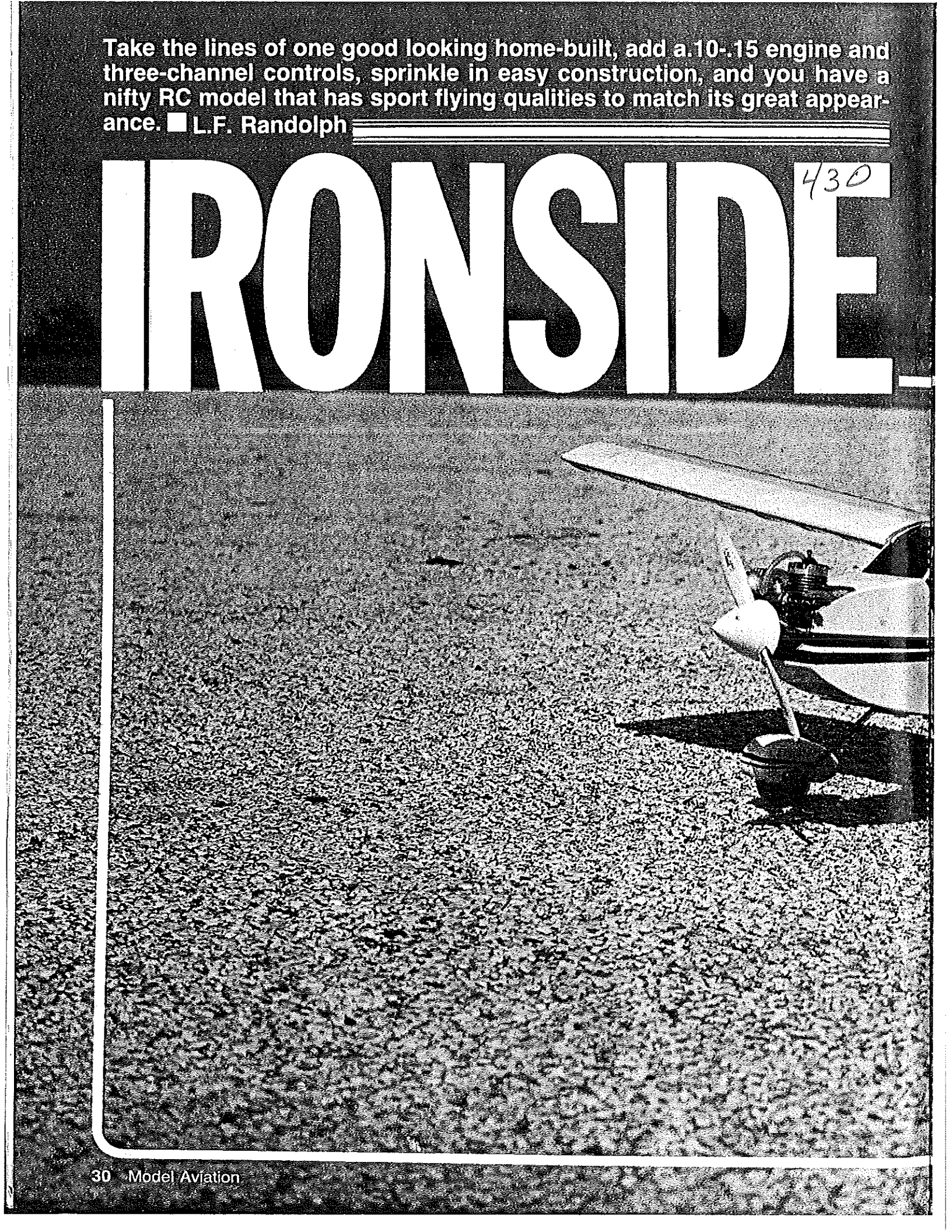
Take the lines of one good looking home-built, add a.10-.15 engine and three-channel controls, sprinkle in easy construction, and you have a nifty RC model that has sport flying qualities to match its great appearance. ■ L.F. Randolph

IRONSIDE

4/30

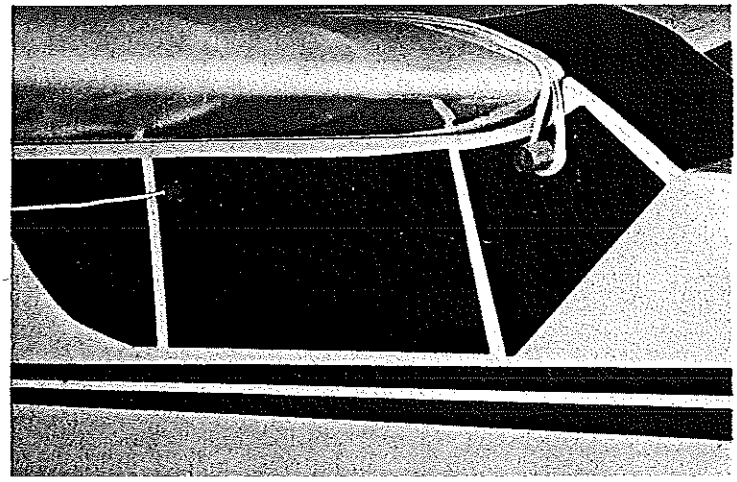


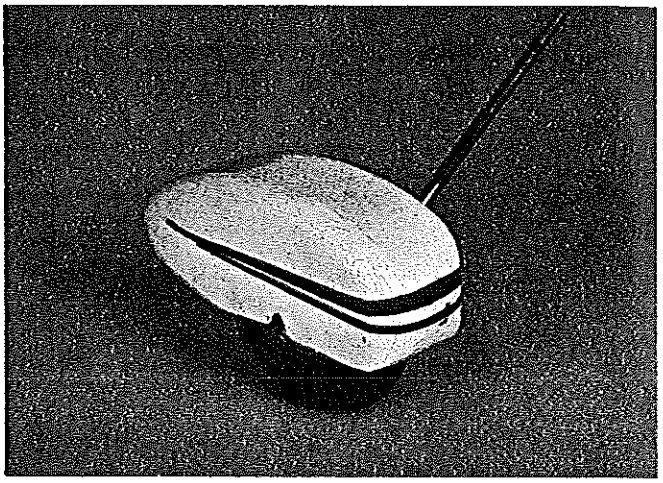
THIS IS A much-corrupted "reminder scale" version of Ron Scott's fine home-built, OI Ironsides. The full-size plane first flew in 1969. It is a single-place, C-85-powered, wooden-frame, fiberglass-covered, high-performance beauty. It is one of those airplanes that looks as if it's going 100 mph when it's parked! Full information on OI Ironsides can be found in the November 1971 issue of Sport Aviation, the journal of the Experimental Aircraft Association.

