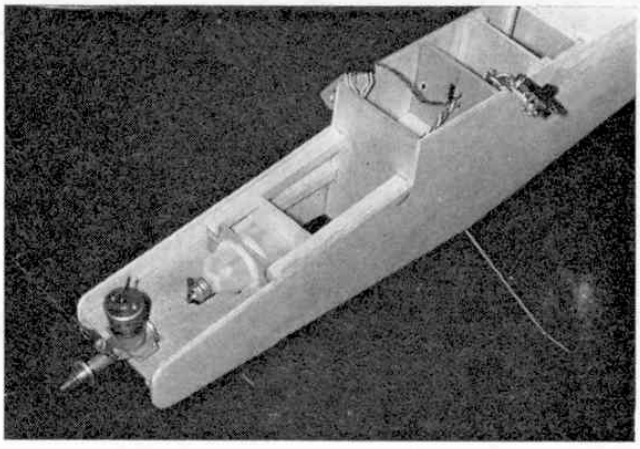
RADIO 4-2

CONSTRUCTIONAL NOTES ON

'CRACKER'



ALTHOUGH THIS model is fairly typical of simple rudder-only R/C aircraft, it has a number of features designed to simplify construction and flying and to make it economical to build while still retaining an attractive appearance. As an example, apart from the ribs, cabin front and fin top, there are no curves to trace—everything is straight lines and any other "softening" curves are sanded in. The structure is strong but light, in order to keep flying speed low but survive rough landings, etc. The target weight for the prototype was 26 ozs. all-up; with an empty fuel tank it came out at 25½ ozs. but the model will still fly well at 32 or even 36 ozs. Although intended for simple rudder-only control, it can be built or converted to rudder and throttle or rudder, throttle, and elevator by builders with a little experience.

Construction is quite straightforward and any puzzling points from a study of the plan should resolve themselves as building proceeds. A building sequence is given on the plan, but these notes amplify one or two points. Each fuselage side is a 4 in. sheet with the corners sliced off and one butt-joined on the top edge; the joint line is shown on the drawing. Cut the sides to shape, then add the $\frac{1}{16}$ in. sheet inside from F4 forward, grain vertical, using contact cement, PVA glue, or balsa cement. Make sure one is left and one right. The notes on the plan cover assembly, but note that the engine bearers are tapered at the front to tilt the engine mounting plate downward; saw and/or plane this taper before assembly. The inside details of the nose are shown in the photographs.

Use soft $\frac{1}{4}$ in. sheet balsa for the blocking around the nose area and the cabin front, and cement all pieces in place before carving and sanding down to the pleasantly curved appearance shown in the pictures of the finished model. Fuel-proof the inside as you go, to prevent later oil soakage weakening the nose.

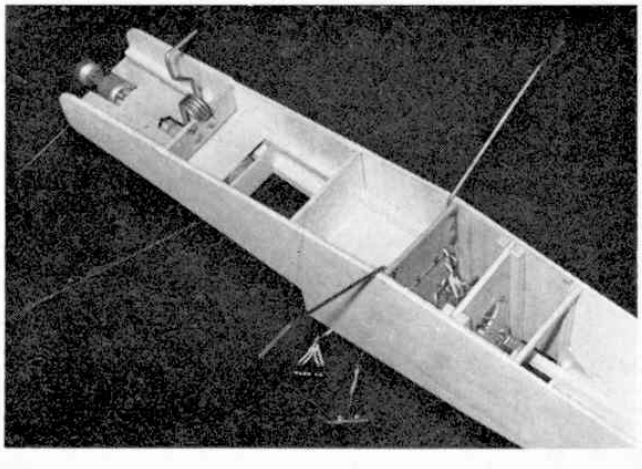
One point—fret out a little hole in F3 (as in one of the pictures) to enable the plug from the escapement to pass through to the receiver. The size will depend on the equipment harness used, but in any event it should be sawn before assembly.

The wing is built around the ply dihedral brace, so make sure this is accurate. One wing panel is drawn, and the second can be built over the same drawing, as shown by the dotted lines and italic lettering, by just putting the centre-section at the other end.

Rudder hinges are strips of silk or nylon or cotton tape, crossed as indicated, i.e. that glued to the port side of the fin pokes through and glues to the starboard side of the rudder and vice versa. Keep the cross-over bits free of cement or dope or the rudder will be too stiffly held to move. The trim tab is held by soft iron wires or tabs of thin aluminium so that it can be bent to trim the model to fly straight.

The prototype was covered all yellow, heavyweight Modelspan on wing and tailplane and lightweight clear dope on the fuselage and fin. After two thorough coats of clear dope the decor was put on by cutting up a thin plastic film self-adhesive black number plate, Letraset letters, and fin transfers, after which the fuselage was given a thin coat of fuel proofer. Help on covering and other constructional matters can be found in Plans Handbook No. 1, or ask your library for our book "All about Model Aircraft."

Use soldered washers each side to retain the wheels, complete the radio installation (see last month and notes on plan) and the model is ready for tests. Check balance point with the fingertips $\frac{1}{4}$ to $\frac{1}{2}$ in. behind the wing mainspar and check that wing, tail etc. are free of warps. Check radio. Glide tests can be made into tall grass or weeds or the model can be flown on a short motor run (15-20 secs) with the motor running as slowly as possible (very rich). Adjust trim tab as necessary; raise wing l.e. with up to $\frac{1}{16}$ in. packing if model tends to dive or lower tailplane t.e. with up to $\frac{1}{16}$ in. packing if there is a tendency to stall. If more adjustment than this seems necessary, add ballast to nose or tail. Gradually increase motor speed and length of run. Try not to apply rudder until model has climbed to a safe height, until you know the effect of the rudder. Later you can change the rattler (if an Elmic escapement) and/or increase the rudder area. Fly with care and you will enjoy many happy hours.



The heading photograph shows the engine, fuel tank and the radio compartment bulkheads installed.

Right: Another view of "Cracker", but this time showing the under carriage and rudder linkage. The wiring harness can also be seen on the rear of the second cabin bulkhead.

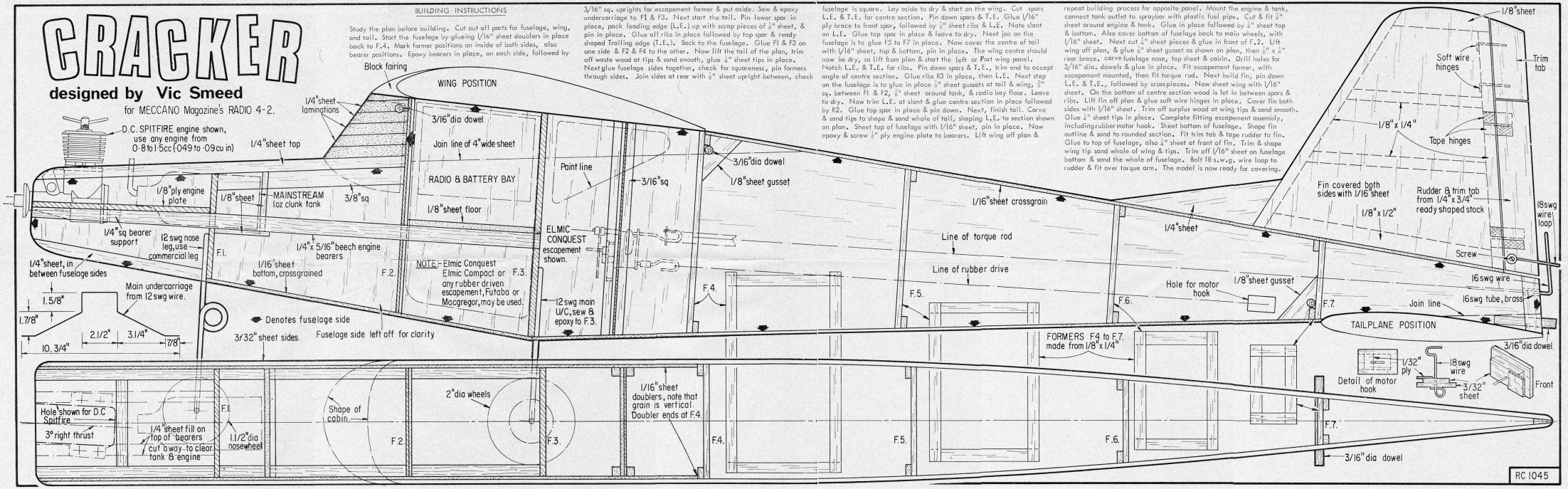
CRACKER

designed by Vic Smeed

for MECCANO Magazine's RADIO 4-2.

