RYAN STA

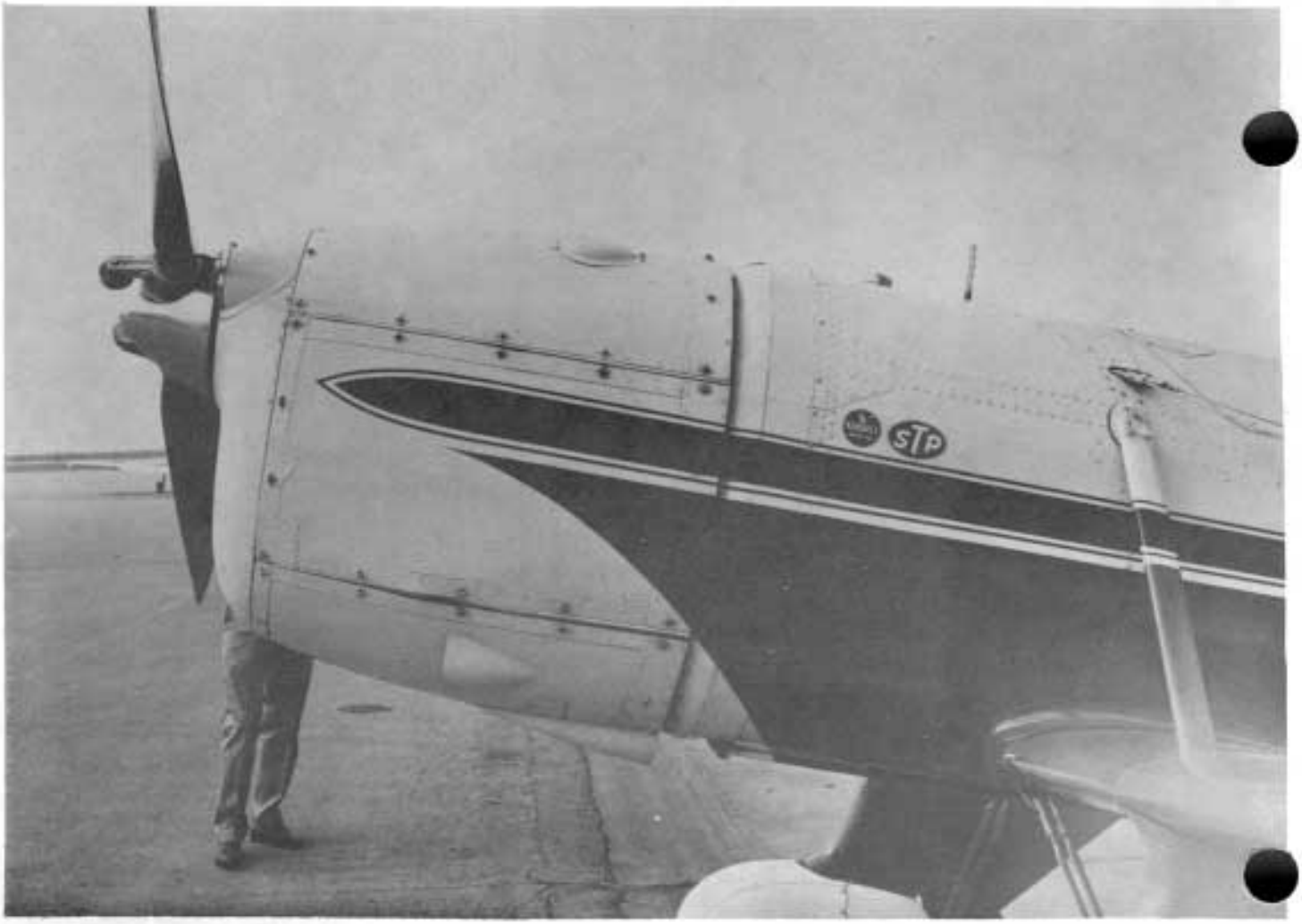
BUILDING INSTRUCTIONS

SIG®

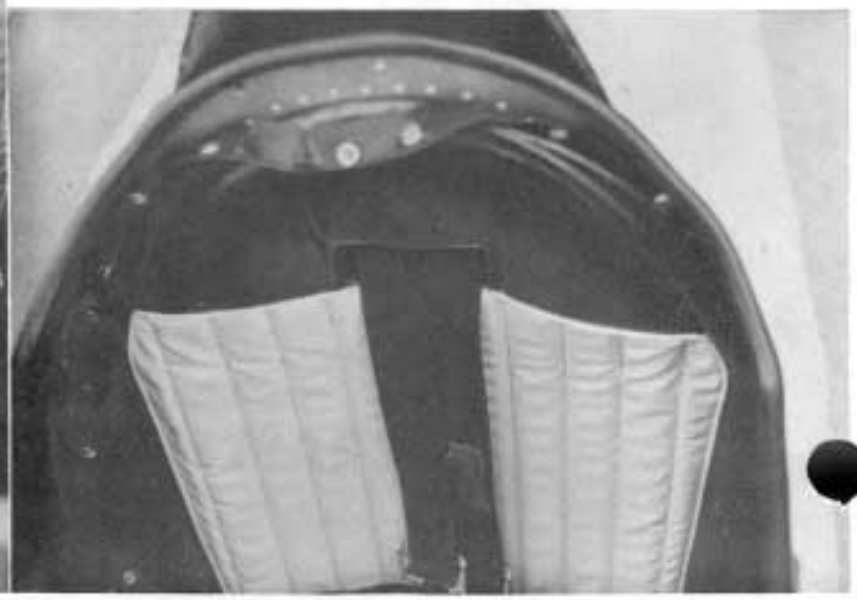
CRAFTSMAN'S KIT

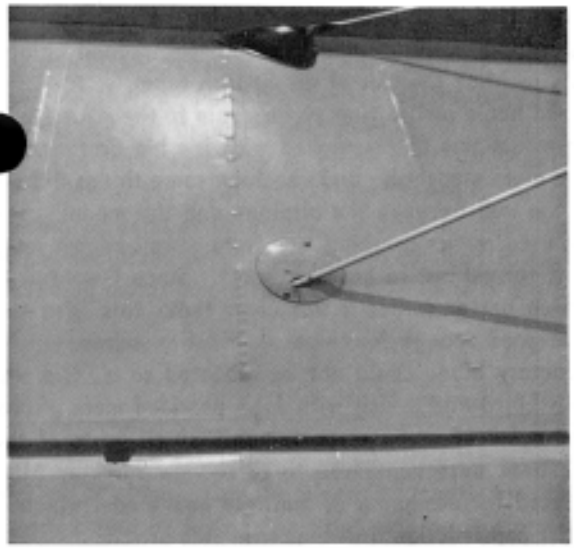
SIG MFG. CO. INC.