The model Ironside retains the racy look of the original, but it is much-modified to provide an easy-to-build sport airplane that performs beautifully on only three channels.

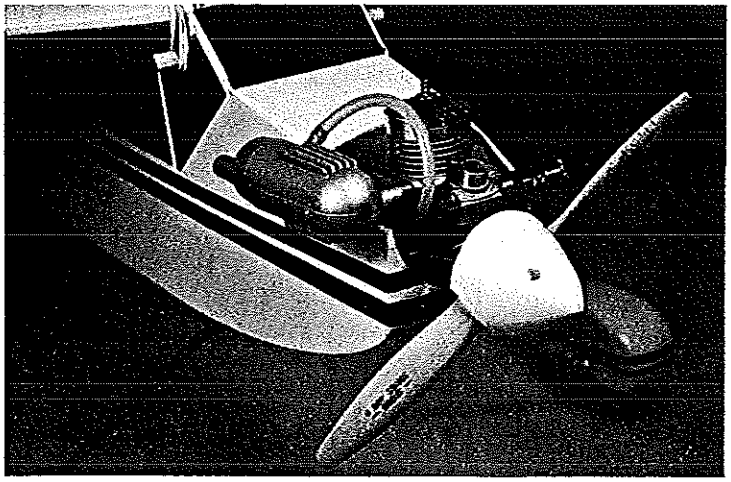
This is a frisky airplane. It isn't hard to fly—just frisky! Quite often, three-channel airplanes are designed as sport jobs or trainers with rather stately performance. That's not so with Ironside: rudder response is immediate. The dihedral, plus dihedral effect of the the low-aspect-ratio wing, produces a roll response to the rudder that is similar to the action of ailerons. Nope, this isn't a trainer, but it is lots of fun to fly, and it never fails to draw compliments on the field.

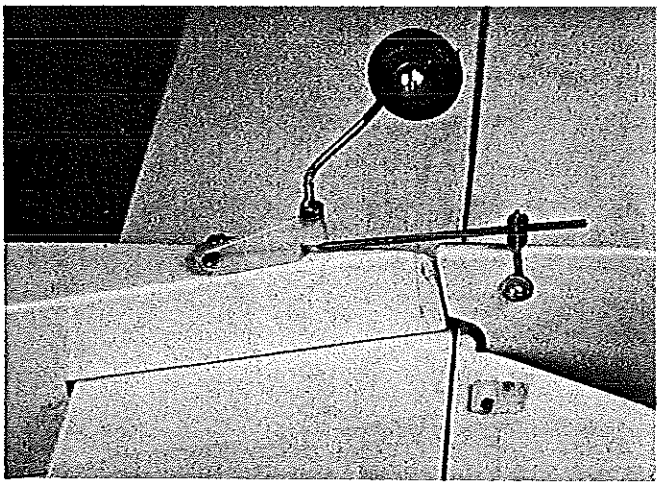
Our author, we feel, has a special knack for designing sport models that are interesting and pleasing in appearance, easy to build, and that fly well. Ironside is a good example of his exceptional talent.





Left: Windshield is black MonoKote. It's also applied to the wing center to give the illusion of the wing passing through the fuselage. The antenna is routed through a piece of fuel line when it passes through the fuselage side. Right: Wheel pants dress up the airplane. They're easy to make and add very little weight. If you're flying from a grass field, leave off the pants and substitute larger wheels. All photos by the author.



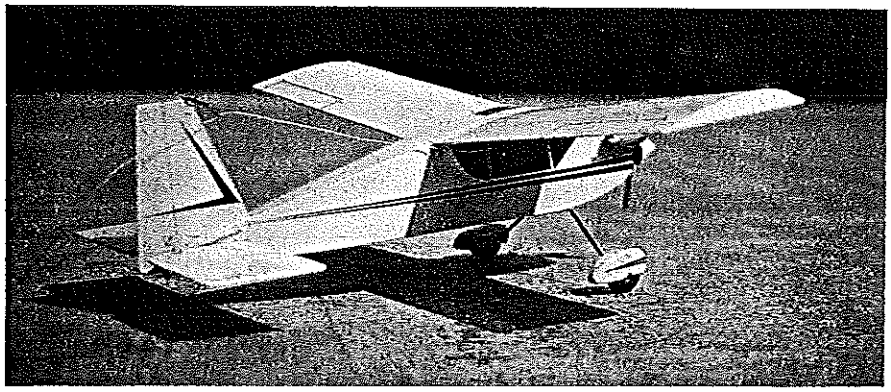


Left: The simple cowl blends the engine into the fuselage smoothly. The looping fuel line is from the muffler pressure tap to the tank overflow line. Right: Tail wheel mount and steering linkage—provides geared-down movement to the wheel for easy steering, little load on the servo.

Most of my flying is done at less than half throttle, so there is no question in my mind that a .10 engine would would be quite enough power.

Takeoffs and landings are straight down the runway with almost no rudder control needed to keep it in line. The climb-out with a tired OS .15 is at a 65° angle, and it will keep going and going. It will snap in its own length when made to do so, and with the proper coordination of rudder and elevator, the rolls are almost axial. It is a frisky, groovy airplane. On the other hand, during one session the rudder servo on a 12-year-old brick refused to go to the right, and the natural stability of the airplane made it possible to return to the runway safely. It is a forgiving airplane.

