don't leave it out; it ties the rudder spar to the control sleeve, and the system won't work without it.



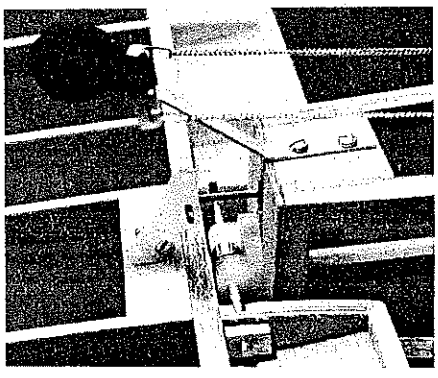
on the portion of the post below R1.

Block up the leading and trailing edge pieces, and pin them in place over the plans. Position the ribs attached to the rudder post over the plans, then glue the entire assembly with CyA (cyanoacrylate). Remember to CyA the joints between the rudder post and the ribs. Complete the structure by adding the corner gussets. When installing the rudder, be sure to use a nylon washer as a bushing between the rudder and fuselage.

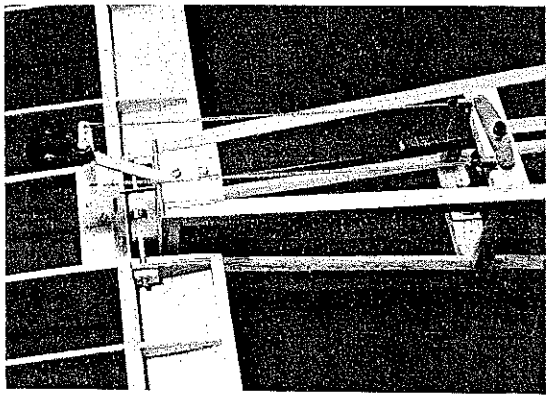
Stabilator. Block up and pin the leading and trailing edges as well as the bottom spar. Position and CyA the ribs. Add the top spar and the 1/32 leading edge sheeting. Drill 3/32 holes as shown, then add the half ribs, S3. Slip a length of 3/32 music wire be-



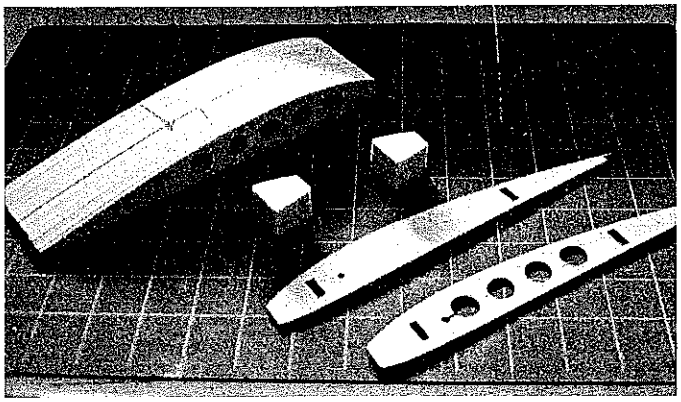
Close-up of the completed tail wheel tiller. Soldered to the bottom of the rudder post sleeve, it's connected to the tail wheel assembly by small jewelry chains, tensioned by springs on one end, just as on the original.

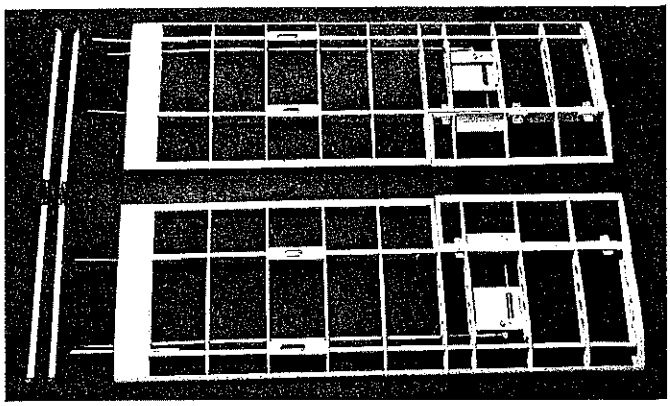


Details of the stabilator pivot mechanism and tail wheel. The ½A nose gear mount must be attached to the ply fuselage plate before covering. Tail wheel assembly details are explained in the text. Cut-and-bent straight pins serve as chain attachments.

