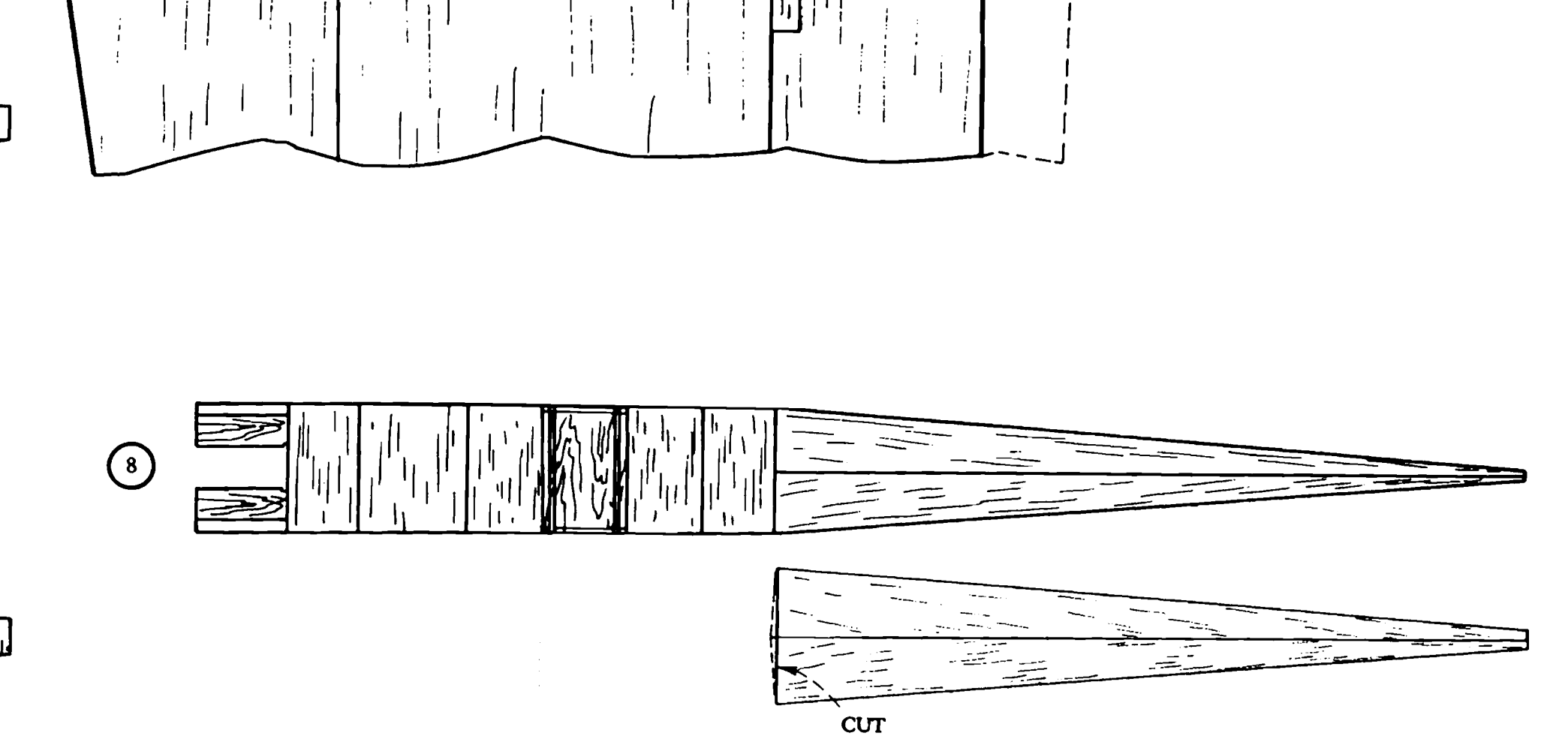
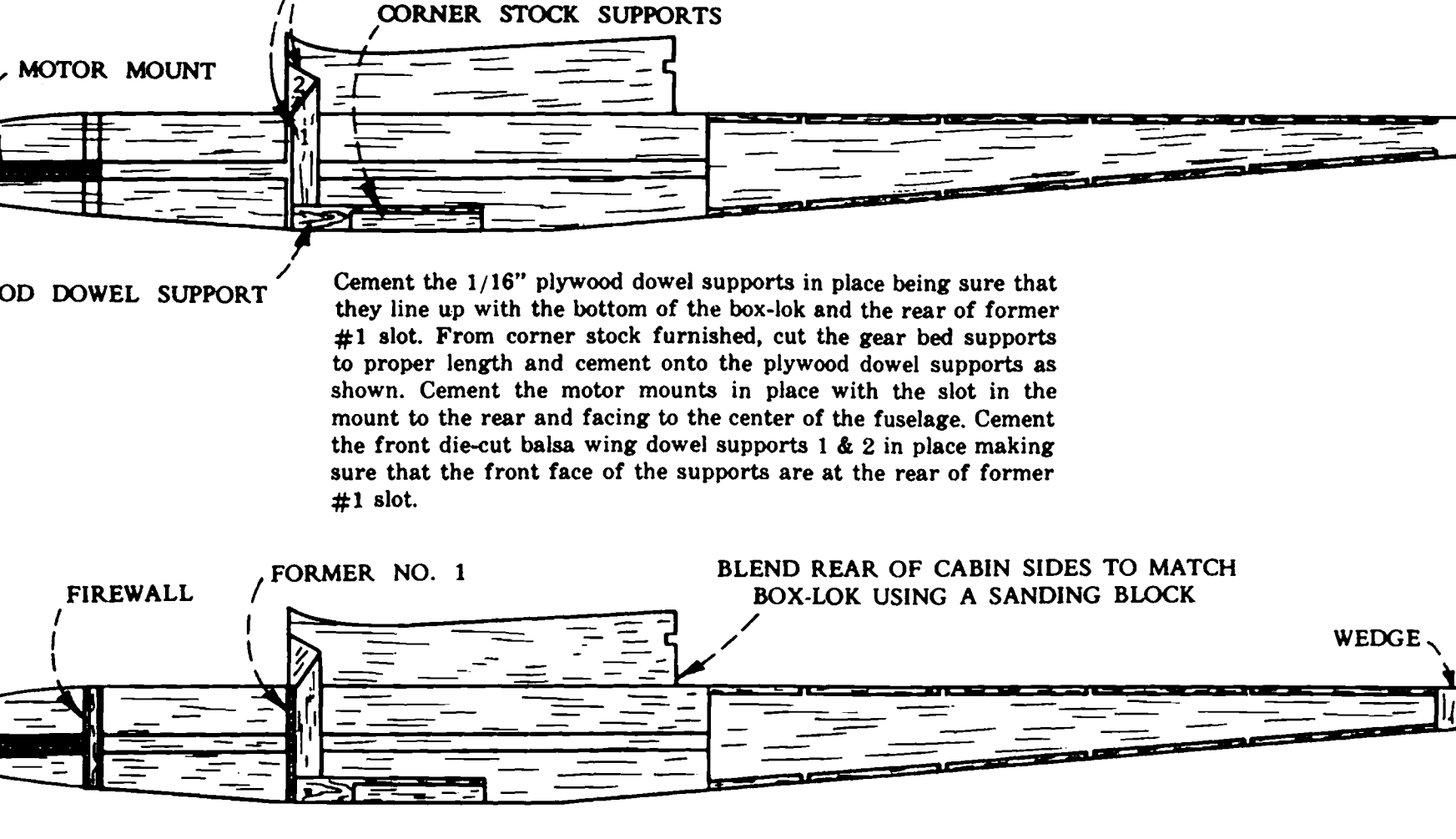


SPECIFIC NOTES ON THE A-RAY:
The A-RAY was developed to fill the need for a simple and low-cost model that would fill the gap between our popular S&H-RAY and our larger low wing multi-jet. The A-RAY is a most realistic looking model that is also capable of performing aerobatics and yet is extremely docile and capable of slower flight speeds than the larger more powerful multi-jet. For all around flying and easy aerobatics, the following control movements have been arrived at and we recommend that the model be set up this way: AILERON- $\frac{1}{4}$ \"/>

