CHAPTER VII

FINAL ASSEMBLY AND BALANCING

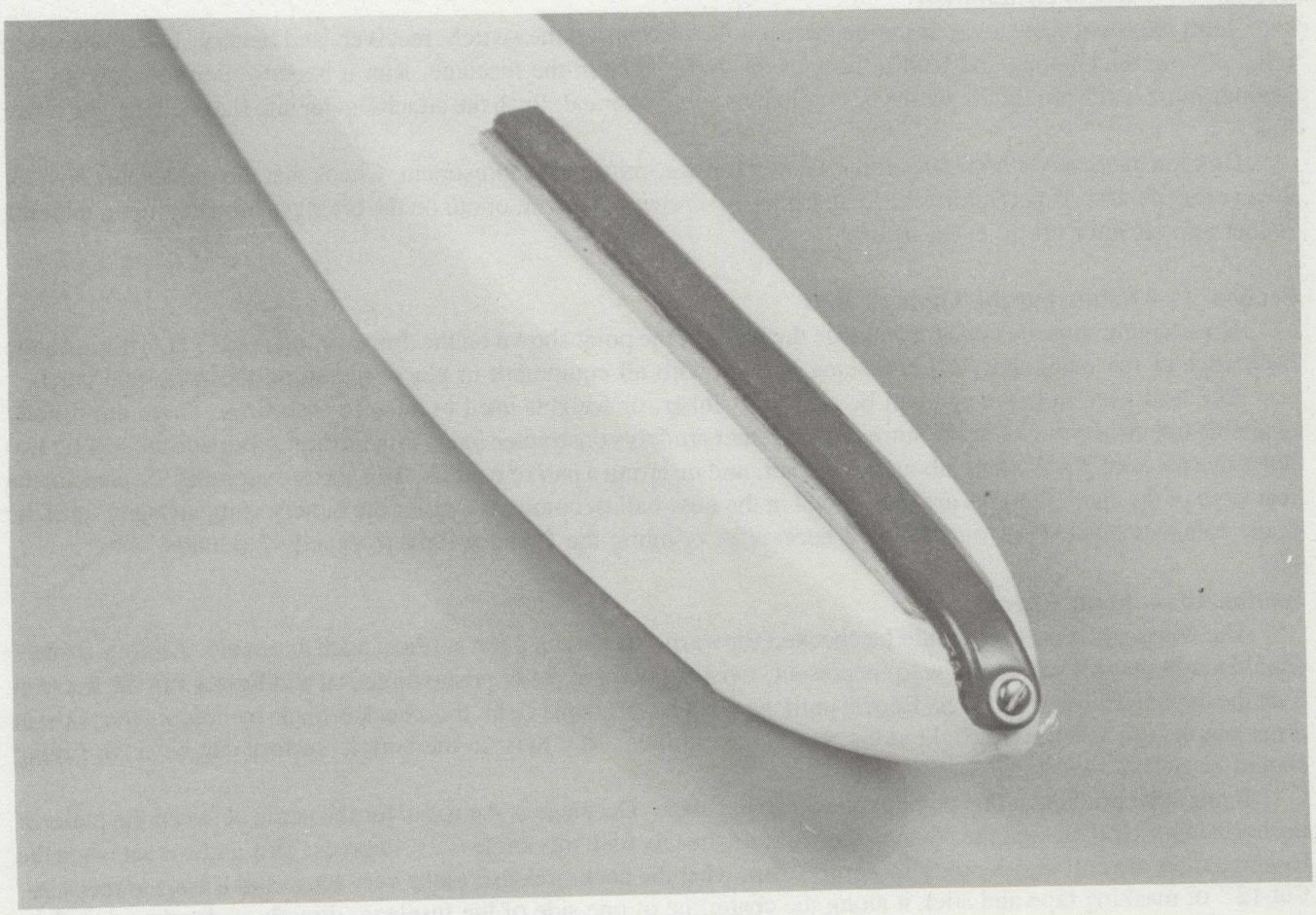
The nice thing about installing all the hardware before covering is that now, when you are anxious to complete the plane, re-installation goes quickly. So, let's get to it!

Section 1 — Skid Installation

If you waited until covering was complete to install the skid, now is the time. Hold the skid in place and cut around it with the X-Acto knife. Peel off the MonoKote and epoxy the skid to the bare fuselage. Paint the skid with some kind of wood sealer so it will shed dirt. This can be anything from clear airplane dope to shellac, varnish, etc., etc. — whatever you happen to have. A plastic, or rubber skid will provide additional protection to the bottom of the fuselage as well as to the towhook. If you wish to install an Airtronics skid, fit it up on the nose as far as practical and trim to length. Round the front with the sanding block. Remove the backing and stick it in place. Drill a 1/16'' hole in the very front, into the noseblock. Screw in place.

Section 2 — Tailskid Installation

Locate the tailskid holes in the rear bottom of the fuselage. Temporarily install the skid. Cut around the skid with the X-Acto knife. Remove the skid and peel away the MonoKote. Epoxy the skid to the bare fuselage.



Airtronics skid installation.

Section 3 — Tow hook Installation

Leave the tow hook out until after glide tests are complete. When ready for a hi-start launch, screw the tow hook into the bottom of the fuselage, pointing to the rear. Tighten the retaining nut securely against the fuselage. Check the tightness of the tow hook before each launch. If it is loose and rotates during launch, you may find the plane in an unrecoverable attitude, and --- kapow!

Section 4 — Hinge Installation

Locate the hinge slots in the fin, rudder, and elevator. Slit the MonoKote at these locations using the X-Acto knife. Lightly coat the hinge tabs with glue, and push into the slots. Wipe the hinges free of excess glue. Fully seat the hinges, leaving only a small crack between the surfaces.

Section 5 — Tail Installation

Locate the rudder and elevator horn holes. Open them with a sharp instrument and screw the horns in place. If the tail is to be glued on, trim the MonoKote away from the mating surfaces. Glue the stab in place, seat and glue the fin into the stab and fuselage. Use the straightedge to align the fin with the fuselage centerline, as described in Chapter V, Section 2e. If the tail is removable, screw it in place using the 2-56 machine screws and the #2 wood screw.

Section 6 — Pushrod Installation

Push the pushrods through the tubing and solder, or epoxy, the couplers to the inside ends. Re-install the servos with their plugs in the receiver compartment. Attach the Snap Links to the servo arms and the rudder and elevator horns.

Section 7 — Wing Hold-Down Dowel Installation

Cut the MonoKote from the dowel holes in the fuselage. Trim the dowels to the lengths shown on the drawing. Push them into place, so they protrude evenly. Apply a little glue and rotate the dowels a quarter turn to get the glue between the dowel and the bulkhead.

Section 8 — Radio Installation

Trim the MonoKote away from the switch holes. Re-install the switch, receiver, and battery. Install the strain relief clip on the antenna and feed it through the 1/16'' hole in the fuselage. Run it back to the rudder, using the antenna hook, as shown in the Airtronics radio instruction manual. Push the attaching pin into the rudder at the hinge line.

Turn on the receiver and transmitter. Center the transmitter trim adjustment. Check that the rudder and elevator are in exact neutral. If not, adjust the Snap Links by screwing them in, or out on the brass pushrod couplers, until the rudder and elevator are in exact neutral.