If you fly from a grass field, don't bother with the wheel pants. Just use larger wheels.



MonoKote trim applied to the fuselage, rudder, and wheel pants is easy to apply, looks great.

Wing. Slice 20 ribs from medium to light balsa, and pin them together into a block so they can be sanded to the same shape. Select four of them and slice 1/16 in. from the tops and bottoms, then widen the main spar notch to accept the 1/16 plywood dihedral braces; these are the center-section ribs. Cut webs from vertical grain 1/16 hard balsa and the dihedral braces from 1/16 plywood.

The trailing edge sheeting is 1/16 medium balsa sheet. The spars can be stripped from 1/16 sheet or be purchased already to size. The leading edge is 1/4 sq. There is a 1/8 sq. cap on the trailing edge. You will need a piece of 1/16-in. music wire to reinforce the trailing edge in the area of the center section.

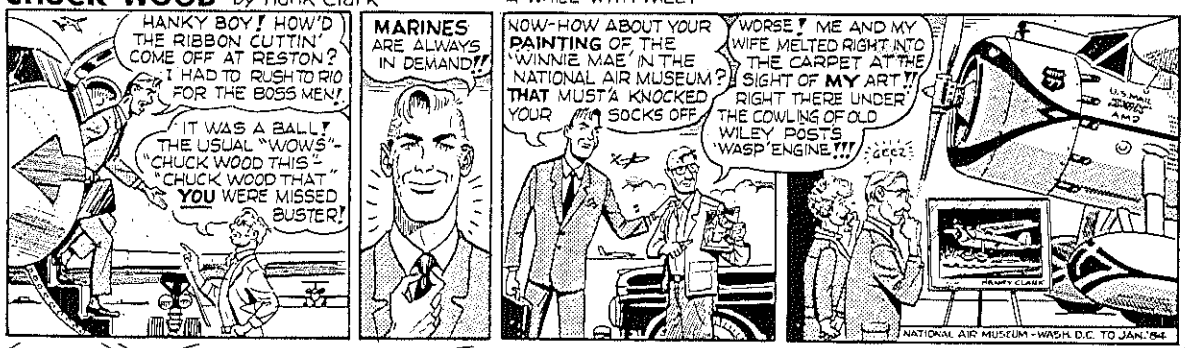
Cover the plans with plastic wrap, and pin the main spar and the bottom trailing edge sheet in place over the plan. Add the second center section rib. Glue it in place, add a web outboard of it, then the first regular rib, another web, another rib, etc., out to the tip. Bevel one of the webs to the dihedral angle, and install it along with the center rib.

Glue on the top main spar. Be sure it is attached to the webs as well as the ribs and the leading edge. Do not install the top trailing edge sheeting at this time. Remove the structure from the plan, and build the other wing-half in the same way.

When both halves are completed, join them with the dihedral braces. The braces should fit nicely into the enlarged notches in the center-section ribs. Add the top trailing edge cap. Glue the tips in place, then sand

CHUCK WOOD by Hank Clark

A WHILE WITH WILEY'



HINGES THRU SPAR

3/16" BALSA SHEET RUDDER

3/16 SHEET BALSA

3/16" X 1/4" BALSA FIN FRAMING

1/32" PLYWOOD REINFORCING

RUDDER HORN

3/16" DOWEL JOINS ELEVATORS

1/16 SHEET BALSA TOP BOTTOM AND SIDES

3/16" SQ. BALSA

WIRE T.E. TIE

F 3

1/16" SHEET DOUBLER BRIDGES OVER C/S JOINT

1/16" SHEET C/S RIBS ONLY

1/8" SQ. LONGERONS

3/4" WHEEL ON 1/16" WIRE THRU NYLON MOUNT

1/4" DOWEL HOLD DOWN (2)

1/16" T. EDGE FILLETS

1/16" PLY DIHEDRAL SPAR BRACE TOP/BOTTOM FRONT/REAR

F 2 1/8" PLY

1/16" SHEET COWL

.15 ENGINE

1 3/4" SPINNER

1/8" PLY TRAY ON 1/8" X 3/8" SIDE RAILS

1/32" PLWOOD DOUBLER FROM NOSE TO F 3

1/16" SHEET WEBS

1/8" BALSA NOSE

KRAFT KM-15 MOUNT ON 1/4" PLYWOOD FIREWALL

3/16" X 3/8" MAIN SPARS TOP AND BOTTOM

1/16" SHEET TOP AN BOTTOM T. E.