KIT NO RC-27

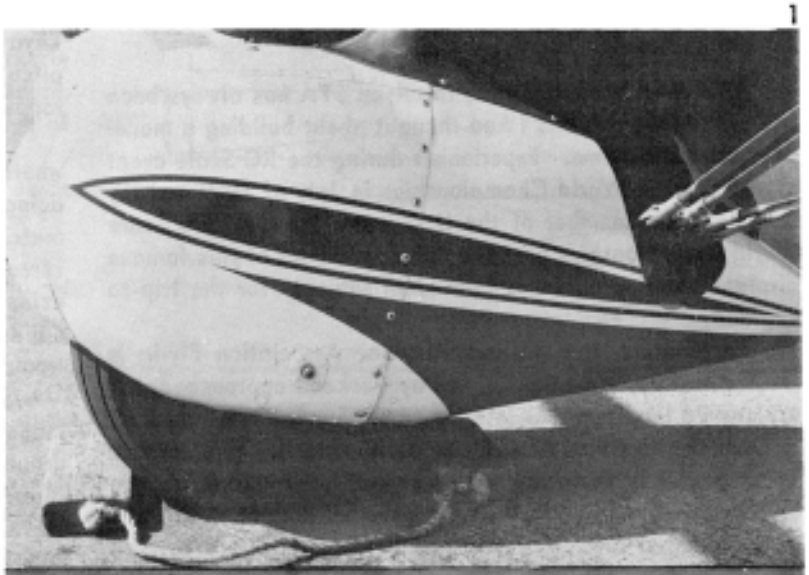


The rear cockpit wall is covered with black leatherette, held in place with snaps. Black shoulder straps pass through the center of the back wall. Seat cushions are made from white vinyl plastic. The back cushion is thin to allow plenty of space for a parachute.