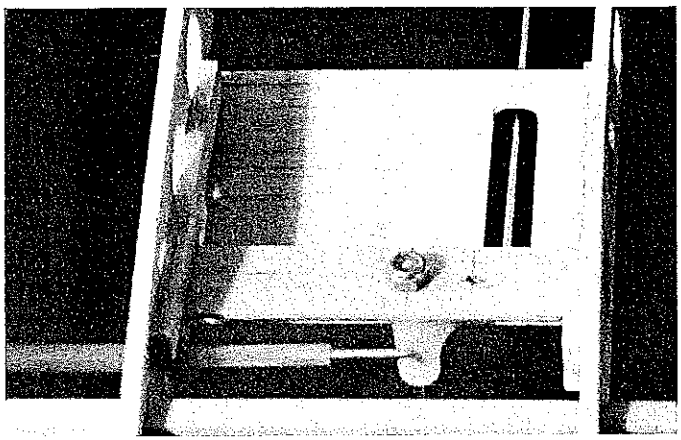


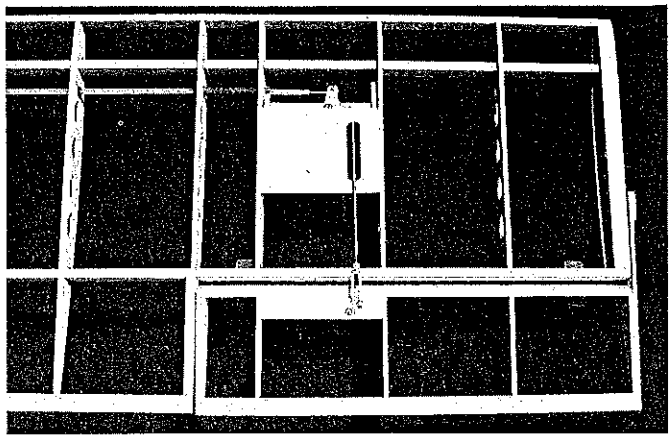
Stabilator and tail wheel assemblies all in one shot. This rigging isn't as easy as a more conventional system, but it's closer to the original full-size Volksplane configuration and is a real eye-catcher with the judges.





Left: Wing ribs ready to go. Lightening holes were cut out one at a time using a length of sharpened brass tubing. The false ribs shown in this photo were never used—though the full-scale Volksplane had them. Right: The completed wing panels and struts (at left). Ailerons, bellcranks, and linkage are also complete. The wings form a light and strong structure, but they also depend on the struts, so don't omit them.



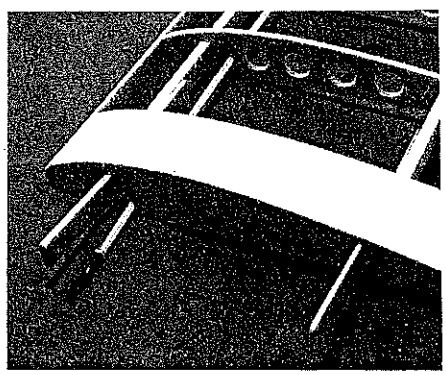


Left: Close-up of the aileron bellcrank assembly. Hardware consists of a small Goldberg bellcrank and horn and inner Nyrod pushrods. Short lengths of outer Nyrod glued to the ribs serve as bearings for the pushrods. Right: A complete aileron with the control linkage installed. The aileron horn is mounted on 1/8-in. ply supports. The bellcrank mount is 1/16 plywood, and the aileron pushrod exit sheeting is 1/16 balsa.

tween the half ribs with the Du-Bro ½A nose gear mount and wheel collar in place, then epoxy the music wire in position. Finish the stabilator by adding the 1/16 balsa webbing and the ballast ribs, S2.

Main landing gear. Fashion the gear from 1/16 T6 aluminum. Trexler balloon tires are mounted on 6-32 bolts. The bolts serve as axles secured with nuts cinched to both sides of each gear leg.

Drill two holes as shown to accept the .030 bracing wires. Crimp and solder 1/16 Balsa USA solder lugs to the ends of each bracing wire, then mount the lugs on the 6-32 axles. Draw each wire through its opposite rigging hole, leaving an inch or so of excess wire. Solder a small length of .030-I.D. tubing flush against the outside of each side of the gear. Be sure to make a good solder joint, since these bracing wires are quite functional. Complete the rigging by cutting off the excess wire.



Close-up of the wing braces and aileron pushrod exiting the wing. Note that the male arm is removed from the clevis on this wing only. The small nut locks the clevis in place.