Section 9 — Balancing the Olympic 650

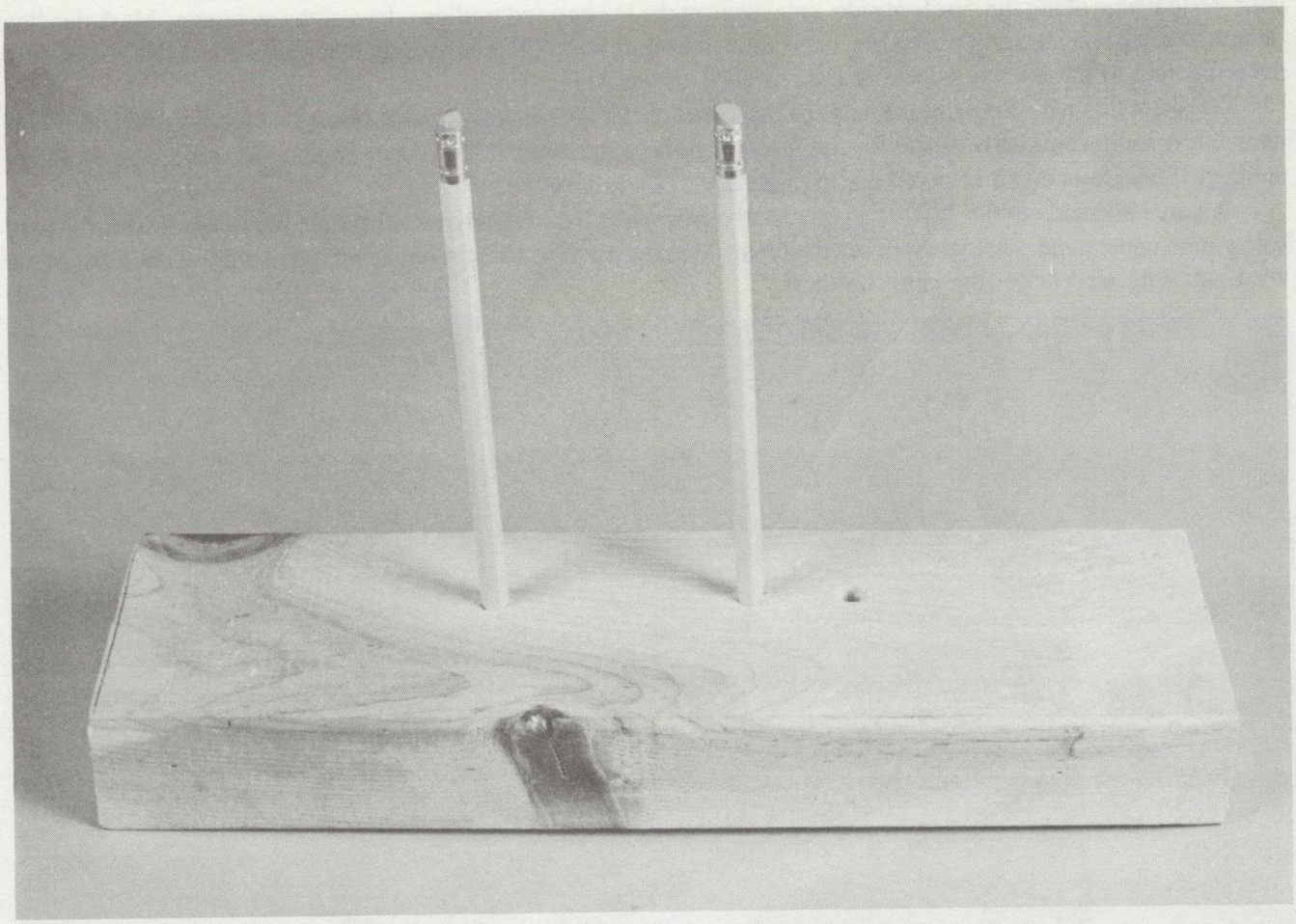
Nose weight must be added to balance the plane at the point shown on the drawing, marked C.G. This is on the back edge of the main spar. All balancing is done with all equipment in place, including the wing and hatch.

The lead used in balancing can be a fishing sinker, or weights used to balance auto tires. These are usually available free from your local tire store. I use a rather crudely constructed balancing fixture. It is made by drilling two holes in a piece of 2 x 4 wood, about 2¾'' apart, and inserting a pair of pencils. This fixture supports the plane at the rear edge of the spar. Weights are than added in the nose ballast compartment, or the battery compartment, until the plane balances level. Four ounces were necessary, bringing the flying weight to exactly 2 pounds.

Section 10 — Final Checks

The wing center section should be checked for warp. Place it on a flat surface, such as a table. All four corners should touch the surface. If any warp is present, twist the wing in the opposite direction and lightly run the hot iron over the upper and lower surfaces. Repeat until the wing is flat. In the field, this check is made by holding the plane at arms length, eye level high. Sight along the bottom surface. Any twist in the bottom surface can be seen. Flying should be delayed until the warp is removed.

It might be prudent at this point to check the decalage. Decalage is the name for the angle between the plane of the horizontal stabilizer and the plane of the wing. In the Oly 650, this angle is 2½ degrees. This angle is set when the fuselage sides are cut, and is pretty foolproof. But, what the heck, it doesn't take very long, and is easy to measure. Cut 12'' of masking tape and stick it along the centerline of one side of the fuselage, directly under the wing. Lay



Balancing fixture.

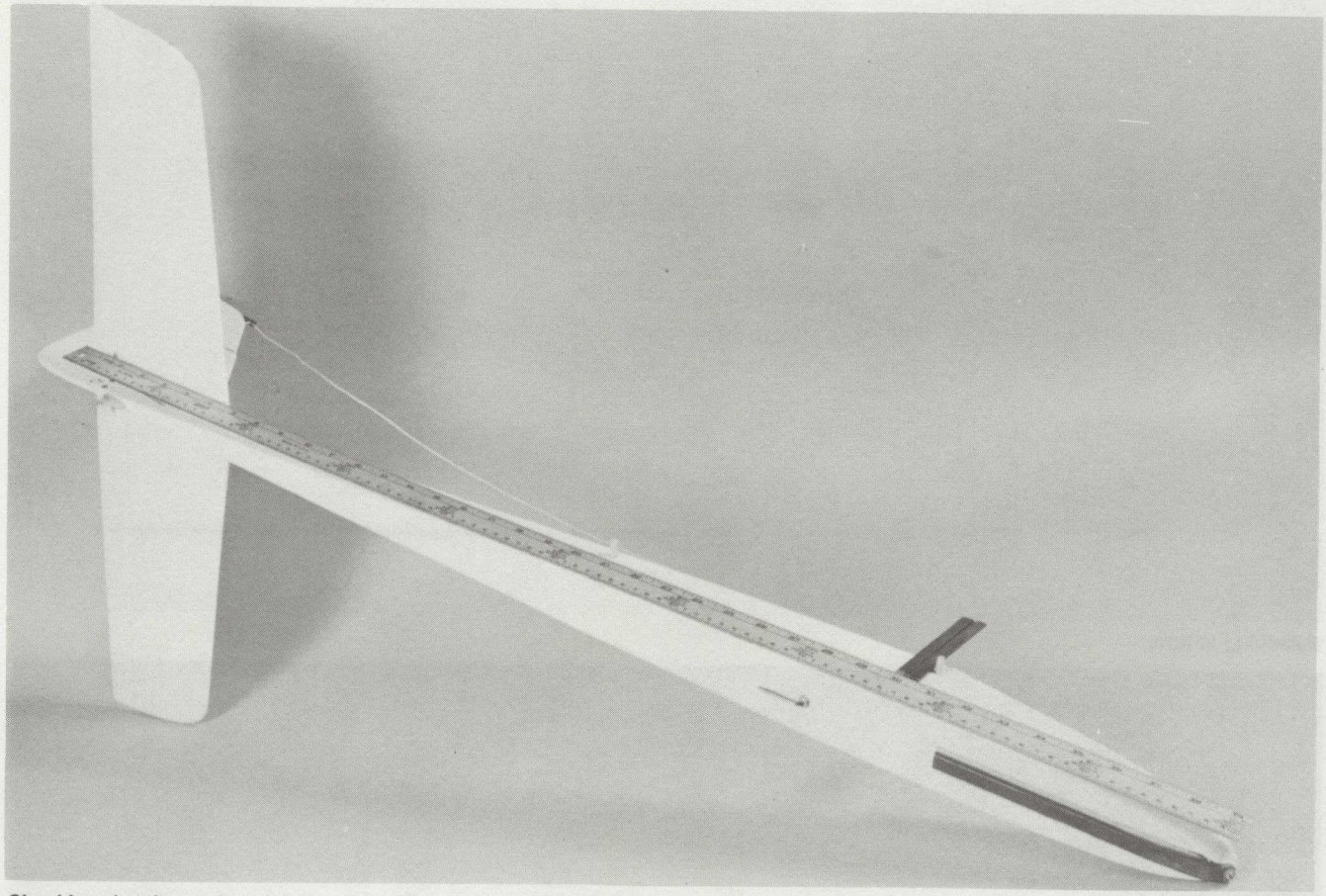


Balancing the Olympic 650.