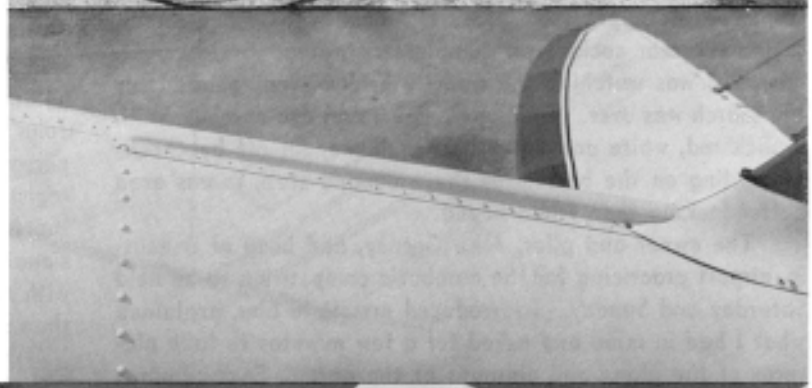




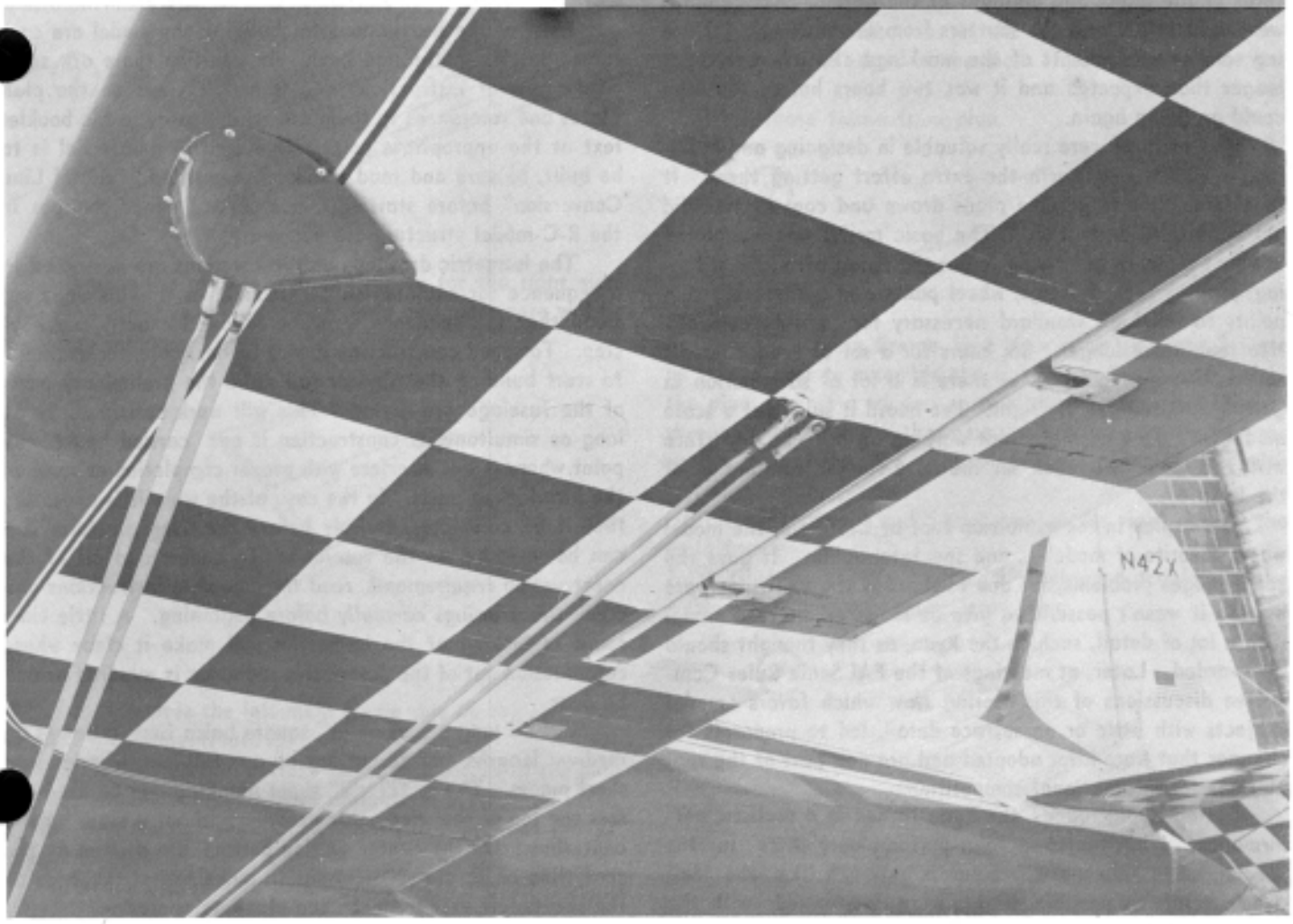
WING FLYING WIRE ATTACHMENT POINTS



DORSAL FIN FAIRING



DETAIL ON BOTTOM OF WING



By Maxey Hester

Like most scale builders, the Ryan STA has always been one of my favorites and I had thought about building a model of it for a long time. Experiences during the RC Scale event at the Bremen World Championships in July of 1969 and my selection as a member of the U. S. team for the 1970 Scale World Championships brought the classic lines of this famous airplane to mind again as the ideal subject for the trip to England.

Fortunately, the Antique Airplane Association Fly-in is located nearby, so as the Labor Day weekend approached, every day I'd load cameras into my trusty Super Cruiser and fly to Ottumwa to try and catch any early arrivals. Five or six Ryans generally show up for this annual get-together of rare old timers. But I was looking for a special kind of Ryan - one with a painted fuselage instead of bare metal and a covered front cockpit to provide a place to mount R-C equipment, saving the rear cockpit for complete detailing.

As I was watching the activity Friday evening, suddenly the search was over. Taxiing by was a real eye-catcher. With a slick red, white and black color scheme, set off by checkerboarding on the bottom of the wing and stab, it was even better looking than I had hoped.

The owner and pilot, John Gosney, had been at a nearby airport practicing for the aerobatic competition to be held Saturday and Sunday. I introduced myself to him, explained what I had in mind and asked for a few minutes to take pictures of the plane and closeups of the parts. Four cameras were used. This kept the shutters from overheating! Including some measurements of the markings, the job took a lot longer than expected and it was two hours before the man could go flying again.

The pictures were really valuable in designing and building, so it was well worth the extra effort getting them. It took some time to get the plans drawn and construction did not start until early 1970. The basic model was completed in about a month but trying to get the flying wires, rib stitching, pinking tape, fairings, wheel pants and many other fine points to the high standard necessary for world competition took much longer. Six hours for a set of rudder pedals sounds like a long time but there is a lot of satisfaction in getting a detail exactly right. I've heard it said that a scale model isn't done until you quit working on it. The departure with the team to London set the date for the completion of the Ryan.

On display in the exhibition tent at Cranfield, the model was a favorite of modelers and spectators alike. It gave the scale judges problems, for due to the way the FAI rules were written it wasn't possible to give as much credit to a model with a lot of detail, such as the Ryan, as they thought should be awarded. Later, at meetings of the FAI Scale Rules Committee discussions of this scoring flaw which favors model subjects with little or no surface detail, led to proposals for changes that were later adopted and are now part of the regulations for international competition.

During flying rounds, the Ryan turned in a realistic performance. I had watched John perform aerobatics in his Special, so to help make maneuvers as much like the full sized aircraft as possible, flights were performed with the Enya .60 throttled down and swinging a big 14" diameter, 6" pitch prop. Final results found the ship in second place, topped only by Mick Charles of the English team.

I arrived home just in time to go again to the AAA fly-in where the model was photographed with it's big brother. In doing some more measuring and checking some things did not match up too well between the airplane and the model. The three-view used in the dsigning was from a well-known magazine but it turned out to have mistakes. Since I wanted to build an even better model it was clear that this drawing wouldn't be good enough for the scale fidelity source.

Satisfactory plans could not be located so a trip was made to Rockford and a visit with John provided more photographs and a set of exact measurements of all parts of the aircraft. These were converted to three-view form by Mike Stott and used for designing an entirely new model which is shown in the construction drawings with this article.

In the interval between the first and second photo sessions a change in markings had taken place. The original holder of the license number N42X asked to have it back so John had traded it in to the FAA for N27JG, which adds the personal touch of his initials. The first model carries the old registration as it was when I originally saw the airplane, but the three-views show the new number. John adds an occasional small decal from time to time. If you want to keep up with these, try to catch him and the STA at one of his air show appearances.

BEFORE BEGINNING CONSTRUCTION

Most of the instructions for building the model are contained in this instruction book. In addition there are some paragraphs of instructions and isometric views on the plan plates and references to them will be indicated in the booklet text at the appropriate point. If a control line model is to be built, be sure and read the section entitled "Control Line Conversion" before starting, since several minor changes in the R-C model structure are necessary.

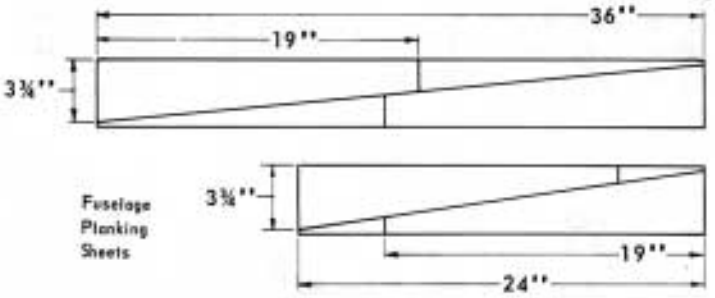
The isometric drawings and instructions are numbered in a sequence for explanation of techniques. This does not mean that the sequence must be followed exactly, step-by-step. To speed construction it may be desirable, for example, to start building the wing or tail while the preliminary parts of the fuselage are drying. This will work satisfactorily as long as simultaneous construction is not carried past the point where it will interfere with proper completion of some of the interlocked parts. In the case of the wing it is necessary that it be completed entirely before the wing platform Z-5 can be installed on the fuselage. To understand all of the construction requirements, *read the complete instructions and study the drawings carefully* before beginning. A little time spent in looking at the isometrics will make it clear where construction out of the descriptive sequence is required or can be done.