1/16" PLYWOOD OUTER PANTS WALL

TIN PLATE SCREWED TO 1/8" PLYWOOD INNER PANTS

ALUMINUM CLIPS AND SCREWS

3/16" SQ. BALSA NOSE SPARS

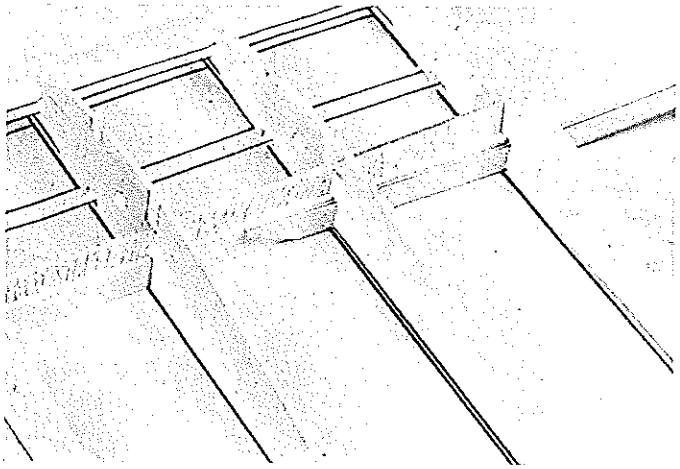
1/16" BALSA RIBS THROUGHOUT IDENTICAL

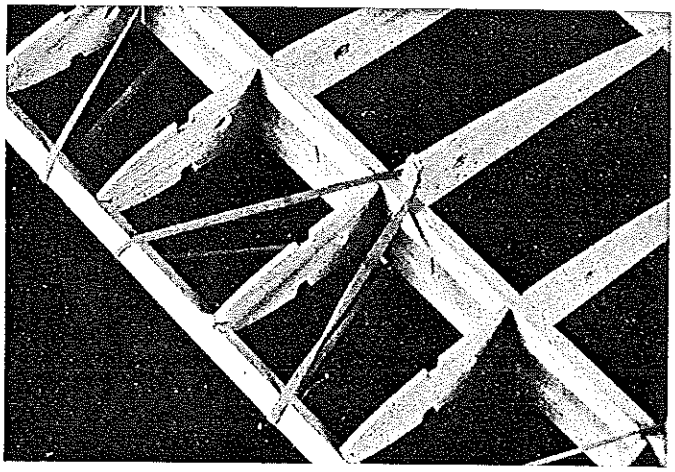
1/8" MUSIC WIRE L. G. MOUNTS ON 1/8" PLYWOOD FLOOR

2" WHEELS HELD BY AXLE COLLARS

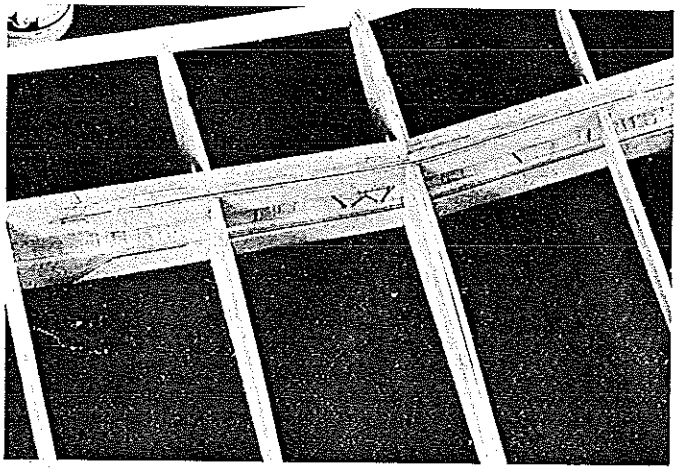
1/4" SQ. BALSA L. EDGE

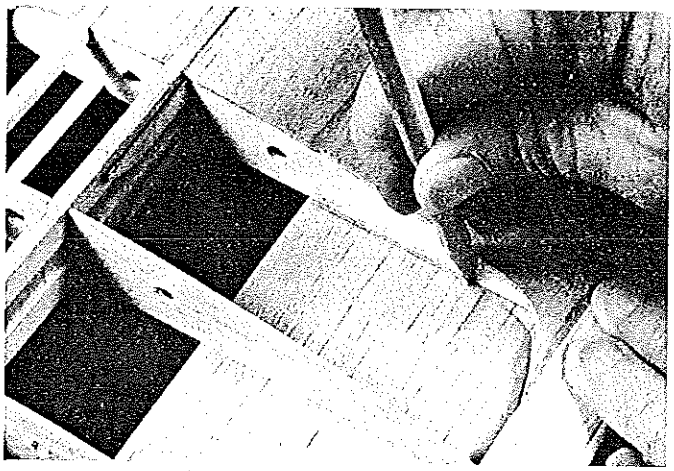
1/8" SHEET TIP FORMER



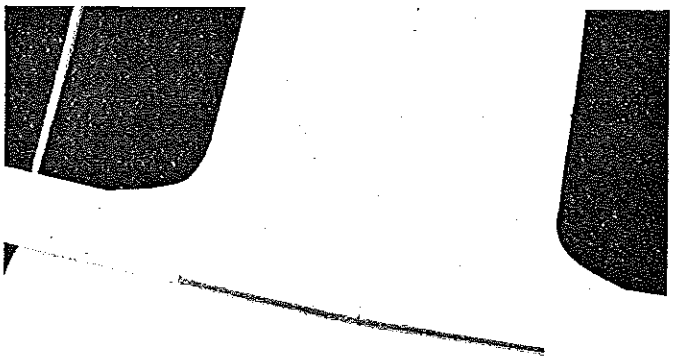


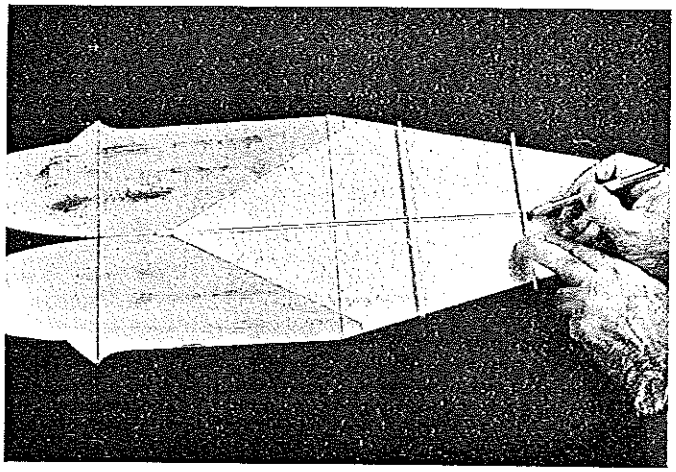
Left: Temporarily place the dihedral braces along the main bottom spar when installing the center ribs. Don't apply glue to the braces, just to the ribs, webs, and spars. Right: Rubberbands and scrap wood are used as pictured to apply gluing pressure to the ribs and leading edge. "Fish-mouth" notch in the ribs and diagonal placement of the leading edge requires less shaping for it to conform to the airfoil than other methods.





Left: Dihedral braces are glued to the center sections of the main spars so that the sheeting, when it is applied, will lay on top of them and even with the spars. Right: Mark and cut the center sheeting to fit between the spars, leading edge, and trailing edge. Gusset-like curve at the leading and trailing edges helps to eliminate wrinkles in the covering which, otherwise, is frequently prevalent in the corners.





