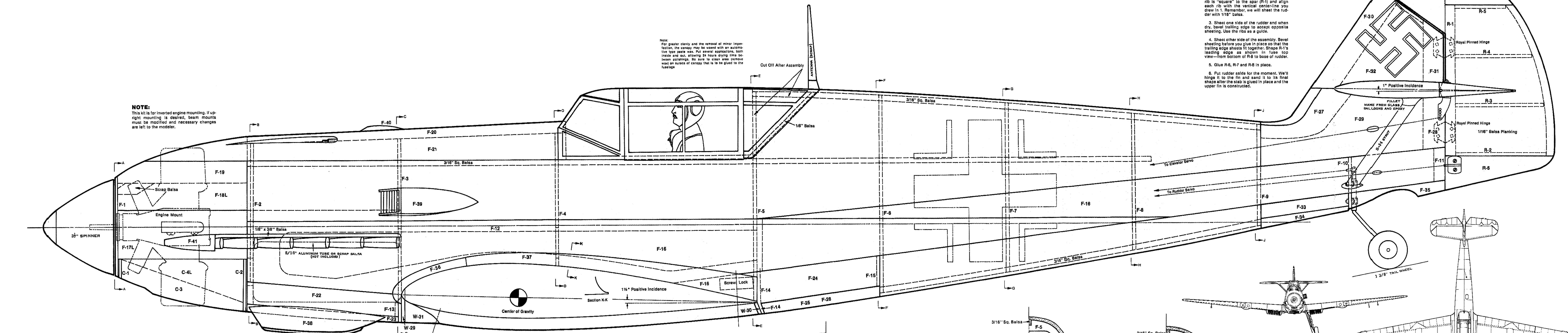
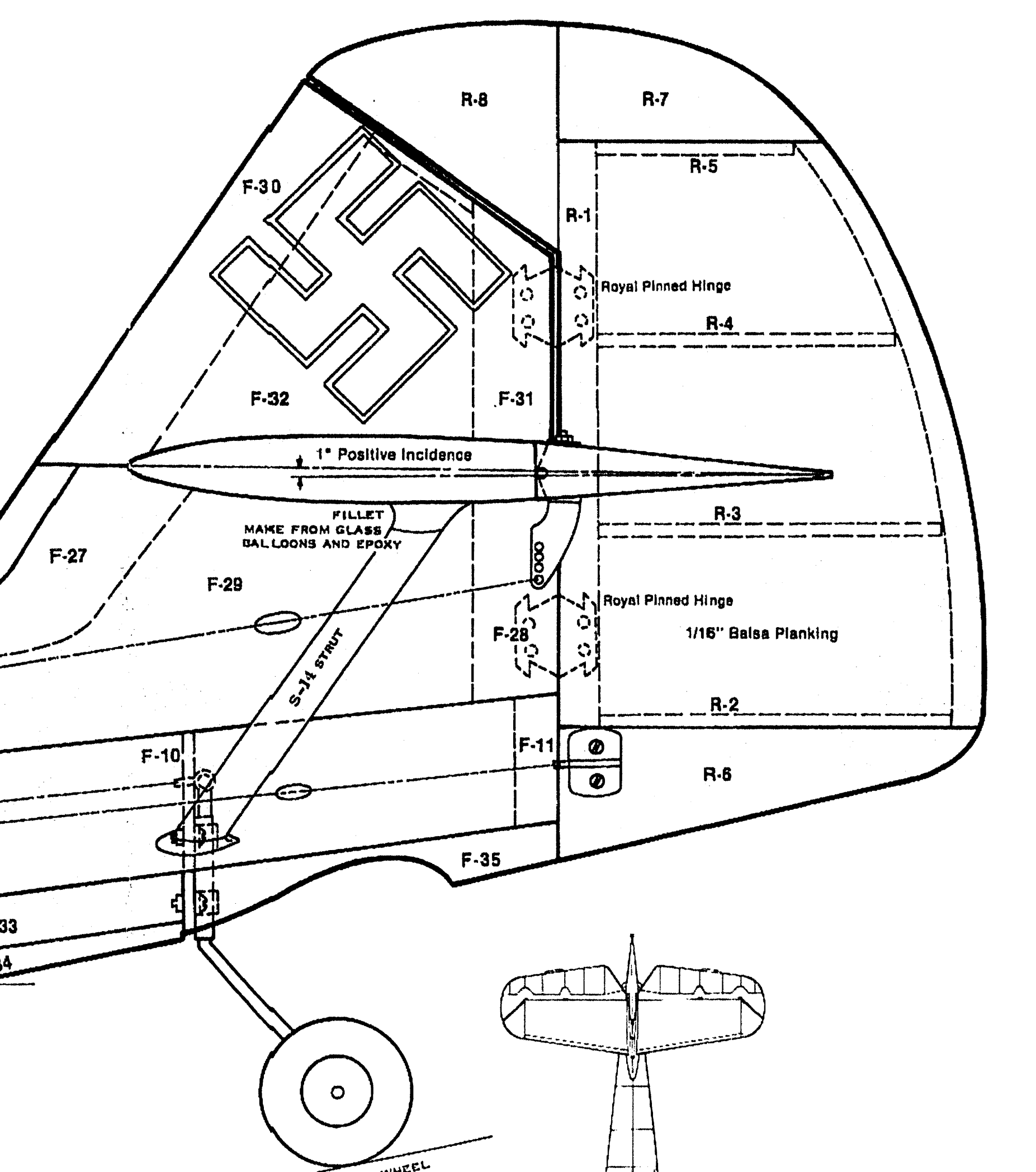


- RUDDER INSTRUCTIONS**
1. After identifying and marking the parts that make up the BF 109's rudder, draw a vertical center line fore and aft on R-1. Mark the positions for the rudder ribs on the left side of R-1. Locate and mark the centers on each of the rudder ribs.
 2. With R-1 resting on its leading edge, glue rudder ribs perpendicular to its rear edge. Use a small triangle to make sure each rib is "square" to the spar (R-1) and align each to with the vertical centerline you draw in 1. Remember, we will sheet the rudder with 1/8" balsa.
 3. Sheet one side of the rudder and when dry, bevel trailing edge to accept opposite sheeting. Use the rib as a guide.
 4. Sheet other side of the assembly. Bevel sheeting before you glue in place so that the trailing edge angles fit together. Shape R-1's leading edge as shown in fuse top view—from bottom of R-8 to base of rudder.
 5. Glue R-6, R-7 and R-8 in place.
 6. Put rudder axle for the moment. We'll hinge it to the fin and sand it to its final angle after the hub is glued in place and the upper fin is constructed.