Cut all long pieces of ¼" square balsa first, followed by medium lengths, before cutting up any full-length strips into short pieces. The 3/32" x 2" sheet planking can be used across the top of the wing center section without a seam on the centerline. On the center section bottom, use a seam on the centerline on several 2" sections to make use of the ends of the sheets left over from the top planking operation.

Clean out and open up the machined notching marks in the special shaped aileron and flap part to a full 1/16" depth.

Cut the ⅛" planking sheets for the top and bottom of the fuselage as shown in the drawings.

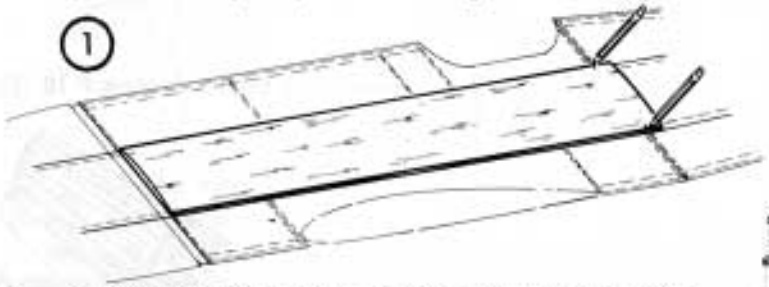
The framework may be glued with either Sig-Bond resin type glue or Sig-Ment solvent type cement. In any joint involving plywood or hardwood, Sig-Bond is the best choice. Areas subjected to unusual strain, exposed to fuel or oil, or including metal pieces should be epoxied with Sig Epoxy Glue.



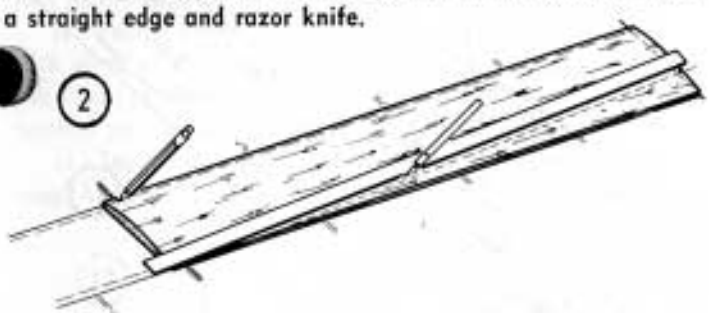
FUSELAGE ASSEMBLY

(Left and right are indicated as if seated in the cockpit)

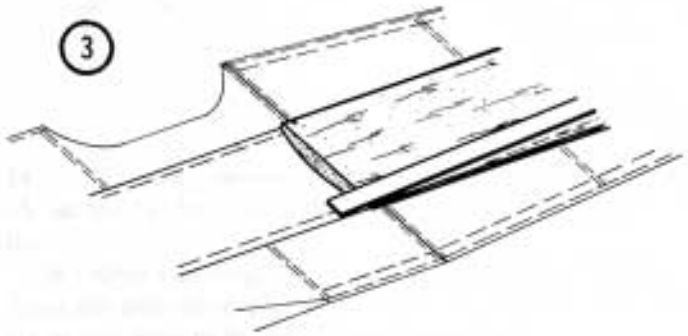
1. Fuselage sides are supplied partially shaped, ¼" x 3¼" x 19" long. Cut the pieces to length for the left side front portion by laying the flat side on the plan, marking with a pencil or ball point pen, and cutting with a razor saw.



2. Cut the taper in the rear portion of the left side with a straight edge and razor knife.



3. Repeat the process with the pieces for the right side. This time the *shaped side will be down* and more care will be necessary for accuracy.



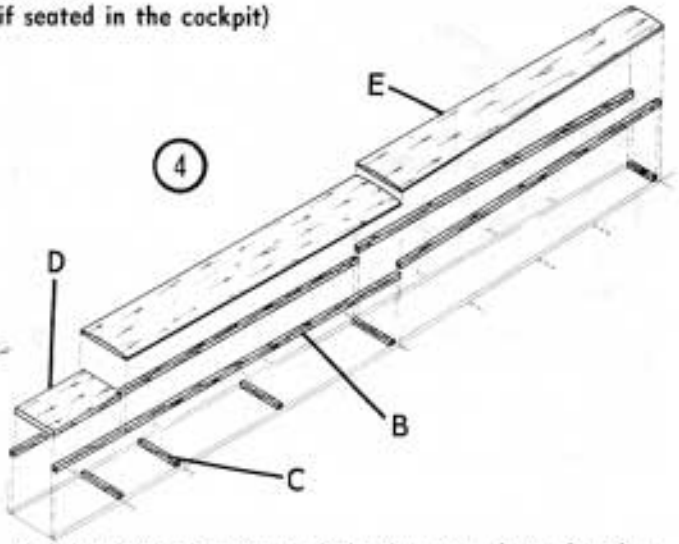
4. (a.) Assemble the left main frame side on the side view of the main frame. (Plate 2).

(b.) Pin the top and bottom ¼" square pieces to the plan.

(c.) Cement the ¼" square uprights in place.

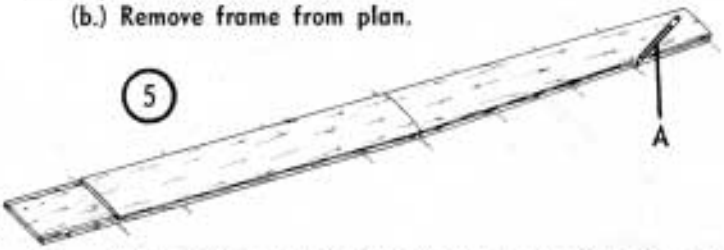
(d.) Add the ¼" sheet balsa front fill-in between the ¼" square longerons.

(e.) When dry, remove pins. Cement the shaped fuselage left sides to the main frame.



5. (a.) Mark the locations of the formers, shown by phantom lines, on the edges of the main frame sides with a pencil or pen.