Left: When the wing is complete and sanded, epoxy a piece of 1/16-in. music wire, which has been bent to the dihedral angle, to the center trailing edge. The wire will keep the wing hold-down rubberbands from cutting into the trailing edge. Right: The fuselage bottom is straight; the two sides can be placed together for cutting the uprights to fit at the same time. Mark the locations of the two bulkheads with a straightedge.

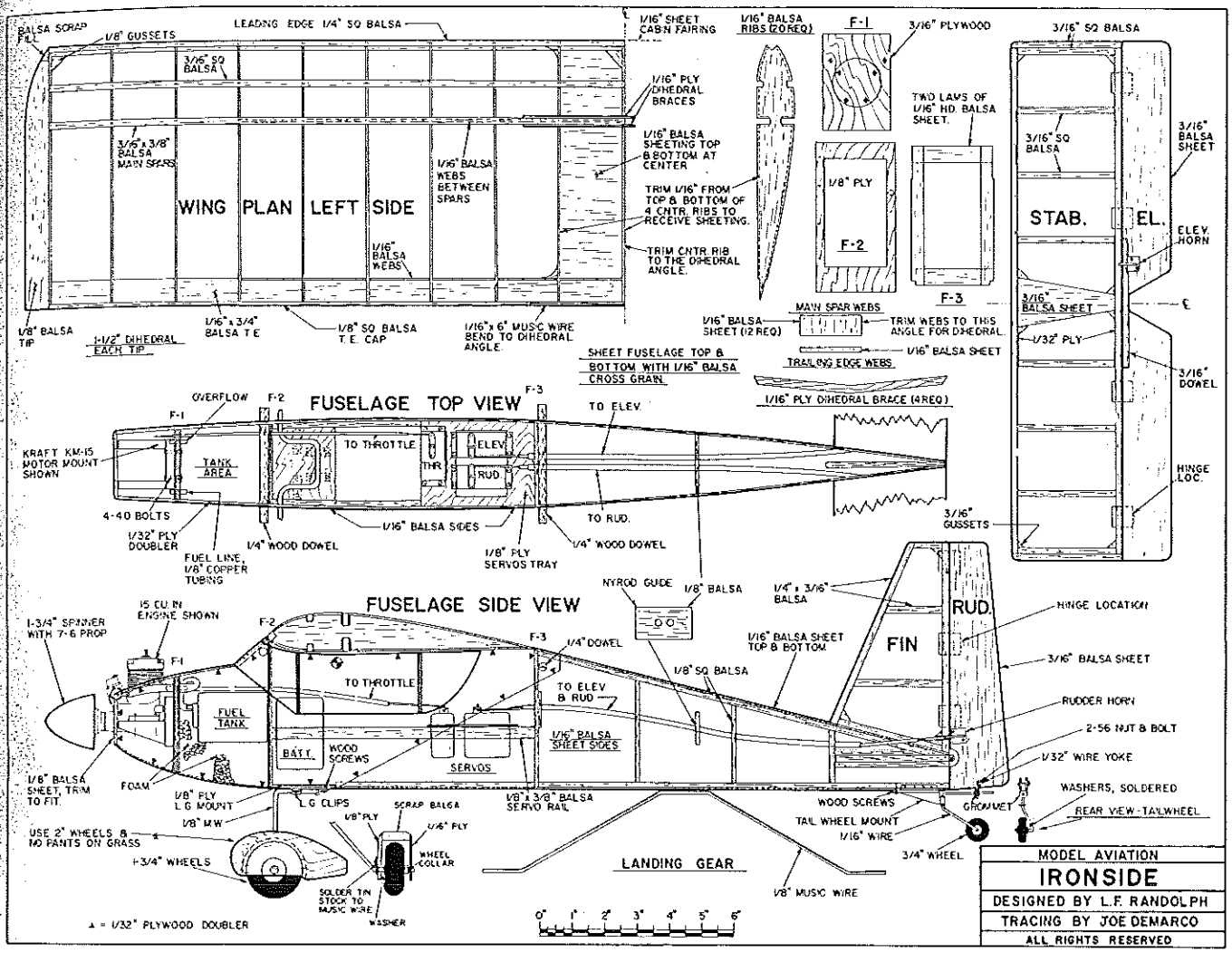
the completed wing. Notch the trailing edge at the center to accept the music wire reinforcement. Bend the wire to the dihedral angle and epoxy it in place.

Fuselage. The sides are cut from a sheet of 1/16 balsa 6 in. wide (made by edge-gluing two sheets of 1/16 × 3 × 36-in. wood together). Make a template of the fuselage side. Cut one side from each end of the wide sheet.

Pin the two sides together, and sand them to the same outline. Use them as a template to cut the 1/32 plywood doublers. Epoxy the doublers in place, and add the longerons and uprights. Once again, pin the sides together and sand to the same outline. It would be a good idea to drill the 1/4-in. holes for the wing hold-down dowels at this time.

Drill the firewall to accept the engine mount bolts and the fuel and throttle lines. Epoxy T-nuts to the rear of the firewall to receive the bolts. Build-up the two cabin formers from scrap 1/16-in. balsa.

Separate the sides, and glue the two formers in the proper locations using a square or right triangle to get them perpendicular to



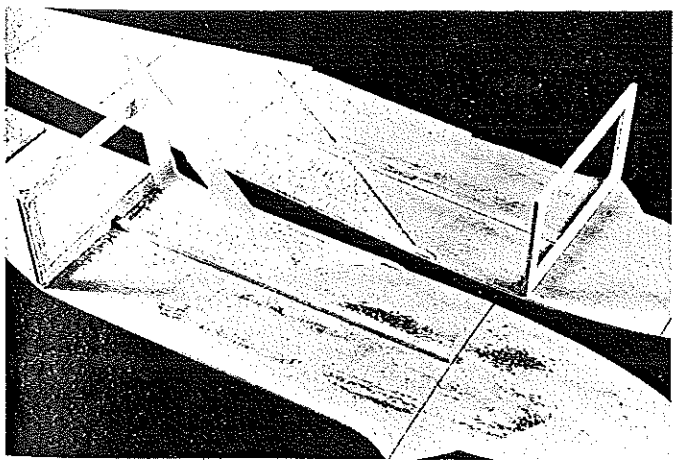
the fuselage sides. Join the sides, and align them with a square. Epoxy the firewall in position, and bring the tail together; check the alignment and correct, if necessary, before the glue has set.