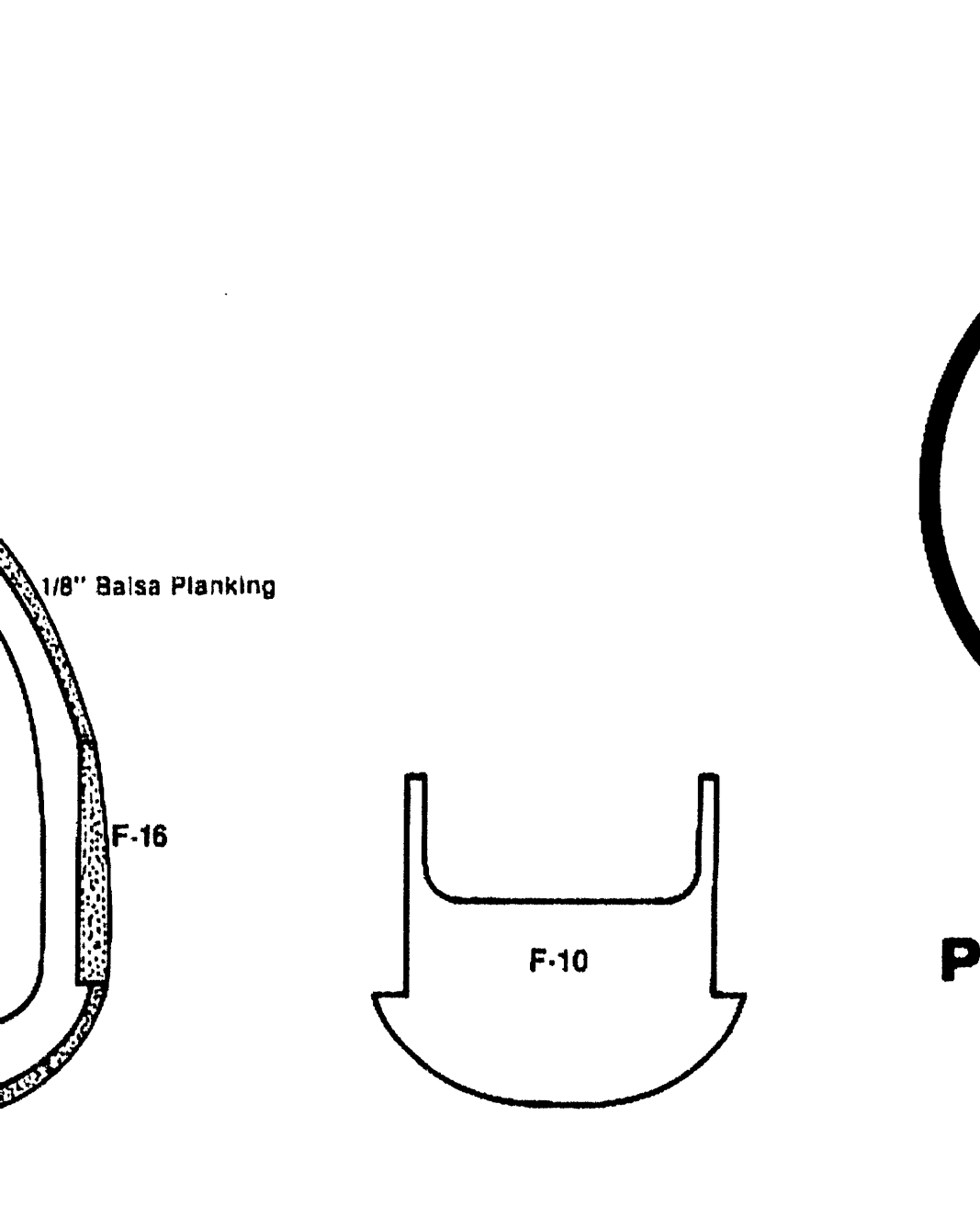
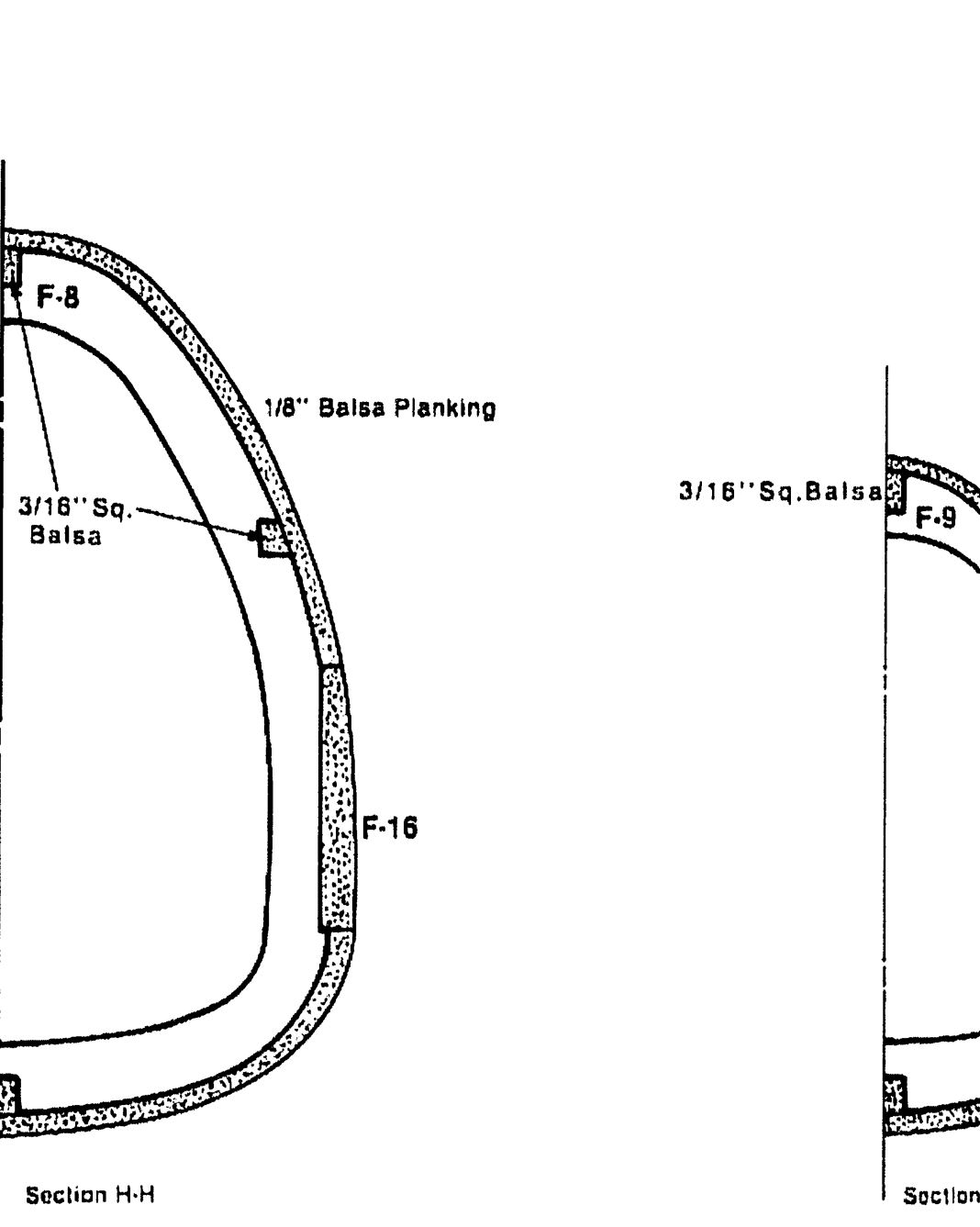
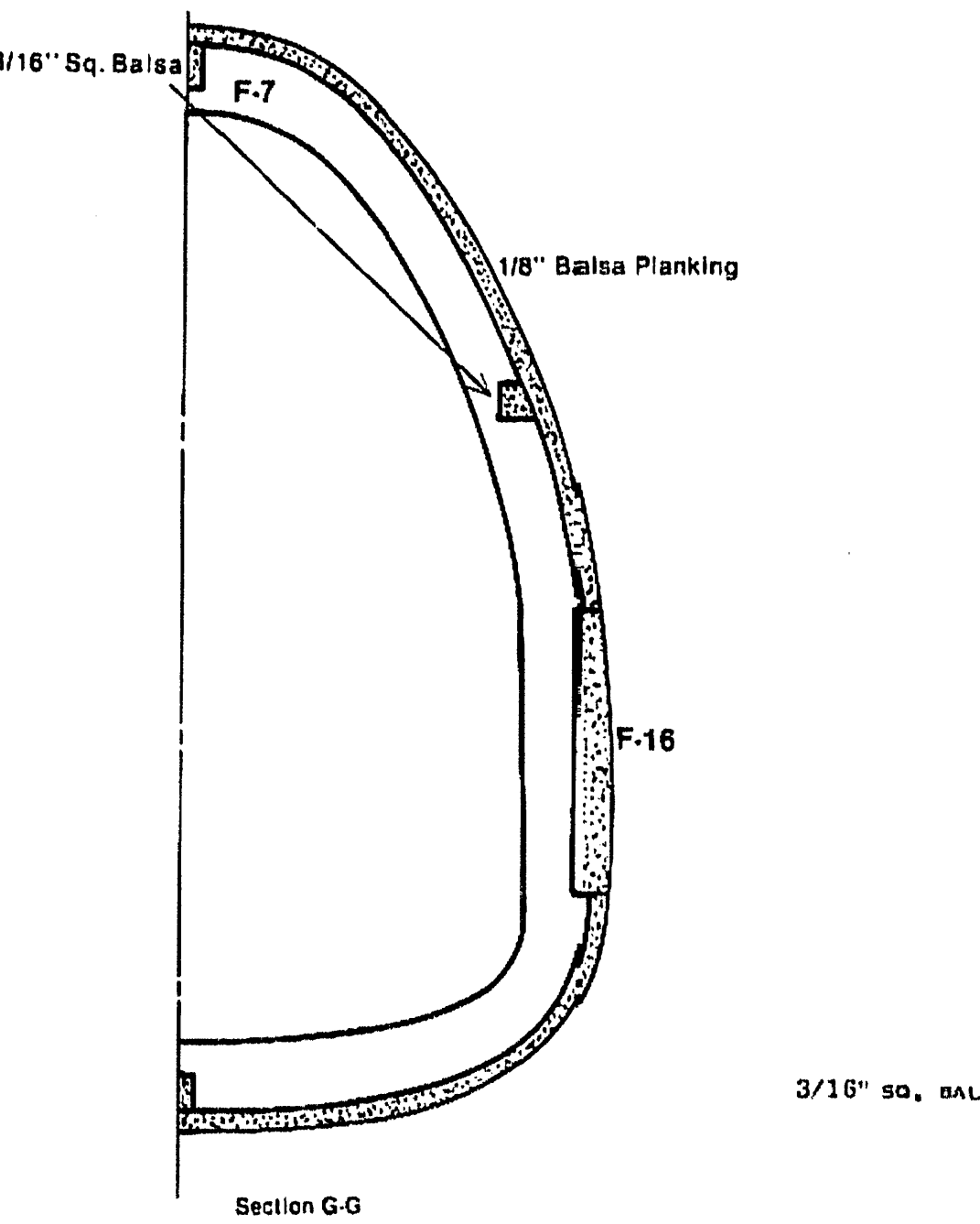
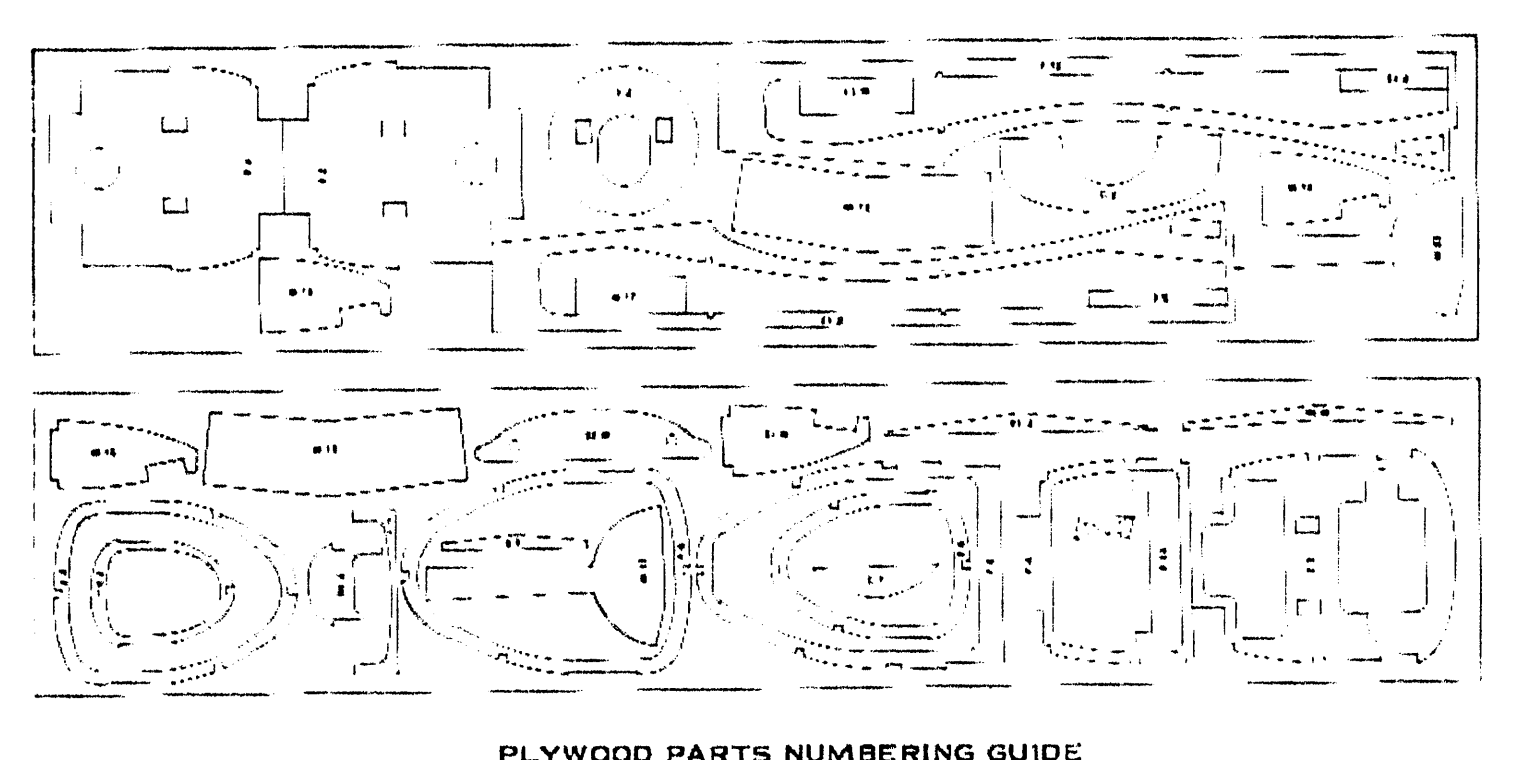