Tail wheel assembly. Cut the tail wheel bracket from .016 brass, drill the necessary holes, and bend the bracket as shown. Solder a length of 3/32-I.D. brass tubing to the base to accept the 2-56 mounting screw. Use a Perfect ¾-in. wheel, sanded down to a diameter of ½ in. and mounted to the assembly with a 1/16-dia. brad.

The tail wheel assembly can be attached to the fuselage with a length of spring steel provided with the CB Associates small tail wheel assembly. Using the entire CB assembly would save some trouble, but it won't be quite scale. To complete the tail wheel, run lengths of light costume jewelry chain or steel fishing leader with small springs on one end from the tail wheel to the tiller arm.

Wings. Begin by making the ribs from 3/32 balsa. I use the sandwich method, making two rib templates from either 1/16 plywood or thin aluminum, then inserting strips of 3/32 balsa sandwiched between them. Use a scroll saw to rough cut the initial shape, then block sand to final shape. Note that the airfoil has a slight undercamber.

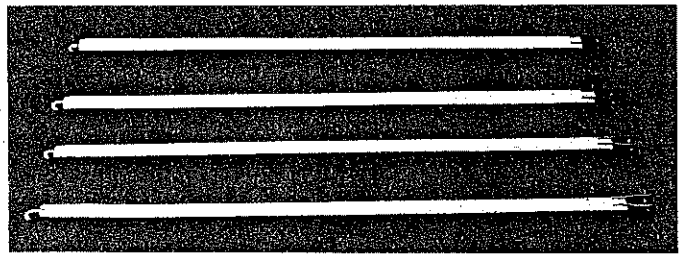
While the sandwich is still intact, drill the holes to accept the aileron pushrods. The lightening holes are optional. If you're going to make them, use appropriate-diameter brass tubing with sharpened edges to produce clean holes.

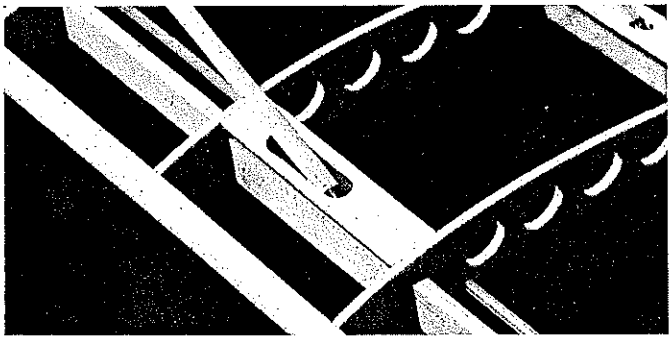
Cut the leading and trailing edge pieces and the ½ x 3/16 balsa spars. Pin the trailing edges to the plans. Slip the ribs over the spars, and slide them in place without gluing. Position the rib/spar assemblies accurately over the plans, and pin them down. Block up and pin the leading edge. When the ribs, spars, and leading edge are properly aligned, glue everything except the root ribs (W2) in place with thin CyA.

Cut out the wing braces, using 1/8-in. plywood for WB1 and 1/16 ply for WB2. Temporarily clamp them to the spars with clothespins. Slide the wings into the fuselage wing brace boxes, and test for fit. With the wings in the fuselage, block up each wing tip 2½ in. from the building board with scrap balsa.

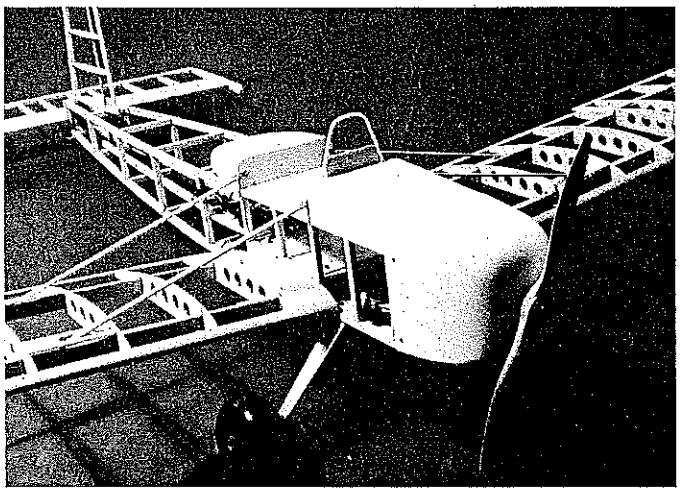
Remove the wings from the fuselage, unclamp the wing braces, and reattach them with a slow-drying glue such as Elmer's wood glue. Quickly reposition the wing braces with the clothespins so that the wings rest against the scrap balsa braces. Double-check to make sure you have 2½ in. of dihedral under each tip, and adjust as needed. Note that the bottom of the wings should rest 1/8 in. above the bottom of the fuselage. When dry, position and glue the ribs flush against the fuselage. Remove the wings, and add the remaining root sheeting.