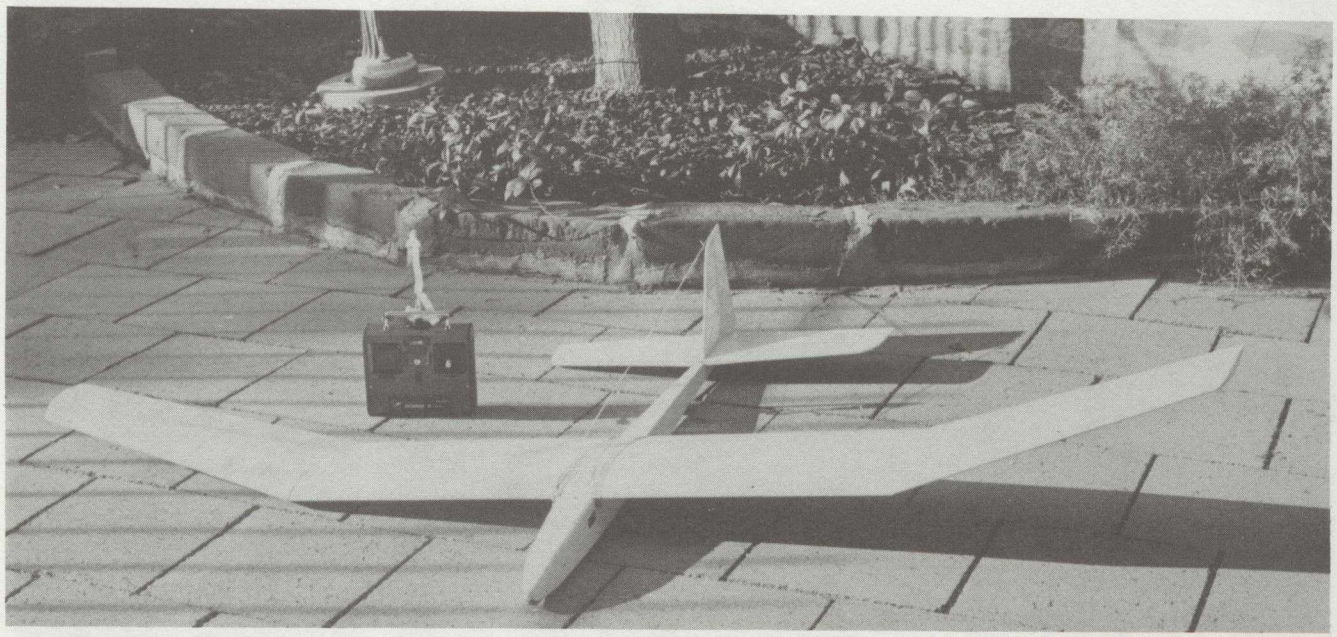
your straightedge along the fuselage side, snug against the leading and trailing edges of the stabilizer. Mark this line on the masking tape at the wing leading edge and the trailing edge. This is the stab horizontal plane. Now, measure from this line to the leading edge and trailing edge of the wing.

Compare this with the measurements of the drawing. Measurements should correspond within about 1/16''. If they don't, a shim should be made for the fuselage to hold the wing at the proper angle. This procedure is highly unlikely if care was taken in trimming the fuselage sides to size.

We are now ready to fly. I suggest you read the chapter on basic aerodynamics before the flying sessions; it may help you to understand what you will see the plane do in the air. The chapter on launching equipment will advise on what you will need to get the beast up there.



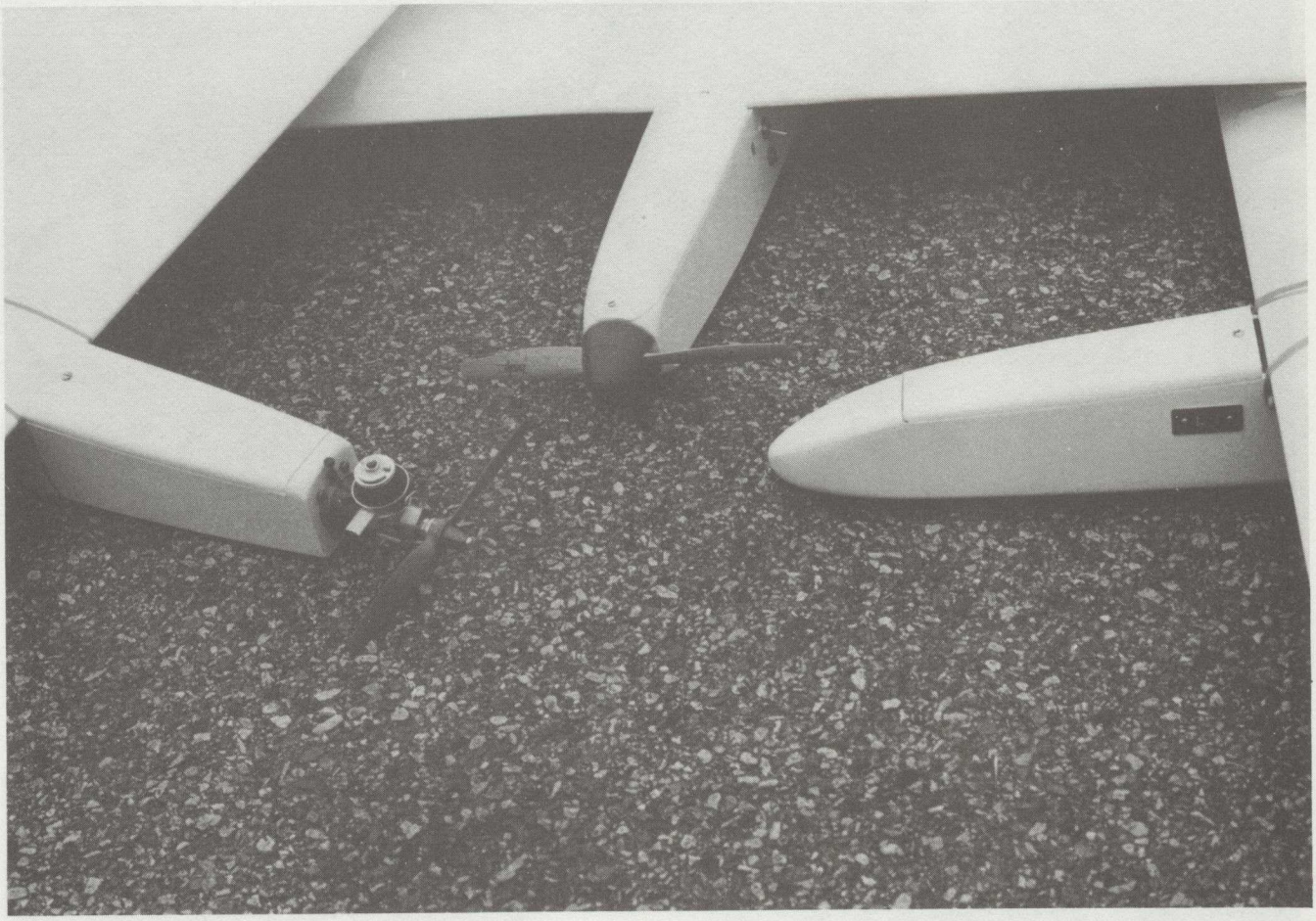
Checking decalage with straight edge.



Olympic 650 ready to fly.

CHAPTER VIII

ALTERNATE CONSTRUCTION — ELECTRIC AND GLOW ENGINE POWERED MODELS



Glider, glow, and electric versions.

For those wishing to use launching methods other than a hi-start, or winch, two alternatives are shown on the plans. Conventional glider launching equipment requires a fairly clear area 600 to 700 feet long. Many fliers live in areas where this size facility is not readily available, and so prefer glow engine, or electric power to get the plane airborne. This chapter will detail the construction and installation differences for these alternatives. Although the plans show installation on the Cox QRC glow engine and the Astro Flight electric system, an equivalent system will work just as well.