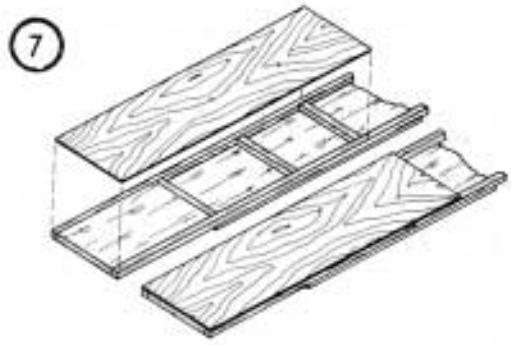
(b.) Remove frame from plan.



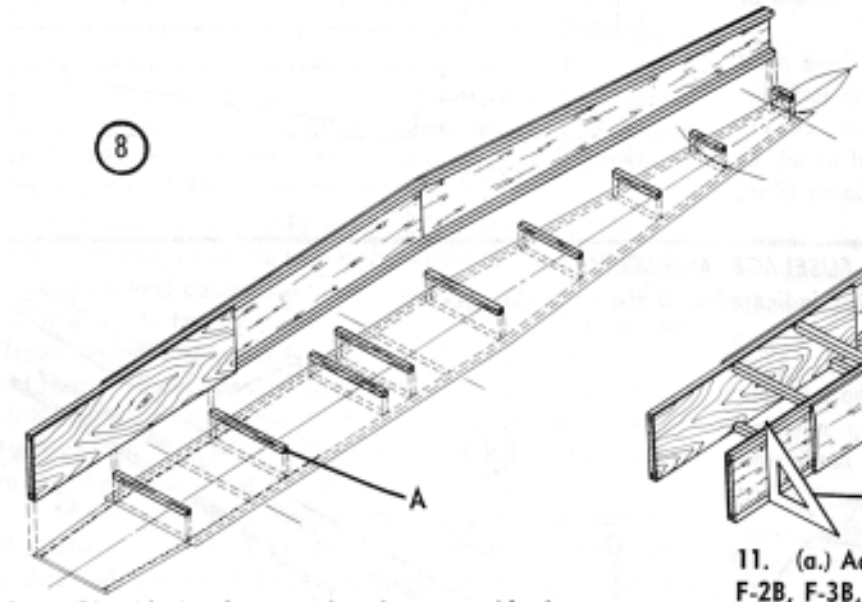
6. (a.)The Main Frame Side View plan on Plate 2 must be turned over to assemble the right main frame side. Hold the plan against a window so that the drawing may be seen through the paper. With a pencil, mark the ends of the lines on the back of the plan. Complete the drawing of lines with a straight edge.

(b.) Repeat steps 4 and 5 to assemble the right side of the main frame.

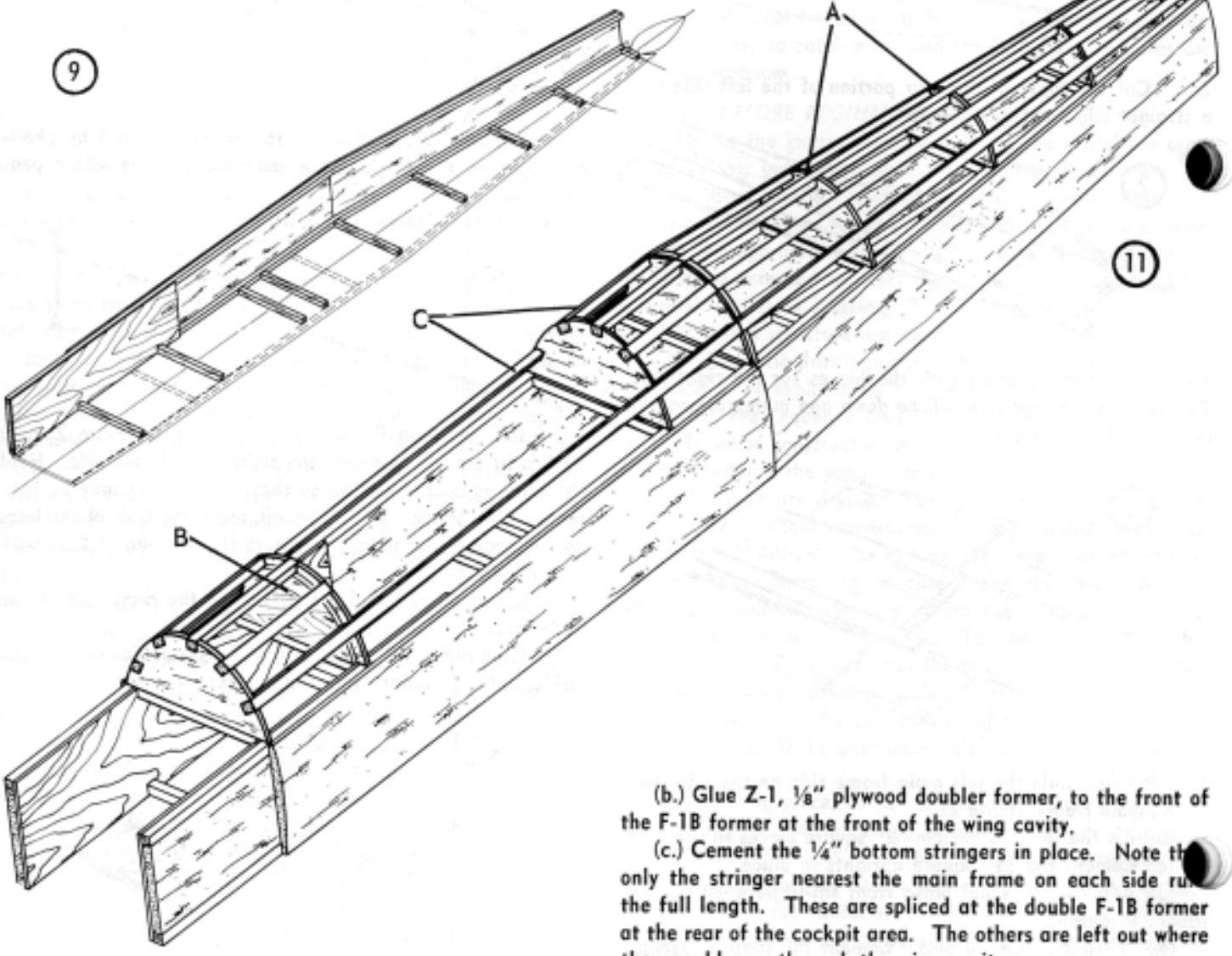
7. Glue the 1/16" x 3¼" x 15½" plywood doublers on the inside of the fuselage main frame sides.