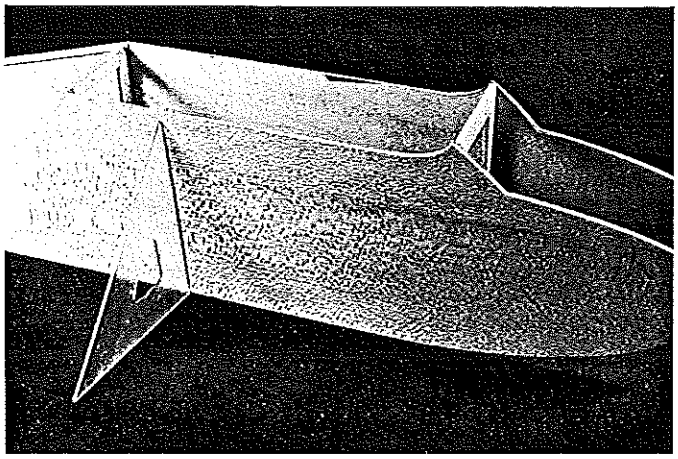
Sheet the bottom of the fuselage. Install the Nyrod guides and the fuel tank with its lines, then complete the top sheeting. At the landing gear location, note that the sides must be notched slightly to accept the 1/8 plywood gear mount so that it will be flush with the rest of the sheeting. Sand the completed fuselage.

Edge-glue three pieces of 1/16 sheet balsa together to form a strip 9 in. long and the same width as the fuselage top sheeting. Place the wing in its saddle on the fuselage, and fit this strip from the leading edge to the trailing edge of the wing to conform to the fuselage top. Glue it in place on the wing. Remove the wing, and fill in between this cap strip and the leading and trailing edges with scrap balsa.

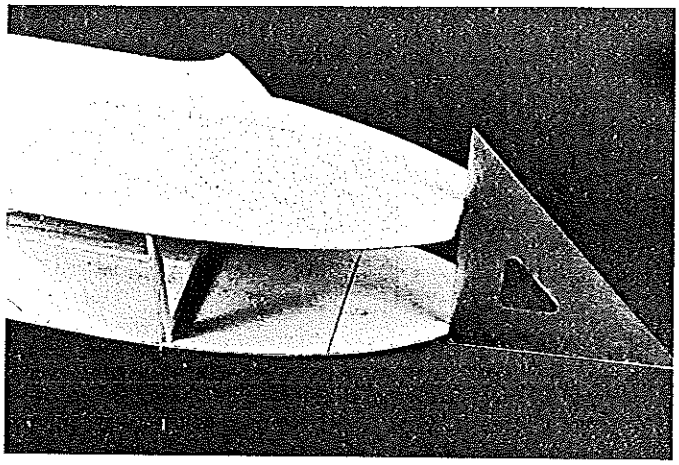
Install the engine mount. Temporarily mount the engine, and trim the fuselage side to fit the muffler. Trim and fit the sheet at the nose to complete the cowl. Remove the engine and mount, then coat the engine compartment with epoxy. I usually drill a small hole at the bottom of the cowl, right at the firewall, to act as a drain for exhaust residue.

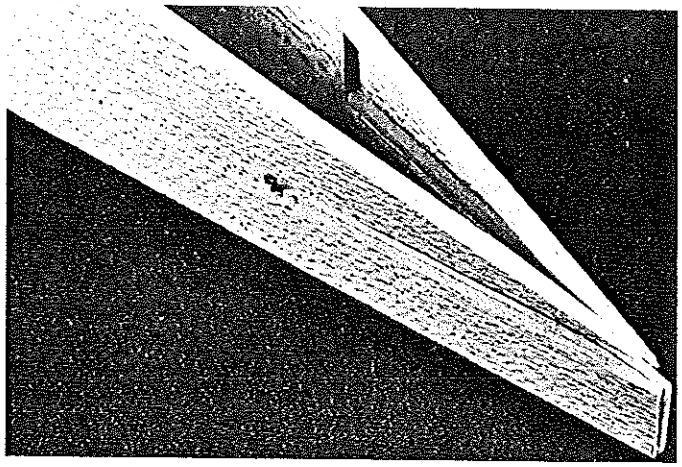
Tail surfaces. Build the stabilizer over the plan just like the wing. Cut the 1/32 plywood doublers, and glue them to the stab leading and trailing edges at the center before adding the sheeting and ribs. The fin is built in the same way as the stab.



