

# A Twin Electric Powered "DH-10"

by W.R. Stroman

Electric engines open up new frontiers for an inquisitive minded modeler. A beautiful Free-Flight Scale to consider.

I have been experimenting with multiple engine Free-Flight models for about a year. The main problem has been keeping the engines synchronized through the power phase. There are systems for doing this with gas engines, but most are complicated and not always dependable. Bob Bouchet, of Astro-Flight Inc., suggested that I use two electric motors wired to a common battery, and this was an excellent solution to the problem and has worked very well.

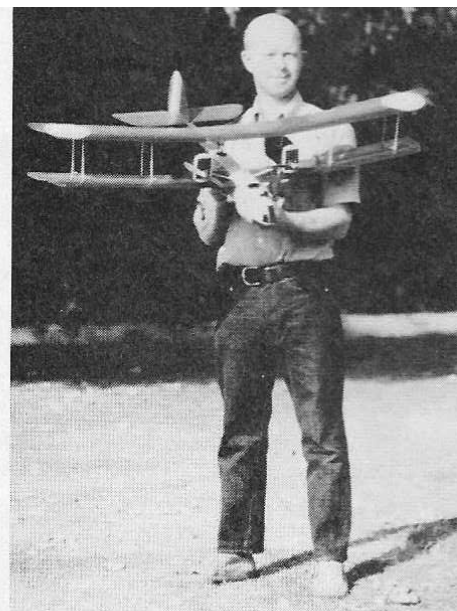
I chose the "DH-10" for my test bed because of its inherent stability due to the four degrees dihedral and four degrees sweepback of the wings. The large rudder and stabilizer were also helpful.

This model is as close to scale as I could find data for, the only thing that isn't documented is the dashboard layout. You will

find that the flight is scale-like also. The rollout for takeoff is long, say about 30 feet, then a gradual but positive climb followed by a cruise to the left in about a 50 foot circle. The descent is gradual and the landing is good.

The most fun I've had is having some of the R/C flyers watch it fly and ask me what frequency I'm on. When I tell them it's Free-Flight their eyes almost pop out of their head. But enough of my "DH-10," let's start building yours.

The first thing to do is to make an aluminum template of the wing rib and of the false rib. Why first? Because while waiting for something to dry, one can cut 5 or 10 ribs and store them away. As you have to make one heck of a lot of wing ribs, this is a less painful way of doing so.