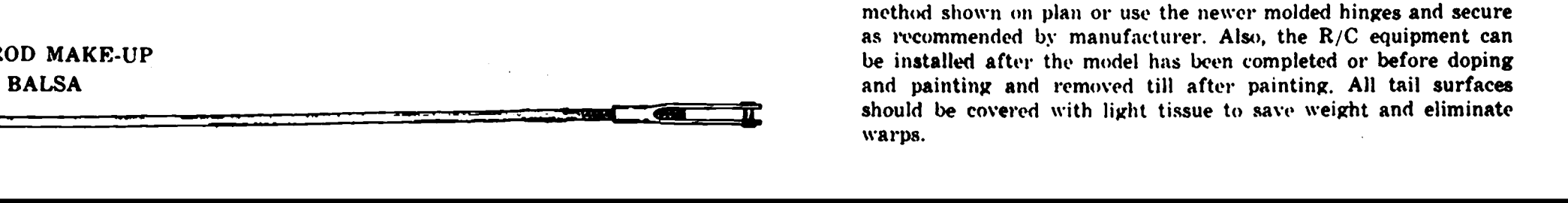
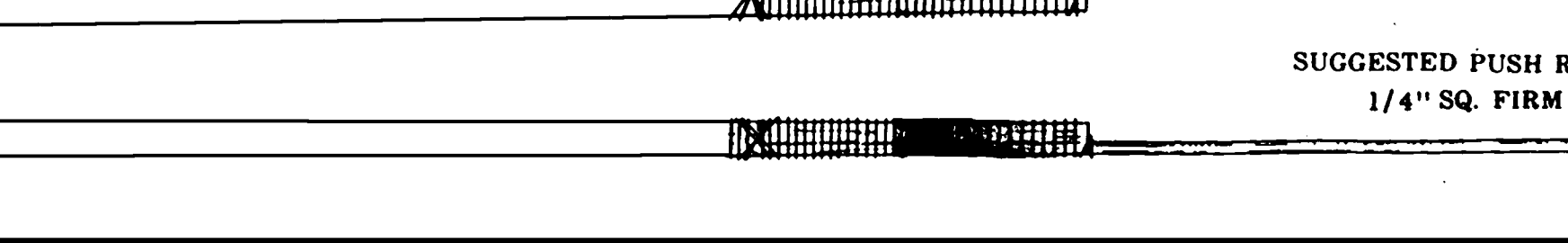
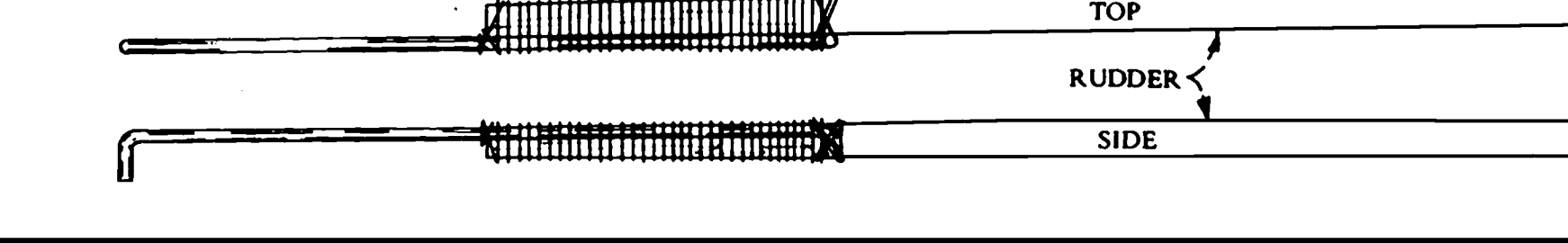
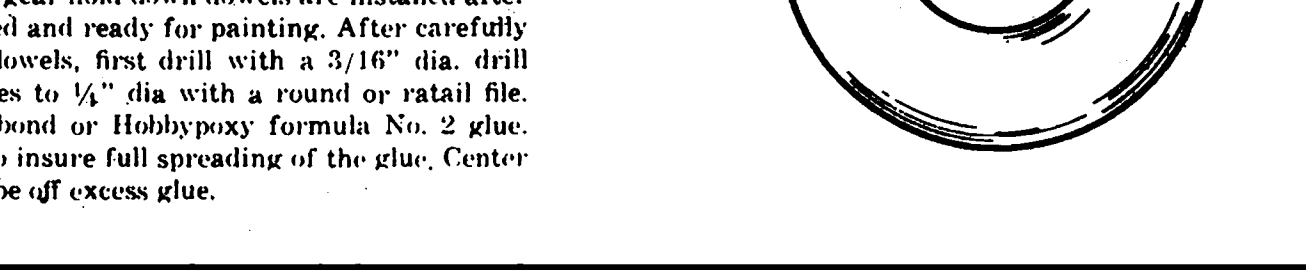
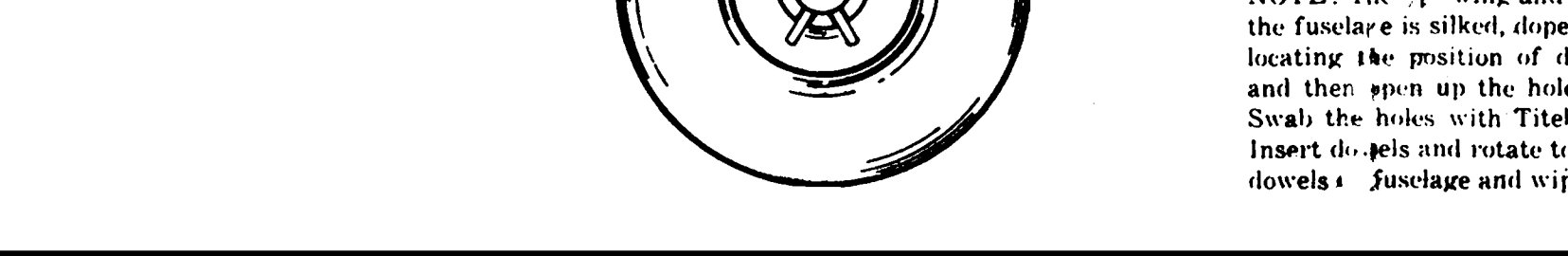
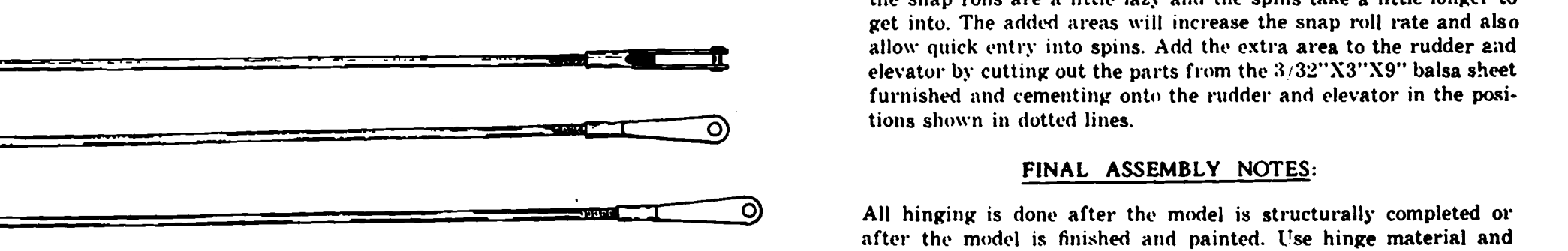
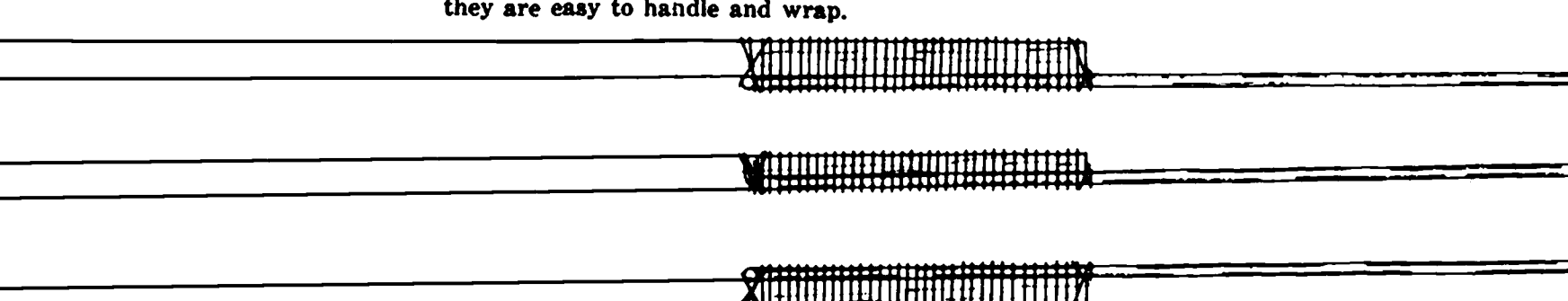
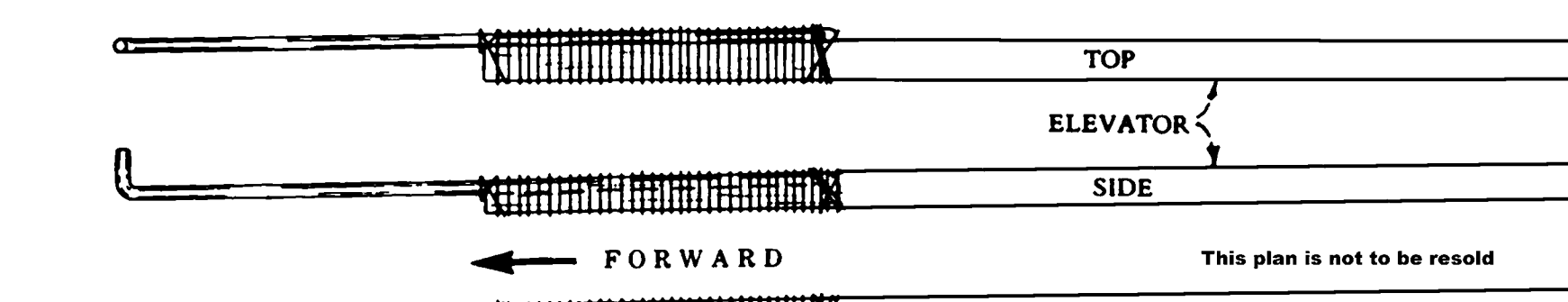
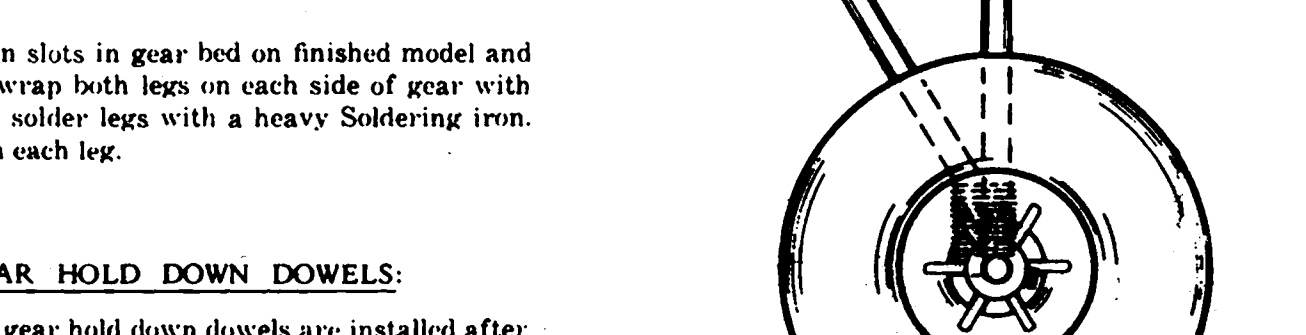
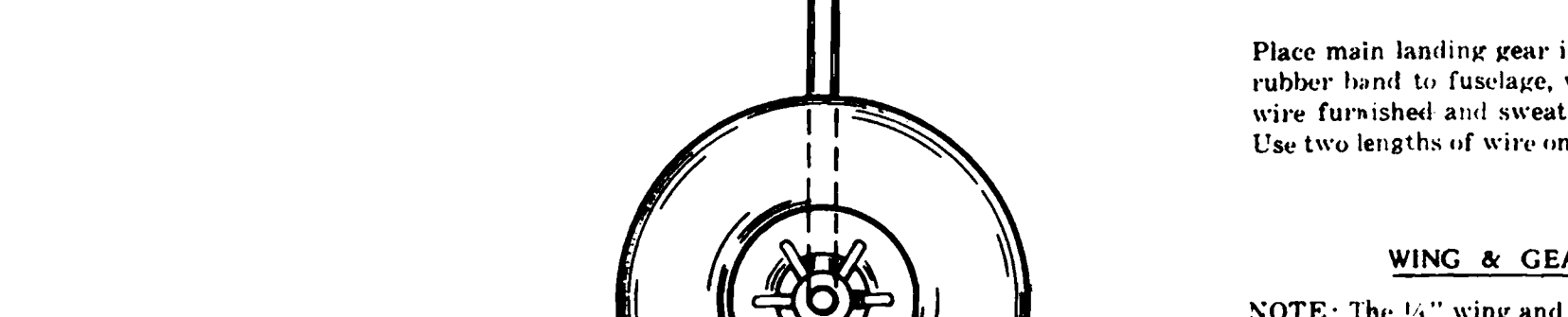
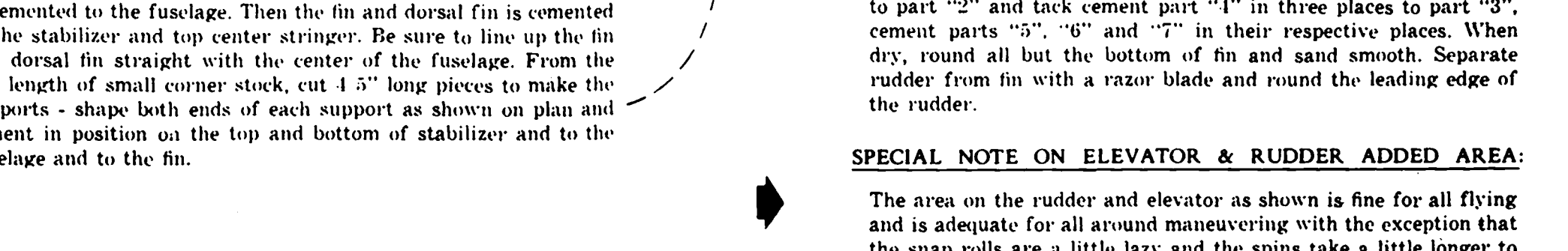
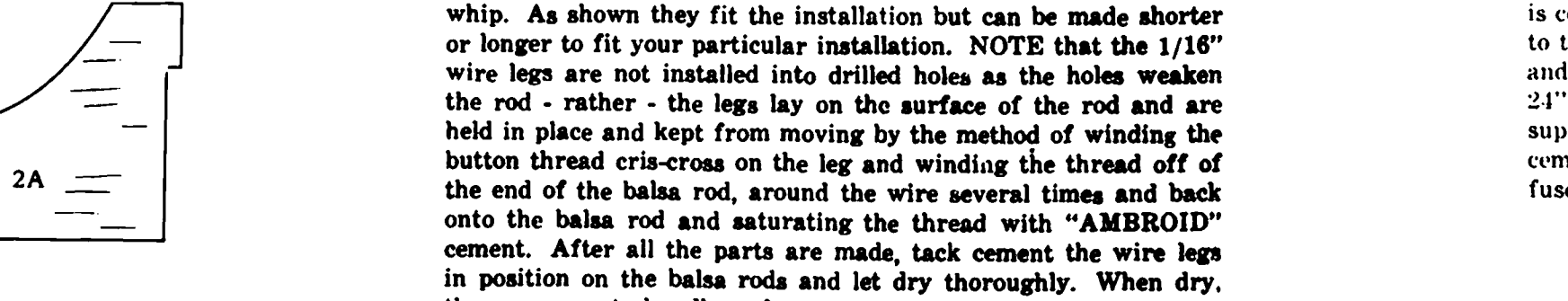
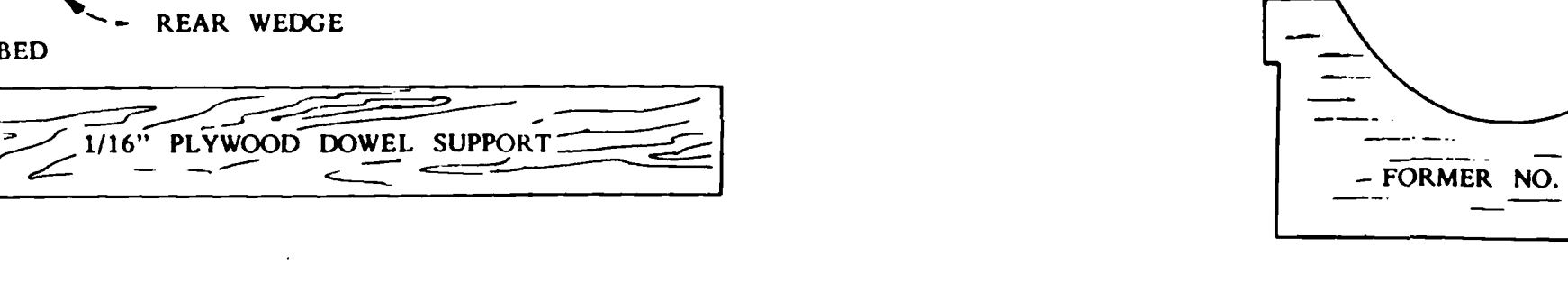
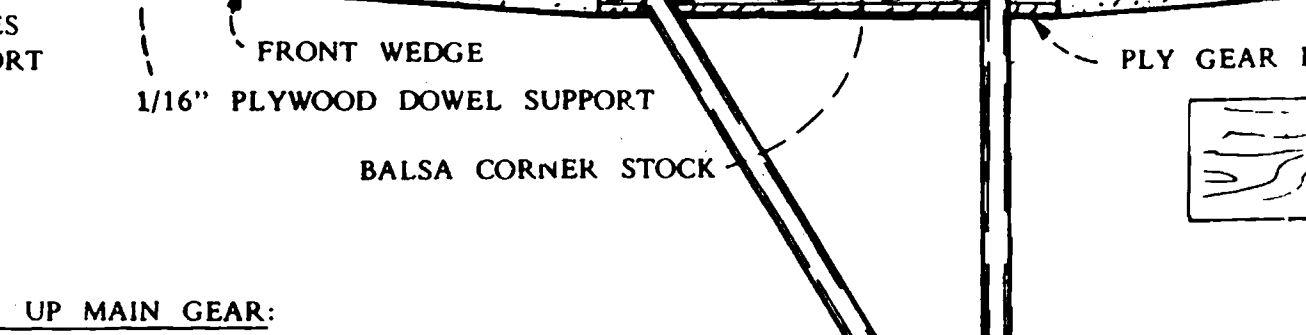
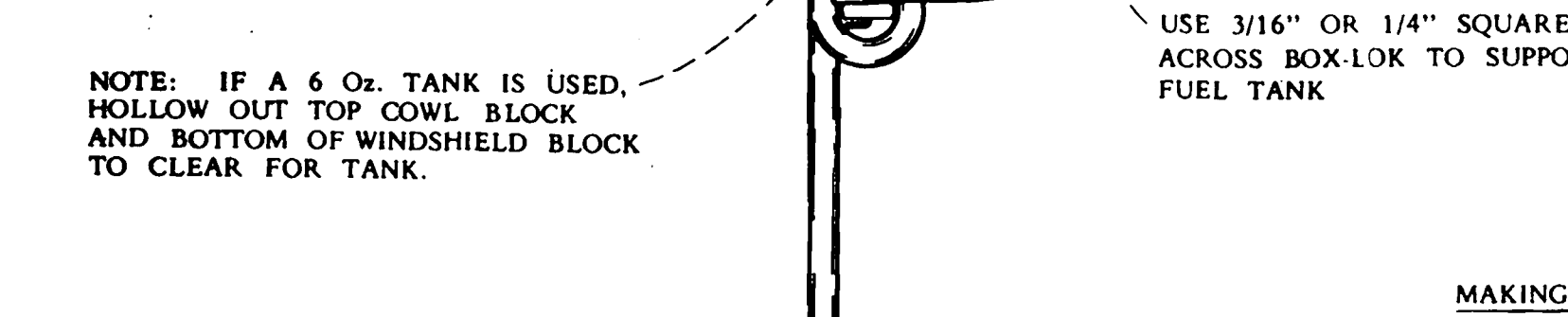
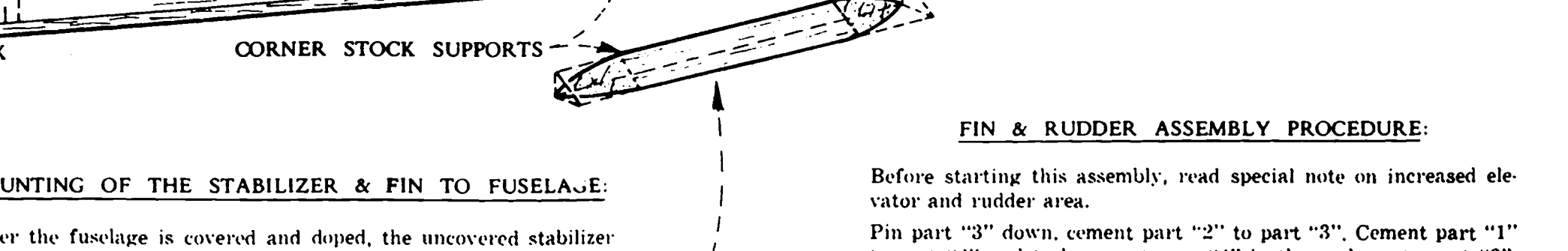
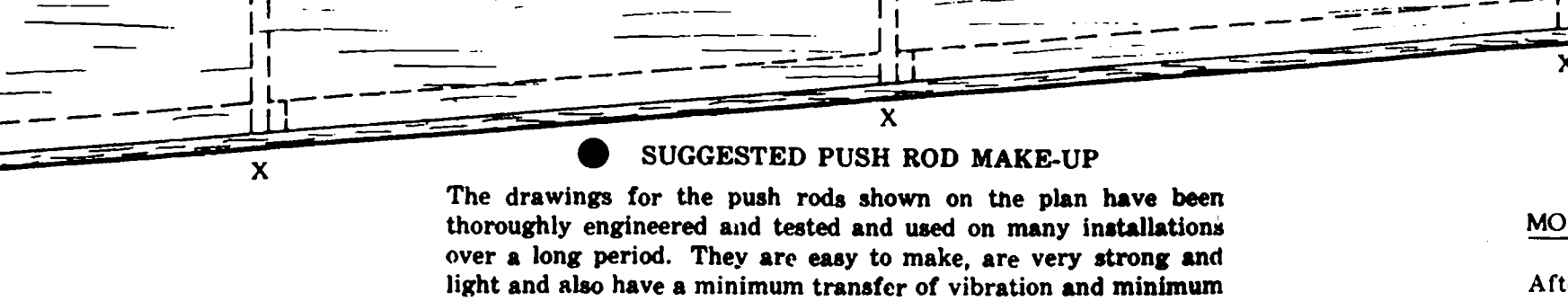
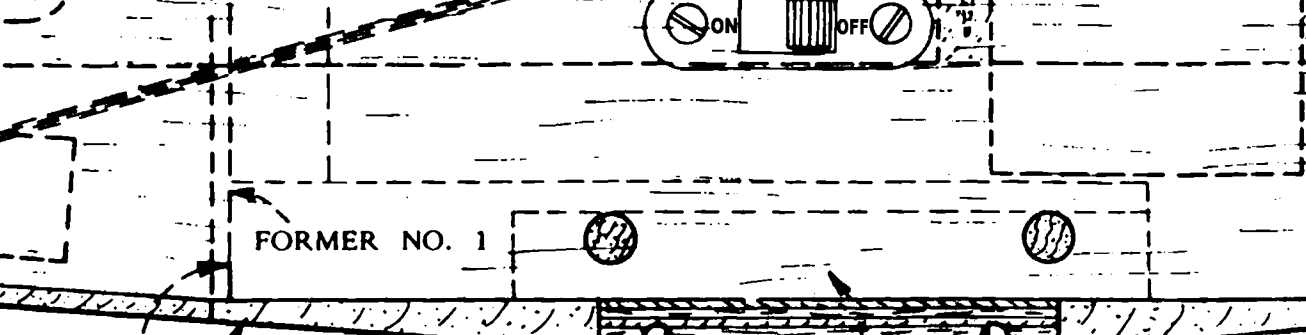
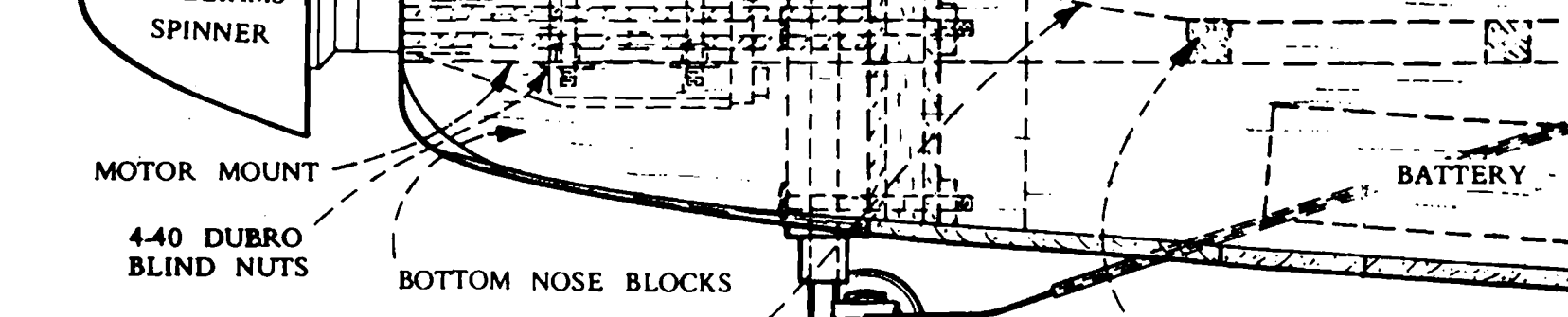