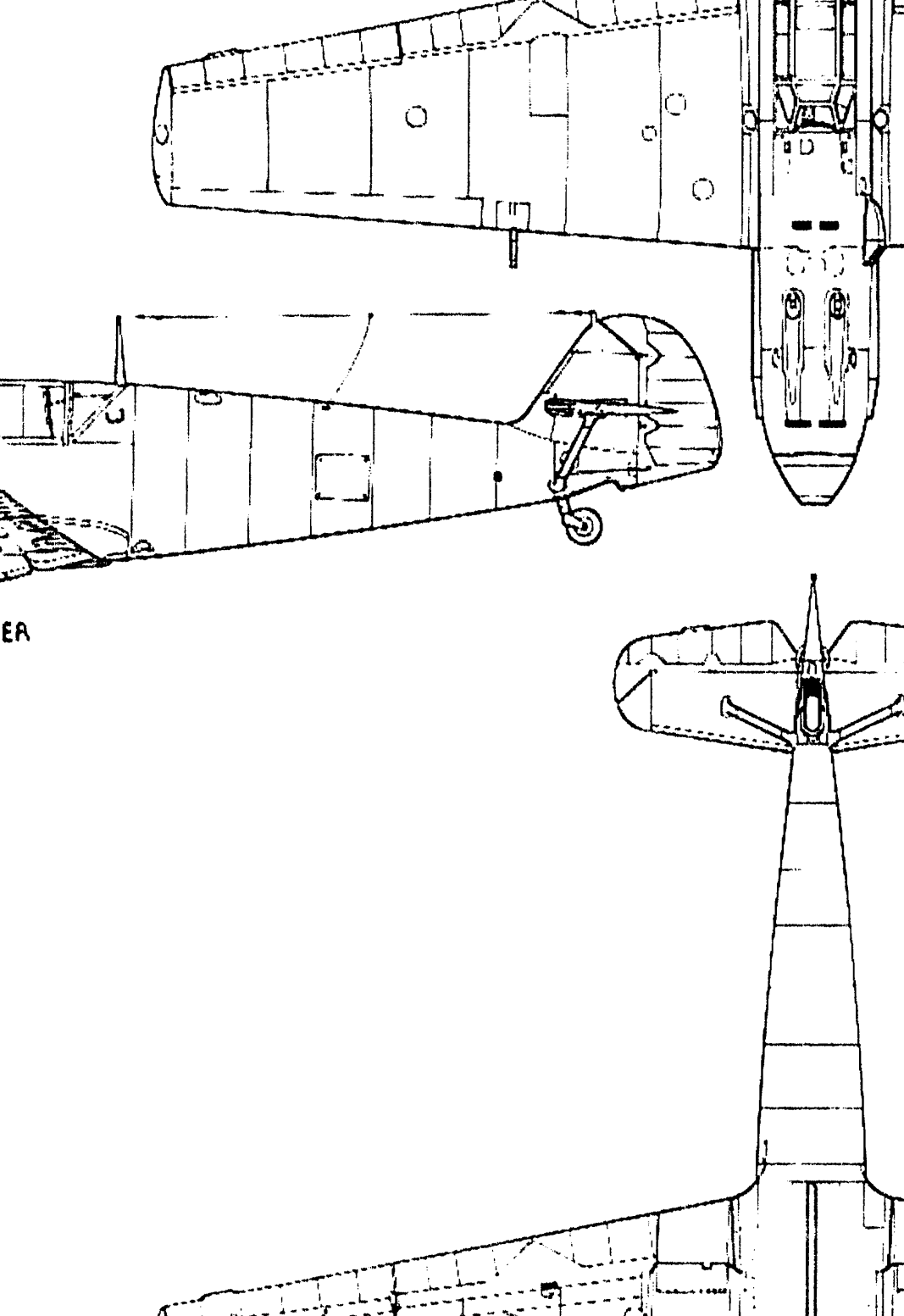
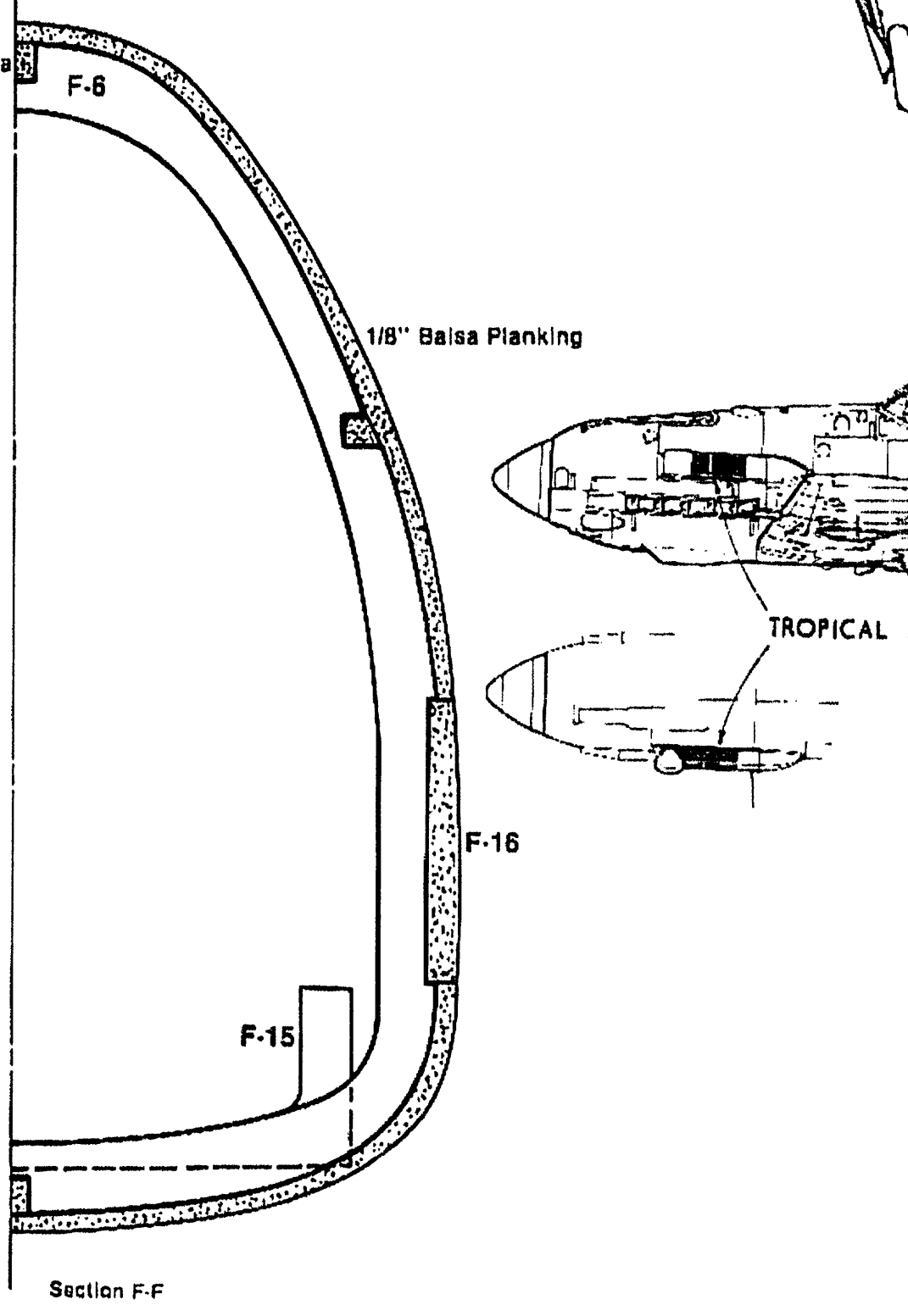
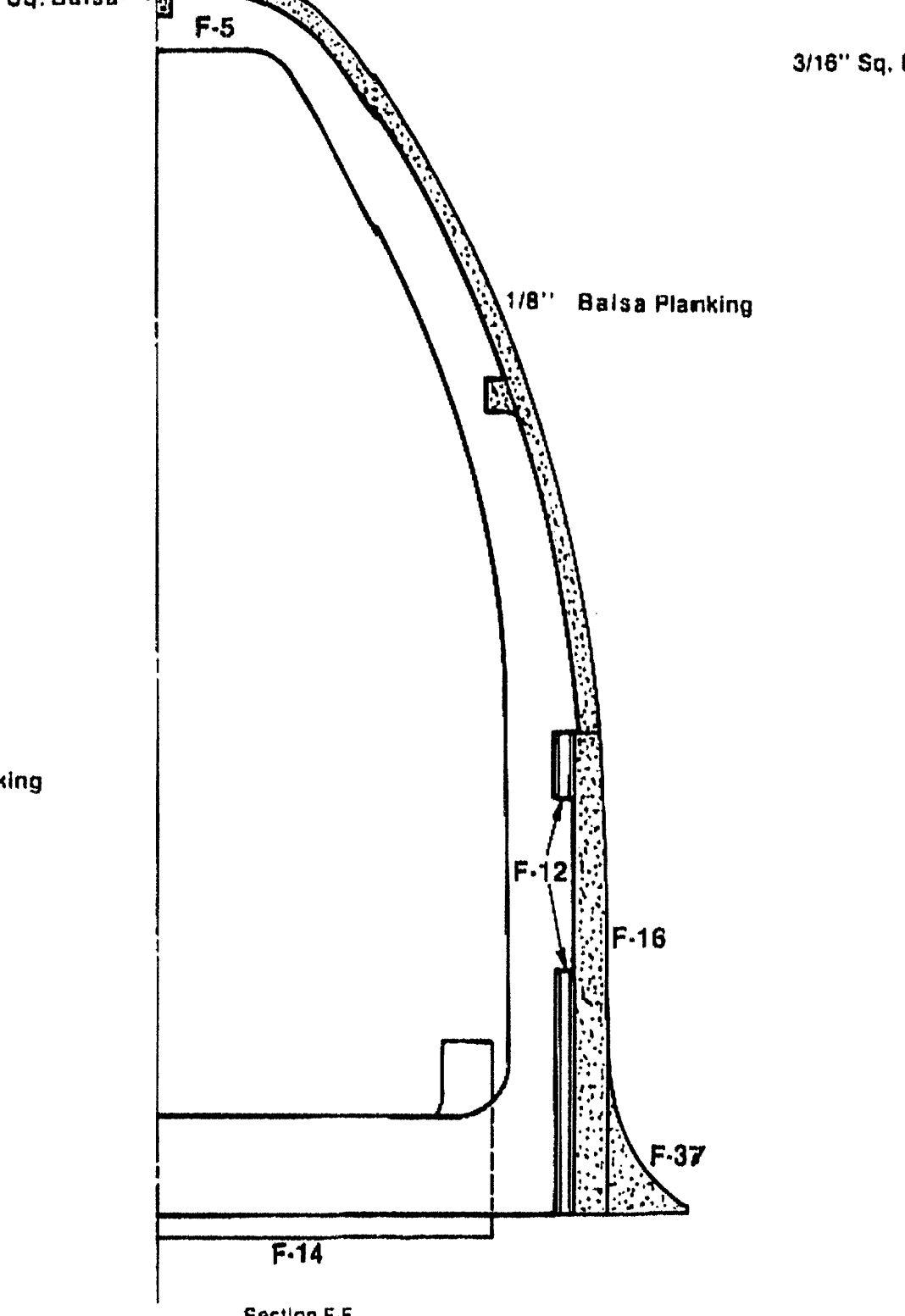
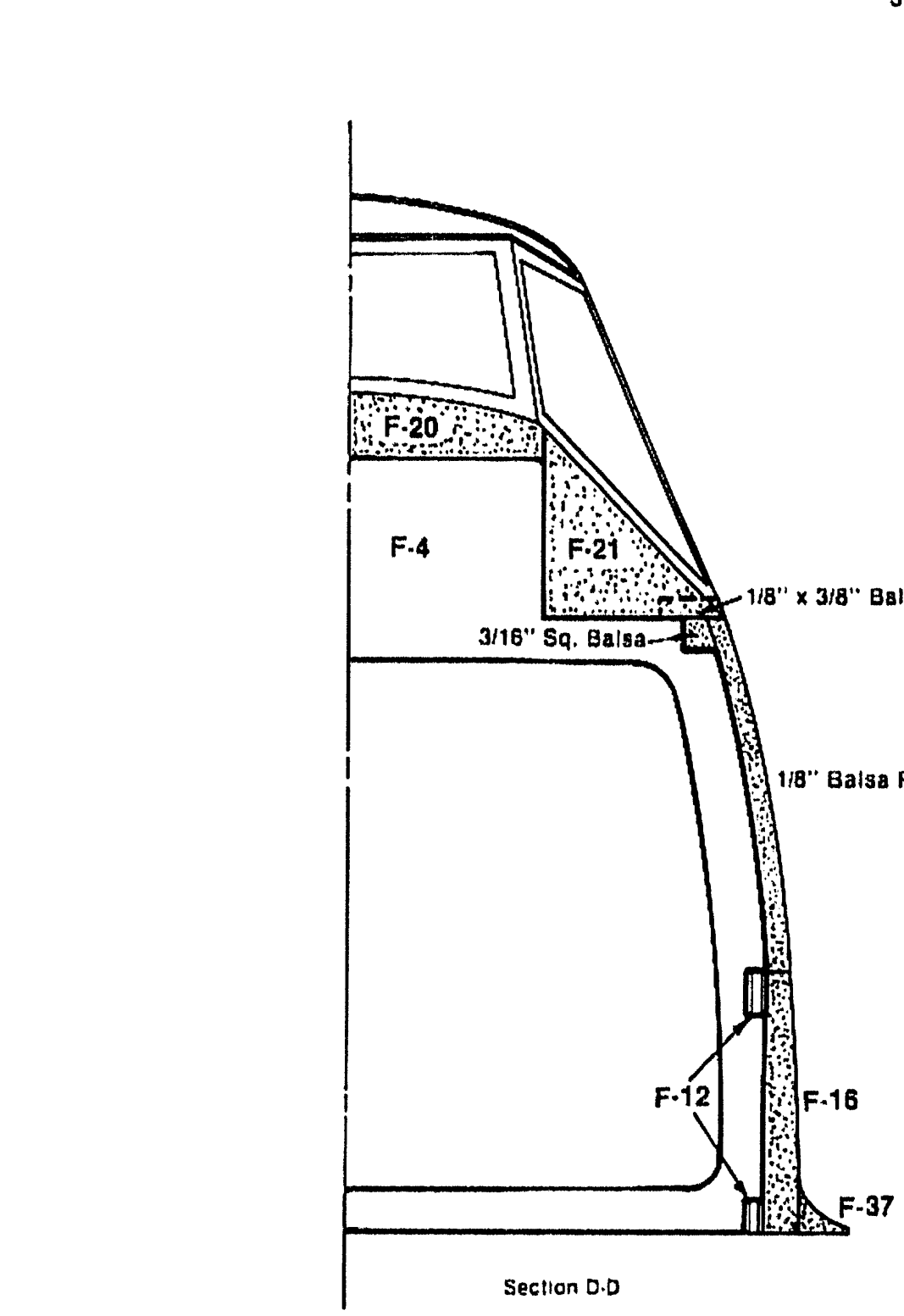
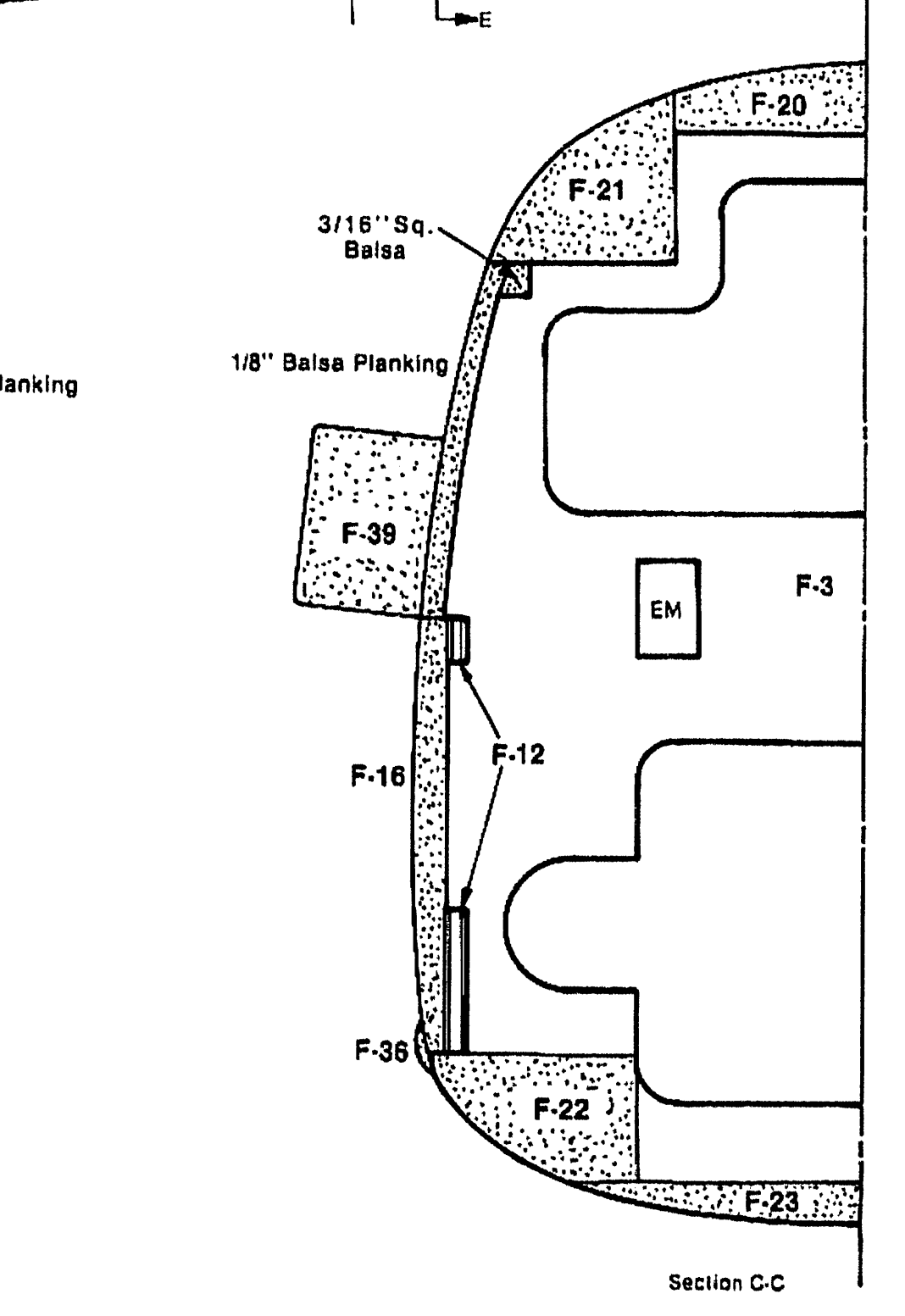