BUILDING INSTRUCTIONS

Study the plan before building. Cut out all parts for fuselage, wing, and tail. Start the fuselage by glueing 1/16" sheet doublers in place back to F.4. Mark former positions on inside of both sides, also bearer positions. Epoxy bearers in place, on each side, followed by 3/16" sq. uprights for escapement former & put aside. Sew & epoxy undercarriage to F1 & F3. Next start the tail. Pin lower spar in place, pack leading edge (L.E.) up with scrap pieces of 1/8" sheet, & pin in place. Glue all ribs in place followed by top spar & ready shaped Trailing edge (T.E.). Back to the fuselage. Glue F1 & F3 on one side & F2 & F4 to the other. Now lift the tail of the plan, trim off waste wood at tips & sand smooth, glue 1/4" sheet tips in place. Next glue fuselage sides together, check for squareness, pin formers through sides. Join sides at rear with 1/8" sheet upright between, check fuselage is square. Lay aside to dry & start on the wing. Cut spars L.E. & T.E. for centre section. Pin down spars & T.E. Glue 1/16" ply brace to front spar, followed by 1/8" sheet ribs & L.E. Note slant on L.E. Glue top spar in place & leave to dry. Next join on the fuselage is to glue F5 to F7 in place. Now cover the centre of tail with 1/16" sheet, top & bottom, pin in place. The wing centre should now be dry, so lift from plan & start the left or Port wing panel. Notch L.E. & T.E. for ribs. Pin down spars & T.E., trim end to accept angle of centre section. Glue ribs R3 in place, then L.E. Next step on the fuselage is to glue in place 1/4" sheet gussets at tail & wing, 1/8" sq. between F1 & F2, 1/8" sheet around tank, & radio bay floor. Leave to dry. Now trim L.E. at slant & glue centre section in place followed by R2. Glue top spar in place & pin down. Next, finish tail. Carve & sand tips to shape & sand whole of tail, shaping L.E. to section shown on plan. Sheet top of fuselage with 1/16" sheet, pin in place. Now epoxy & screw 1/8" ply engine plate to bearers. Lift wing off plan & repeat building process for opposite panel. Mount the engine & tank, connect tank outlet to spraybar with plastic fuel pipe. Cut & fit 1/4" sheet around engine & tank. Glue in place followed by 1/8" sheet top & bottom. Also cover bottom of fuselage back to main wheels, with 1/16" sheet. Next cut 1/4" sheet pieces & glue in front of F.2. Lift wing off plan, & glue 1/8" sheet gusset as shown on plan, then 1/8" x 1/4" rear brace. carve fuselage nose, top sheet & cabin. Drill holes for 3/16" dia. dowels & glue in place. Fit escapement former, with escapement mounted, then fit torque rod. Next build fin, pin down L.E. & T.E., followed by crosspieces. Now sheet wing with 1/16" sheet. On the bottom of centre section wood is let in between spars & ribs. Lift fin off plan & glue soft wire hinges in place. Cover fin both sides with 1/16" sheet. Trim off surplus wood at wing tips & sand smooth. Glue 1/4" sheet tips in place. Complete fitting escapement assembly, including rubber motor hook. Sheet bottom of fuselage. Shape fin outline & sand to rounded section. Fit trim tab & tape rudder to fin. Glue to top of fuselage, also 1/4" sheet at front of fin. Trim & shape wing tip sand whole of wing & tips. Trim off 1/16" sheet on fuselage bottom & sand the whole of fuselage. Bolt 18 s.w.g. wire loop to rudder & fit over torque arm. The model is now ready for covering.



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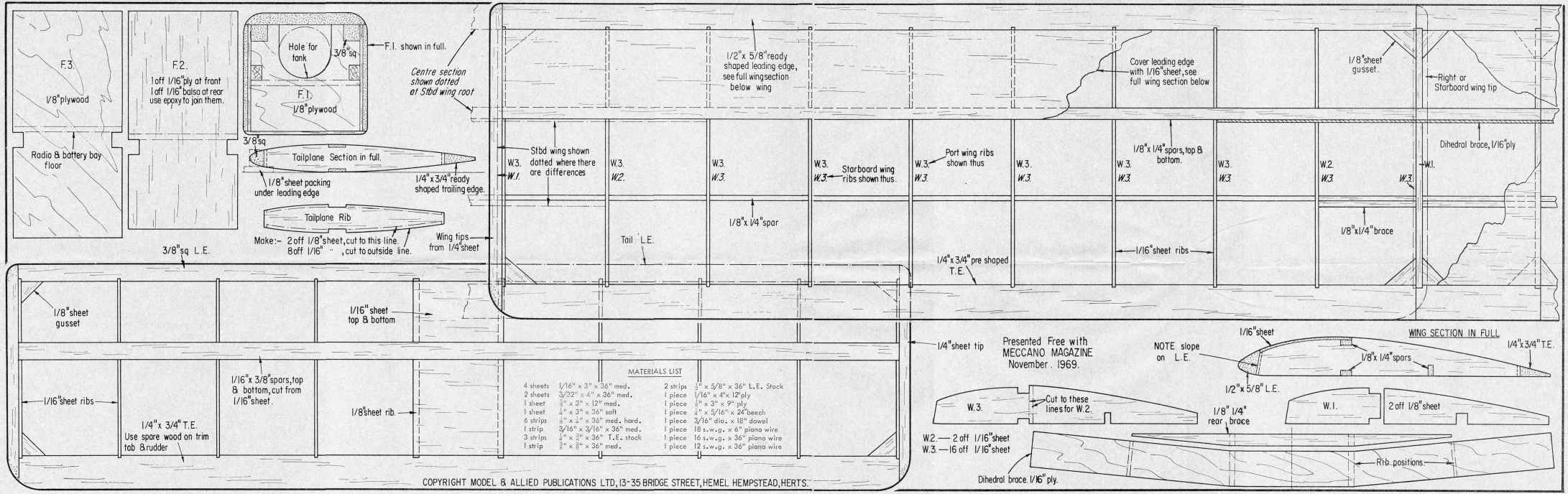