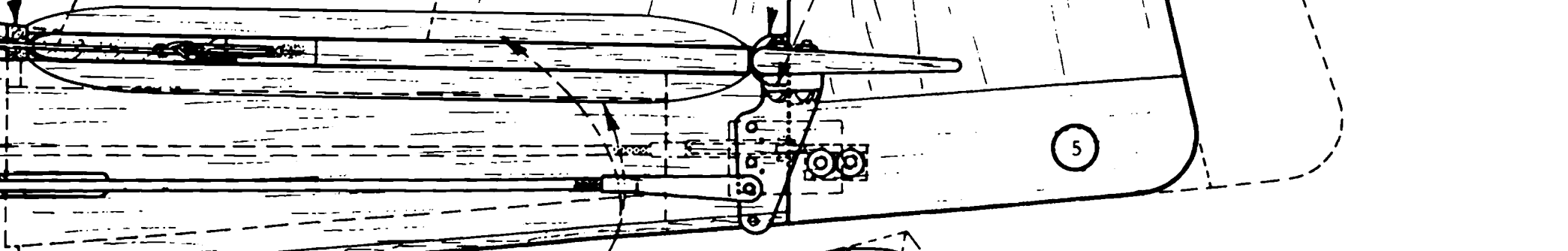
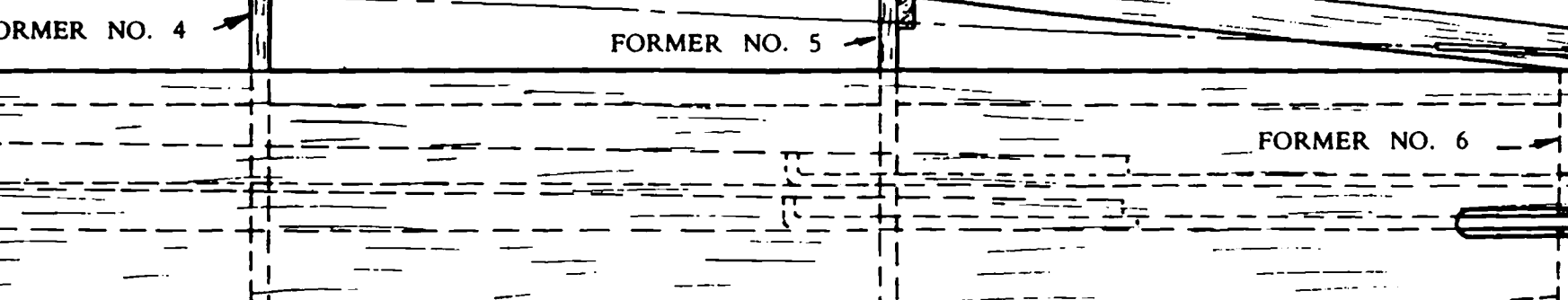
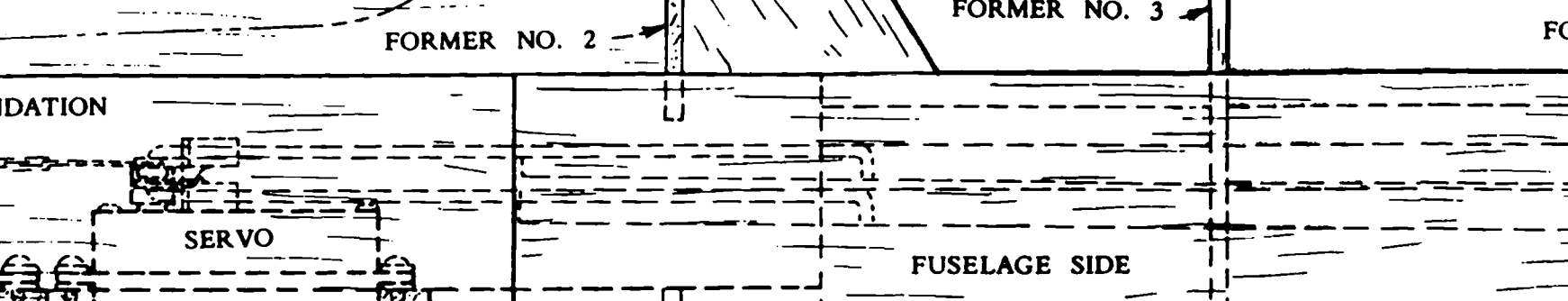
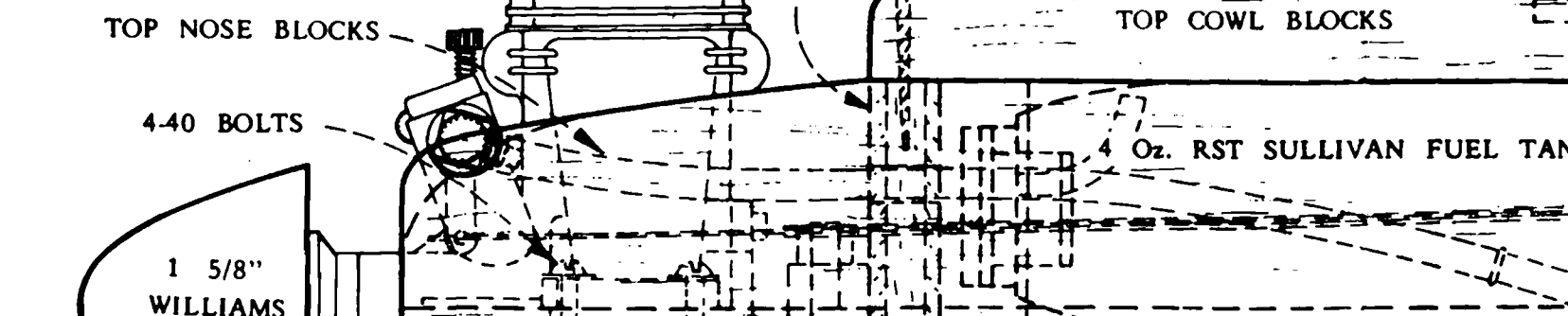
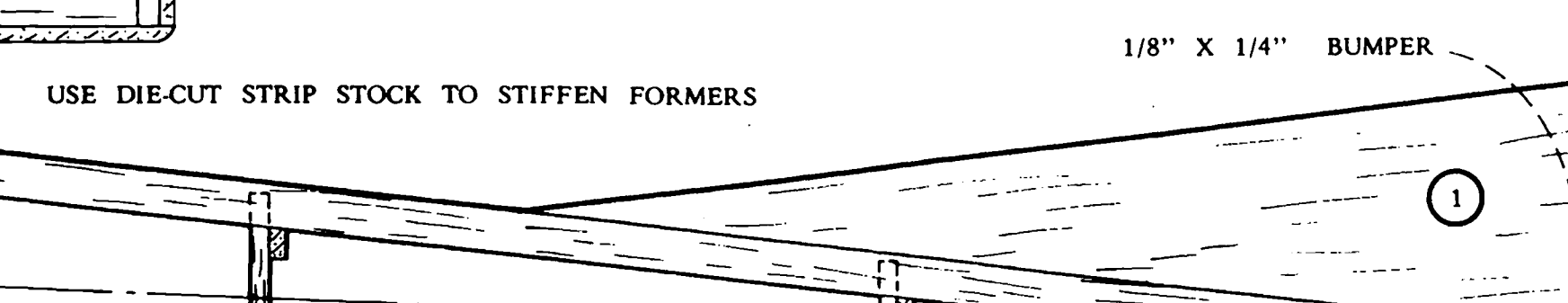
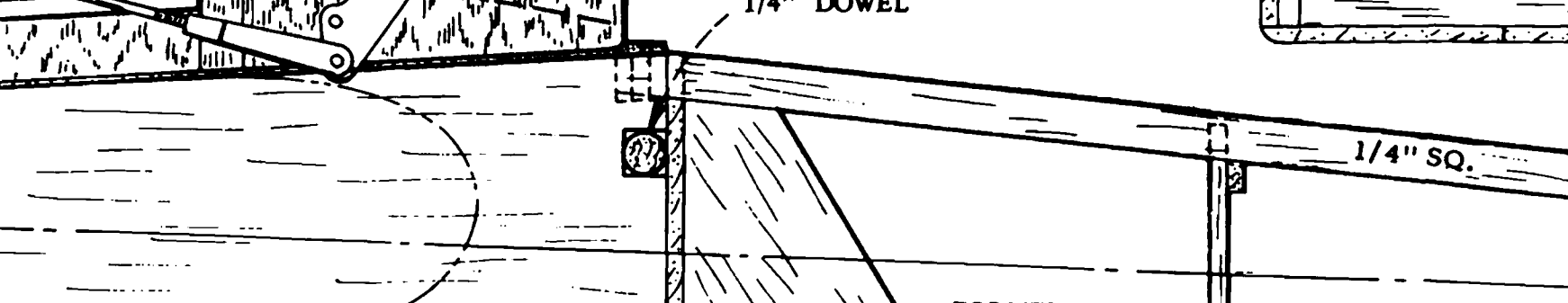
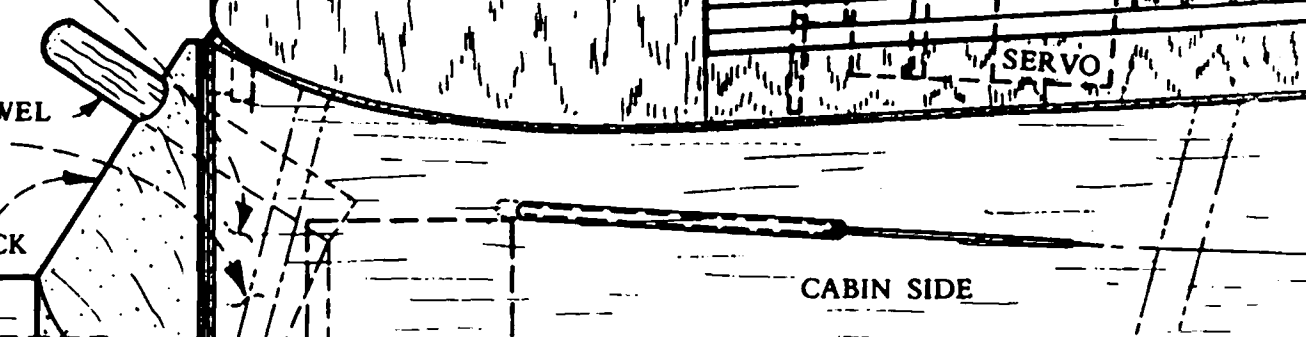
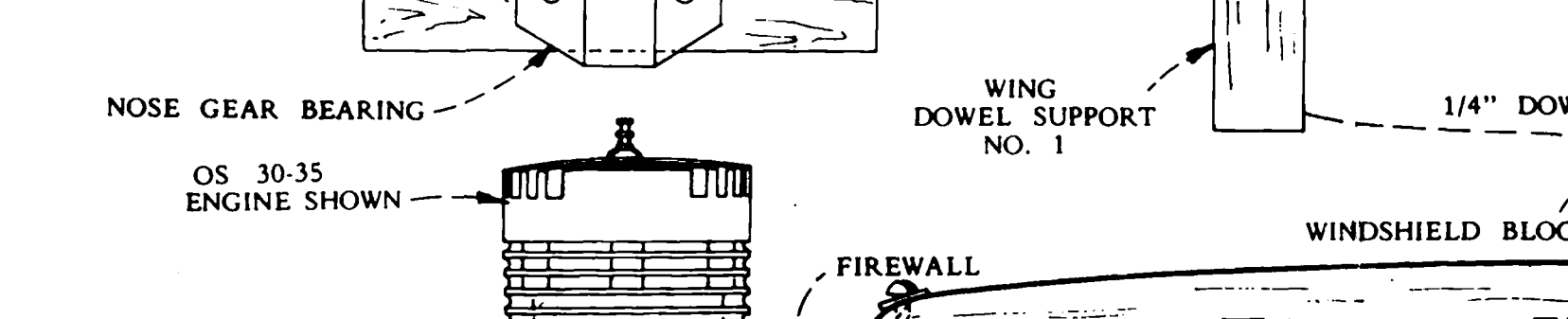
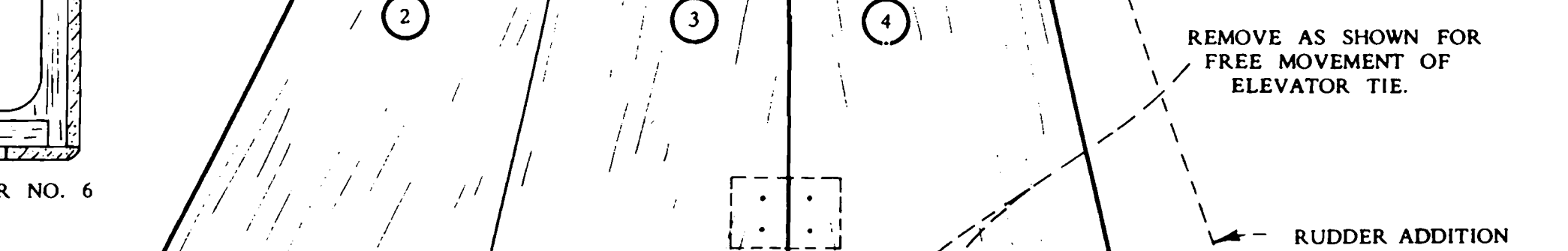
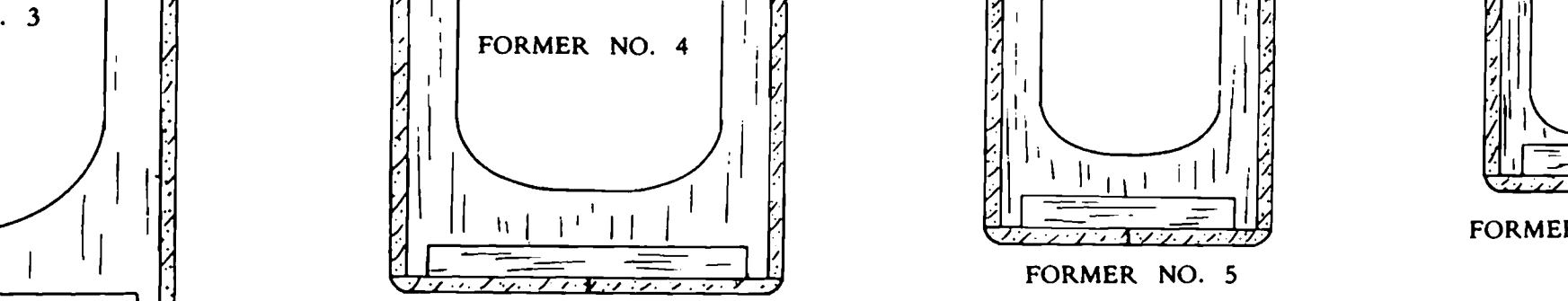
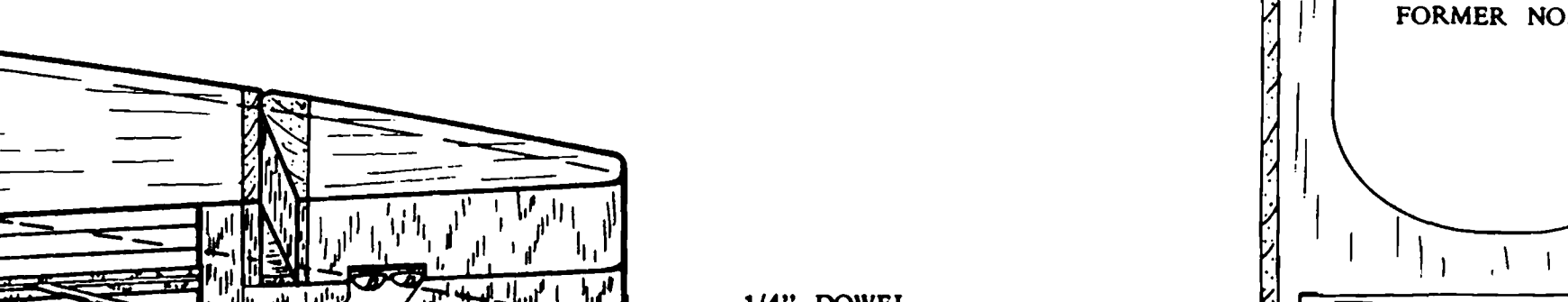
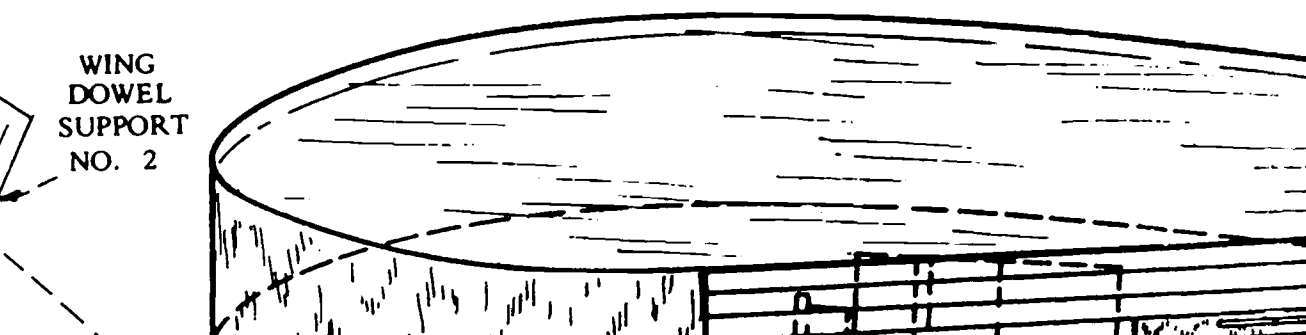
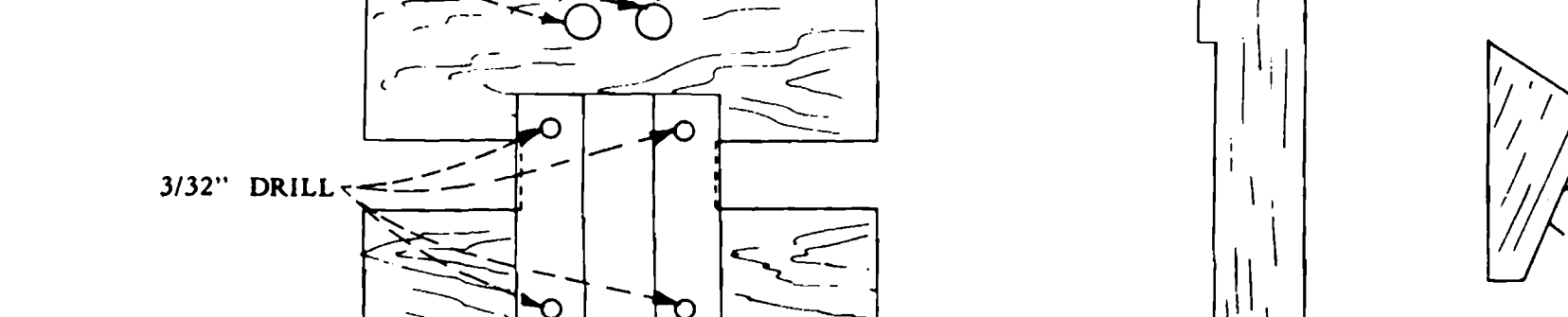
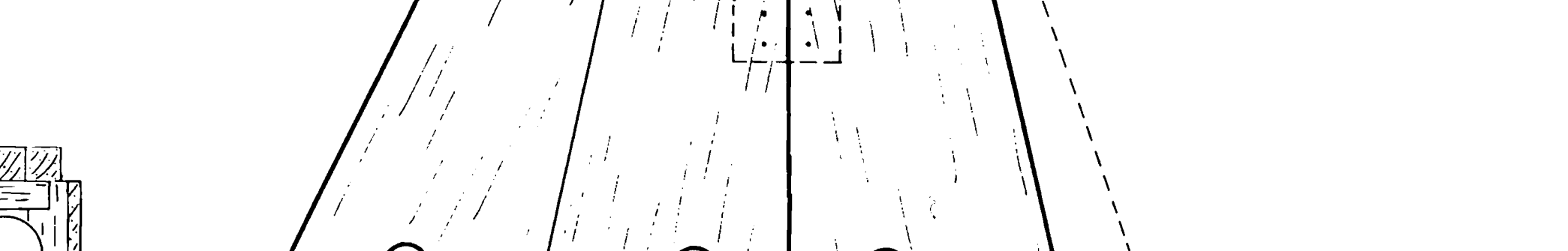
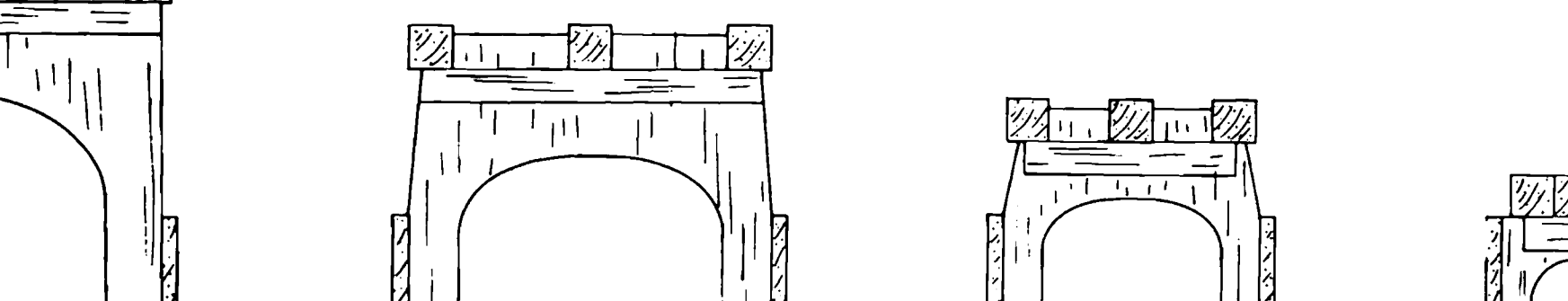
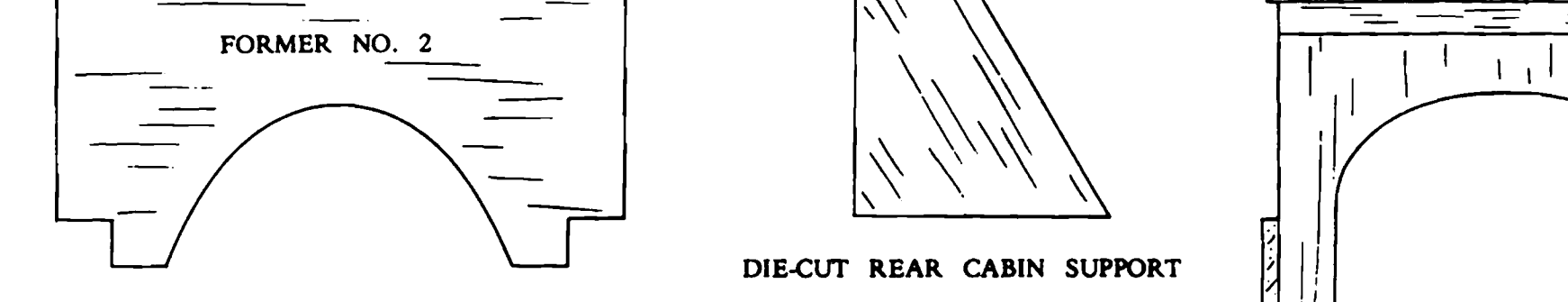
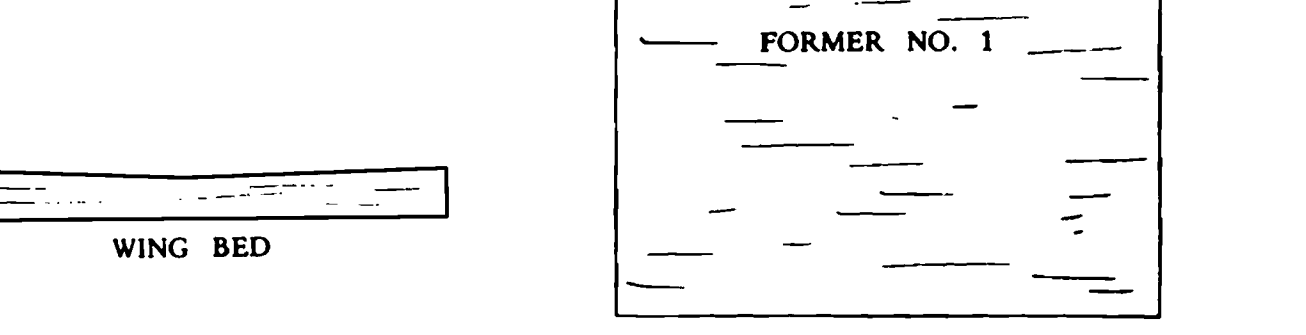
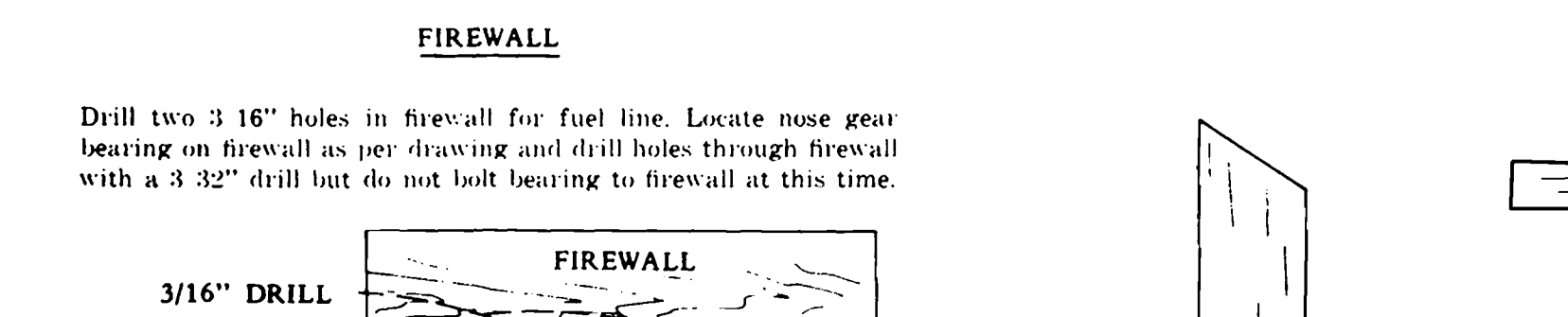