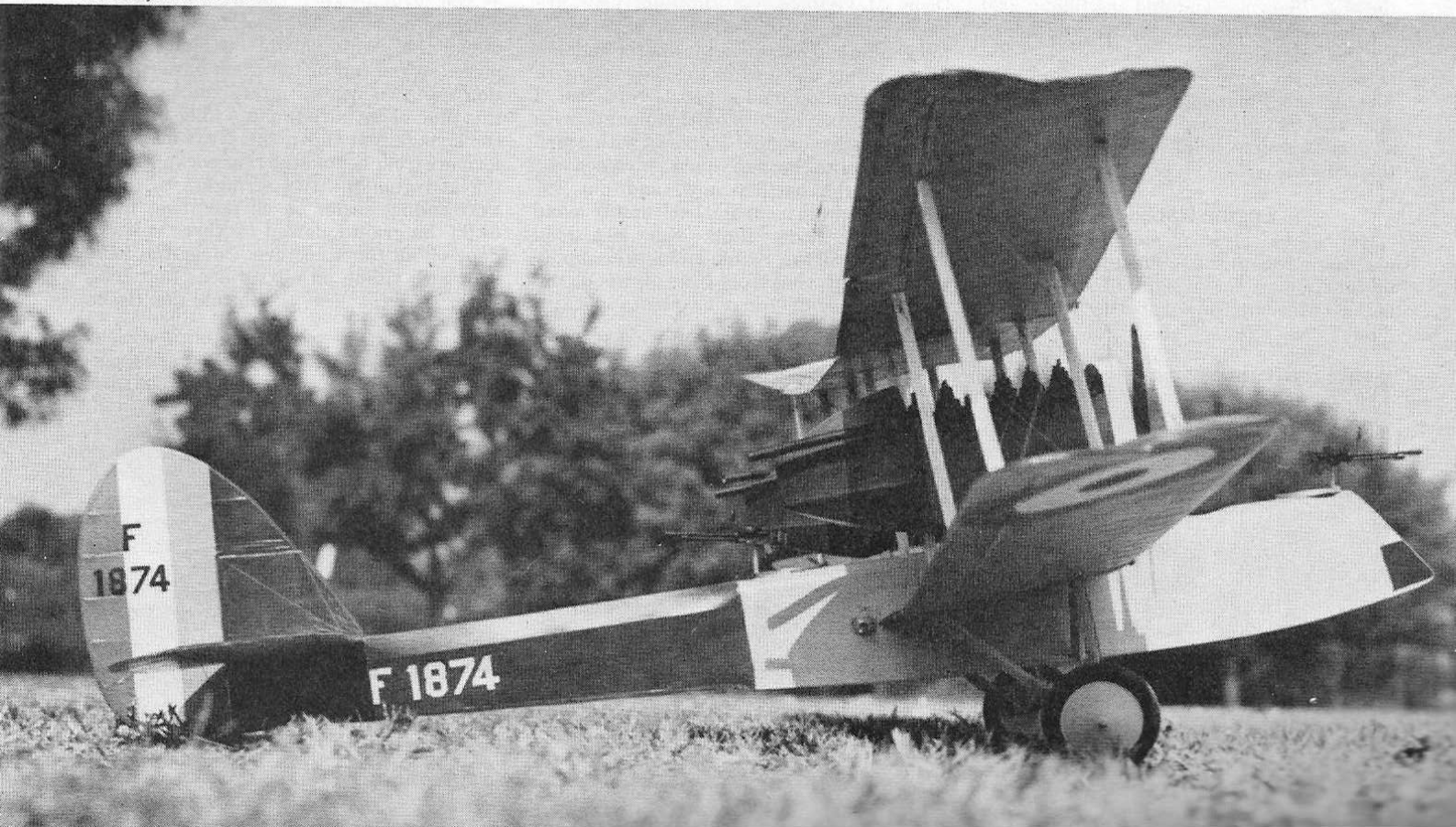


## The Fuselage

As in most models, lay out the box frame sides on the side view of the plans. The frame should be medium to hard  $\frac{1}{8}$ " square balsa. Then put the spacers to make a box form from the top view. Add the nose block next and the landing gear wire, (I wrap mine with thread and glue it with three coats of cellulose cement, It makes a very strong system). Now cover the bottom and sides with  $\frac{1}{32}$ " sheet to just behind the rear gunners cockpit. Glue a piece of  $\frac{1}{16}$ " sheet on the inside area where the lower wing goes through.

Lay out the stringers for the lower center wing full length, glue the ribs on *one* side only and mark the location of the ribs with a pencil on the opposite side. Mark the locations of the stringers on the side

Photos by John Williamson





of the fuselage using the rib template, cut the holes, and slide the wing through, and glue on the other ribs and false ribs. Insert the fillers between the stringers at the end rib spaces and add the fillets, .020 dia. wire loops for the rigging, and hooks for the rear hinge.

Install the landing struts of  $\frac{1}{16}$ " dia. wire on the wings and glue them in well. Add the  $\frac{1}{8}$ " plywood insert for the tailskid at this time being sure to slot it for the tailskid.

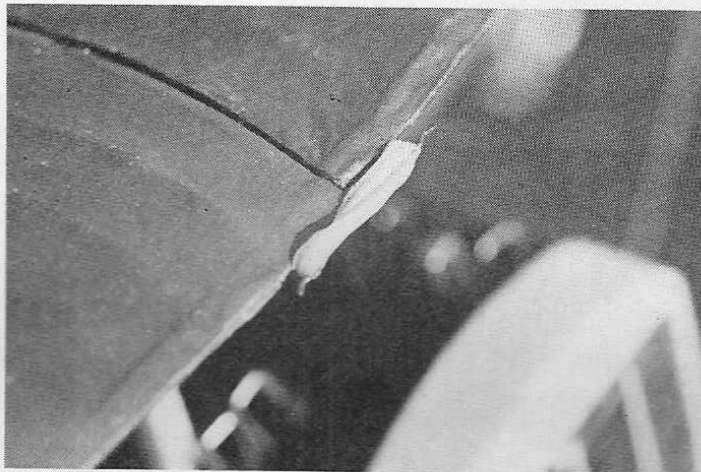
#### Engine Nacelles

Cut the  $\frac{1}{8}$ " plywood motor mounts and glue them together and make a hole in the upright mount for a tight fit of the .020 motor. Measure and cut the interplane