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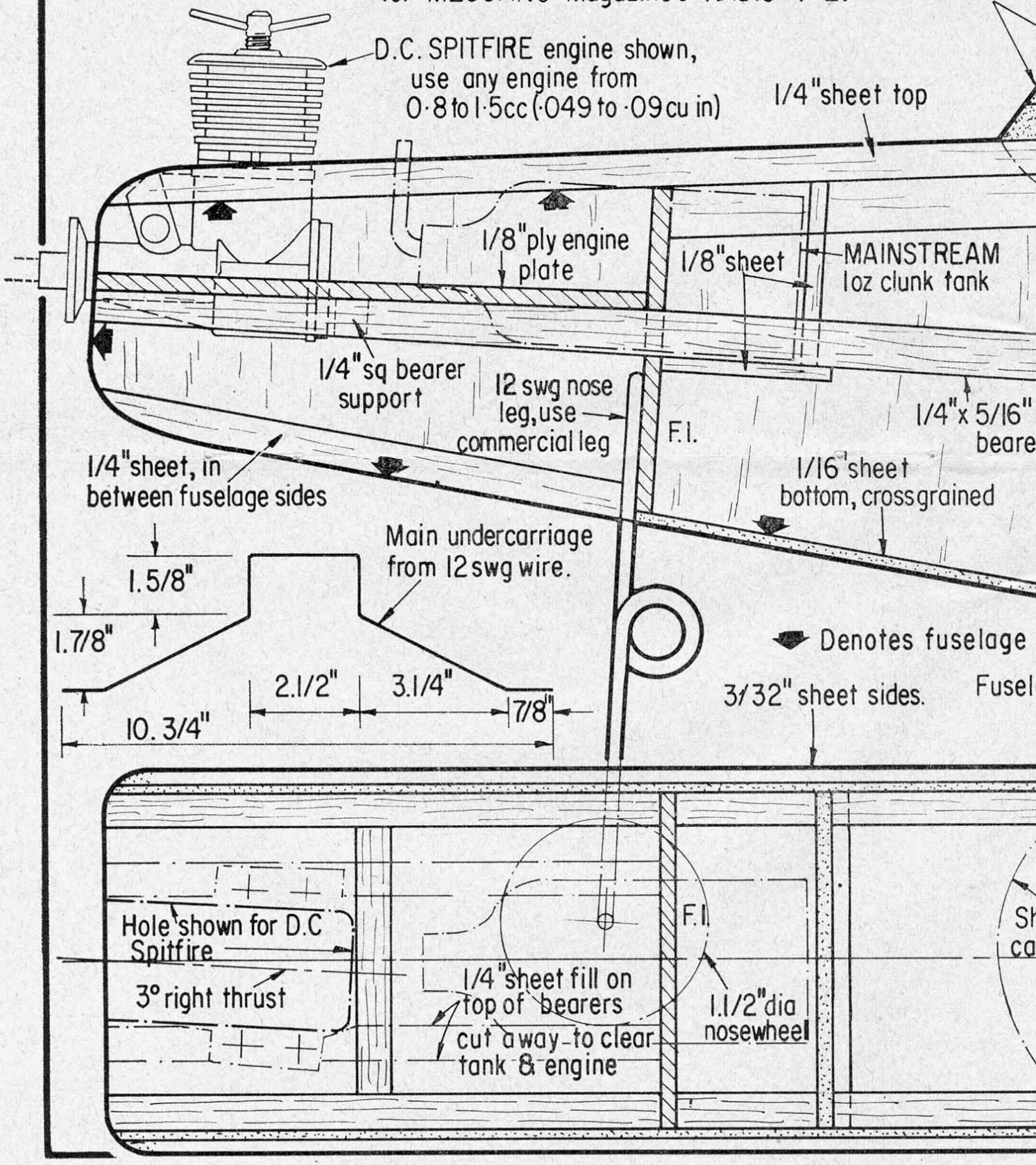

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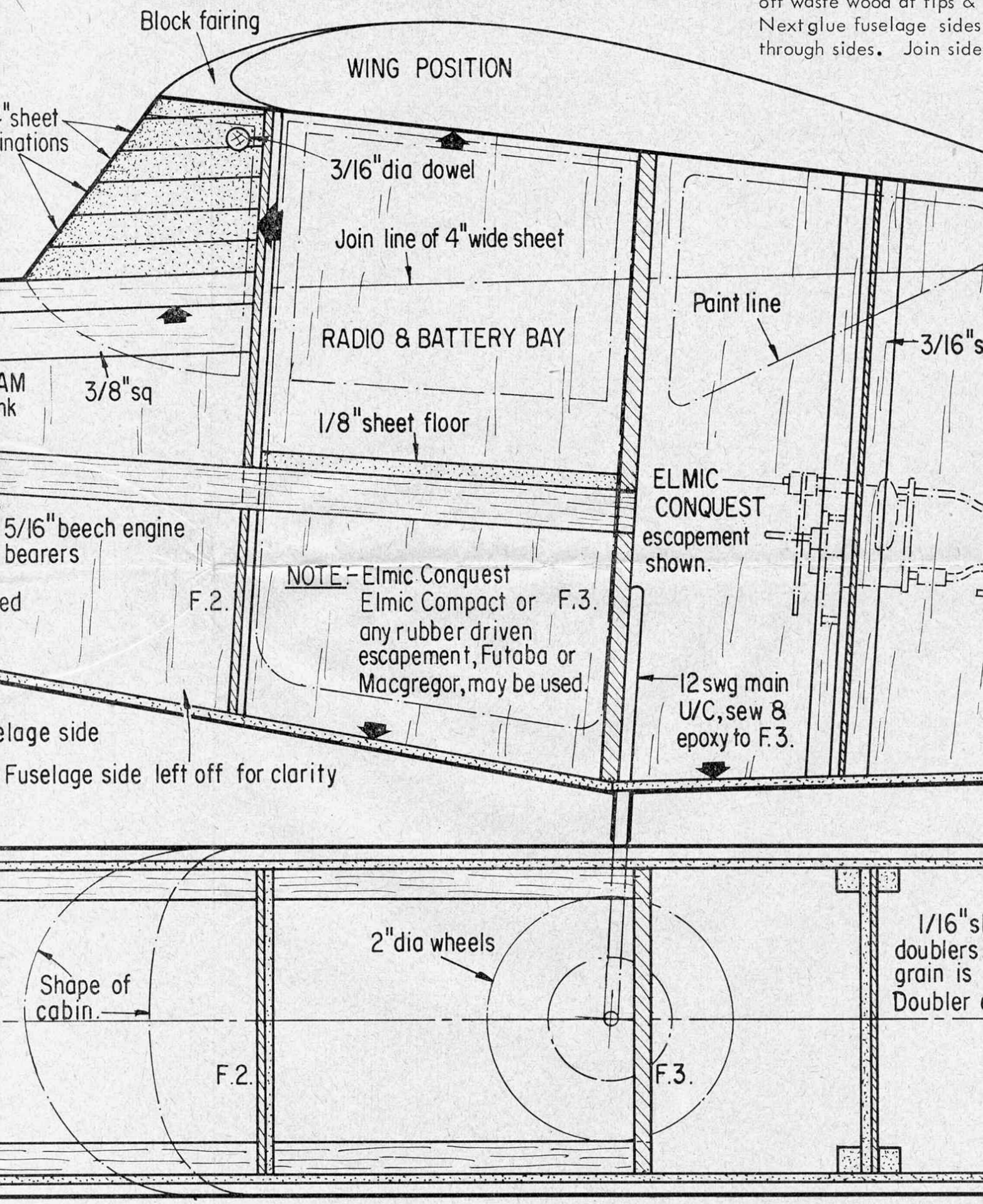
off waste wood at tips &
Next glue fuselage sides
through sides. Join side