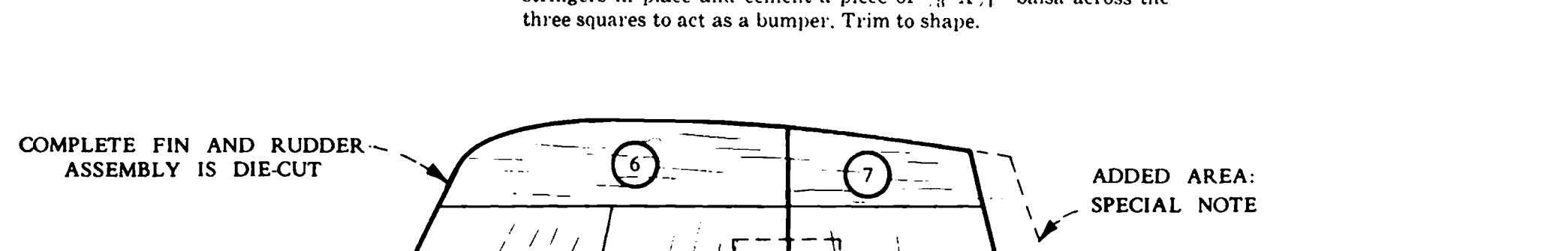
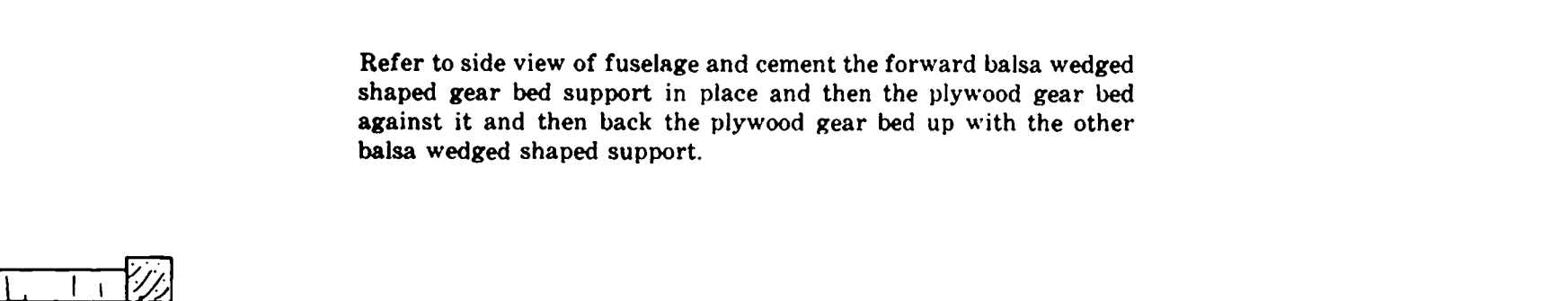
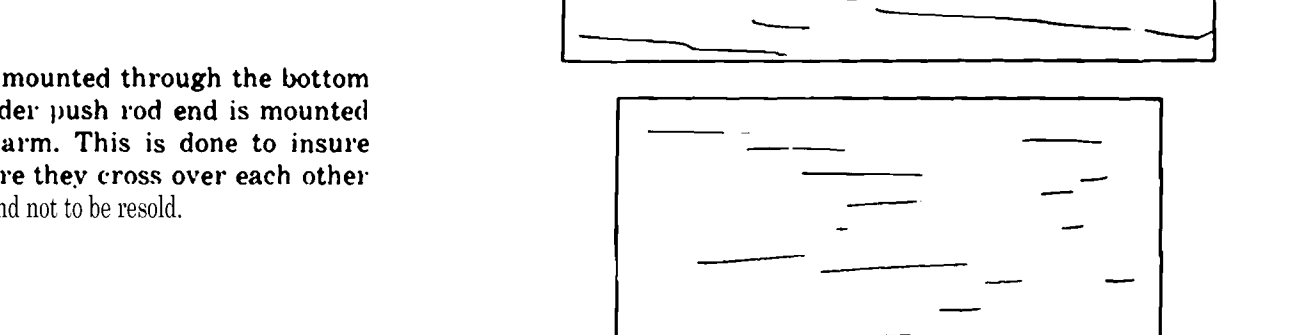
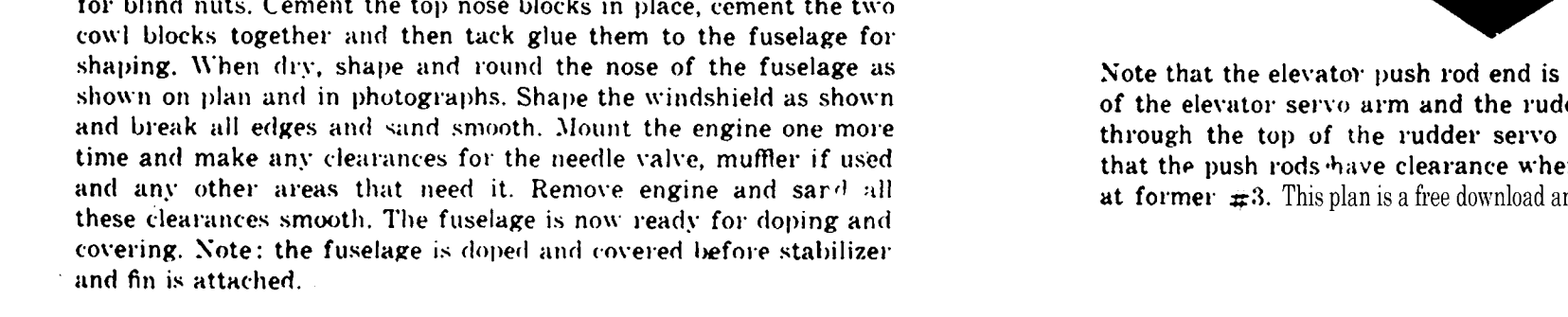
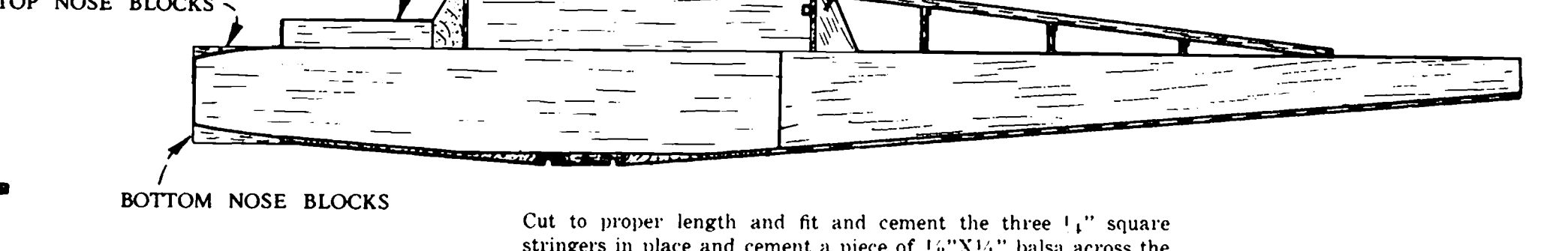
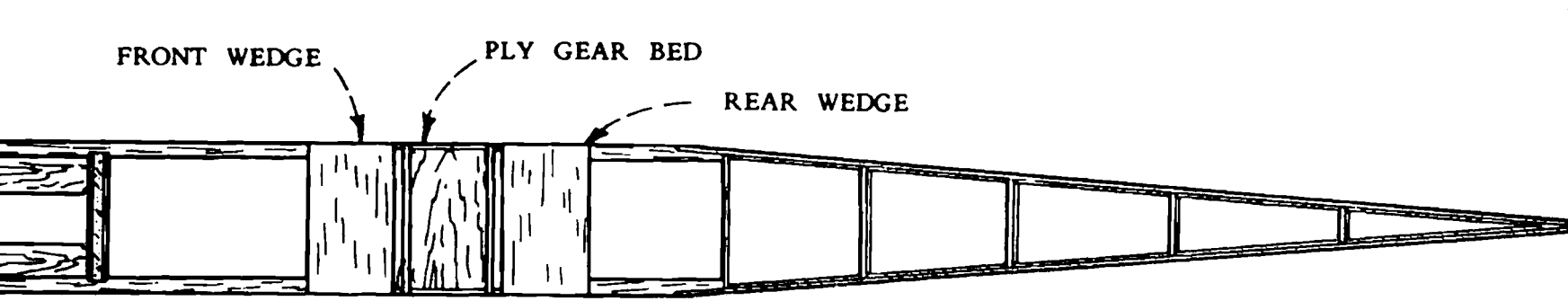
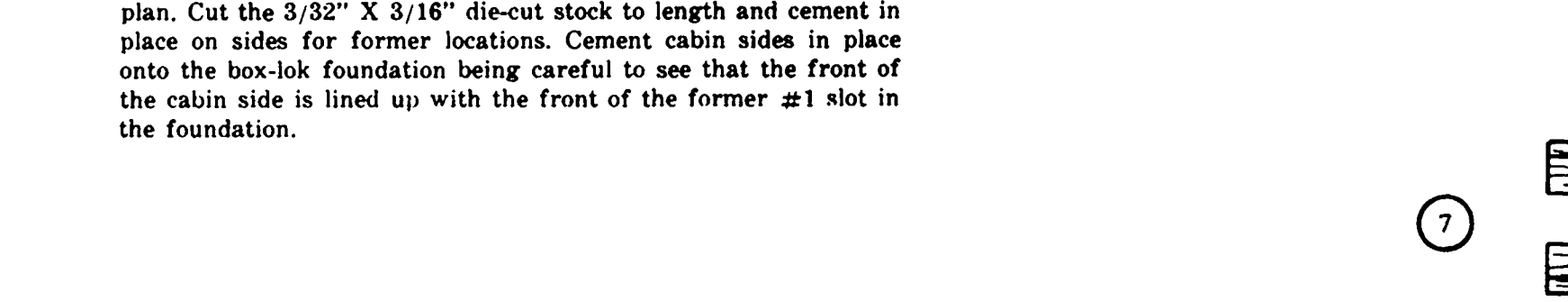
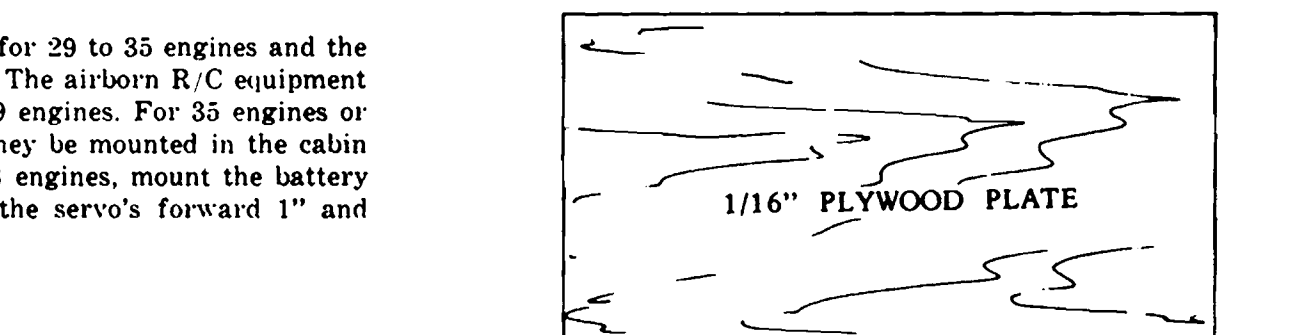
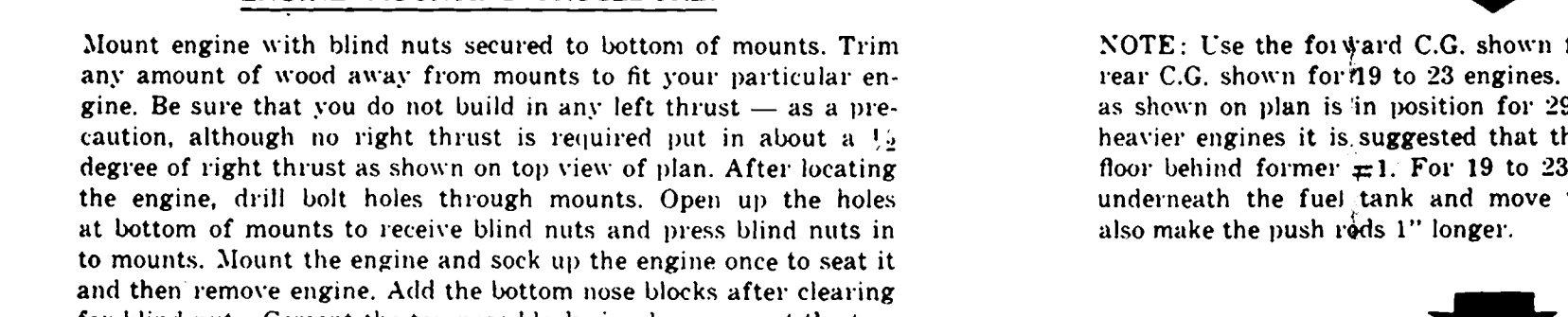
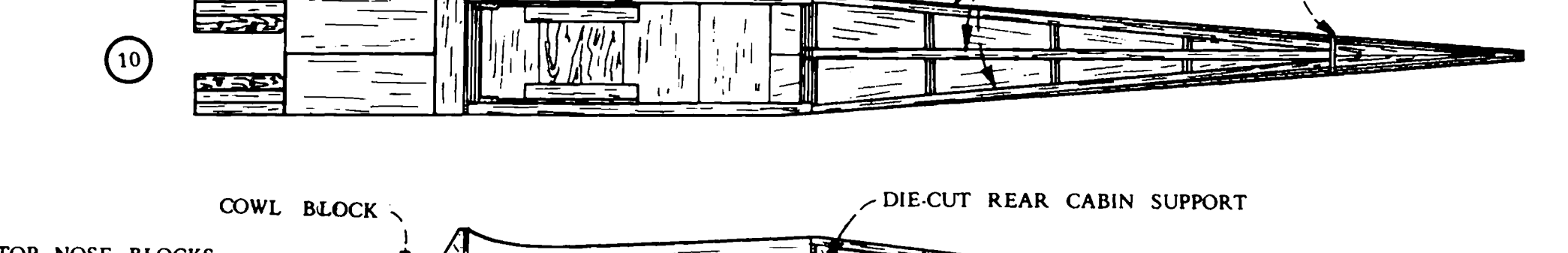
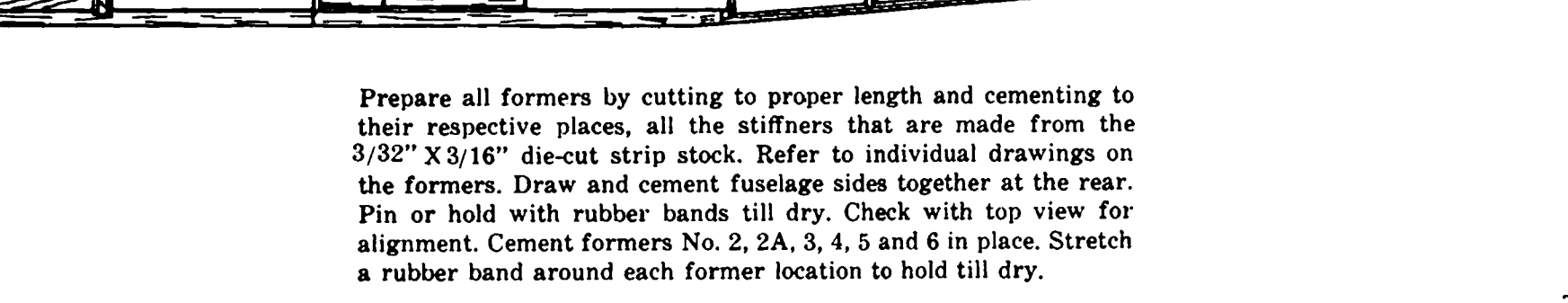
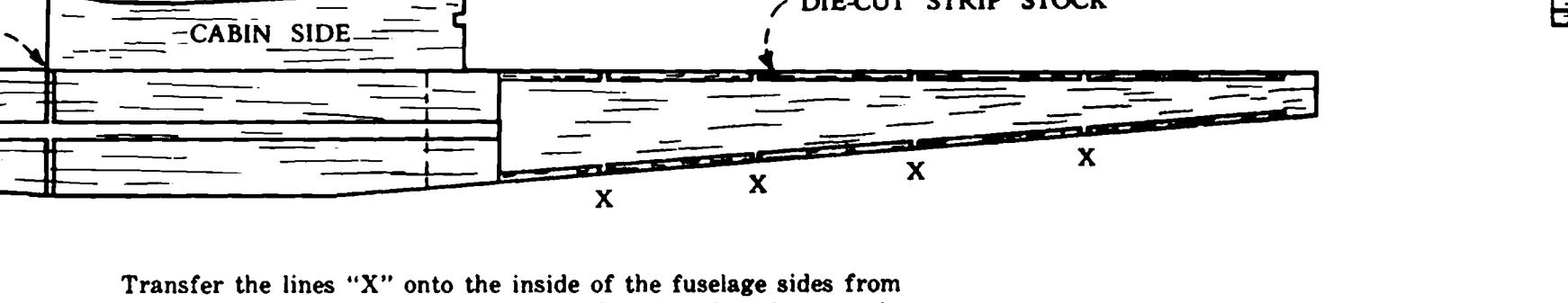
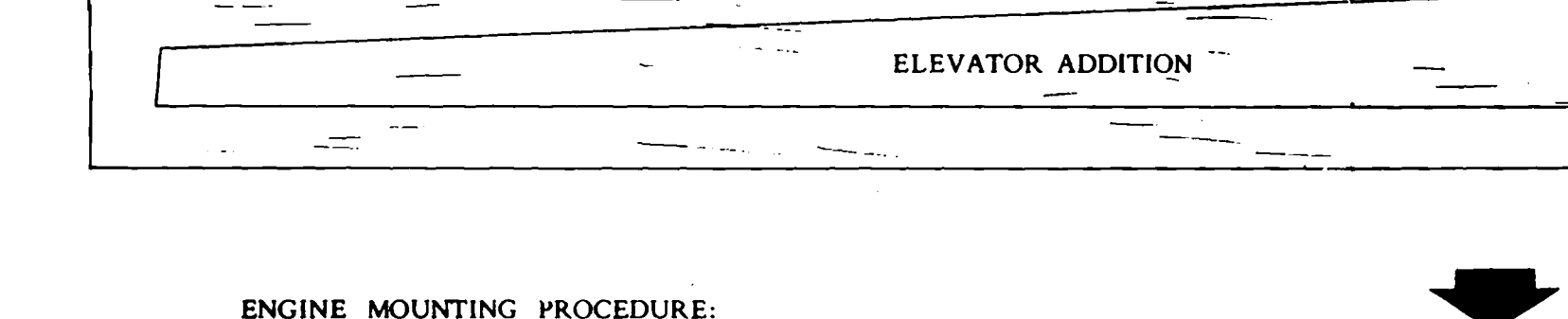
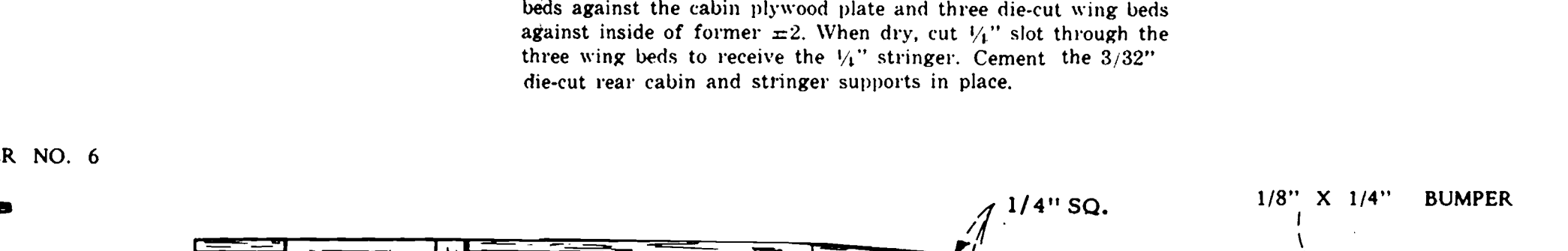
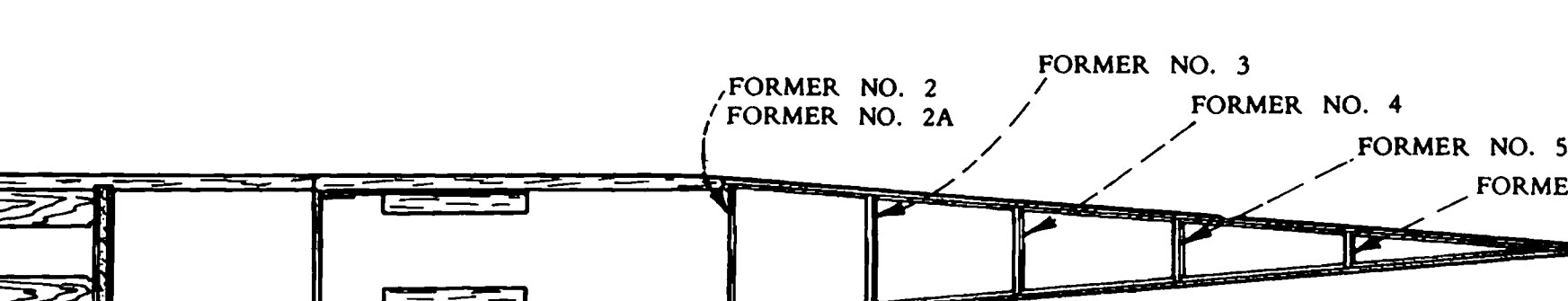
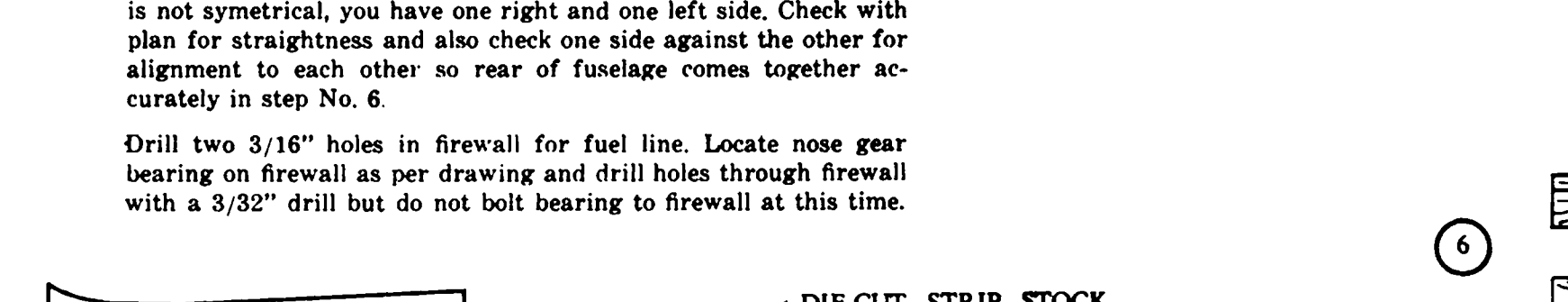
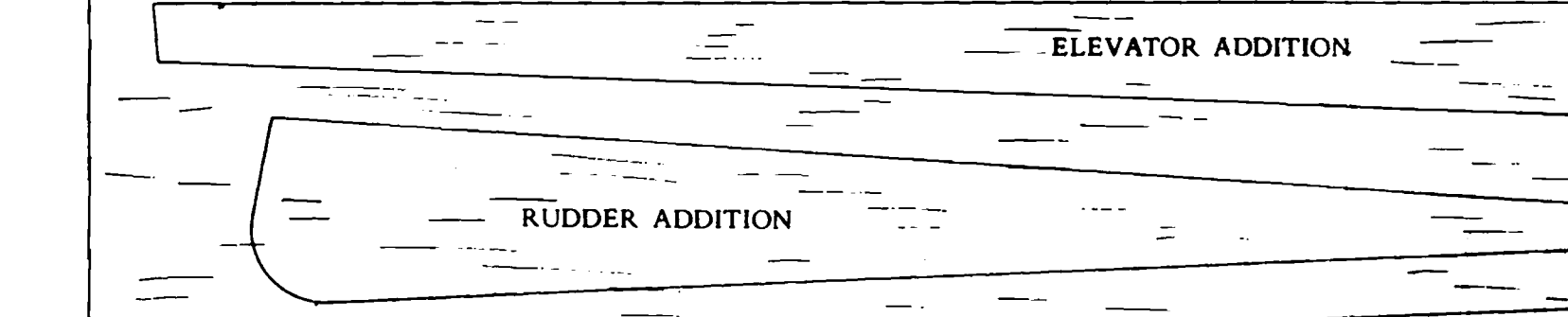
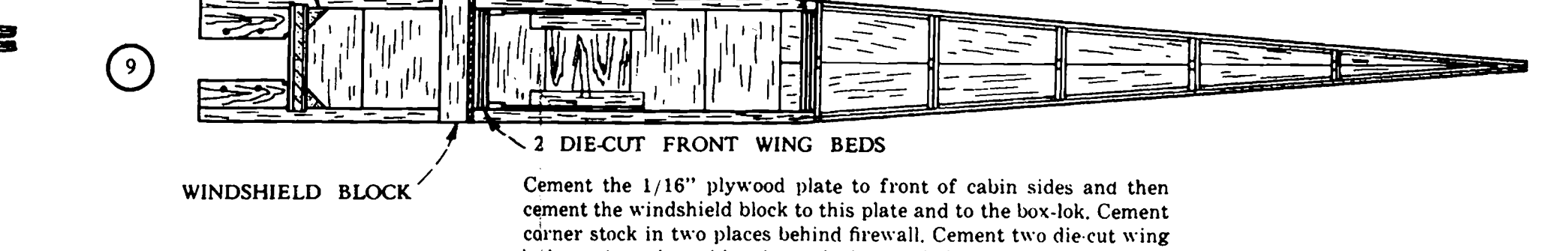
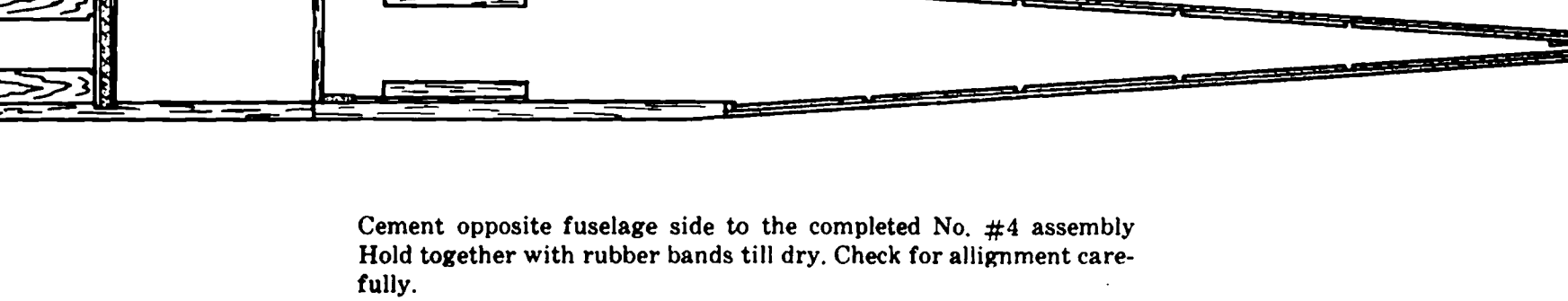