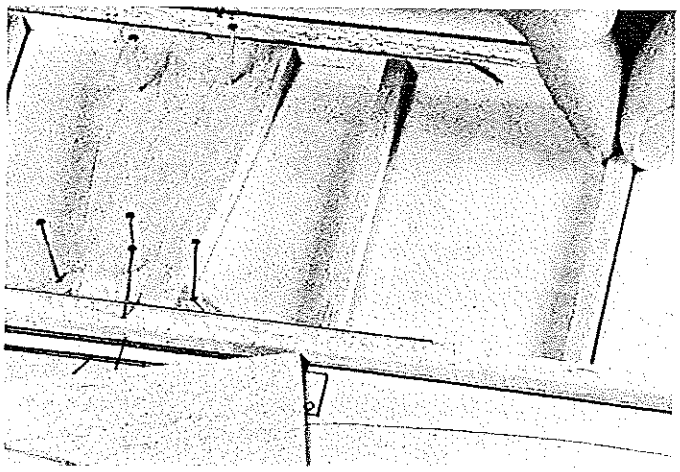


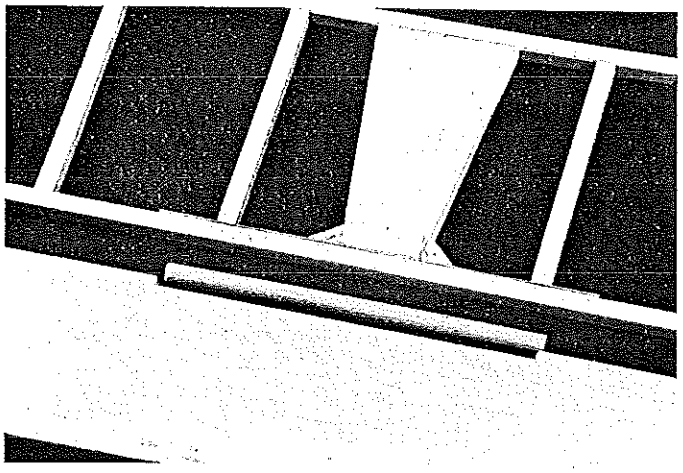
Left: Glue the cabin bulkheads to alternate fuselage sides. Use a triangle to get them square with the sides, and glue them to the previously-marked locations. Right: Join the fuselage sides with the bulkheads. On a flat surface, check to assure that the fuselage is square.



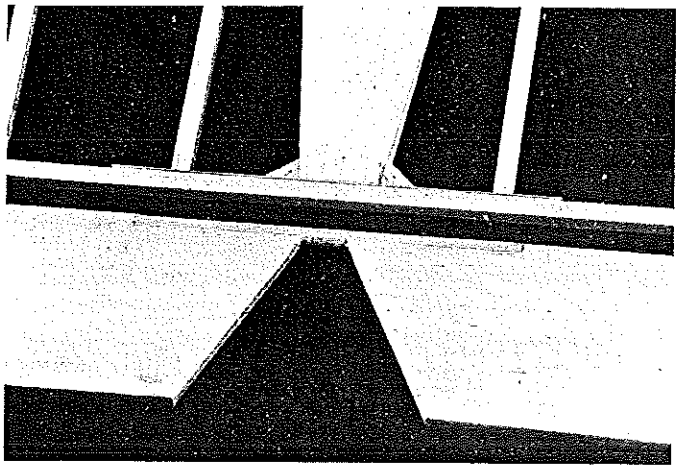


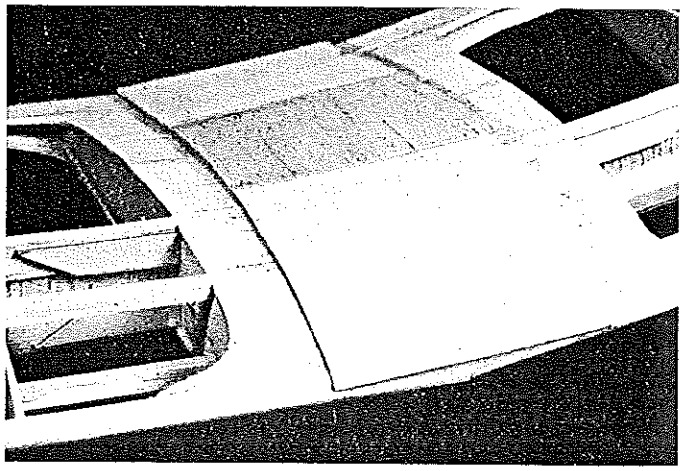
Left: Once more, use the triangle to align the fuselage sides fore and aft. A fuselage with sides askew will cause unwanted thrust offset as well as misalignment of the tail. Right: Longerons should be beveled at the tail so the balsa sides touch. Check the stab slot to see that the stab will be properly aligned, without any tilt, when it is glued in place later. Attention to small details pays big dividends.





Left: Build the stab and rudder over the plan just as you did the wing. Don't omit the 1/32 ply doublers at the center. The strength provided is more than worth the added weight. Right: Notch the leading edge of the elevator, and glue in the 3/16-in. dowel before the rudder clearance notch is cut. Use of one of the slow-cure cyanoacrylate glues, together with an accelerator, makes this a strong, smooth joint.





Left: Cut the rudder notch all the way to the dowel, which becomes the carry-through for the elevator. It is a good idea, at this point, to strengthen the wood where the horns will be mounted with a few drops of CyA. Right: After the fuselage top and bottom sheeting is complete, place the wing in its saddle, and add the top fairing to blend into the fuselage. This makes the wing look like it goes through the fuselage.

Cut the elevator from soft 3/16 sheet. Install the 3/16-in. dowel carry-through before cutting the rudder notch in the trailing edge. Cut the rudder from the same soft stock as the elevator. It's a good idea to reinforce the locations of the horns on these surfaces by letting some cyanoacrylate glue soak into the bare wood. Sand the elevator carry-through clearance hole in the leading edge of the rudder.

Covering. This airplane was designed for one of the iron-on films, and the surfaces are hinged with the same material. A description of this hinging method was in the April 1979 *Model Aviation*. Follow the manufacturer's instructions packed with the film. After the fuselage is covered, seal the edges around the firewall and cowl with epoxy to eliminate the possibility of fuel sneaking through. Remove the covering from the top of the fuselage (where the fin-rudder will be mounted) and from the center of the stab, and epoxy the tail group to the fuselage.

Miscellaneous. Bend and mount the tail wheel as shown. Bend the landing gear from 1/8-in. music wire, and attach it to the mounting plate with brackets and wood screws. If wheel pants are desired, they should be

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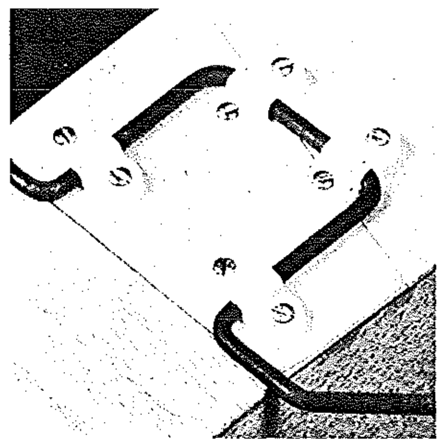
Ironside/Randolph

Continued from page 36

built-up now. Once covered, they are mounted with screws through brackets soldered to the landing gear when the wheels are installed. Epoxy the wing hold-down dowels in place.