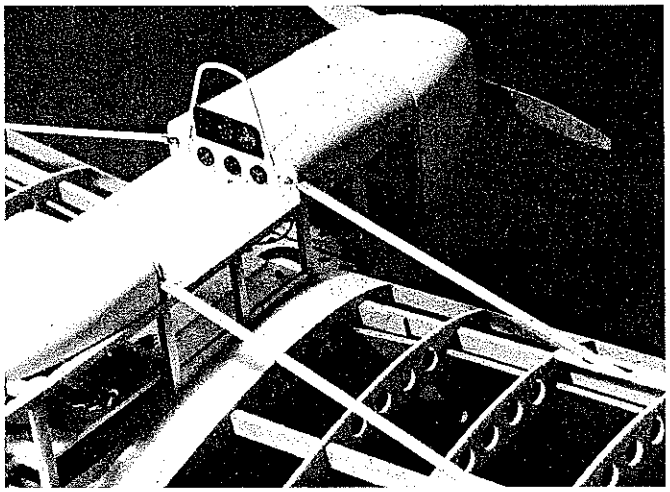
To construct the ailerons, separate the





Left: The four completed wing struts. They're finished with white Krylon spray paint. The hooked end fits into the wing panels. Right: Close-up of the wing struts attached to the wing panels. The hooks at the end of the struts attach to wire loops built into the main spars. Length can be adjusted by screwing the hooks in or out as necessary to achieve correct fit and tension on the struts. The exit panels are 1/16 balsa sheet.





Left: Front view of the completed frame. The vacuum-formed cowl is attached with small Perfect wood screws to ply tabs glued to the firewall. Trexler 2¾-in. balloon tires are recommended. Right: The cockpit area showing strut attachment points, instruments, and windscreen frame.

necessary ribs from the rear spar as shown using a sharp razor blade. Make the necessary separation at the trailing edge as well. Cut the aileron ribs to the proper angle, and add the 1/8-in. balsa aileron backplates. Use scrap 3/16 balsa to evenly build up the top and bottom surfaces at the rear spar where the aileron ribs were cut away. Finish by adding the aileron bellcrank assembly along with the pushrods. I used the inner portion of Nyrods for the aileron pushrods. To save weight, I cut ½-in. lengths of outer Nyrods for guides and glued them in place at each rib.

Small loops of .047 music wire inserted and glued into the spars as shown serve for attaching the struts to the wings. Be sure to add the 1/32 plywood spar brace to reinforce these spar sections.

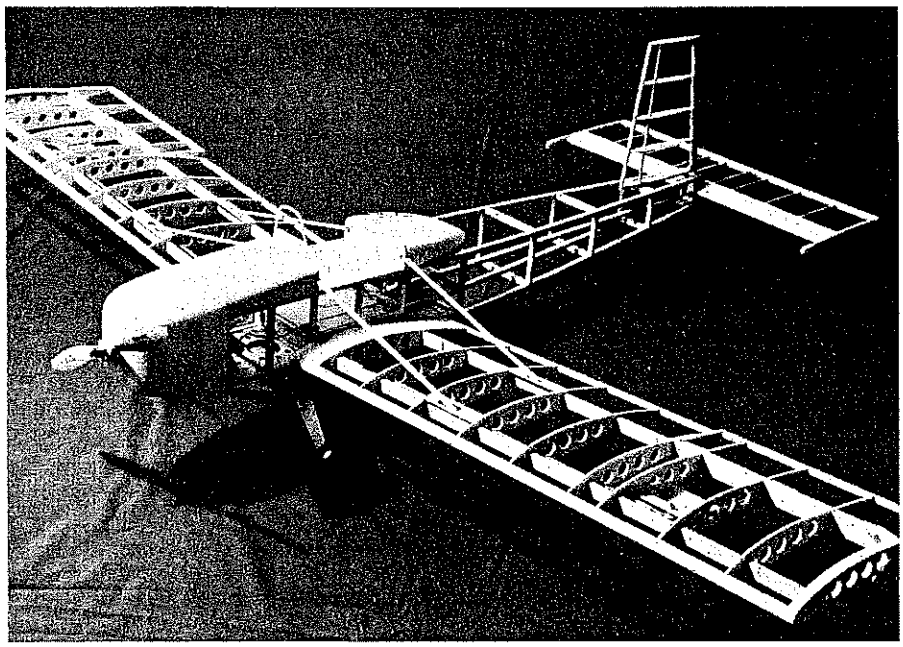
Wing lock screws. The wings are held in place using 2-56 x ¼-in. socket-head screws set 1/8 in. into each forward wing brace box. Begin by inserting both wings into the fuselage, making sure each is flush. Drill and tap a 2-56 hole into each forward wing brace box as shown in section B-B. Countersink the holes in the balsa crosspiece so that the tops of the screws are flush with the bottom of the fuselage. The 2-56 screws should hold the wings firmly in place without any sloppiness. Do not fly without the wing lock screws!