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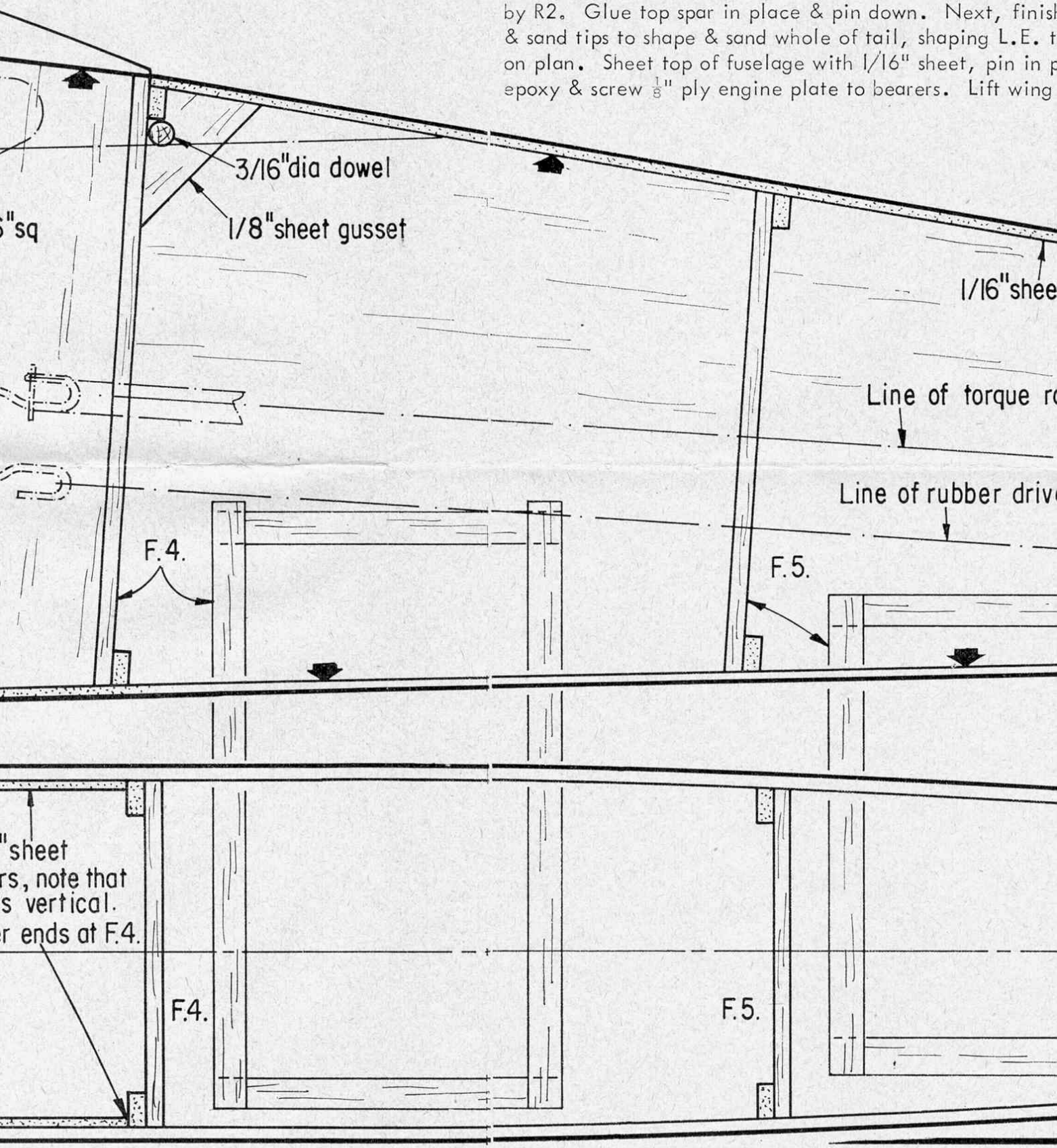