8. (a.) Cut the crosspieces to length over the plan and pin down. Note that some of the cross pieces occur only on the top and others on the bottom.

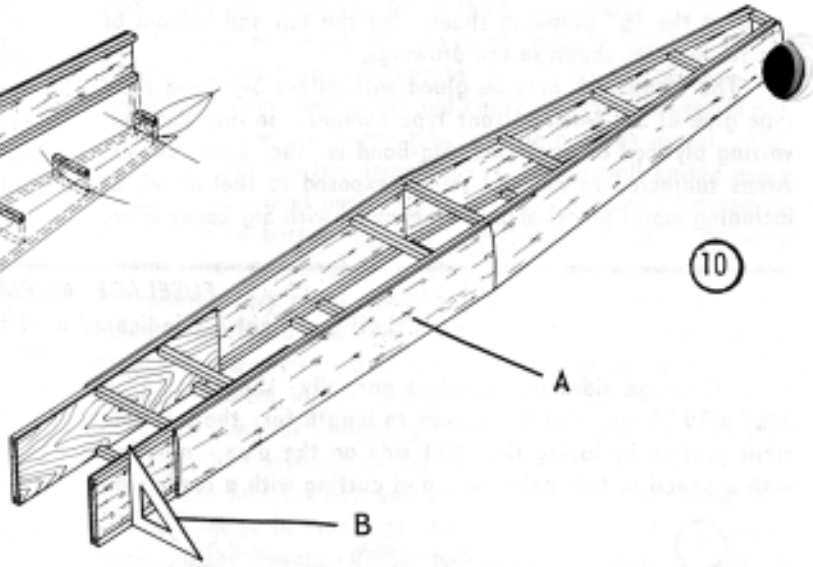


9. Pin side in place on the plan , top side down, on the main frame top view. (Plate 3).



10. (a.) Add the other side.

(b.) Check alignment of main frame sides with a triangle.



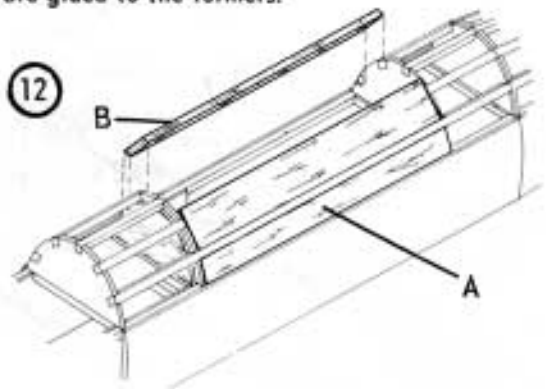
11. (a.) Add the 3/32" sheet balsa bottom formers F-1B (5), F-2B, F-3B, F-4B and F-5B.

(b.) Glue Z-1, 1/8" plywood doubler former, to the front of the F-1B former at the front of the wing cavity.

(c.) Cement the 1/4" bottom stringers in place. Note th only the stringer nearest the main frame on each side ru the full length. These are spliced at the double F-1B former at the rear of the cockpit area. The others are left out where they would pass through the wing cavity.

12. (a.) Inset ¼" sheet balsa fill-in pieces between the main frame and the nearest stringer in the wing position cavity. Recess until the fill-ins are flush with the formers in the middle of each piece. This leaves them protruding slightly at the main frame and at the nearest stringer. Trim with a knife and shape to the contour of former F-1B with a sanding block.

(b.) Cut ¼" x 1½" x 12" balsa sheet wing saddle pieces to fit into the wing cavity. Recess until they are flush in the middle, leaving them protruding slightly at either side where they are glued to the formers.

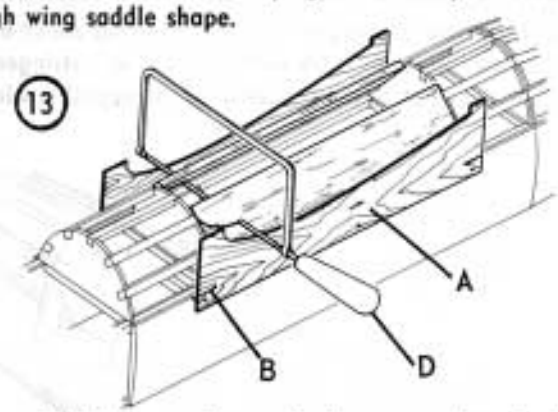


13. (a.) The wing saddle sanding jig is supplied die-cut from 1/16" plywood.

(b.) Transfer the line-up marks onto the jig from the jig pattern on Plate 3. Match the marks on the jig with the bottom of the fuselage main frame.

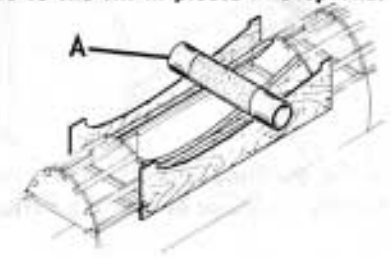
(c.) Fasten jig in place on the fuselage main frame sides with some of the wood screws provided for the cowl. Since the fuselage sides are shaped, the jig must be shimmed to a vertical position with scrap balsa.

(d.) Set the blade of a coping saw sideways and cut out to rough wing saddle shape.



14. (a.) Using sandpaper glued to a cardboard tube, finish out the ¼" balsa wing saddle pieces to match the plywood jig.

(b.) After removing the plywood wing saddle jig, trim and shape the protruding edges to match the contour of the formers as was done to the fill-in pieces in Step 12a.



15. Before adding the top formers and stringers, the plastic tubing pushrods should be installed along the bottom of the main frame. Check their locations on the Fuselage Side and Top Views on Plate One. Since access to them is still easy at this point, it might be advisable to jump out of the sequence of this text and check the exact lengths of the pushrods and outer housings and the angles at which they will approach the servos and control horns. Mounting the servos would aid this alignment process.