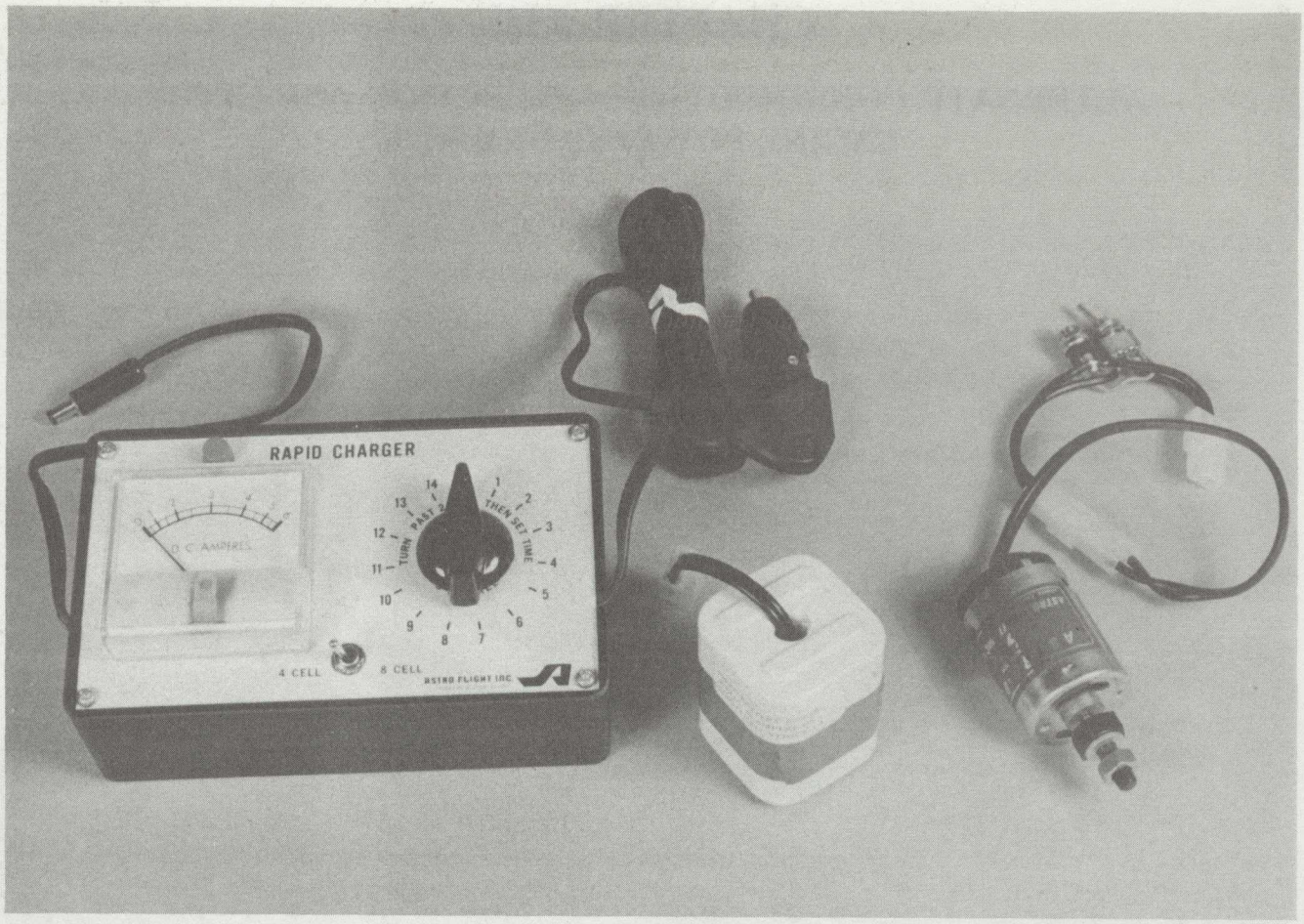
Section 1 — Electric Power System

A. Construct the fuselage as described in Chapter IV, Section 4, with the following exceptions:

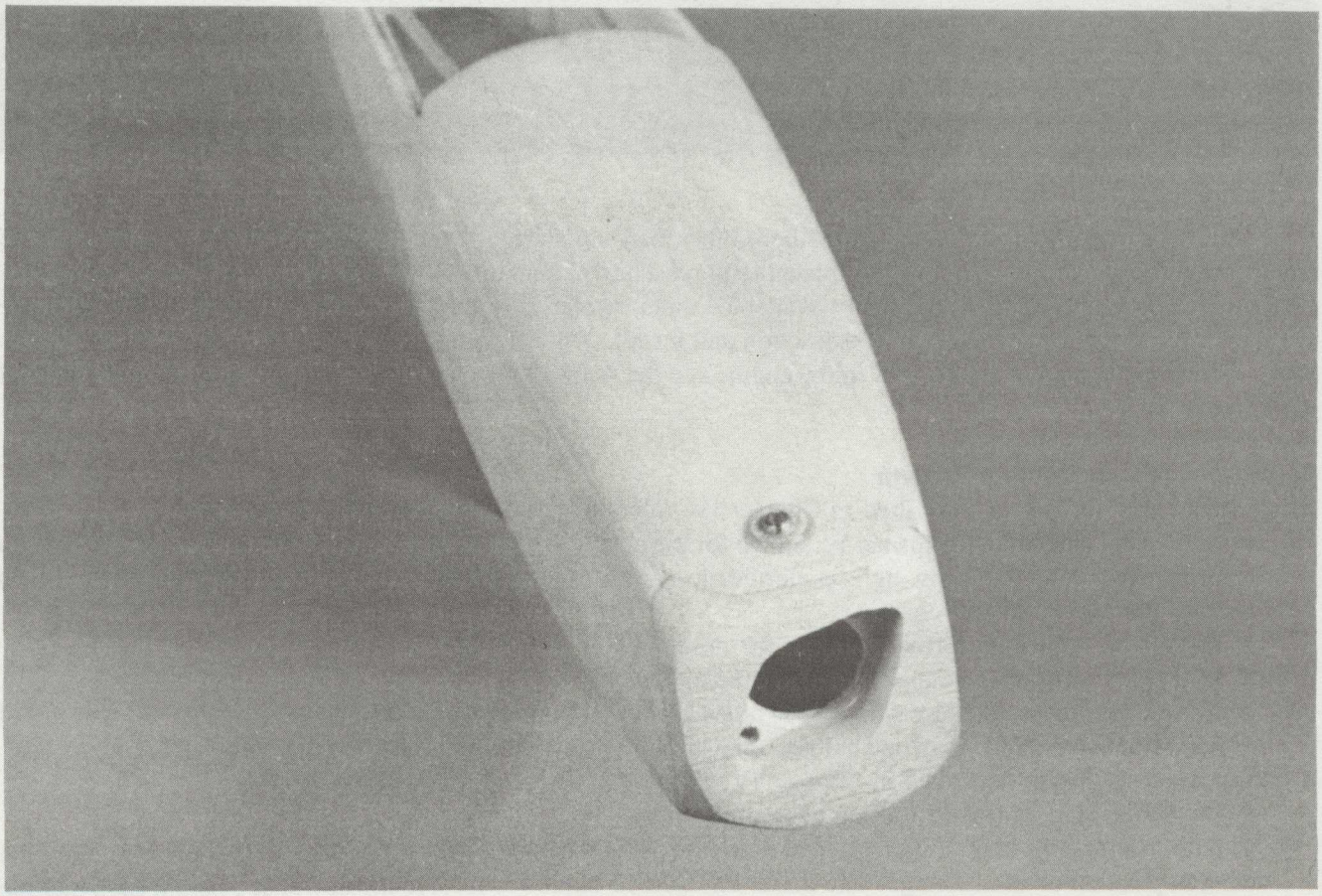
1. In Step 4c, substitute the former F1 shown for the electric version and the former F3, shown for the bolt-on wing version. (The bolt-on wing is preferred, to permit easy removal during battery charging. This aids in cooling the battery during charge.)
2. In Step 4j, substitute former F1A for the noseblock.
3. In Step 4l substitute the electric version of the hatch.
4. Do not do step 4m (drilling wing dowel holes). Instead, cut the outer plastic pushrod tubes 1/4'' forward of former F4. Construct the plywood hold-down plate and epoxy it to former F4, bracing it with triangular stock.