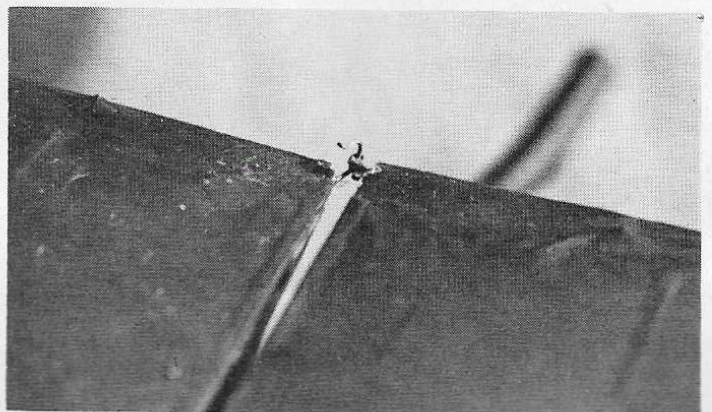
struts that fit at the ends of the center wings. The best way to make these is to laminate two  $\frac{1}{16}$ "x $\frac{1}{4}$ " hard balsa strips together with the  $\frac{1}{16}$ " dia. wire between them. Make sure that the wire ends are long enough to protrude into both wings for good support. Glue the motor mounts to the struts and install the diagonal wire braces for additional support. Now install the Astro .020 motors on the mounts with aluminum bands held in place with small bolts and nuts through the  $\frac{1}{8}$ " plywood.

Install the battery now, and put  $\frac{1}{2}$ " square blocks in front and back of it to avoid its shifting during flight. Now is a good time to install the switch and power supply plug. Mount these on  $\frac{1}{16}$ " plywood and wire the assembly leaving plenty of extra

wire to go to the motors. Check your motors for opposite rotation, and if all is in order start carving the blocks for the top of the fuselage. Make these as thin as practical as you want to keep the weight down as much as possible. The block that goes between the struts should be built in two pieces so you can install them easier. Position the two center interplane struts at this time being sure to put a filler between the stringers at this point. Next make the formers from behind the rear cockpit to the tail and glue the two stringers to them. Put sanding sealer on all the sheet parts to fill the grain followed by three coats of dope on all the structure. Cover the fuselage with tissue on all surfaces (not Silkspan, it is too heavy). Shrink the tissue



Electric power makes twins such as this possible projects. Flies nicely. **Left and below:** Neat hooks and rubber bands join wing panels. 50" span.



and give it two coats of clear dope.

Now make the upper center wing, being sure to put the .020 dia. wire hooks for the rigging on the bottom side of this wing, and drill holes for the interplane struts to fit into. While on the subject of rigging wires, I usually use hooks on the upper wings and loops on the lower wings. Should you have a hard landing, the loop on the bottom wing retains the rigging wire. If you have ever spent an hour or two looking for an .020 rigging wire in dry grass you will know what a great idea this is. Now cover and dope the upper wing.

### Rudder Assembly

Laminate the outside form around a piece of stiff cardboard with white glue and let dry overnight, then lay the framework inside and cut apart the vertical stabilizer from the rudder. Glue the annealed iron wire on the rudder and sand it to final shape. Now give it three coats of dope and tissue it as you did the fuselage. Glue the other end of the wire to the vertical stabilizer and dope and cover it.

### The Elevators

These are made in the same way as the rudder, that is, laminated. Install the framing, sand to shape, glue iron wire on elevators, cover, glue wire to horizontal stabilizer and cover. Give both the rudder and elevator two *thin* coats of *plasticized* dope.