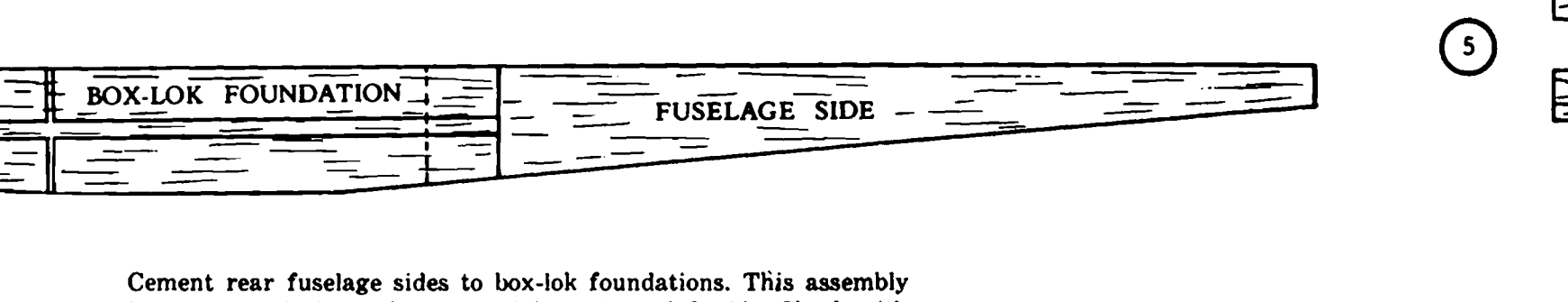
IMPORTANT PRE-WORK INFORMATION:
Remove all die-cut parts from sheets and orient them with the plan. Note that the forward end of the dorsal fin is not die-cut all the way - continue this cut with a razor blade before removing from sheet. Also, you will note that the two center ribs are partially die-cut in the servo bay to make it easier and more accurate when removing this area in preparing the lay. Sometimes when balsa is being sawed, the balsa might be under tension and becomes relieved during the sawing operation with the possible result of warped strips and leading edges etc. - If you encounter this on any part, simply straighten them by exposing them to steam over a kettle and straighten them out.