B. Construct the wing as described in Chapter IV, Section 7, with the following exceptions:

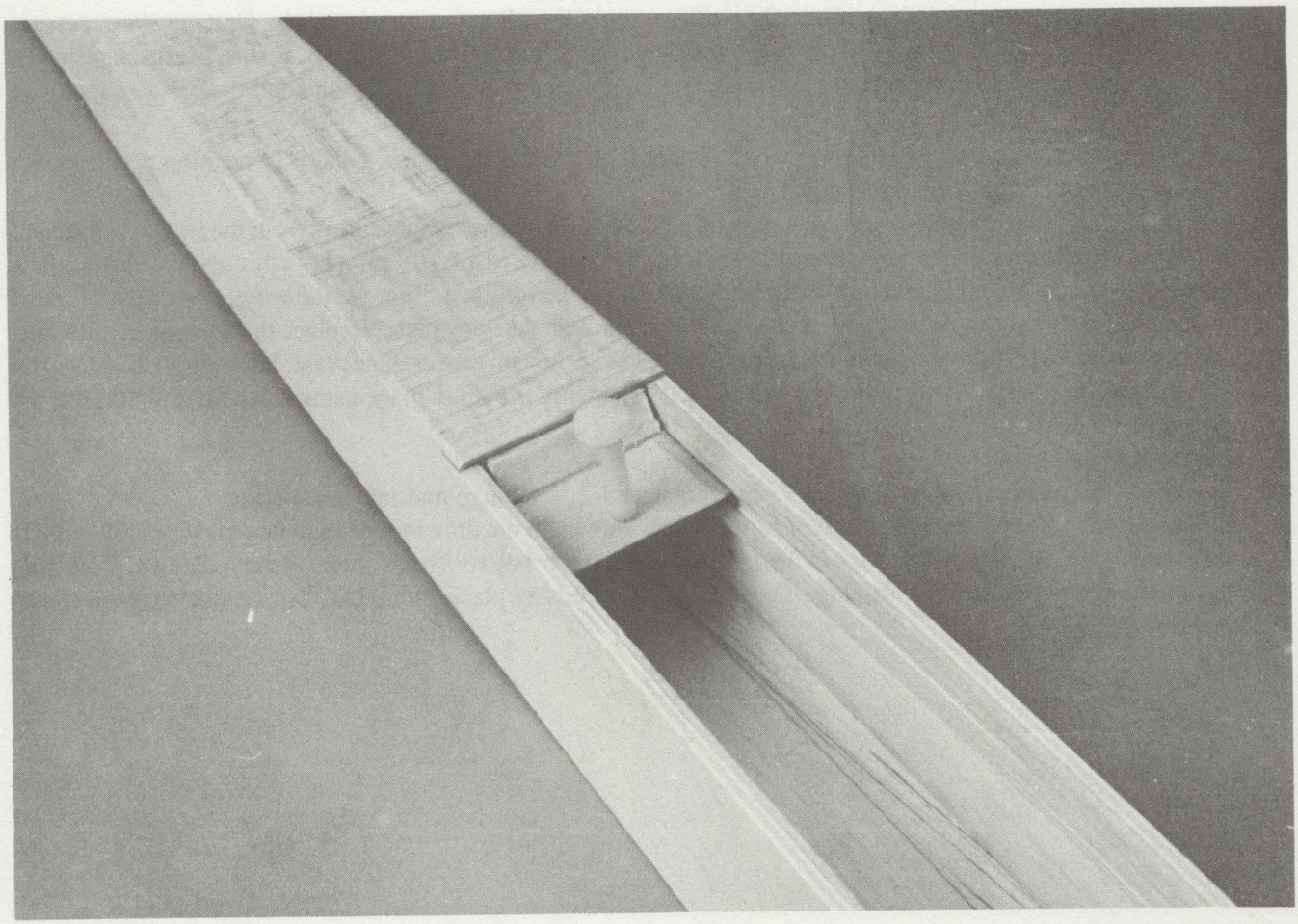
1. Do not do step 7s (inlaid trailing edge reinforcement).
2. After completing step 7t, cut a piece of 3/16'' dowel to the length shown, for the wing hold-down. Place the wing in position on the fuselage. The center rib must be slotted to receive the dowel at a height such that the dowel mates with the 3/16'' hole in Former F3.



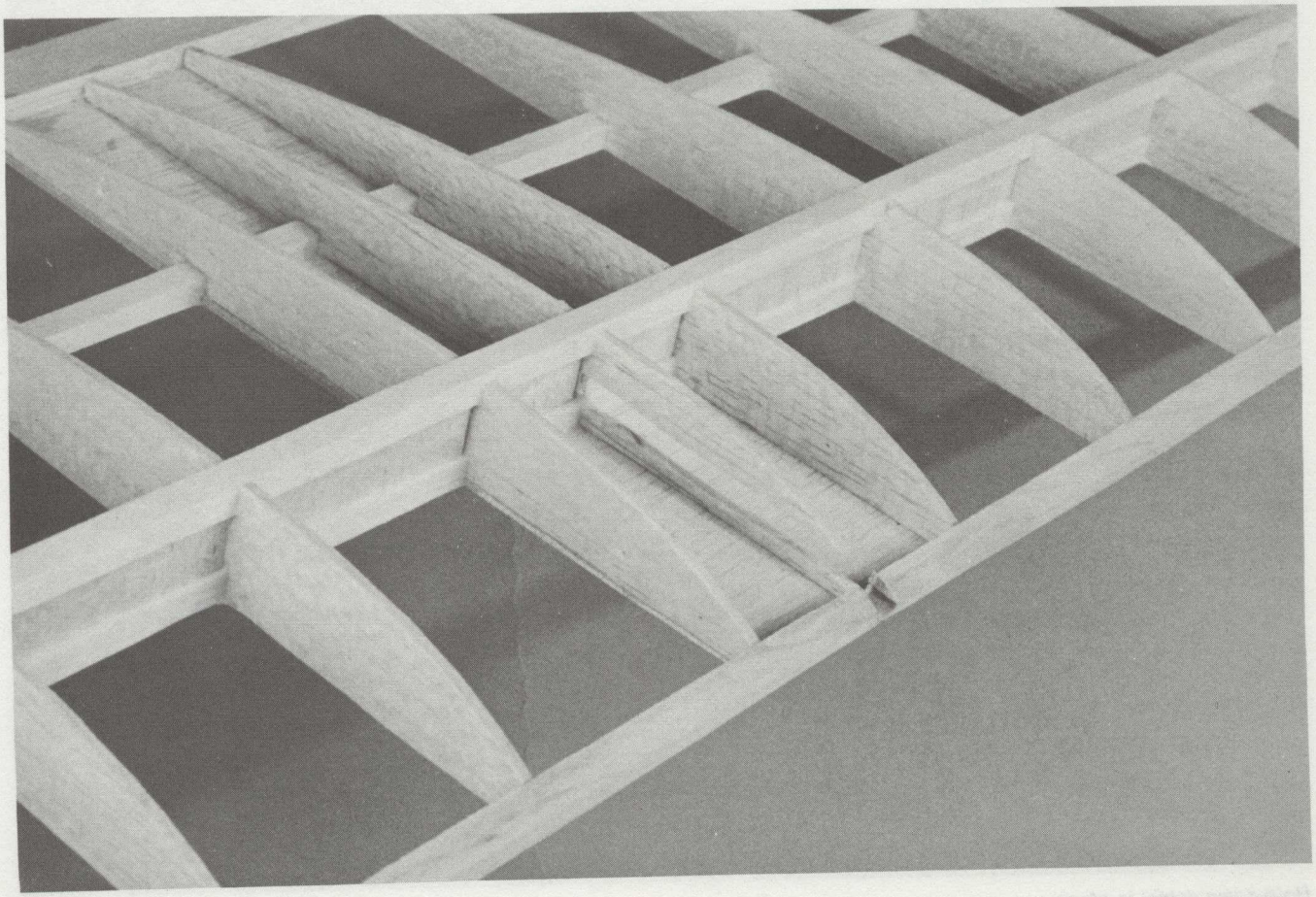
Astro Flight 05 electric system.



Installation of nose former F1A and electric version hatch.