e wing. Cut spars
& T.E. Glue 1/16"
& L.E. Note slant
Next job on the
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Port wing panel.
E., trim end to accept
hen L.E. Next step
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tion in place followed
t, finish tail. Carve
L.E. to section shown
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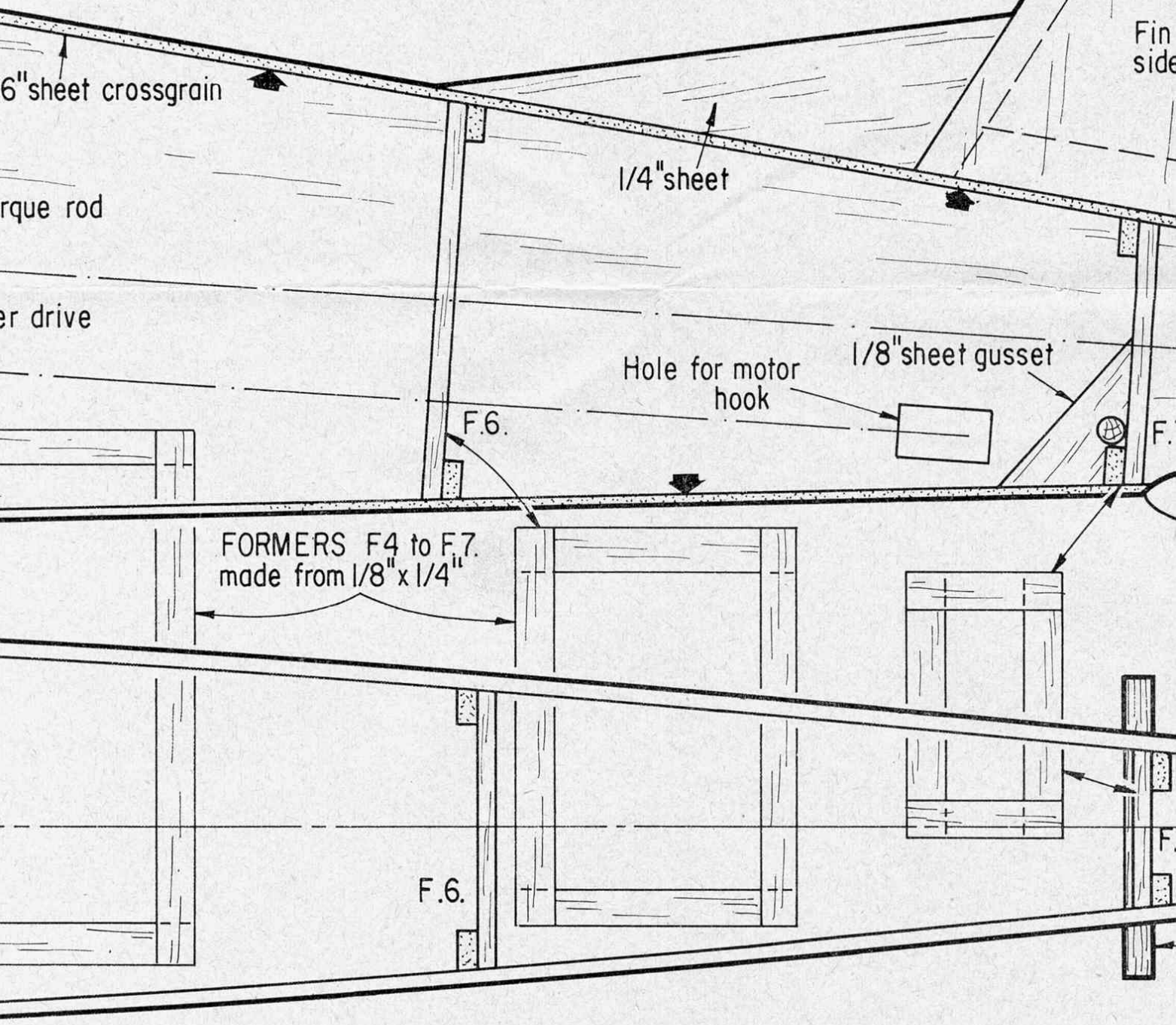
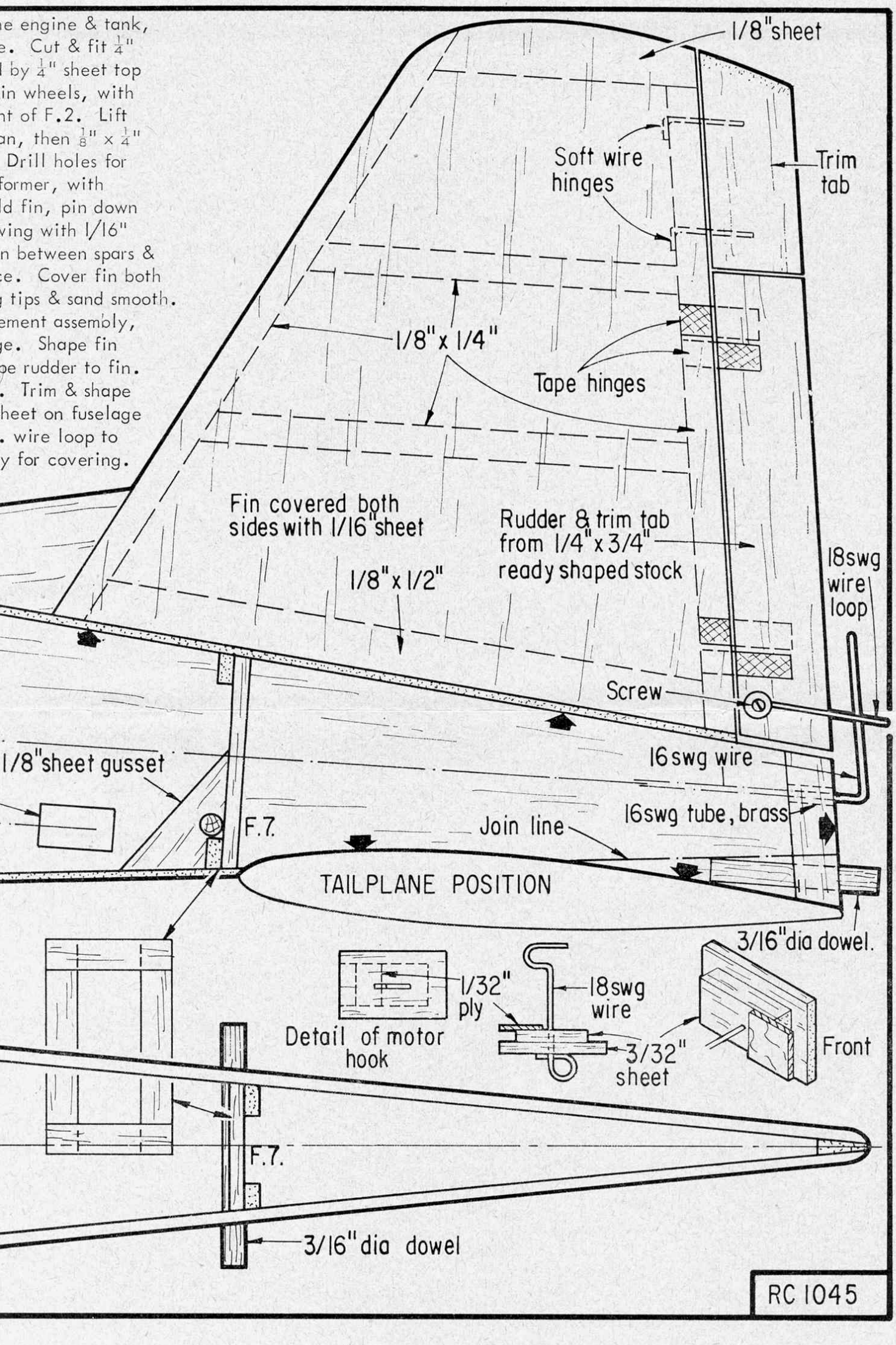
ft wing off plan &

repeat building process for opposite panel. Mount the engine & tank, connect tank outlet to spraybar with plastic fuel pipe. Cut & fit $\frac{1}{4}$" sheet around engine & tank. Glue in place followed by $\frac{1}{4}$" sheet top & bottom. Also cover bottom of fuselage back to main wheels, with 1/16" sheet. Next cut $\frac{1}{4}$" sheet pieces & glue in front of F.2. Lift wing off plan, & glue $\frac{1}{8}$" sheet gusset as shown on plan, then $\frac{1}{8}$" x $\frac{1}{4}$" rear brace. carve fuselage nose, top sheet & cabin. Drill holes for 3/16" dia. dowels & glue in place. Fit escapement former, with escapement mounted, then fit torque rod. Next build fin, pin down L.E. & T.E., followed by cross pieces. Now sheet wing with 1/16" sheet. On the bottom of centre section wood is let in between spars & ribs. Lift fin off plan & glue soft wire hinges in place. Cover fin both sides with 1/16" sheet. Trim off surplus wood at wing tips & sand smooth. Glue $\frac{1}{4}$" sheet tips in place. Complete fitting escapement assembly, including rubber motor hook. Sheet bottom of fuselage. Shape fin outline & sand to rounded section. Fit trim tab & tape rudder to fin. Glue to top of fuselage, also $\frac{1}{4}$" sheet at front of fin. Trim & shape wing tip sand whole of wing & tips. Trim off 1/16" sheet on fuselage bottom & sand the whole of fuselage. Bolt 18 s.w.g. wire loop to rudder & fit over torque arm. The model is now ready for covering.