### The Wings

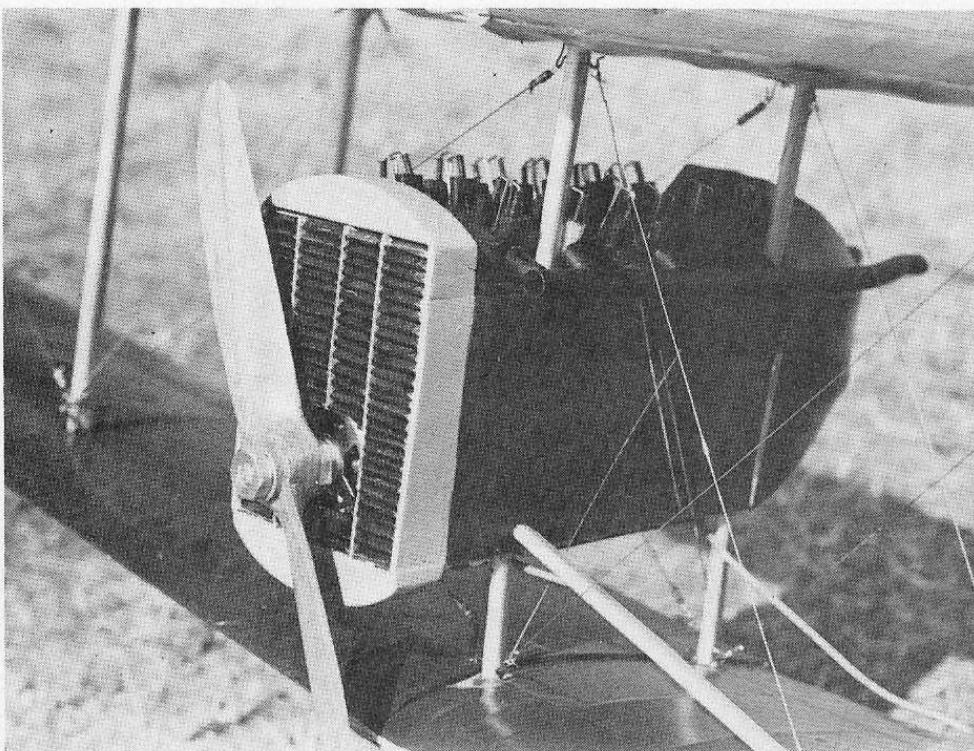
Laminate the wing tips and horn balance for the ailerons and sand to shape. Lay the bottom stringer near the front of the wing and the trailing edge. Now glue the wing ribs into place, then add the leading edge by pinning it in place with spacers beneath it to obtain the proper height. Glue the top two stringers on next and add the false ribs. Turn the wing panel over and glue on the remaining stringer. Now put the fillers between the stringers where the interplane struts are located. Drill the holes for the interplane struts (top of bottom wing, bottom of upper wing) and install the hooks for the rigging. Also, install the loops to form the rear hinge and the hooks at the front to hold the rubber bands. Cut the ailerons from the wings and make them adjustable the same way as the rudder and elevator. Mine flew best with all ailerons set up  $\frac{1}{8}$ " at the rear.

It is time to complete the framework on the engine nacelles. The areas between the interplane struts are  $\frac{1}{16}$ " sheet balsa, the radiator tops and bottoms are balsa blocks, while the louvers are  $\frac{1}{32}$ "x $\frac{1}{16}$ " balsa strips. Before installing the louvers, paint a long stick of  $\frac{1}{32}$ "x $\frac{1}{16}$ " grey, then cut off as much as you need and install. This is much easier than trying to paint the louvers after they are installed.