Screw hold-down plate installation.



Rib slot for hold-down dowel.

It may be necessary to notch the leading edge with a round file to drop the dowel slightly. Or it may be necessary to slightly elongate the hole in F3. The important thing is that the wing be held tightly against the fuselage by the dowel. When the slot is properly cut in the center rib, glue the dowel in place, and add the balsa supports on each side.

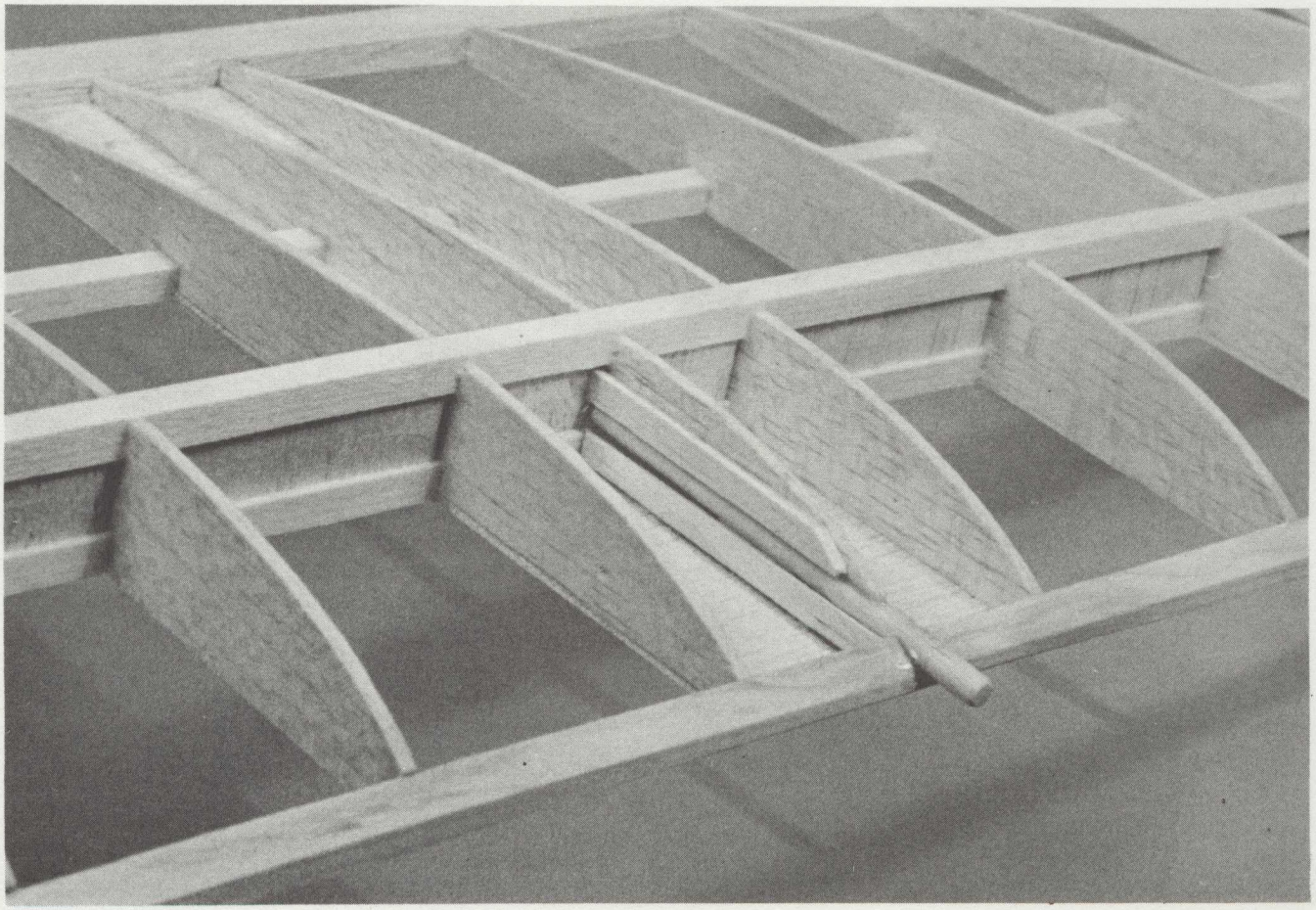
3. Cut a 1/2'' x 1'' piece of 1/16'' plywood. Taper it all around the edges. Glue it in position on the center trailing edge, to support the hold-down bolt.

4. Put the wing center section on the fuselage. Check that it is square by measuring from the tip of each side of the wing, back to the tail. Make sure these distances are equal. Drill a 1/16'' pilot hole through the center of the plywood plate on the wing, and into the hold-down plate in the fuselage. Remove the wing, and drill an 11/64'' hole in the fuselage hold-down plate, and a 3/16'' hole through the wing plate. Replace the wing on the fuselage and run a 10-32 tap through both holes, cutting threads in the hole in the fuselage plate. Lacking a 10-32 tap, use a 10-32 machine screw. This will work just as well. The wing is held in place using a Sig Sh 530 10-32 x 1'' Nylon Wing Bolt.

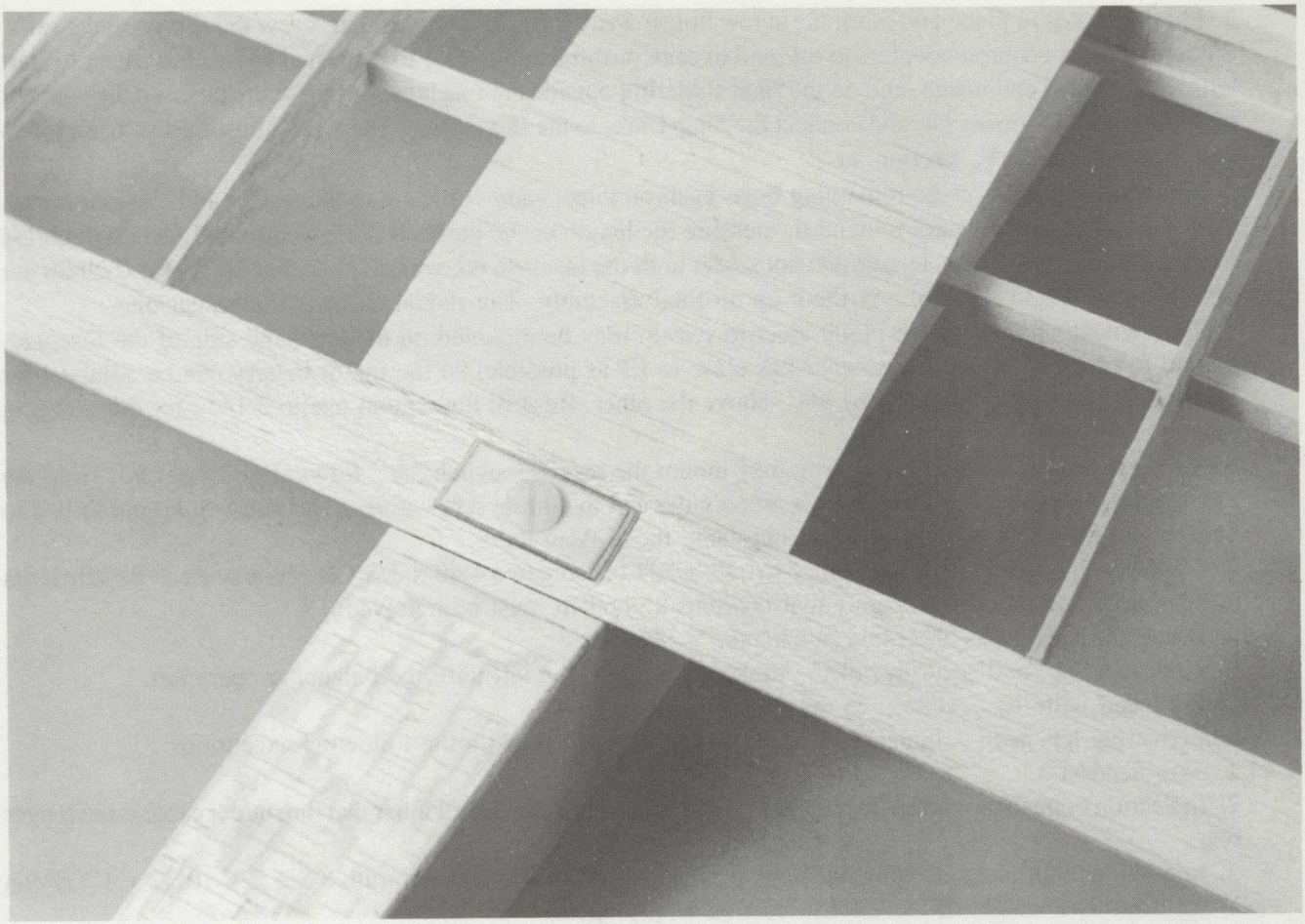
C. Equipment Installation.