Multi **A-RAY** Multi
(AEROBATIC RAY)
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PLANS BY LOU ANDREWS AND BILL HARNEY



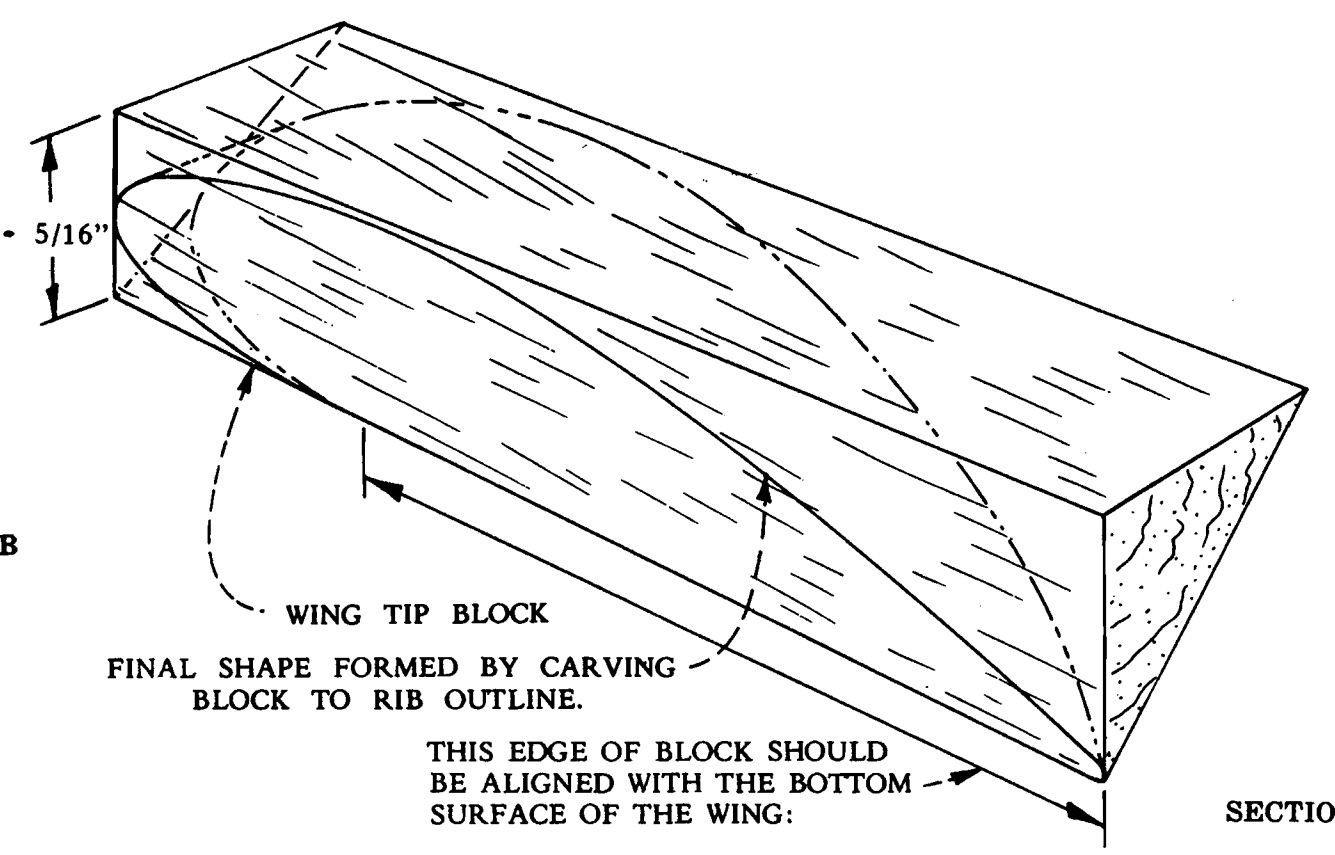
SPECIAL NOTE ON ELEVATOR & RUDDER ADDED AREA:
The area on the rudder and elevator as shown is fine for all flying and is adequate for all around maneuvering with the exception that the snap rolls are a little lazy and the spins take a little longer to get into. The added areas will increase the snap roll rate and also allow quick entry into spins. Add the extra area to the rudder and elevator by cutting out the parts from the 3/32\"/>