16. Glue top 3/32" sheet balsa formers F-1T (6), F-2T, F-3T and F-4T to the top of the fuselage main frame. (See isometric view with accompanying paragraph titled "Fuselage Structure" between the Fuselage Side and Top Views on Plate One).

(b.) Add ¼" square stringers. Note that the stringers nearest the main frame run through the cockpit cavity but the rest do not. These full-length stringers remain in place during planking but can be removed later after sanding the fuselage and cutting out the cockpit opening if a detailed cockpit is desired. The full-size Fuselage Side View layout drawing on Plate One shows the cockpit in final form for detailing with the stringers removed. Stringers are not notched into F-4T and F-4B, but are butt glued to the front of these formers.

(c.) Some of the stringers will not exactly match the curv of the fuselage formers and will protrude slightly after assembly. Sand these stringers flush with the contour of the formers.

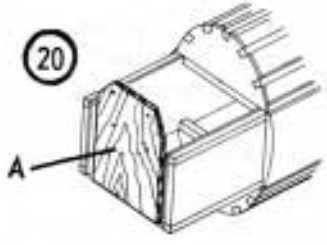
17. Just above the windshield of the Fuselage Side View on Plate One is an isometric and nearby instruction paragraph entitled "Flying Wire Bracket Support." This shows the ¼" x ½" balsa piece (for mounting the fuselage flying wire metal bracket) to be installed before planking.

18. To the left of the isometric just described is a small isometric showing the plywood insert necessary to provide a mounting base for the wing strut (WS). This should be installed at this point in construction so that it may be sanded flush with the fuselage planking.

19. (a.) The 3/16" plywood firewall is prepared for installation by sawing to shape. (See "Cross Section At Firewall" view showing firewall pattern and isometric above it on the lower part of Plate Three).

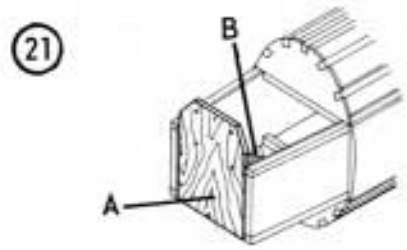
(b.) Drill holes to mount Sig Motor Mounts. (See Isometric, upper left hand corner of Plate Three). Exact spacing of the mounts will be determined by the width of the engine used. Blind nuts are epoxied to the back of the firewall to permit easy removal of the motor mounts. Protect the blind nuts during the epoxying operation by stuffing the threads full of modeling clay. This will be pushed out the first time bolts are inserted into the blind nuts.

20. (a.) The 3/16" plywood firewall is epoxied between the main frame sides.



21. (a.) Bend the sides of the front of the fuselage to grip the firewall. Hold in place with masking tape while drying. *Check alignment* to insure that the firewall is centered and both sides bent an equal amount.

(b.) Epoxy 3/4" triangular balsa stock in the corners behind the firewall.



22. Shape the 1" x 2¼" x 4½" tail block as shown in an isometric view and described in the instruction paragraph titled "Tail Block" near the Fin layout drawing on Plate One. Cement in place.

23. Look at the isometric on the plan just below the Wing Saddle Jig Pattern on Plate 3. This shows the installation of the hardwood anchor blocks HF-4. (Pattern for HF-4 appears below the Front View on Plate 3). Locate the block position by reference to the Fuselage Side View on Plate One. Cut a slot and cement into the sheet balsa wing saddle. Note that these blocks must be tilted so that their bottom will be parallel to the wing dihedral.

At this point it is necessary to have the wing completed and planked to allow locating the holes in Z-1 and the wing center section for installation of the wing hold-on dowel.

Temporarily pin or tape the 1/32" plywood wing platform, Z-5, in place on the wing saddle and hold the wing in position. If it does not fit snugly up against the fuselage, modify the wing saddle where necessary so that it does. At the same time check to see that the incidence angle is maintained at the correct amount -- ⅜" higher at the chord line point on the leading edge than the chord line point at the trailing edge. (See Fuselage Side View on Plate One). Use the bottom of the main frame as a measuring point for checking. Also check to see that the wing is not cocked sideways with one tip higher than the other. An easy way of doing this is to put a pin into the top of the fuselage in the exact center and stretch a string to the wing tip, marking the distance and checking to the other tip for equal distance.

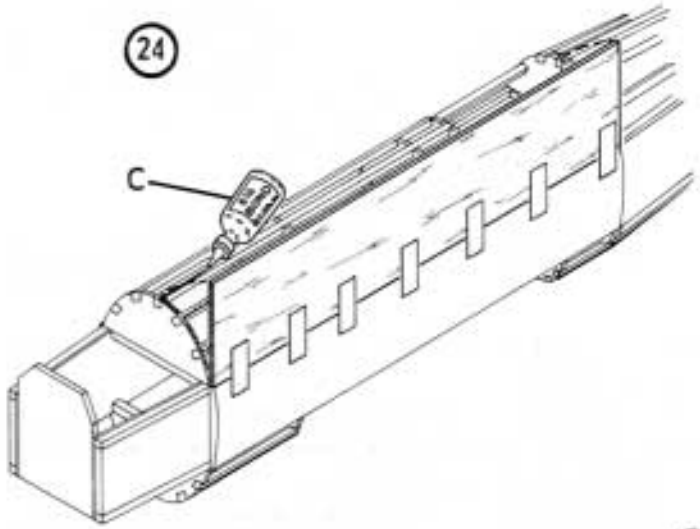
Tape the wing in place. Locate a spot on the front of plywood former Z-1 approximately where the chord line would come through at the wing center section. Put a piece of ⅛" wire in an electric drill and drive a hole through the F-1B former on the front of the fuselage to the marked spot on the front of Z-1. Drill on through Z-1 and the second F-1B former into the wing center section --- through the leading edge cap, leading edge and the block behind the leading edge.