1. Follow the instructions in Chapter V, Section 1 and 2, for hinge and tail installation.

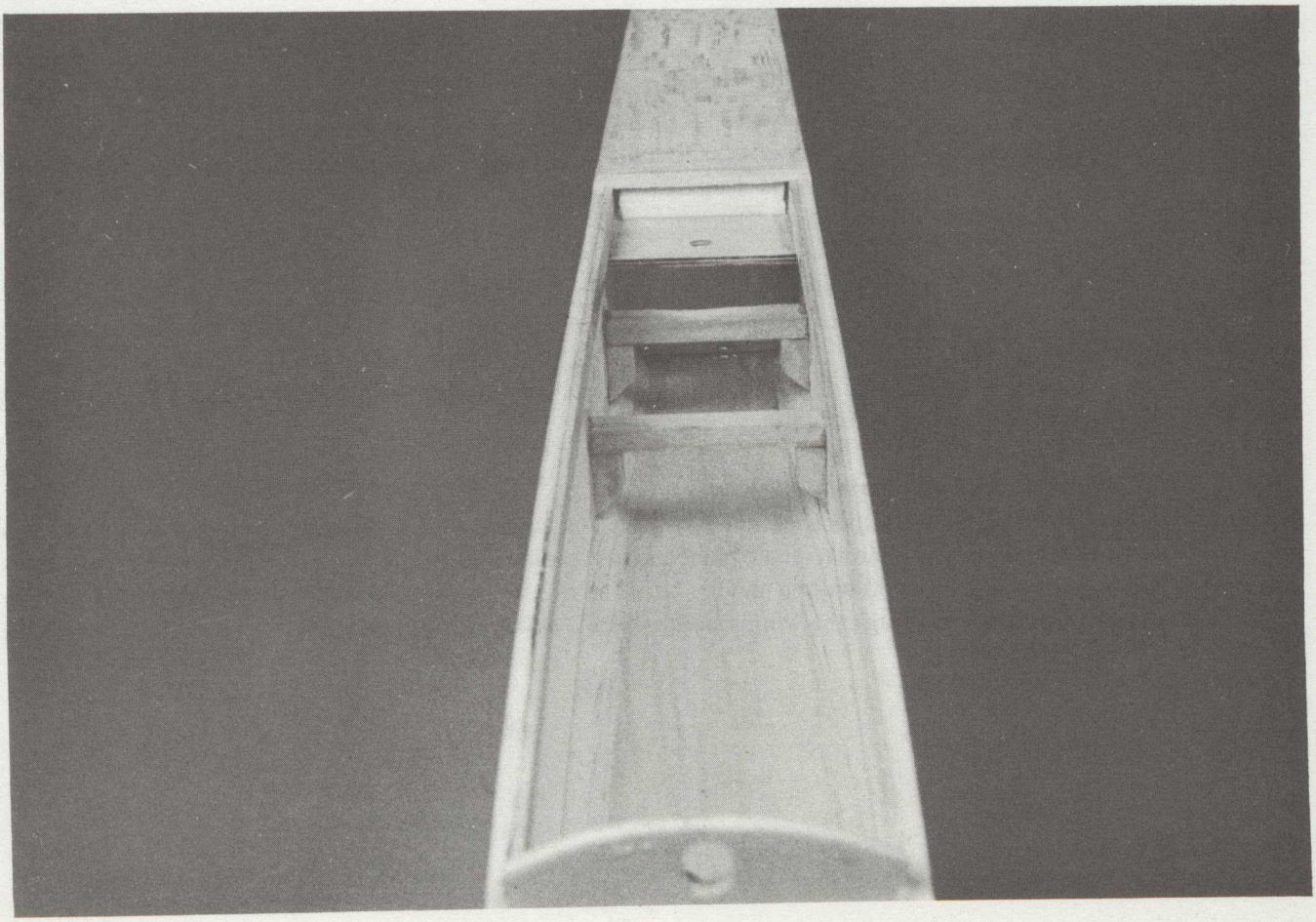
2. The servos are mounted just ahead of former F4 as shown on the drawing. Mount the rear servo rail with its back edge 1⅛'' forward of F4. Mount the front servo rail with 1-9/16'' separation between the two. Both rails are mounted 3/4'' above the fuselage floor. Epoxy the rails in place, with 1/4'' sq. spruce support blocks underneath.



Hold-down dowel in place.



Screw support plate.



Servo rail installation.

3. Put the servos in place and mark the screw holes. Drill 1/16'' pilot holes and screw the servos to the rails. Solder the brass pushrod couplers to one end of each pushrod cable. Due to restricted space, it is easier to start with this finished end inside, and do the final soldering outside the fuselage. So, poke the pushrod through the tubing forward of former F4, and connect the Snap Links to the servo arms. The servo arms must be trimmed as decribed in Chapter V, Section 3a.

4. Screw a Snap Link on the remaining brass pushrod joiners and clip them to the rudder and elevator horns. With the rudder and elevator in neutral, measure the length of the pushrod cable to properly fit into the brass joiner. Cut the cable to this length. Do not solder until the fuselage is covered. Note that the pushrod cables are not the same length. Do not mix them up on final assembly. The rudder cable is the longer one.

5 .The switches for the Astro Flight electric system may be mounted on the left hand side of the fuselage, behind former F3. Mount the switches as close to F3 as possible, so the motor battery can be adjusted for balance. Drill two 1/4'' holes, one 3/4'' above the other. Re-drill the bottom one to 5/16'', for the charging plug.

6. To keep the switches clustered, you may mount the receiver switch 3/8'' forward of former F3. Hold the escutcheon plate in place, and mark the rectangular and mounting screw holes. The screw holes are drilled to 5/64'', and the rectangular hole is cut out using the X-Acto knife.

7. The Astro Flight 05 motor is mounted to bulkhead F1, using two 4-40 x 3/8'' machine screws. Be sure it fits flat against F1. Any epoxy or glue that prevents a good fit must be removed.

8. Install the tailskid as described in Chapter V, Section 7.

9. Final location, and securing, of the motor battery will be left until the balancing operation.

D. Now, proceed with the covering, as described in Chapter VI.

E. When covering has been completed, proceed with Chapter VII, with the following exceptions:

1. Skip Section 3.

2. In Section 6, push the cables through the tubes, from the inside. Remember that the rudder cable is the longer one.

3. In Section 7, in place of wing hold-down dowels, the wing is secured with a Sig 530 10-32 x 1'' Nylon Wing Bolt. The weight of the electric version is 43 ounces.

4. In Section 9 (balancing), install all equipment, including the propeller, spinner, and motor battery. Place the motor battery 3/4'' behind former F3. Screw the wing in place and, using the balance fixture described, note the balance point. If it does not balance at the C.G. point shown on the plans, remove the wing and slide the motor battery forward, or backward, until the C.G. is where shown. Trim lengths of 1/4'' sq. spruce, and epoxy these to both sides of the fuselage, front and back of the battery, to prevent movement.

F. This completes the electric power version of the Olympic 650. Since considerable heat is developed during the charging, and discharging of the battery, it is advised that you remove the wing, and charge with the battery outside the fuselage. This will improve the life of the battery.