FUSELAGE ASSEMBLY PROCEDURE:

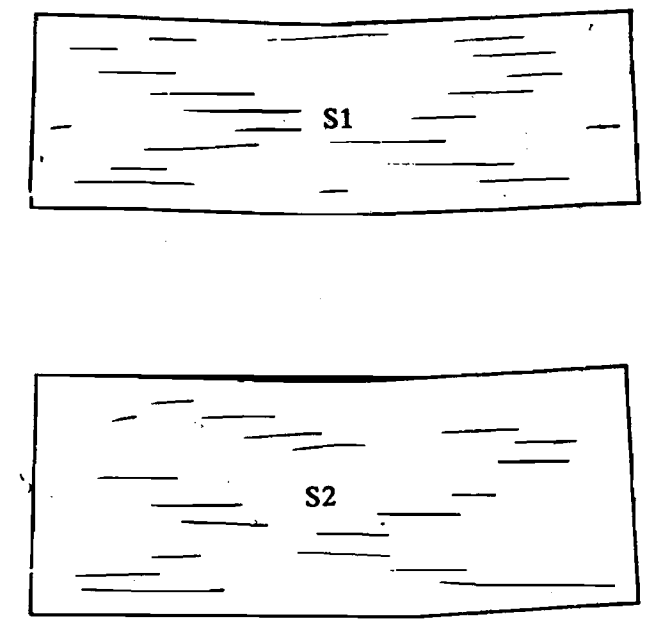




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ELEVATOR & STABILIZER ASSEMBLY PROCEDURE: Before starting this assembly, read special note on increased elevator and rudder area. Pin sheet "A" to board and pin and cement part "B" to part "A". Notch elevator leading edge in center as shown and fit and cement 3/16" dovetail elevator tie to elevator. Tack cement in 4 places the elevator to the stabilizer and pin to plan. Cut the 3/16" x 7/16" x 10 3/4" strip of balsa exactly in half with a razor blade and cement to the ends of the elevator and stabilizer. Add the extra area to the elevator at this time if you wish. Remove the complete assembly from the board and shape the tips and round the tips and front of stabilizer and sand the whole assembly smooth. Separate the elevator from the stabilizer with a razor blade and round the leading edge of the elevator.



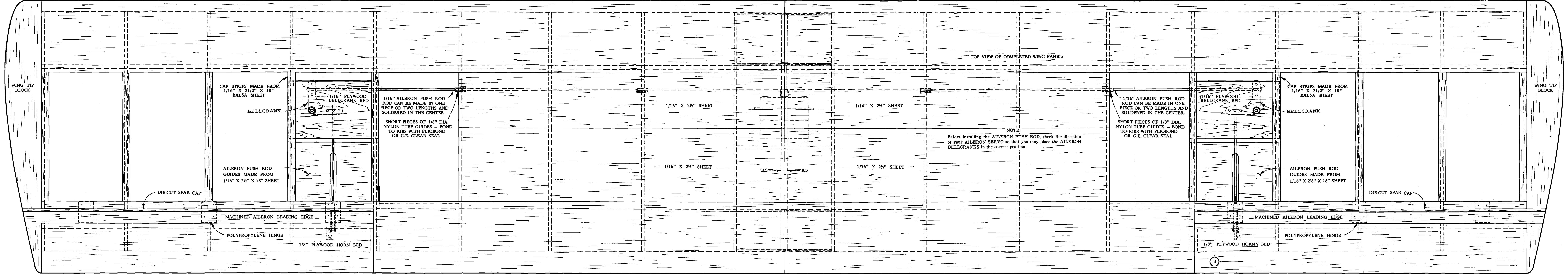
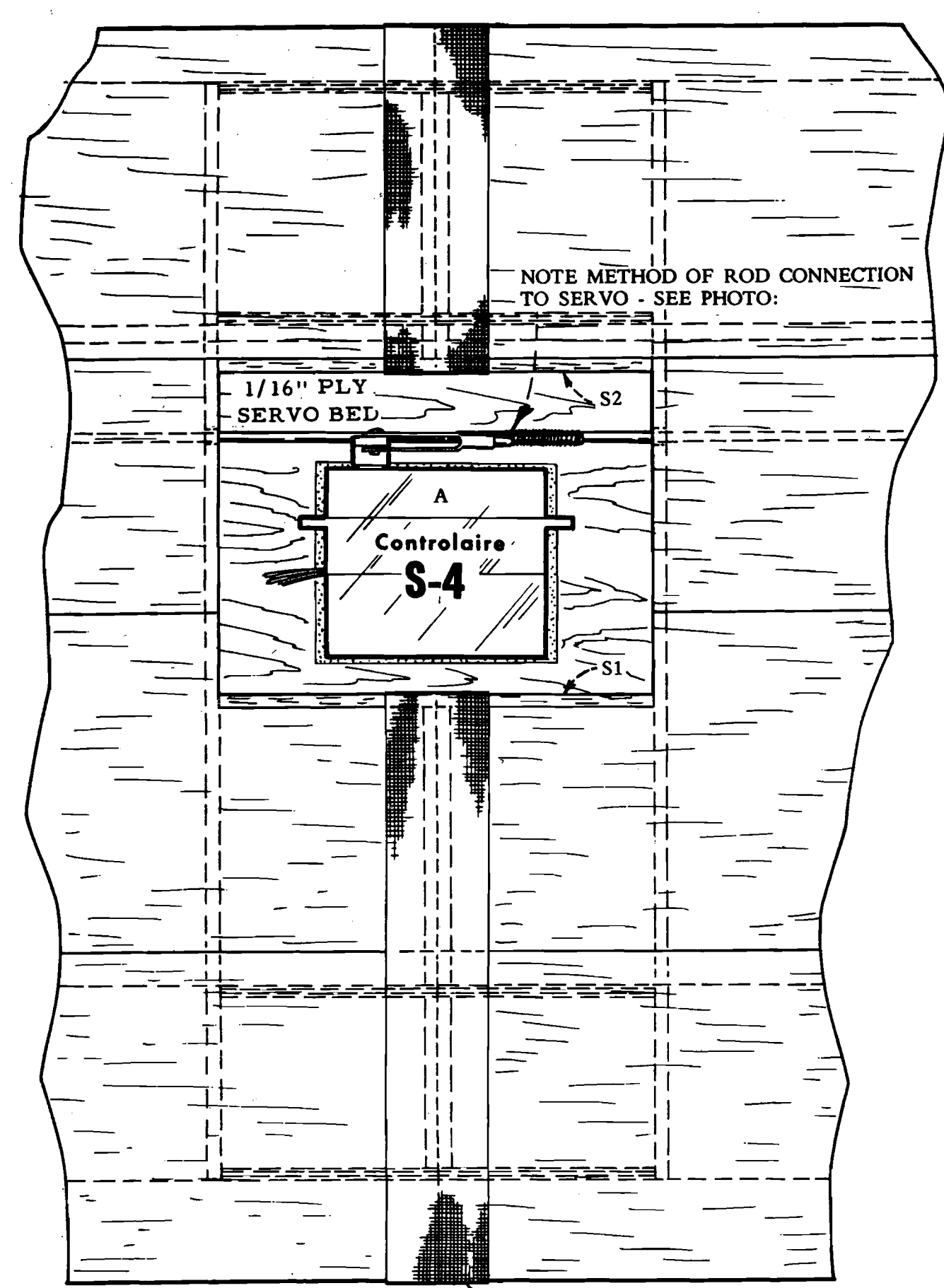
- 1 1/16" PLYWOOD SPAR TIE FRONT TOP SECONDARY
2 1/16" PLYWOOD LEADING EDGE TIE
3 1/16" PLYWOOD SPAR TIE REAR TOP SECONDARY
4 1/16" PLYWOOD MAIN SPAR TIE
5 1/16" PLYWOOD SPAR TIE REAR BOTTOM SECONDARY
6 1/16" PLYWOOD TRAILING EDGE TIE

WING ASSEMBLY PROCEDURE: From the 3/8" stock, trim all leading and trailing edge sheets to exactly 25" - measure or use plan as a measurement - length is determined from center of wing to outside of tip rib. The remaining 11" of each 36" sheet is later used for the center section sheeting. Also, trim all the leading and trailing edges, main, secondary and rear spars to 25" length - (measure or use plan as reference). Pin leading edge sheets in place on plan area that is marked "A" with the rear edge of sheet at rear edge of main spar location. Pin trailing edge sheet in place of plan area marked "B" - line up rear edge of sheet with trailing edge of wing. Cement trailing edges of wing to sheets "B" - line up rear of trailing edge with rear of sheet "B". Place main and bottom rear spars in their approximate positions on plan. Line up exact positions using several ribs as guides. Butt the ribs to the trailing edge and mark the exact position of spars onto sheet with a soft pencil. Remove ribs and cement the spars in place on sheet. Using ribs as a guide, locate, mark and cement the bottom aileron spar in place - (make from the die-cut 3/32x3/16" stock).

Cement all but the center No. #5 ribs into their respective positions. Cement ribs to sheet "B" to spars but not to sheet "A" at this time. Cement leading edges in place. Cement plywood horn bed in place against trailing edge, to rib #1 and to the sheet but not to rib #2 and against aileron bottom spar. Cement riblet R2A to rib #2 and cement riblet R2B to plywood horn bed, against the aileron trailing edge and to aileron spar but not to rib #2. Remove the wing panels from plan. Apply cement to all ribs and leading edge. Bring up the bottom sheet to meet the ribs and leading edge and pin till dry. Cement ribs #5 together and let dry. Pin one wing panel accurately to plan again in the upright position. Trim the leading and trailing edges and main and bottom rear spars on both panels only enough to have them fit snug with the opposite wing panel raised 2" off the board as measured from the bottom of the sheet at the main spar at the tip rib. Now position and cement the two R5 center ribs in place. Cement the top front and rear secondary spars in place and also the all of the plywood spar ties. Fit and cement the top leading and trailing edge sheet in place on the wing panel that is flat on the board. When dry, raise

this panel 2" off the board and lay the other panel flat on the board and fit and cement the top sheet in place. When dry, remove wing from board and fit and cement all center section sheeting in place. Position and cement the 1/16" plywood bellcrank beds in slots in ribs R2 and R3 on both panels. Make cap strips from the 1/16"x2 1/2"x18" sheet and fit and cement in place on the ribs that require them. Make and cement the aileron push rod guide sheets in place. With a sanding block, sand the tip ribs flat and true and from the wing tip block saw two tips about 1/4" longer than required and cement and pin to wing tips as per drawing. When dry, remove excess balsa from the top of the block till it blends in with the aileron and also on the front bottom of the aileron - refer to drawing. This procedure will automatically shape the plan view of the tip. The wing should now be cleaned up by rounding the leading edge as per airoff drawings and gently breaking all corners on the trailing edges and tips and sanding the complete wing smooth. This plan is available as a free download. This plan is not to be sold.