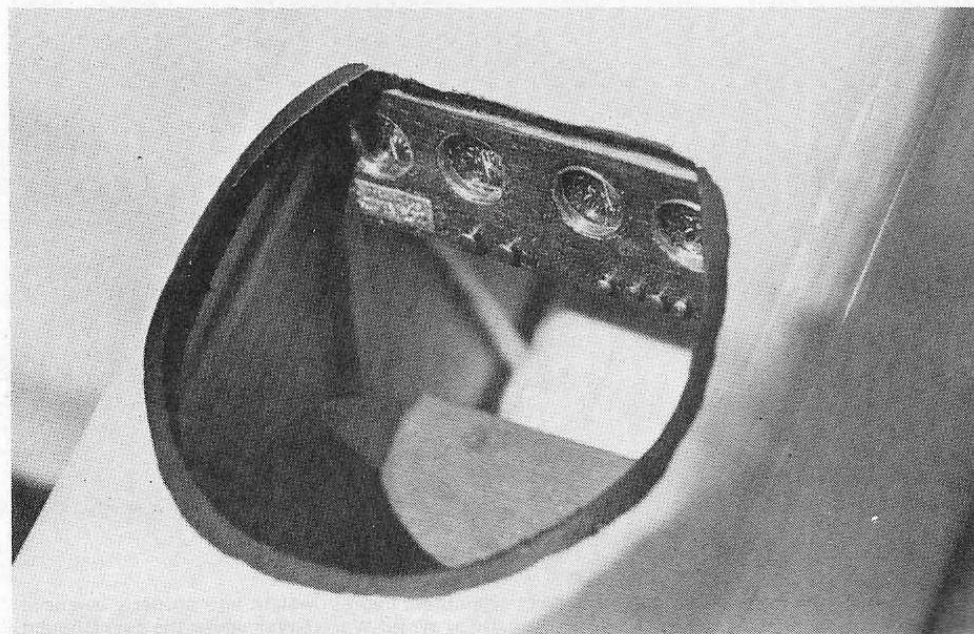
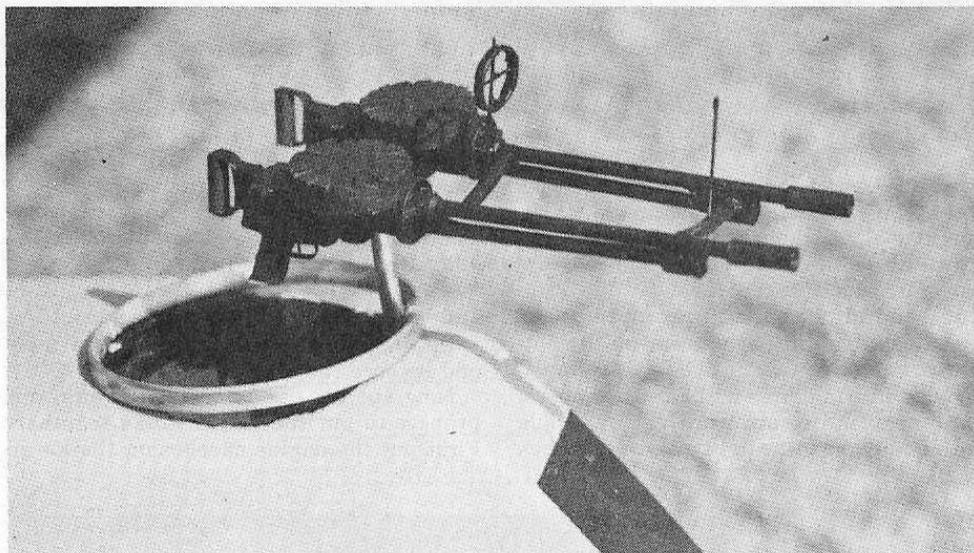
The streamlined area behind the rear interplane strut is a framework of balsa sheet covered with tissue and is made separate; then glued on.