e engine & tank,
e. Cut & fit $\frac{1}{4}$"
l by $\frac{1}{4}$" sheet top
in wheels, with
nt of F.2. Lift
an, then $\frac{1}{8}$" x $\frac{1}{4}$"
Drill holes for
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wing with 1/16"
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. Trim & shape
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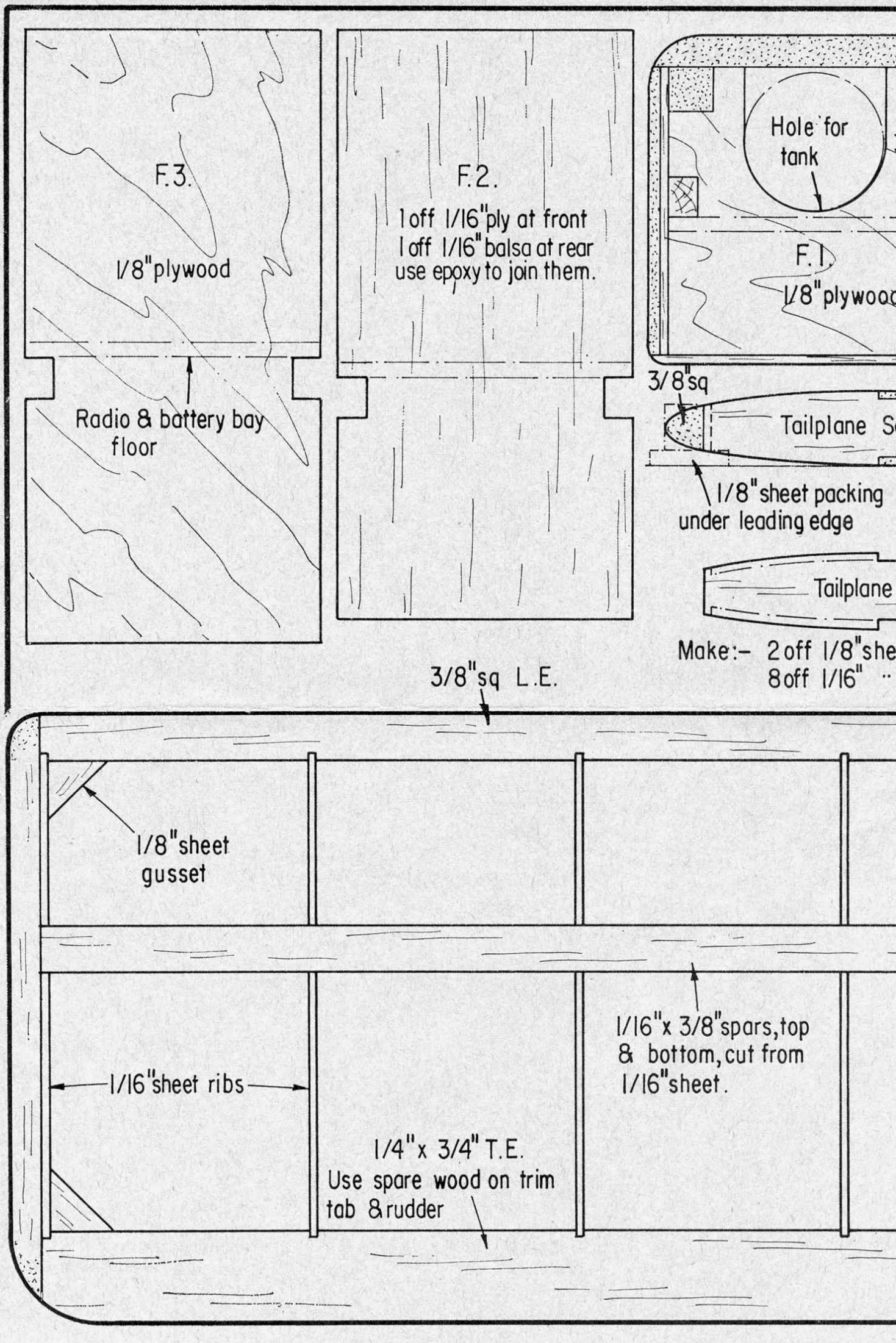
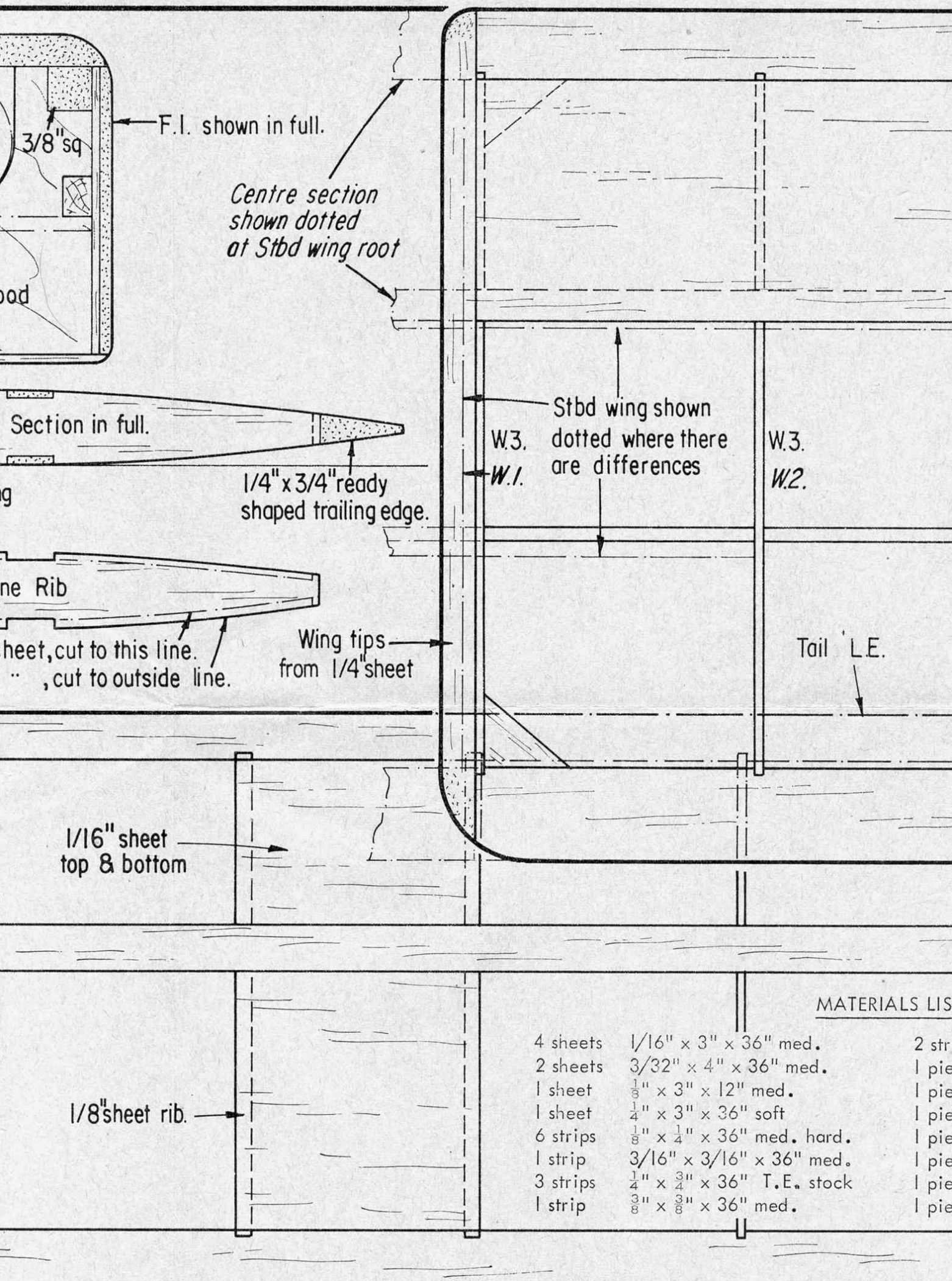
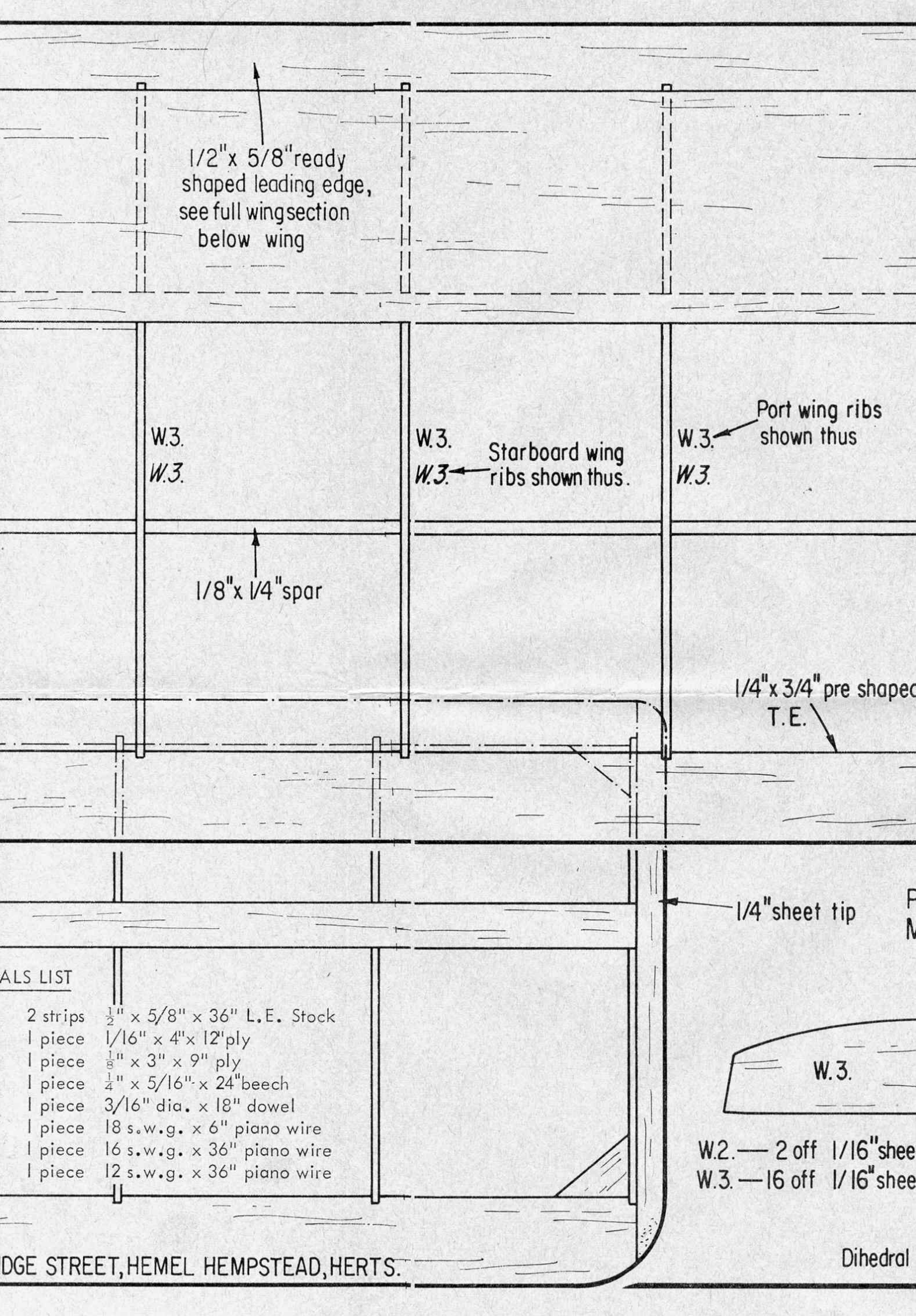
RC 1045