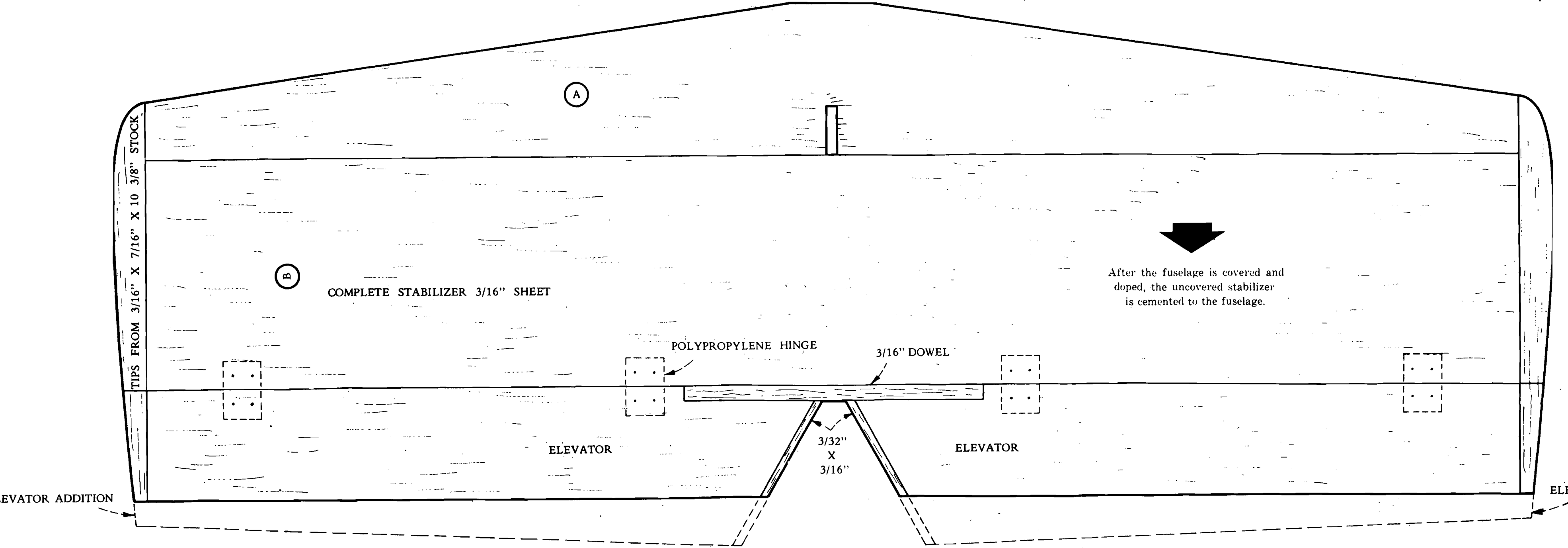
SERVO BAY & AILERON REMOVAL PROCEDURE: Carefully measure from plan and mark onto center of wing with a soft pencil the location of the aileron servo bay area to be cut out. Remove the sheet and portion of the center ribs that are already partially die-cut through and cement the 1/16" plywood bed in place and also the S1 and S2 partitions. Measure 1-15/16" in from the trailing edge of wing and draw a pencil line from rib R2 on the aileron side and out to the tip on the top and bottom of the aileron area to be removed. Draw a pencil line onto the sheet between R2 and R2B - refer to plan for accurate location. Refer also to photograph. With an X-Acto saw, carefully saw through between R2 and R2B and through wing tip. With a razor blade or knife, cut through top and bottom sheet at pencil lines and remove enough sheet so you can see through the area. Saw or cut through all the ribs in the area until the aileron separates from the wing. Clean up the surfaces by trimming all the rib stulls flush and flattening out the surfaces with a sanding block - refer to drawings. Cement the die-cut spar caps in place and cement the machine shaped leading edge to the aileron. When dry, trim and clean up the aileron and aileron bay and make a final fit of aileron to wing so you have a 1/32" gap all around. Prepare and mount bellcrank and pushrod on each panel.



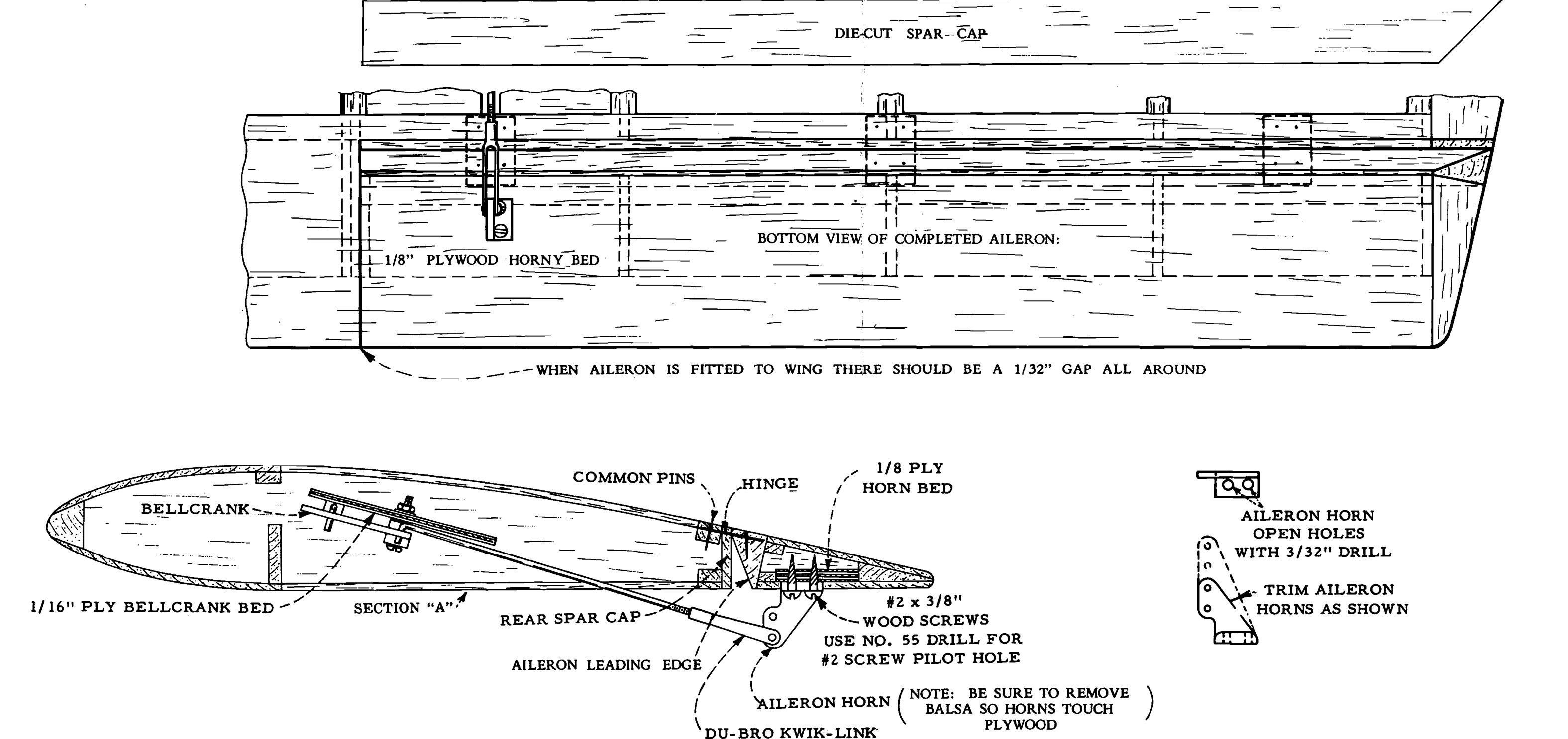
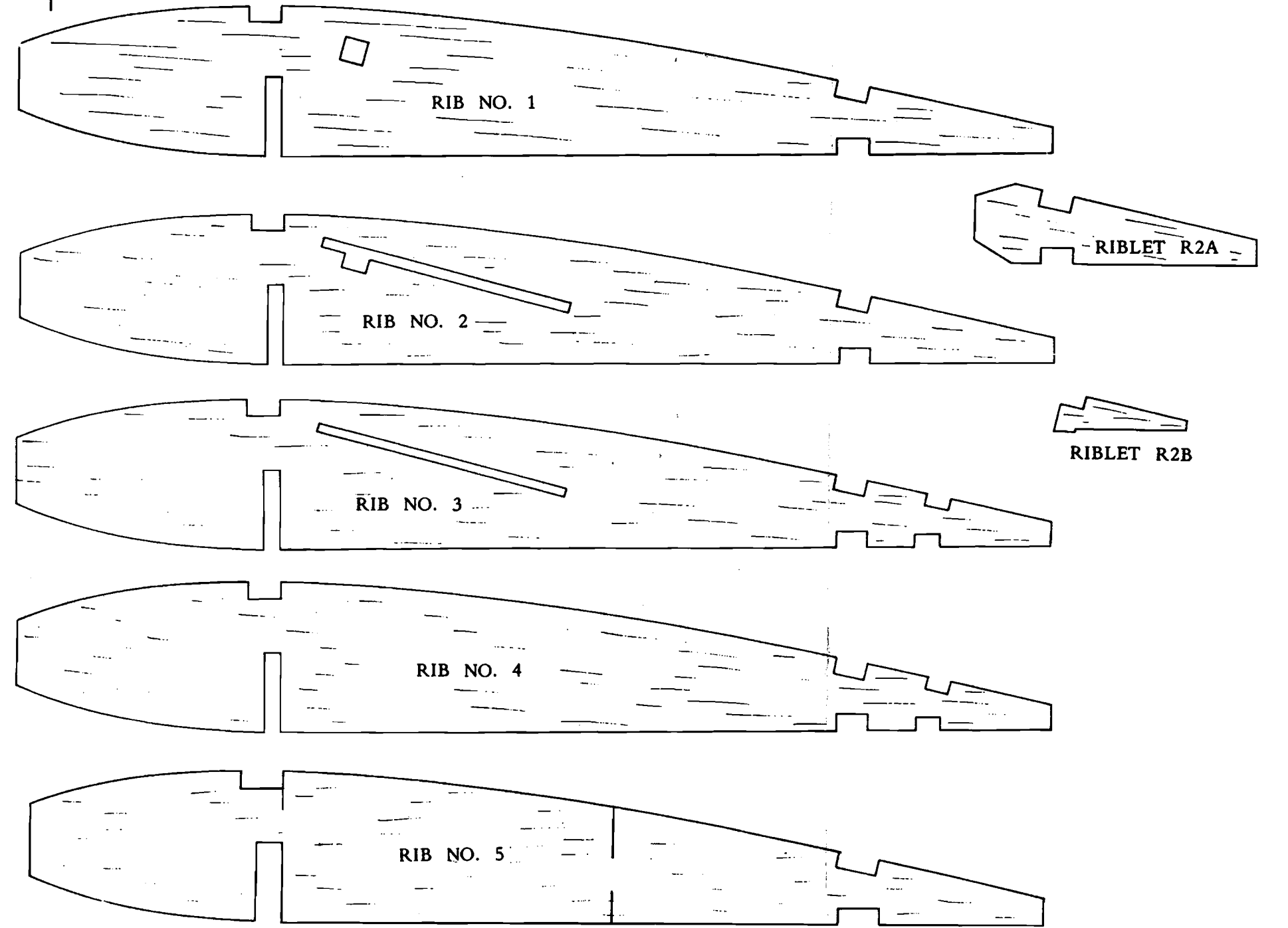
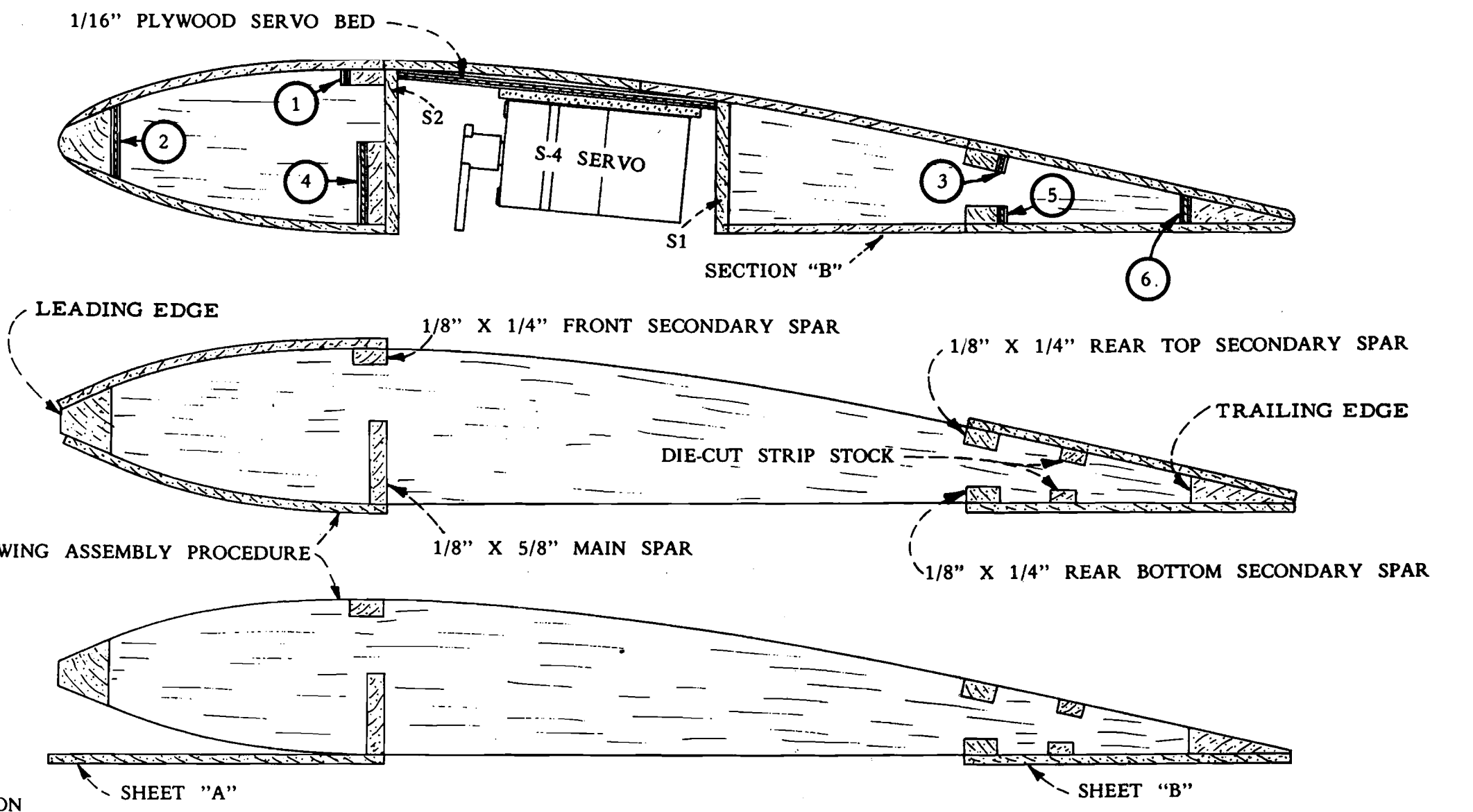
NOTE: Before installing the AILERON PUSH ROD, check the direction of your AILERON SERVO so that you may place the AILERON BELLCRANKS in the correct position.

NOTE: SHORT PIECES OF 1/8" DIA. NYLON TUBE GUIDES - BOND TO RIBS WITH FLOIBOND OR G.E. CLEAR SEAL

NOTE: BE SURE TO REMOVE Balsa SO HORNS TOUCH PLYWOOD



After the fuselage is covered and doped, the uncovered stabilizer is cemented to the fuselage.



AILERON HORN OPEN HOLES WITH 3/32" DRILL TRIM AILERON HORNS AS SHOWN