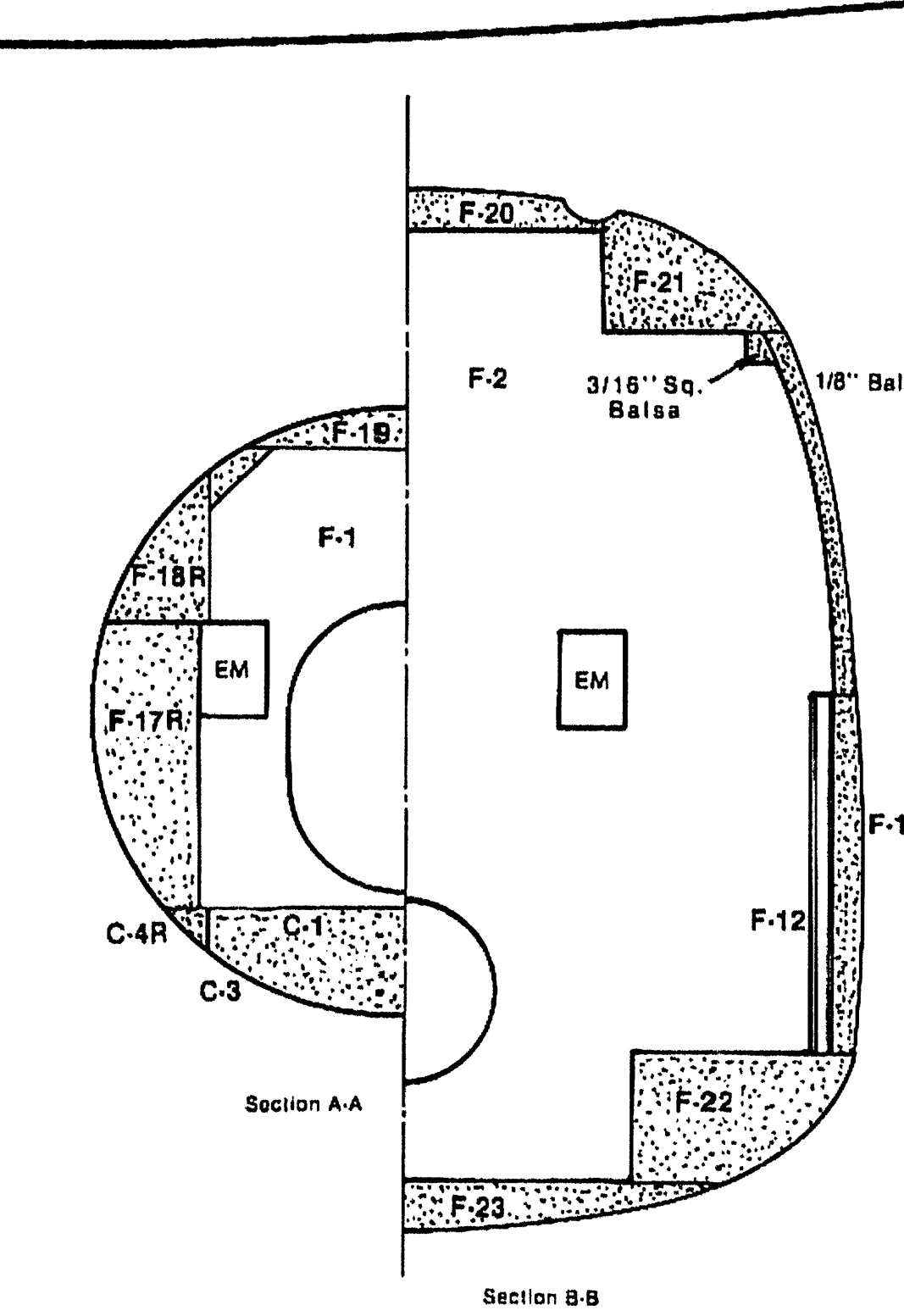
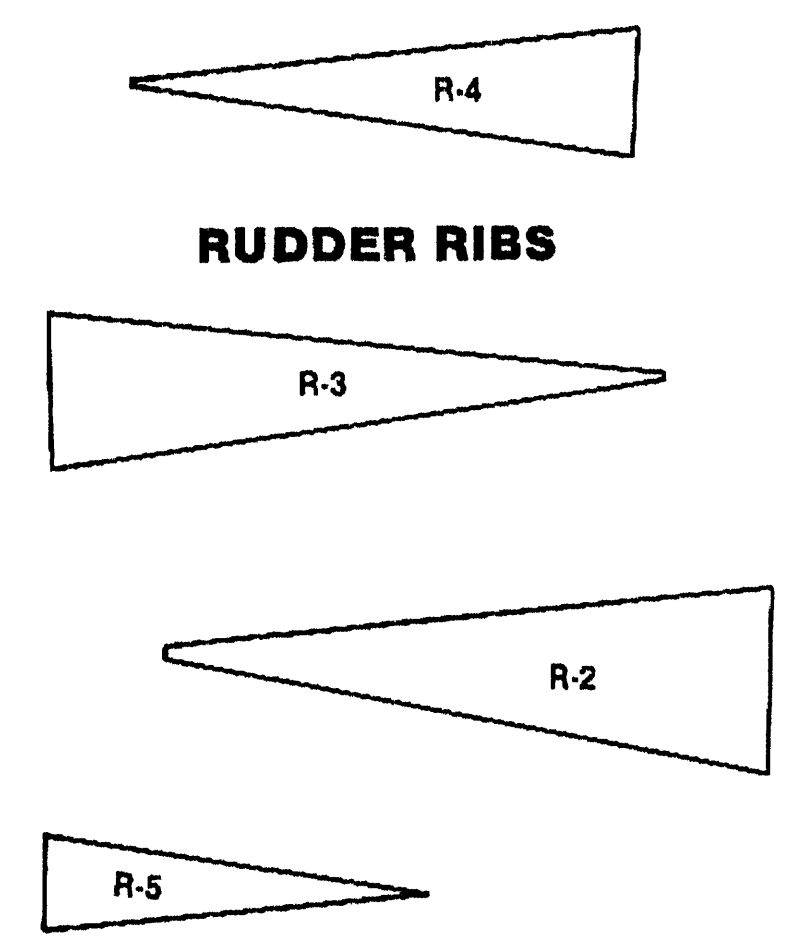
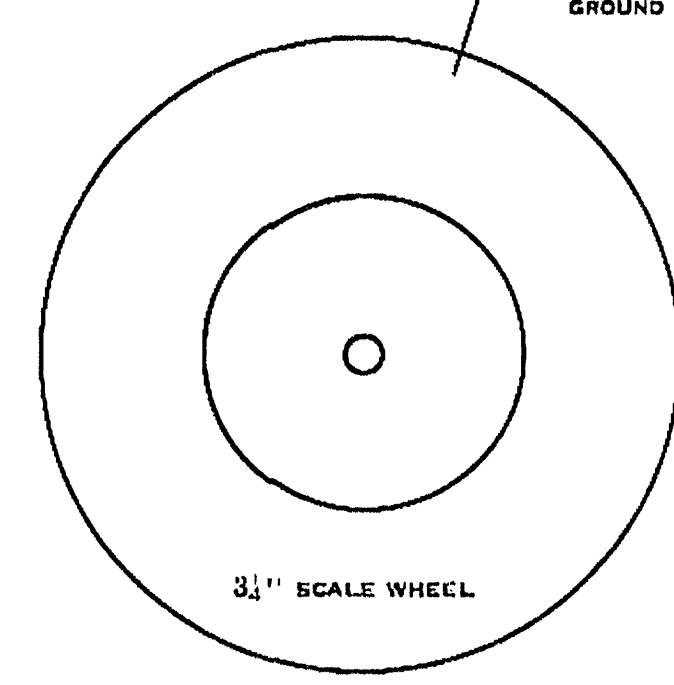
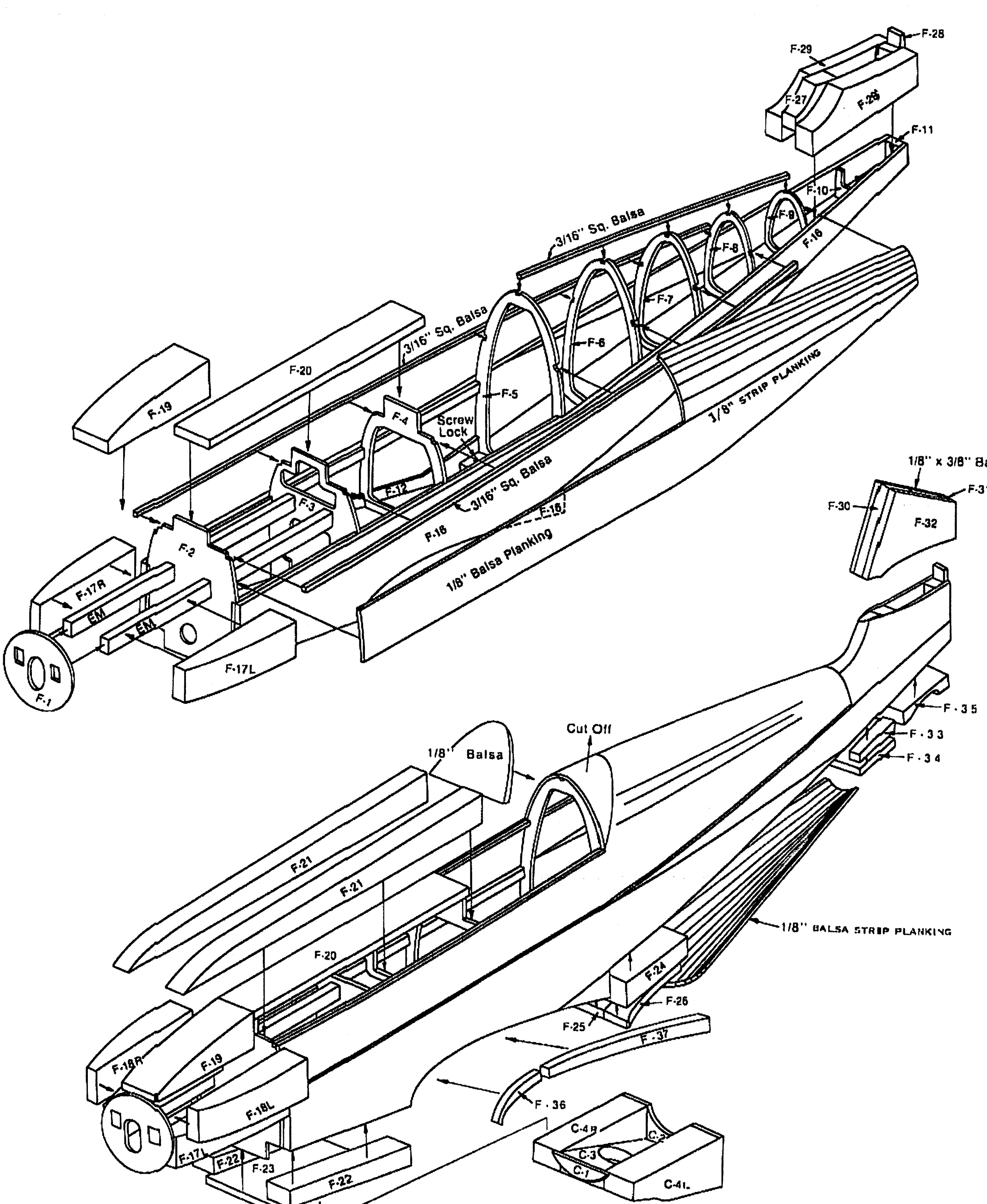