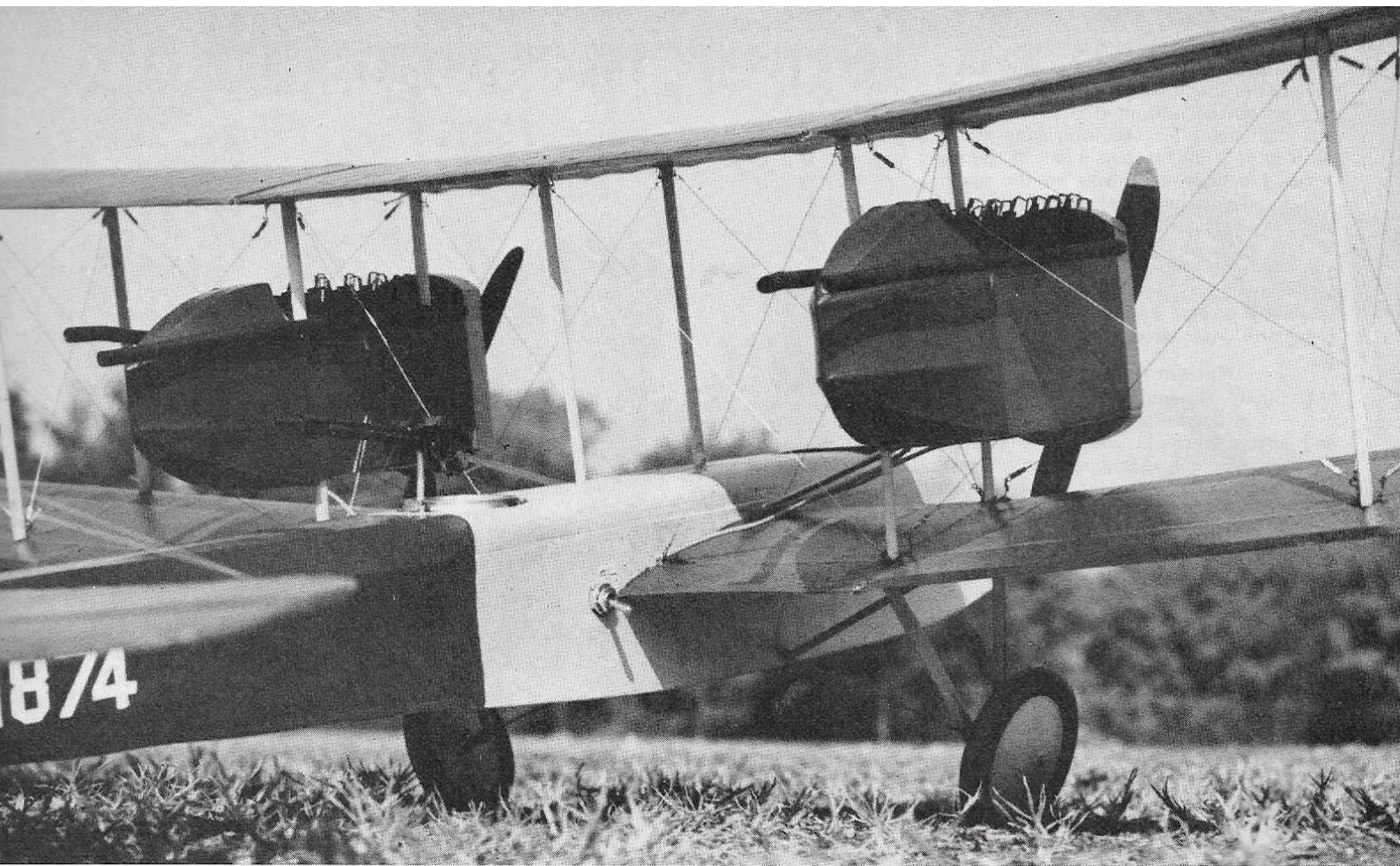
Now for the color doping. Although I own an airbrush I used a  $\frac{1}{2}$ " inch wide brush to dope this model, because in 1918 they were not using sprayguns to paint their aircraft, so if a few brushmarks show it looks a little more scale. Also, you should have sharp lines between color separation you won't normally get from an airbrush.

The fuselage was brown on the top and sides from behind the rear gunners cockpit. FLYING MODELS



The radiator, mark of a liquid cooling system, hardly the modern method. Astro .020 (equivalent) electric motors within the nacelles, detailed on the drawings. **Center:** A pair of machine guns, detailed on the drawings. **Below:** The sparse instrumentation of the day will lessen the effort to a degree. Cockpit interior.





pit to the end of the tail. The top surfaces of the wings, elevator and horizontal stabilizer and all of the vertical stabilizer are brown also. All of the engine nacelles except the radiators are brown. The radiators, and all sheet surfaces of the fuselage, (including the sheet areas on the bottom) are light grey. The rudder is stripped in red, white and blue with black numbers. The interplane struts were natural while the landing gear was light grey. The wings

had roundels on the top surface of the upper wings outlined with a  $\frac{1}{16}$ " white band. The roundels on the bottom of the lower wing were not banded in white.