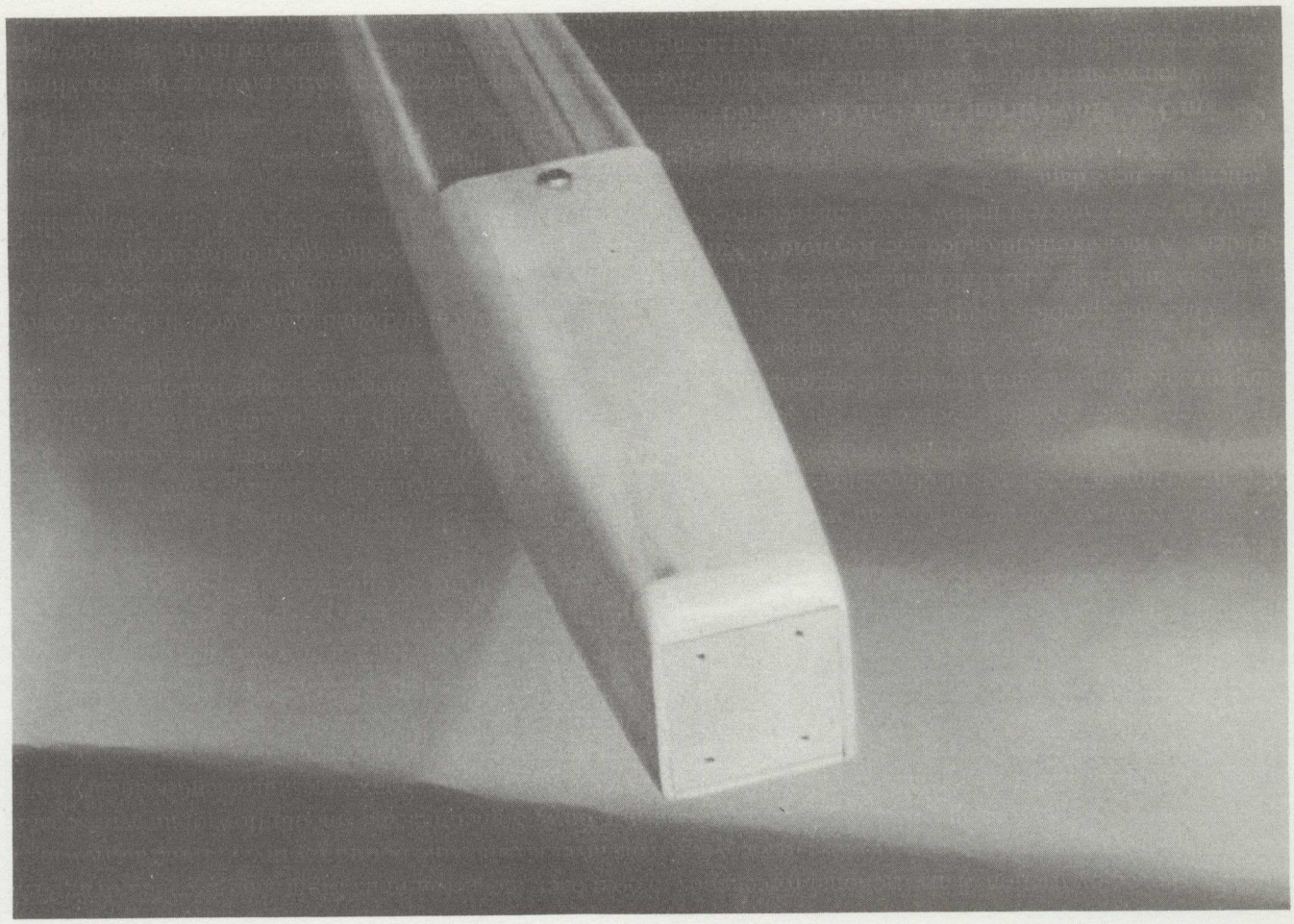
Section 2 — Glow Engine Powered Version.

The entire construction of the glow engine version is exactly the same as the glider version, except the noseblock is not installed.

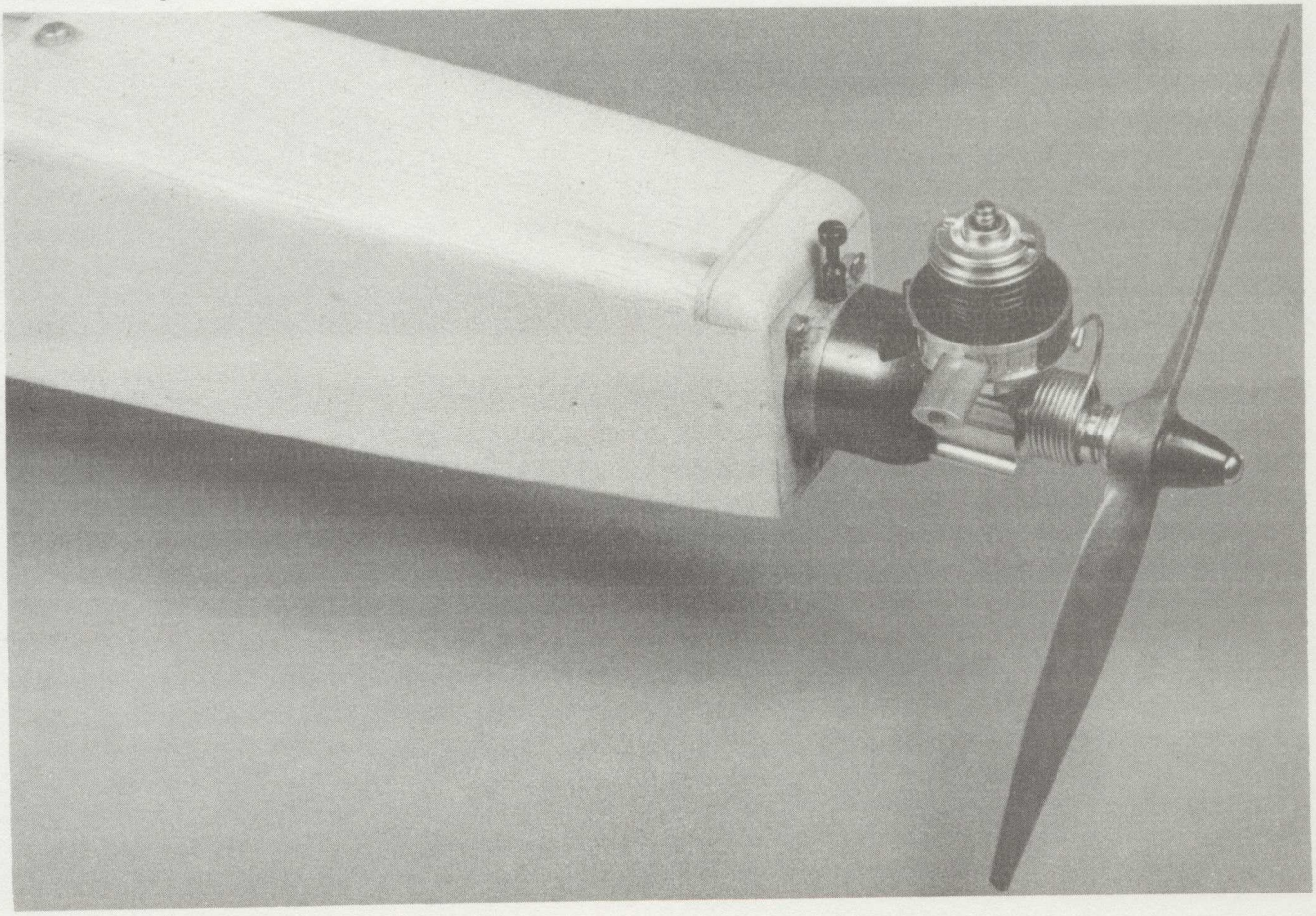
The engine is mounted, using 2-56 x 3/8'' machine screws. The finished weight of the prototype, dry, was 32 ounces. Balancing took 2 ounces of lead, directly behind F1.

Section 3 — 2 Meter Wingspan Version

Although not shown on the plan, modification to 2 meter wingspan is very simple. If the outer wing panel spars are cut to 20¾'' instead of 17¼'' as shown on the plan; and the leading and trailing edges are made longer, to fit this increased spar dimension, the Oly 650 will be an Oly 715. The ribs will need to be spaced out equally, and will be farther apart than the original. Although the wing loading of the 2 meter version is slightly lower, performances will be nearly identical.



F1 drilled for engine.



Engine in place.

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