F.3.
1/8" plywood
Radio & battery bay floor
F.2.
1 off 1/16" ply at front
1 off 1/16" balsa at rear
use epoxy to join them.
Hole for tank
F.1.
1/8" plywood
3/8" sq
Tailplane S
1/8" sheet packing under leading edge
Tailplane
Make:- 2 off 1/8" she
8 off 1/16" ..
3/8" sq L.E.
1/8" sheet gusset
1/16" x 3/8" spars, top & bottom, cut from 1/16" sheet.
1/16" sheet ribs
1/4" x 3/4" T.E.
Use spare wood on trim tab & rudder



MATERIALS LIS

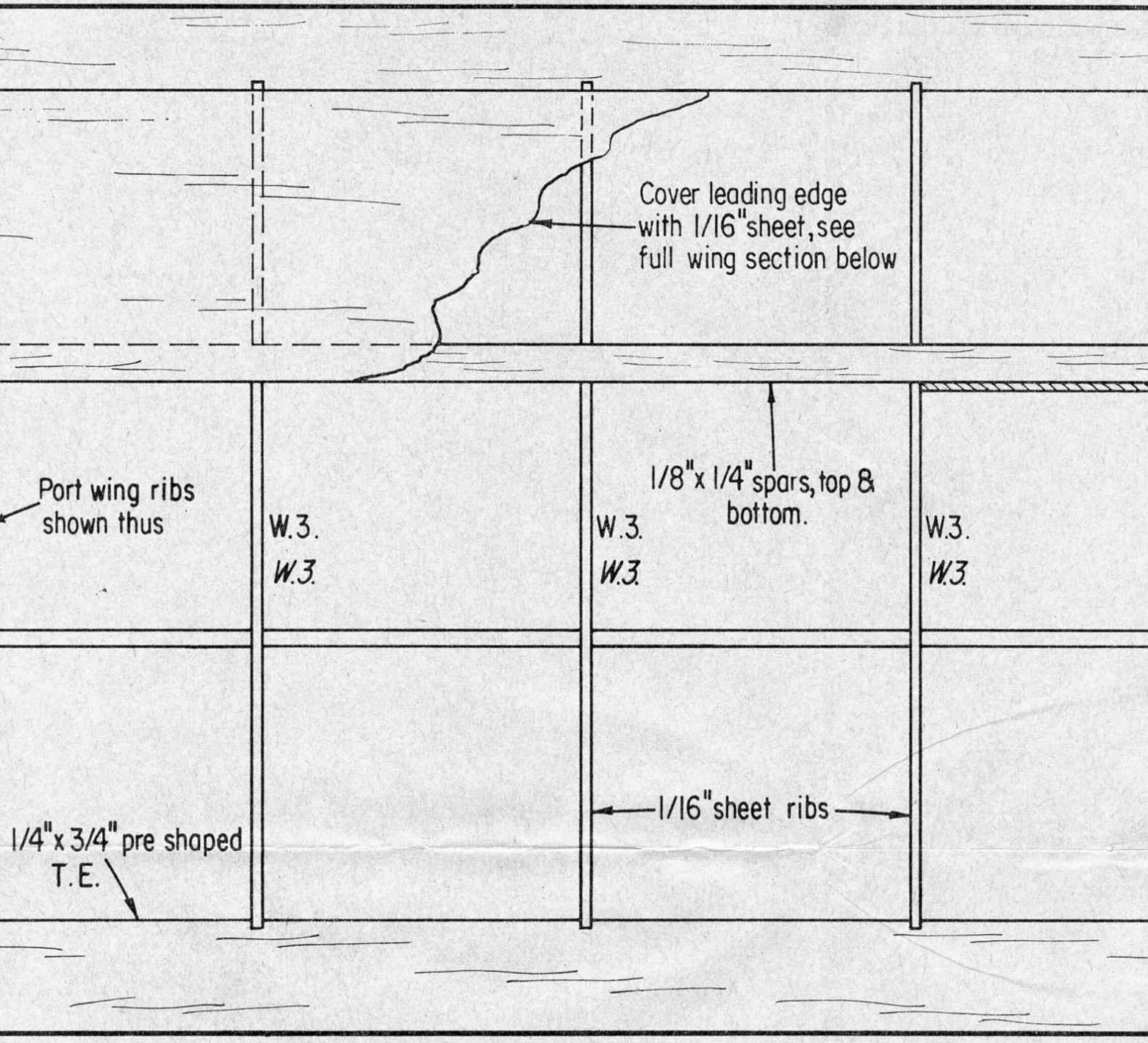
4 sheets	1/16" x 3" x 36" med.	2 str
2 sheets	3/32" x 4" x 36" med.	1 pie
1 sheet	1/8" x 3" x 12" med.	1 pie
1 sheet	1/4" x 3" x 36" soft	1 pie
6 strips	1/8" x 1/4" x 36" med. hard.	1 pie
1 strip	3/16" x 3/16" x 36" med.	1 pie
3 strips	1/4" x 3/4" x 36" T.E. stock	1 pie
1 strip	3/8" x 3/8" x 36" med.	1 pie



ALS LIST

2 strips	$\frac{1}{2}$" x 5/8" x 36" L.E. Stock
1 piece	1/16" x 4"x 12"ply
1 piece	$\frac{1}{8}$" x 3" x 9" ply
1 piece	$\frac{1}{4}$" x 5/16"- x 24"beech
1 piece	3/16" dia. x 18" dowel
1 piece	18 s.w.g. x 6" piano wire
1 piece	16 s.w.g. x 36" piano wire
1 piece	12 s.w.g. x 36" piano wire

DGE STREET, HEMEL HEMPSTEAD, HERTS.