Wing struts. Cut the fuselage joining brackets from .016 brass sheet. Drill the holes where shown. Cut the four struts from 1/8 x ¼-in. spruce. Using a razor saw, cut slits to accept the brackets. At the other end of the struts, drill and tap 2-56 holes to accept the wing joining hook.

Fabricate the hooks from 2-56 threaded rod. Sand the struts to a streamlined cross section, check for fit against the fuselage, then CyA the fuselage joining brackets in place. Finally, adjust the fit of the struts by screwing the wing hooks to the proper depth, then CyA the hooks in place. Use roundheaded 2-56 screws to attach the struts to the blind nuts at formers F3 and F4.

Radio installation. Microservos, a lightweight receiver, and a 250-mAh battery are more than adequate to direct the Volksplane. In the prototype, the battery and receiver are secured with rubberbands to a tray made of 1/8-in. Lite Ply. The receiver tray is then secured with #2 screws to strips of 1/8-in. Lite Ply glued to the fuselage just aft of section C. The elevator and rudder servos are also placed in this area. Access to the radio gear is via a hatch constructed in the bottom of the fuselage. The elevator

Continued on page 106



Volksplane in its bare bones ready for covering and detailing. With all the lightening holes shown and using white MonoKote, it weighs about as much as a Guillow rubber-powered kit.

Volksplane/Kelety

Continued from page 106

the model easily sustains eight-to 10-minute flights.

In its competition debut at this year's San Louis Obispo Electrifest, the Volksplane took first place in Sport Scale—not bad for its first time out. If you've thought of joining—or already have joined—the quiet revolution, the Volksplane is a great Electric to build.

CL Navy Carrier/Perry

Continued from page 71

widely accepted "Denver Rules," which can be obtained by sending a stamped envelope to me. Members of some of the Midwest Control Line clubs will sponsor the .15 Carrier event.

• *Sig Skyray Carrier:* The Sig Manufacturing Company is sponsoring an unofficial Carrier event for its Skyray 35 model. I've discussed the Skyray Carrier event in previous columns. There will be no restrictions in entry. Details of the event can be obtained from Sig or by sending me a stamped envelope with your return address on it.

The Eugene Ely Award is another part of the Nats made possible by the Navy Carrier Society. This perpetual award recognizes the outstanding competitor in the three Carrier events at the Nats. The winner is determined by adding the official scores for each of the three official Nats Carrier events (Profile, Class I, and Class II), with the flier having the greatest total score being the winner. The individual award consists of an engraved silver platter. It is presented at the annual dinner meeting of the Navy Carrier Society during the Nats.

The Rookie of the Year Award is also being sponsored by the NCS. It will go to a contestant who is new to Nats Carrier competition. The award will be a subjective one based on performance, participation, sportsmanship, and other factors deemed appropriate by the sponsors.

Sterling Models update: I just received a letter from Tom Haldis describing the recent changes at Sterling. Tom is the new president of the company, which now bears the name Sterling Hobbies, Incorporated. Those of you who may have been disappointed with Sterling kits in the last few years will be happy to hear that Tom's efforts to improve the quality of the materials and workmanship are paying off.

I've just examined one of Sterling's newly reissued F6F Hellcat kits, and I found good quality wood with excellent die cutting. The Hellcat has a 42-in. span and about 360 sq. in. of wing area. It can be easily converted for competition in Profile Carrier, and I'm glad to see it available again.

Two other kits, the P-51 Mustang and Yak-9 (which converts to an Airabonita for Scale bonus points), should have completed a new production run by the time this issue reaches your hands. Both kits have wing areas just above 300 sq. in.

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