#### Final Assembly

Fit the Williams Bros. wheels on next and be sure they turn free.

Now cut all the interplane struts and prepare to put the whole works together. First put the engine nacelles on the lower

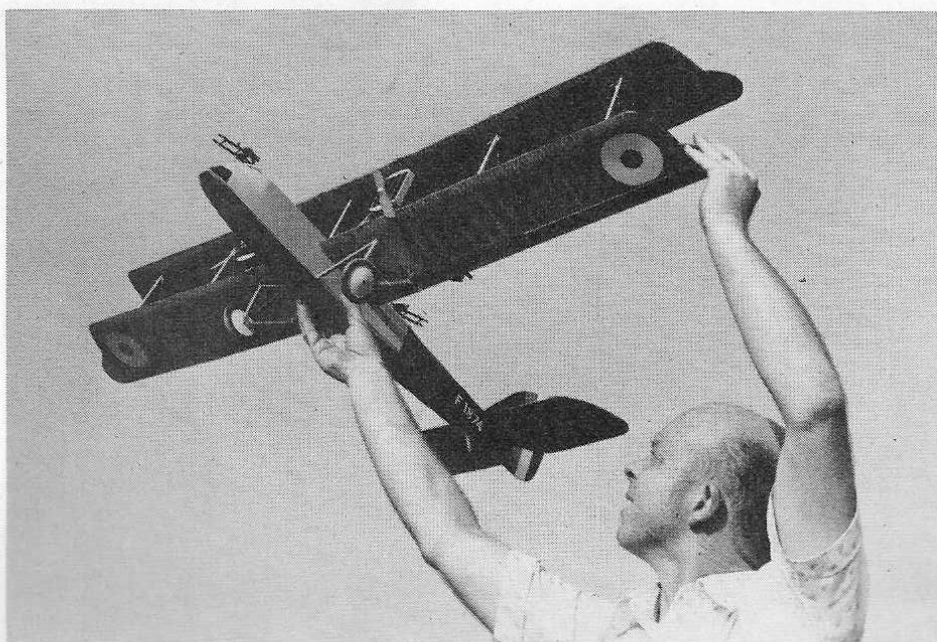
wing with the interplane struts, then fit the top center wing on to this and glue the struts. Now put .020 dia. wire rigging to form an "X" between the struts fore and aft. Check for straightness by using the center struts on the fuselage as a guide, then install .020 dia. wire from the center struts to the outside ones to form another "X" as shown in the front view.

At this point glue the interplane struts on both lower wings and fit the top wings on. Hook the outer wings to the center wing at the back, and put the rubber bands at the front to hold them in place. Next with the model setting level, brace the wings on blocks to the proper dihedral shown on the plans, then fit the .020 dia. wire between each interplane strut fore and aft. Check from the top to see if both wings line up. Now starting from near the center wing, rig one bay at a time checking for proper alignment both for angle of incidence and dihedral. Install the tailskid and relax, most of the work is done!

You may now wire your motors and check for proper rotation, then solder the connections. Make the engine detail as shown on the plans and mount it on  $\frac{1}{16}$ " sheet, paint flat black and install on nacelles. Put the exhaust pipes on to cylinders with hot glue.

The machine guns are also painted flat black and are glued to both the front and rear gunner's cockpit.

I found that my "DH-10" needed a little down elevator for a flat glide and a small (about  $\frac{1}{4}$ " diameter) piece of clay in the nose. Make your adjustments very slight here, as the model is rather shortly coupled fore and aft. You are done! Best of luck with your "DH-10" Electric!



A magnificent Flying Scale design, a type seldom attempted. Light in weight and properly balanced. At top: How could aviation have reached this zenith by World War I? War spurs the development.