NOTE:
This kit is for inverted engine mounting. If up-right mounting is desired, beam mounts must be modified and necessary changes are left to the modeler.

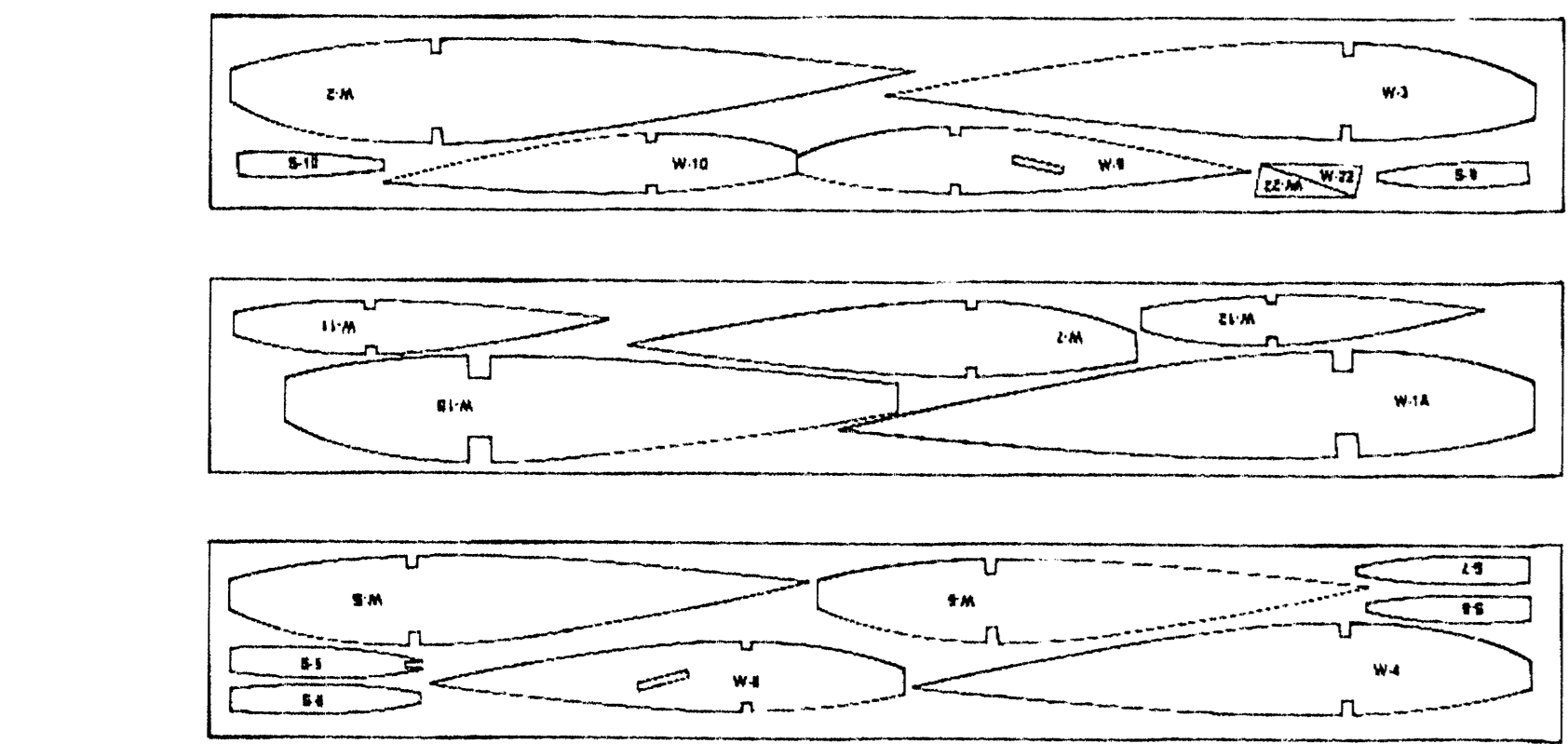
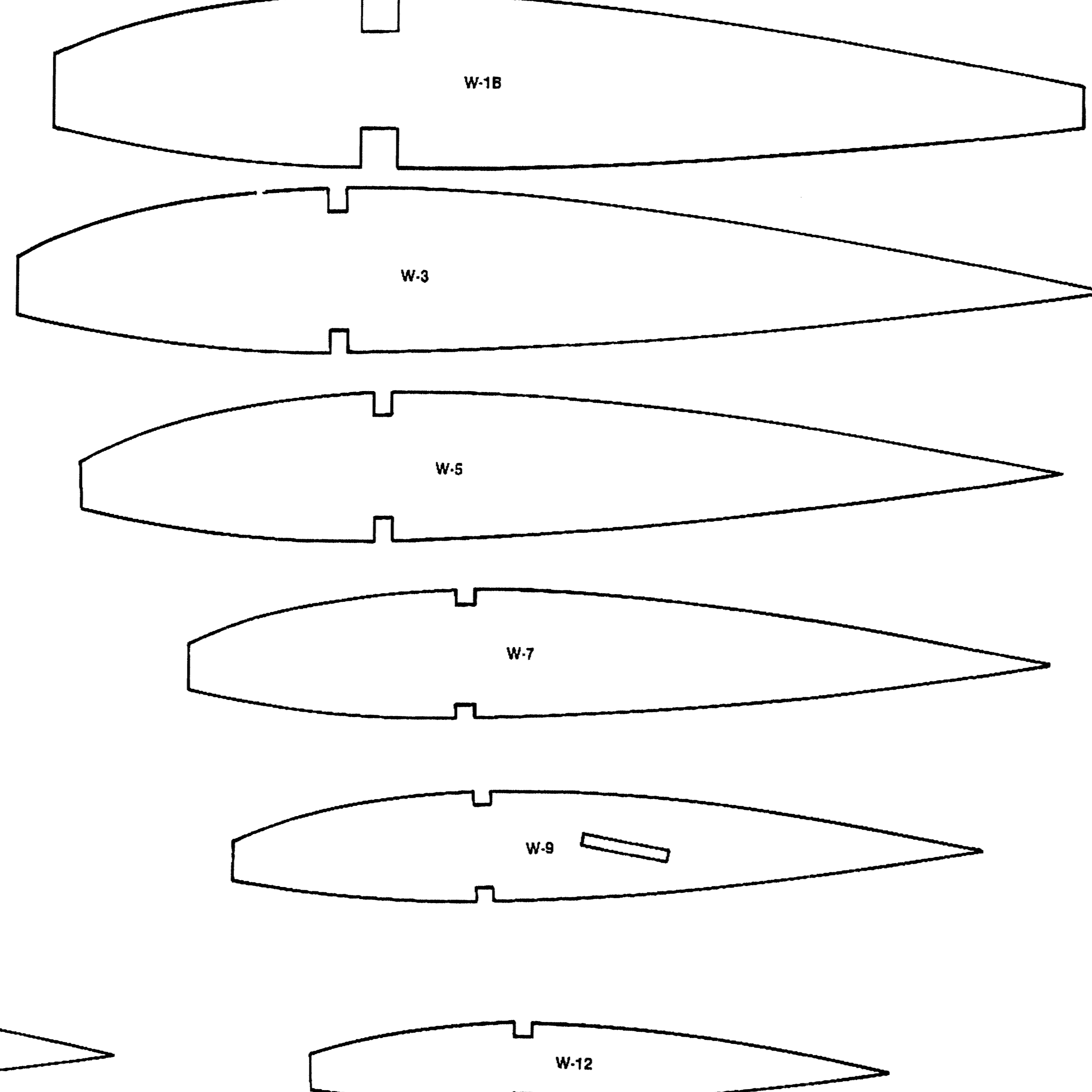
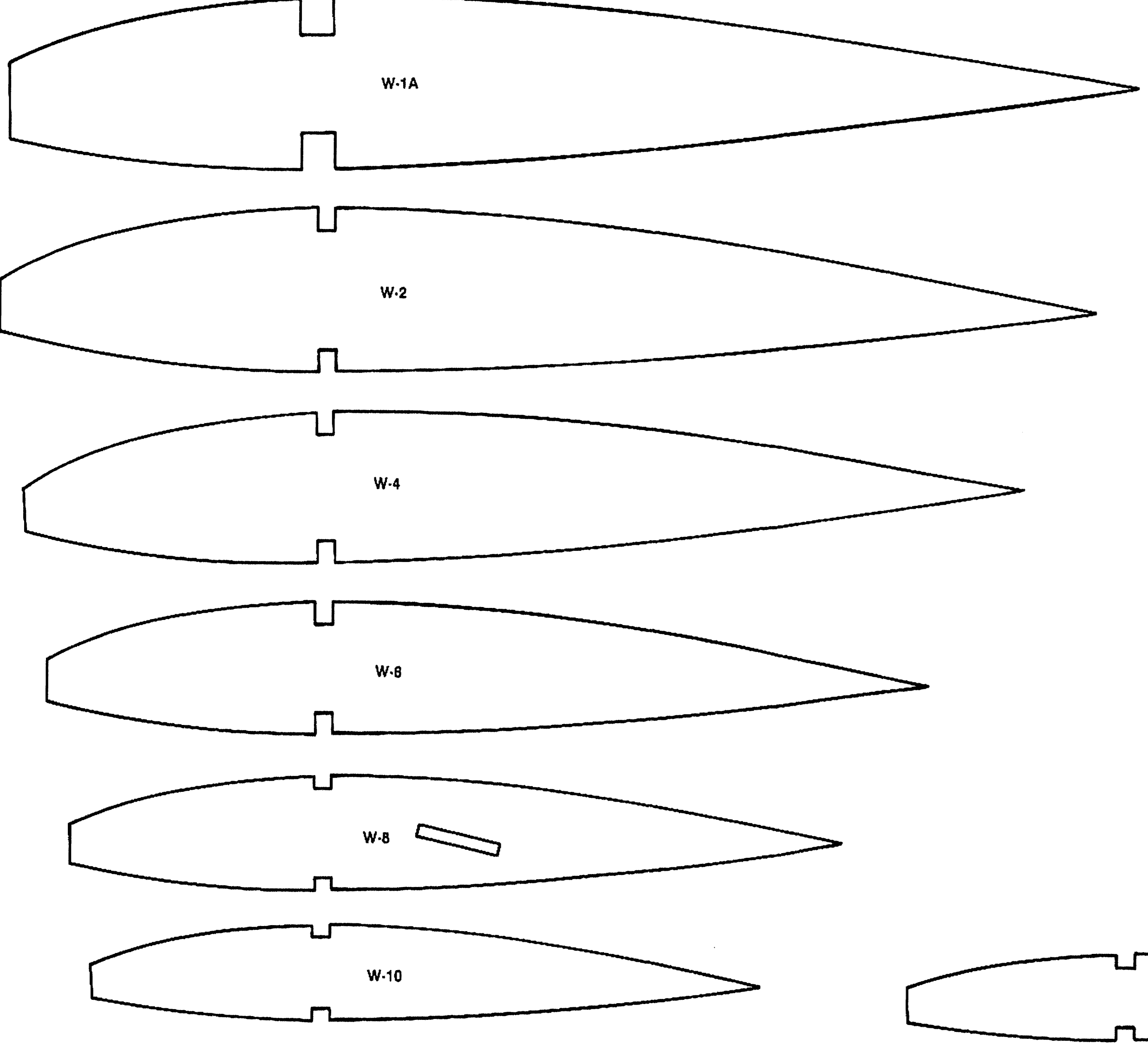
NOTE:
For greater detail and the removal of minor imperfections, the canopy may be sanded with an automotive type sand wa. Put several applications, both inside and out, allowing 24 hours drying time between applications. Be sure to clear area (around waist or neck of canopy) this is to be glued to the fuselage.