1/4" sheet tip

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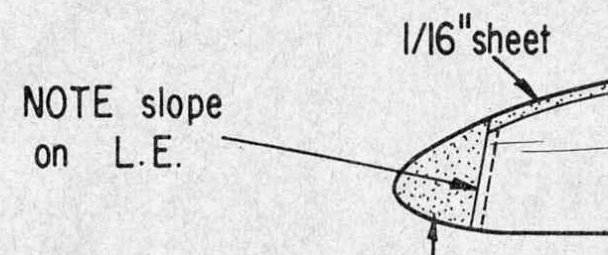
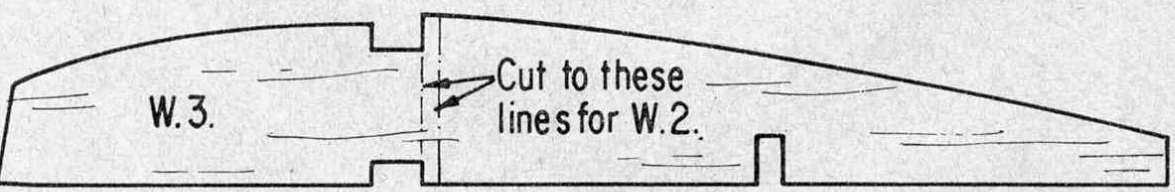
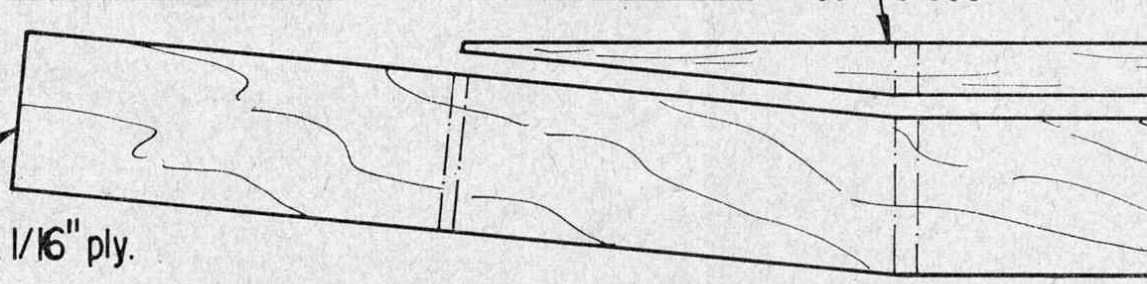
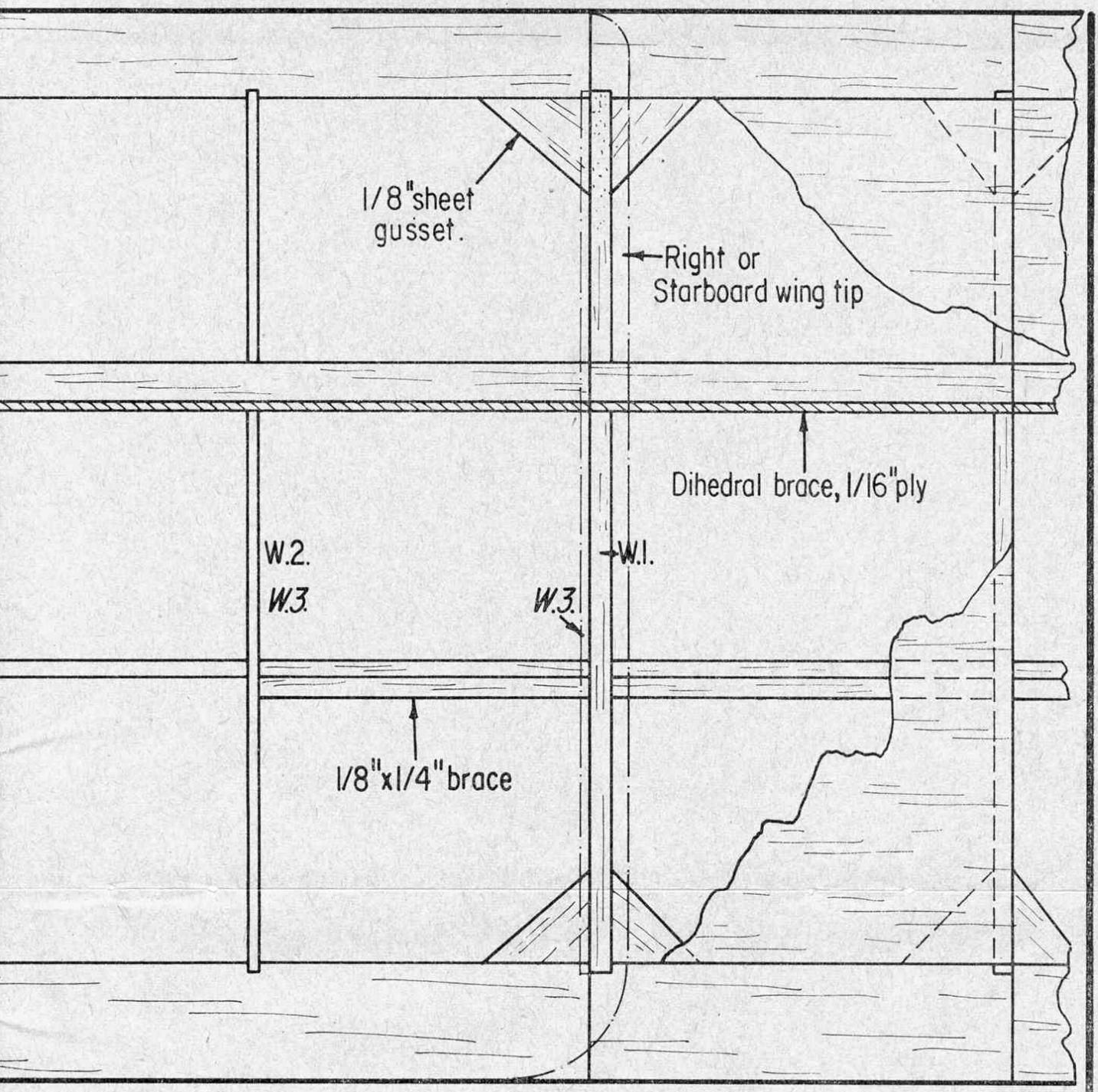




1/8" 1/4" rear brace

2. — 2 off 1/16" sheet
3. — 16 off 1/16" sheet





/16"sheet

WING SECTION IN FULL

1/4"x3/4" T.E.

1/8"x 1/4"spars

x 5/8" L.E.

W.1.

2 off 1/8" sheet

ce

Rib positions.