Make a plywood servo tray the same width as the inside of the fuselage in the cabin area. Mount the servos in this tray. Mount the engine, and place the receiver and battery pack in the forward part of the cabin area. Slide the servo tray along the servo rails until the airplane balances at the location shown on the plans. Glue the tray at this spot.

Connect the elevator and rudder to their respective servos. Run some soft iron wire through the guide from the throttle servo to the engine. Check to ensure that the surfaces move in the proper direction when control is given and that the throttle line runs smoothly and correctly. Attach fuel and overflow lines to the engine. Any warps in the wing or tail surfaces should be removed with a hot iron or heat gun.



The landing gear mount is very simple. Screws go through the ply plate, so it is a good idea to glue 1/16 balsa over the mount (on the inside of the fuselage) to keep wiring away from the sharp screw ends.

Flying. It is a very good idea to taxi around a bit to get familiar with the control response. This is especially important to do if you have been flying full-house birds and are used to

For Fun/Winter

Continued from page 128

keyed the plywood fin into slots.

"The hottest thing on the market in those days was the Space Bug, so I hung one on the front end. It wasn't until later that I found Hill and Ozzie Czeppa mounted their wings underneath, though I never figured out why. I had mine on a platform behind the fin and still do it that way. Oh, well, whatever makes your tires squeal, I reckon.

"About a year ago, one of our club members asked me how come mine went to the right. He informed me that VHT models should fly to the left (I don't know where some of these people get their information). At any rate, this ROW (surprise!) job is a little different in that it has a hull for a fuselage. At 400 squares, it had a Medallion .09. To keep if from leaping off the water, I replaced that with a Babe Bee. The result, a realistic 10- to 15-ft. takeoff. Tell ya how ignorant I was—and still am—I called my designs UHT for Ultra High Thrust, never knowing that the rest of the world spoke of them as VHT.

"Just finished a magic black box," says Smitty, going into the glide, "to help out old (censored) like me rig the wire bracing on Indoor models. It is completely adjustable and only measures 6 x 7 x 26, which solves the portability problem. Although small, it opens out to create a black hole which makes nichrome wire stand out like a silver dollar in a mud puddle, and it'll hold any size wing in any position. I am as proud as a dog with two tails."

Speaking of two-tailed dogs, if a Bellanca fuselage profile is a lifting airfoil—and many others, too—isn't a deep-bellied fuselage an inverted airfoil, and (if so) what do we lose?

Bill Winter, 4426 Altura Ct., Fairfax, VA 22030.

steering with your left hand when the airplane is on the ground.

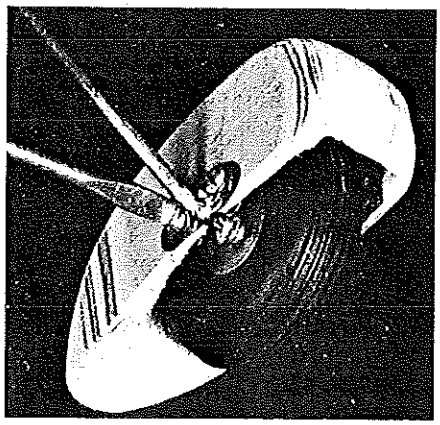
You will find that tracking is no problem. The landing gear is close to the leading edge of the wing, and the tail wheel holds the airplane at a relatively low angle of attack when at rest on the ground. Treat Ironside as if it were a tri-geared airplane, and you will be OK.

Takeoffs are straight down the runway, needing only a hint of right rudder. Hold a little forward stick to get the tail up, and let the speed build for lift-off.

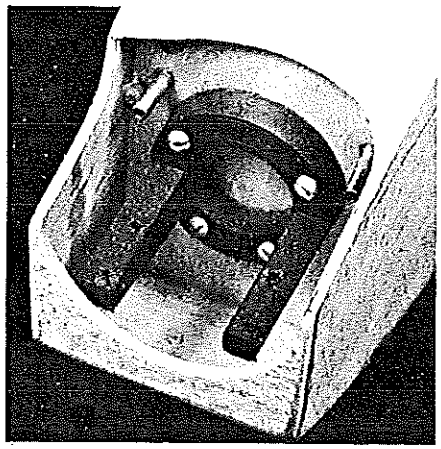
When landing, keep the speed up, and let it bleed off by easing the stick back at the flare. Ironside will settle in with hardly a bounce.

The rudder is more sensitive than ailerons at low speeds. The airplane will snap, but that isn't a threat as long as it is not "horsed around" at low speeds.

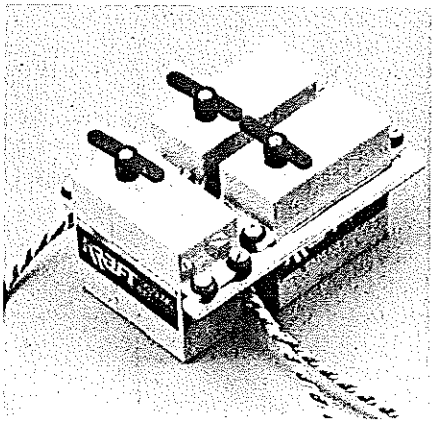
I think you will be surprised at the performance available from a three-channel airplane. The sky *is* the limit.



Wheel pants are laminated from ¼-in. balsa with 1/16 and 1/8 ply sides, then sanded to shape. Mount with small wood screws through brackets soldered to the landing gear legs.



The cowl is quite simple—just a piece of sheet across the fuselage sides, trimmed to fit the engine. Cut away the side of the fuselage in the area of the engine exhaust to clear the muffler. The fuel lines and throttle line can be seen in the picture. Coat this area with epoxy after the airplane is covered.



Mount the three servos on a ply tray that fits on the servo rails in the cabin. Slide them back and forth until the airplane balances at the proper place, then glue to the rails.