NOTE:
THE STRUT LENGTH ON THIS MODEL HAS BEEN SHORTENED FROM ACTUAL SCALE TO AID IN GROUND HANDLING.

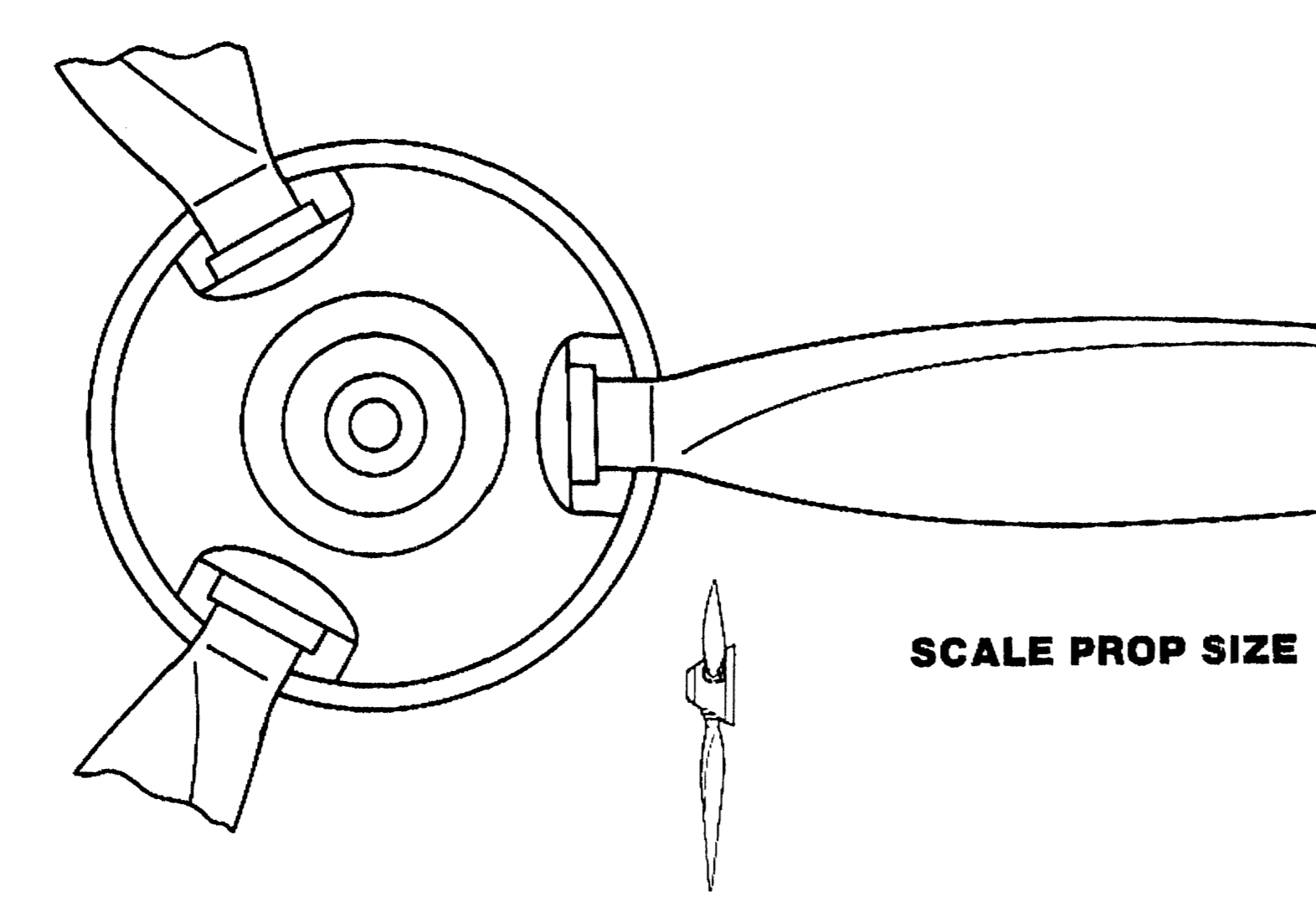
NOTE TO THE MODELER:
All formers and ribs are shown actual size to make "section" building easily accomplished from these plans, and to facilitate any repairs that may be necessary.



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BF 109E-3

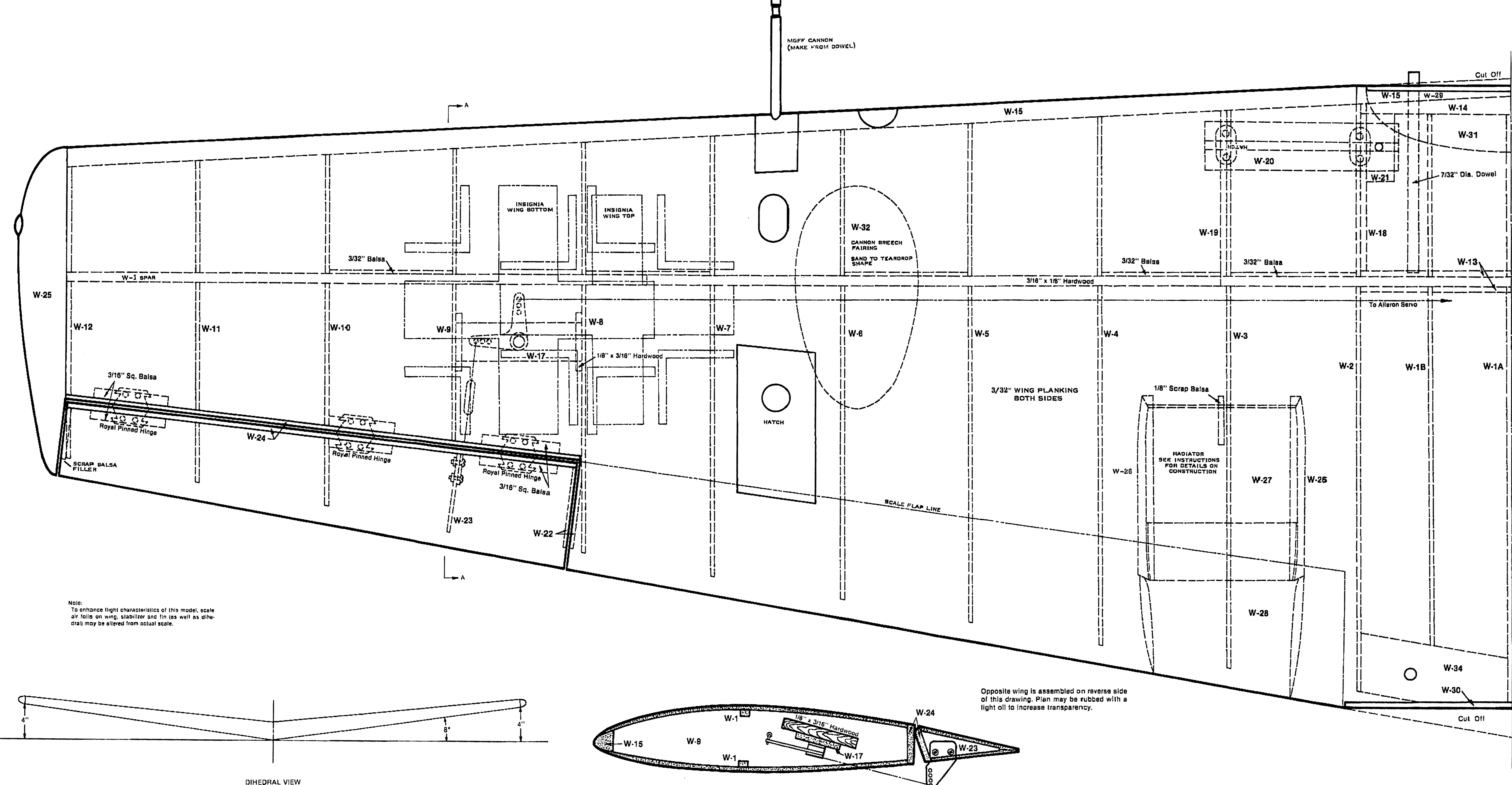


WING NUMBERING GUIDE FOR Balsa RIBS

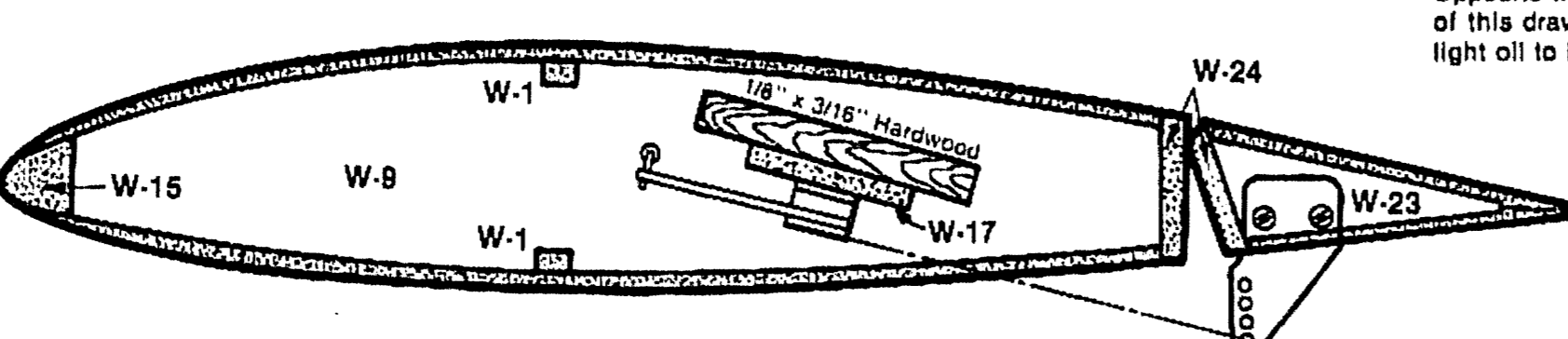


SCALE PROP SIZE

NOTE TO THE "SCRATCH" BUILDER
Modified canopies, decals, color and scale information, span aluminum covers (where applicable) are all available.

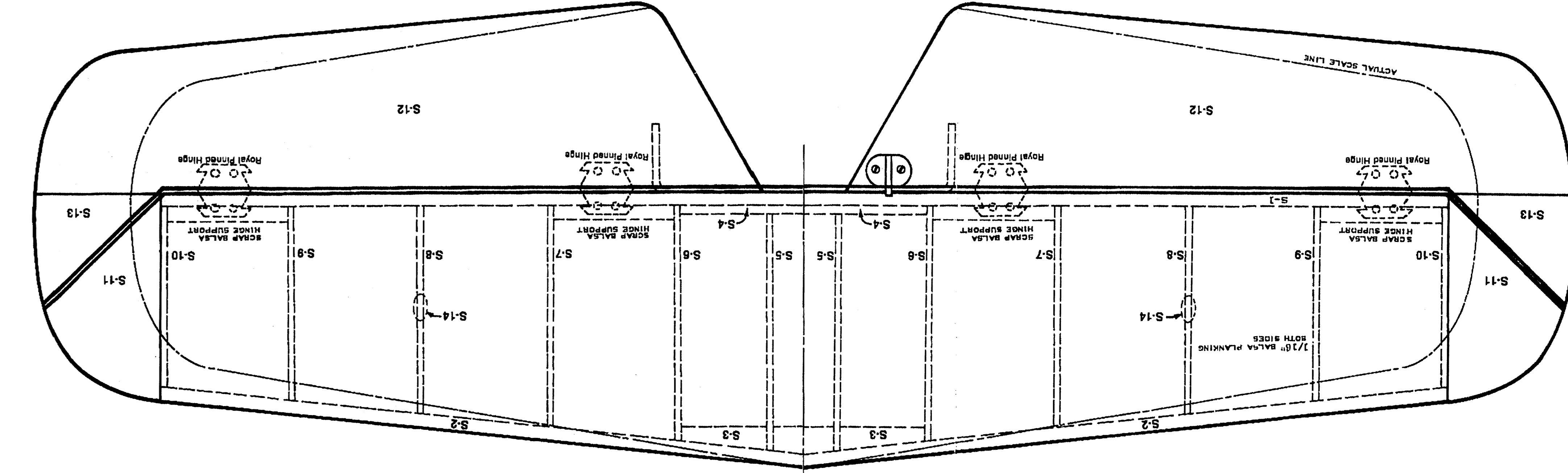
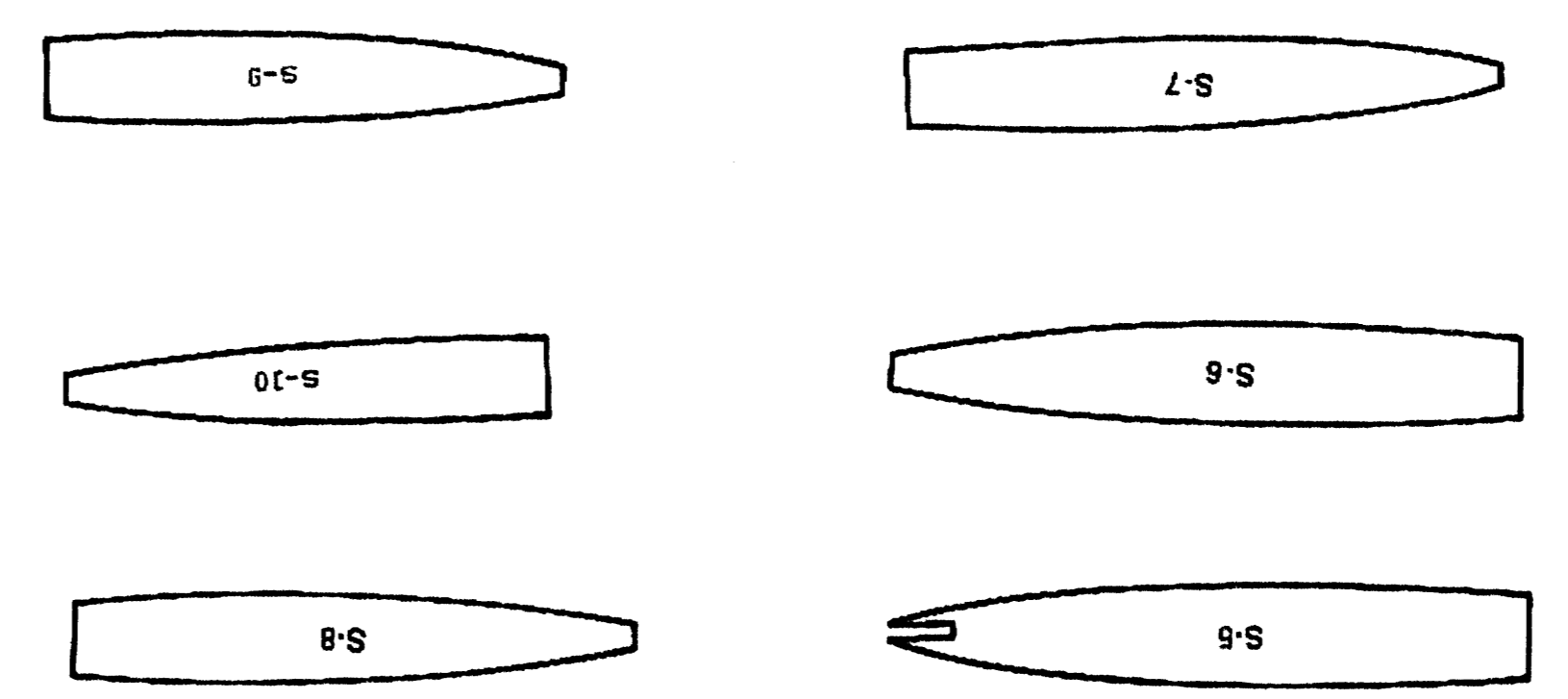


DIEDRAL VIEW



Section AA

Opposite wing is assembled on reverse side of this drawing. Plan may be rubbed with a light oil to increase transparency.



HORIZONTAL STABILIZER CONSTRUCTION

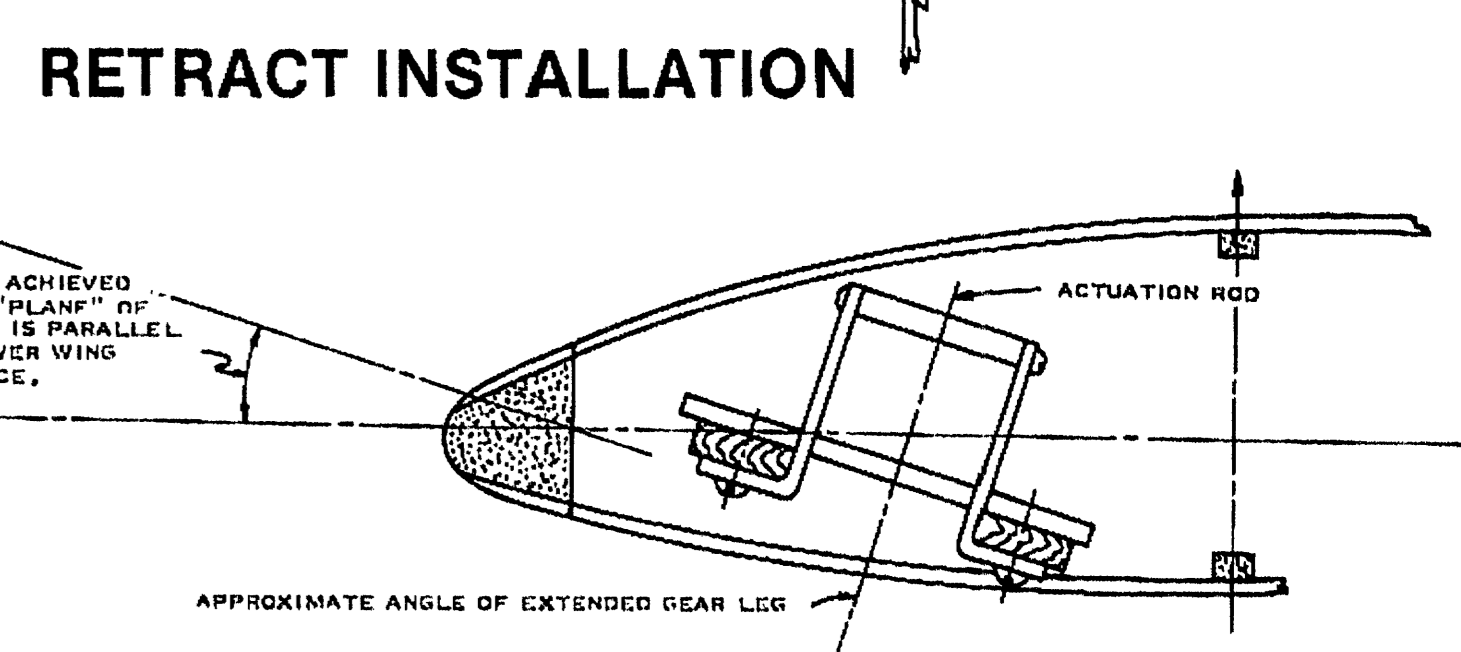
1. Locate and mark the spar holes.
2. With S-1 marking on the leading edge, place the rib on the form and mark the spar holes.
3. Mark the spar holes on the ribs.
4. Glue the spar holes in place.
5. Sand the stabilizer assembly on the form.
6. Install the spar holes in place.
7. Install the spar holes in place.
8. Glue the spar holes in place.
9. Glue the spar holes in place.
10. Glue the spar holes in place.
11. Glue the spar holes in place.
12. Glue the spar holes in place.

WING CONSTRUCTION WITHOUT JIG

1. Trim W-1 lower spar to proper length and pin in place over plan.
2. Add spar doubler.
3. Pin W-3 to W-12 in place, add top spar and doubler. No glue yet.
4. Pin L.E. W-15 in place.
5. Lightly glue T.E. of ribs to insure they stay straight.
6. Install and glue 3/32" shear webs in place. Glue all ribs and spars, and L.E. in place. Reserve for other work.
7. This assembly will now allow you to trim the wing from the plans.
8. Trim ribs W-1, W-15, and W-2 as necessary for fit of W-3, W-15 and W-24.
9. Trial fit wing halves together with W-3, W-14 and W-24 in place. Insure you have no gaps and check for correct. When satisfied, glue all parts in place.
10. Glue W-18's in place. Add spar hardware.
11. Glue W-18, 19, 20 and 21 in place.
12. Sand wing assembly to get rid of any knobs, bumps, etc. that would preclude a good sheathing job.
13. Refer to jig instructions for sheathing and final construction.

RETRACT INSTRUCTIONS

1. Carefully cut 4 pieces of maple mount stock that measure 1/8" x 1/2" x 1/8" to fit between ribs W-2 and W-3. They should have a good "friction" fit between the ribs.
2. Fit these retract mechanism mounts to the retract. Note that the rear mount will have to be trimmed to clear the spring coil of the retract leg and the bolt head on the board end of the retract. The front mount will be trimmed to the coil head and the pin.
3. Insert the mounts between W-2 and W-3 after cutting a gear leg slot about 3/8" wide and 1/2" deep in W-3 and a 1/4" wheel well hole in W-4.
4. Insert the retract, with the mounting flanges below the wood mounts, with the board side of the retract 1/16" outboard of W-3. Tack the retract to the mounts with a couple of drops of cyanoacrylate glue (Hot Stuff, etc.).
5. Add Royal's adjustable axle to the end of the retract's legs, and position a 3" wheel on it. With the gear extended, make sure that the wheel tracks fore and aft (with a slight bit of toe-in). Retract the gear leg and trim W-4 to clear the wheel when the gear leg is retracted to the main wing spar.
6. You can "lign" the retract and its mount so that, when the wheel is retracted, its disk is parallel to the lower surface of the wing. When it does, epoxy the mounts to ribs W-2 and W-3 for the epoxy seal. Install 4 gussets of 1/8" plywood (from the die cut sheet) to reinforce the retract mounts where they "meet" the ribs.
7. You may now drill the retract mounts and install bolts and nuts. Drill through ribs W-1, W-18 and W-2 for the actuating rod ends.
8. Cut a wheel well out of the lower wing planking, when you plank the lower surface of the wing.



RETRACT INSTALLATION

APPROXIMATE ANGLE OF EXTENDED GEAR LEG



ROYAL PRODUCTS CORP.

WING CONSTRUCTION

1. Identify and mark each of the pre-cut wing ribs in the kit. Following the instructions for your wing jig, drill the appropriate jig holes in each rib (or bore if the ribs fall fore and aft of the main wing spar).
2. Add the wing ribs from W-1A through W-19 to the jig, adjusting the rib spacing as shown on the plans. If your jig will hold the entire wing at one time, build both panels at the same time. Otherwise, build one panel (right and left) as you now indicate.
3. With the ribs properly aligned, glue the 1/8" x 3/16" hardwood main wing spar and spar doublers into the notches on top and bottom of ribs W-2 and W-3, respectively. The notches in W-2 and W-3 go "down".
4. Glue wing rib doublers W-18 and W-19 to ribs W-2 and W-3, respectively. The notches in W-18 and W-19 go "down".
5. Glue the 3/32" sheet balsa shear webs between the top and bottom spars at the locations noted on the plan top view of the wing.
6. Glue W-15, the leading edge, to the front of all of the ribs, making sure that it is aligned with all of them.
7. Glue the alleron ballcrank hardwood brace to ribs W-8 and W-9. Epoxy the alleron ballcrank mount (W-11) in place after you've installed the ballcrank beneath it.
8. Sheet the top of the wing with the 3/32" balsa sheathing. Note that the sheathing on the leading edge (W-15) extends beyond the aft end of each rib about 3/8". Trim the sheathing strip to locate the trailing edge of the wing panel properly.
9. Let the entire wing panels dry—at least overnight!
10. Remove the wing panels from the wing jig. We're now going to work from the bottom of the wing.
11. Chamfer the wing's trailing edge—so that when we add the bottom sheathing (later) the trailing edge will taper to an attractive edge. Use a file with a sharp blade and/or a sanding block to get a smooth chamfer.
12. Carefully cut ribs W-9 through W-12 up to top sheathing so that alleron spars and alleron wing spar may be glued in place after the wing is completely sheathed. Remove all of W-9's aft of the alleron spars and glue ply alleron rib W-23 in its place. Add nose alleron rib W-22 at the inboard end of alleron on either side of the top-cut line. Note the measurements you had to make to locate the alleron dimensions, because, when you cut the alleron away from the wing structure, when the lower wing sheathing is in place, you're going to have to relocate the alleron hinge line! Use of pin holes punched through the sheathing is a big help here.
13. Glue the 3/16" square balsa alleron hinge doublers fore and aft of the alleron spars as shown on the plans. Locate them at the top of the spars after sanding them to conform to the airfoil shape. Since everything is spaced-out at this point, make sure you glue the hinge doublers to the spars and the top sheathing.
14. Remove the aft end of rib W-18 and epoxy W-34 in place.
15. Clear slots, fore and aft of the main spar, in the plywood wing planks W-13 and epoxy them in place. Do the same at the leading edge and epoxy W-14 to W-15.
16. Carefully trim ribs W-2 and W-3 to remove the balsa in the area where there's a rectangular notch in the plywood doublers. The landing gear mounting blocks (W-25 and W-26) will fit between these two ribs. It's a good idea to fit the bent landing gear wires into the mounting blocks before wiring them together or to the wing structure. With every thing lined up, install the landing gear retaining straps. Remove the wire from the wing canopies—but don't glue them in place until in the wing. If you intend to use retract, install them at this time! Use special retract installation instructions on the plans!
17. Install the alleron horn, to W-23, as shown on the drawings. Align the alleron ballcrank with the lower arm parallel to rib W-8 and install the alleron push rod.
18. Install the servo-to-alleron ballcrank push rod. Each intervening rib will have to be drilled to accept this rod—so keep things aligned.
19. Sheet the bottom of the wing. Remember to chamfer the bottom sheathing where it meets the top sheathing at the trailing edge. You'll have to cut clearance slots for the alleron push rod and the alleron horn. Properly done, the wing's trailing edge will be about 1/16" of an inch thick for its entire length.
20. Using the measurements you recorded in step #12, cut the alleron away from the wing structure. Note that the ends of the alleron are perpendicular to the trailing edge! Taper the leading edge of the alleron to conform to the "AA" cross section and remember to allow for the thickness of the W-24 horn and wing spars when measuring and making your cut. Glue wing and alleron spars in place. Shape alleron spars as shown on "AA" cross-section on plans. Then, hinge the alleron to the wing. Do not glue hinges in place yet.
21. With the alleron in place, glue the wing top—W-25—in place. Sand the top to conform to the airfoil but wait until the wing is completely sheathed before rounding it to its finished shape.
22. If you've built only one panel, repeat steps 2 through 21 above. MAKE SURE THAT YOU'RE MARKING THE "OTHER HALF" OF THE WING! The model won't fly very well with two such wing panels!
23. With both wing panels in hand, epoxy 'em together. Note that W-14 and both W-13's fit into the "other" panel and that W-14's are applied together. A bit of sanding, particularly on the inboard ends of the wing sheathing, may be necessary to get a good fit. Note that the proper dihedral angle (if any) will raise each panel 4" above the building board. Take your time—and avoid twisting the wing.
24. When the wing center section joint is thoroughly "dry" trim the leading and trailing edges as shown by the hatched area on the plans and epoxy W-28 and W-29 in place. This is a good time to notch the top sheathing and install the alleron servo.
25. Reinforce the wing's center-section with a 2 1/2" strip of fiberglass. Apply the "glue" with some epoxy of resin, centering it on the center line.
26. Sand the wing so that the entire surface is smooth. Round and line the wing tips. Use a sanding block here to avoid any hills and valleys in the wing.
27. If it's your desire, "glass" the assembled wing with a light fiberglass cloth and resin. Easy on the resin!
28. Glue the underside radiator assemblies (W-25, 27 and 28) to the bottom of both panels as shown on wing top view. Sand the sections to the cross-sections shown. Add the wing canopies ("bumps") (W-30) to wing bottom and sand 'em to fit smoothly into the wing surface. Drill the leading edges for the wing canopies—but don't glue them in place yet. They might break off as you handle the wing.

Model ME 109E-3 Specifications

Wing Span	8 1/4 in.
Fuselage Length	2 1/4 in.
Wing Area	60 sq. in.
Wing Loading	50-55 g.
Scale Ratio	1.8 in. = 1 ft.

Full size ME 109E-3 Specifications

Wing Span	32 1/4 in.
Fuselage Length	25 1/2 in.
Wing Area	174 sq. ft.
Height	12 ft., 23 in.
Level Speed	320 MPH

MESSERSCHMITT BF 109E-3