Using this ⅛" opening as a pilot hole, enlarge to ¼" to accept the ¼" wing dowel. Install the ¼" dowel in the wing using epoxy (Refer to wing instructions). When dry, re-attach wing to fuselage. Locate exactly the points to drill into and through the wing bolt anchor blocks HF-4 for the nylon wing bolts. Use a small drill on the first attempt so that if it is not straight, the hole can be corrected. The final hole through HF-4 should be done with a No. 7 wire gauge drill or, lacking that, a 13/64" drill bit. Tap out HF-4 with a ¼-20 tap to take the nylon mounting screws. Open up the hole through the wing to ¼" diameter to pass the ¼" screws. Remove the temporarily attached wing platform for later permanent installation.

24. (a.) Apply a bead of glue to the edge of the main frame and tape ⅛" balsa planking sheet in place. Allow to dry.

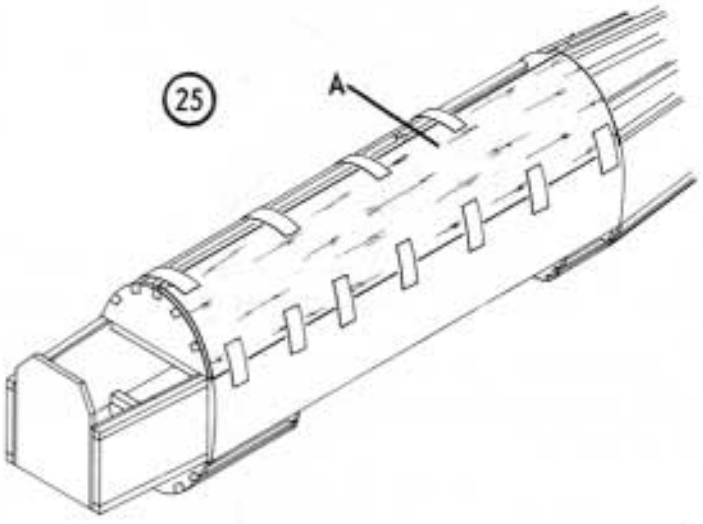
(b.) Dampen planking sheet thoroughly with a sponge.

(c.) Apply glue to the formers and stringers.

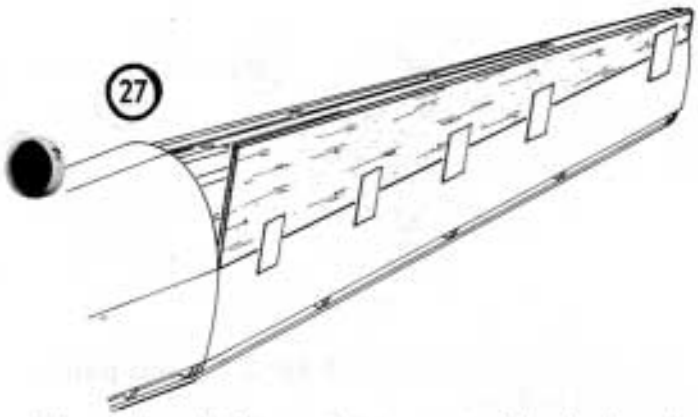


25. (a.) Bend sheet into position and secure with masking tape or pins

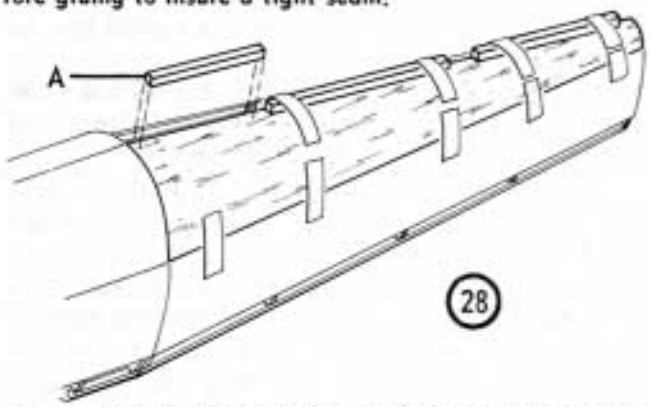
(b.)Using a straight edge, trim the planking sheet along the top stringer so as to leave half of the top stringer exposed for attachment of the planking on the opposite side.



26. Repeat the planking process on the opposite side of the front part of the fuselage and on the bottom of the front part.

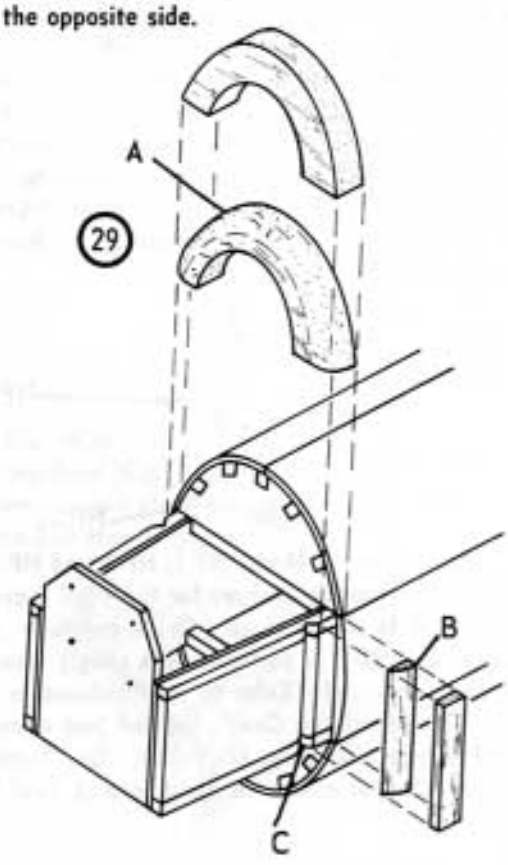


27. The planking on the rear part of the fuselage is applied as in the preceding steps. Fit the planking sheet carefully in the joint between it and the front planking sheet before gluing to insure a tight seam.



28. (a.) The rear planking sheet is a little more difficult to hold down because of the taper. Taping ¼" square pieces to the edge aids in forcing the sheet in place.

(b.) Trim sheet with a straight edge along the top stringer so as to leave half of the stringer exposed for attaching planking on the opposite side.



29. (a.) The front of the fuselage on the top and bottom is formed by rings cut from 5/8" sheet balsa. Hold the 5/8" balsa sheet in place against the front fuselage former and trace the outline of the fuselage on the sheet. Cut out and cement in place. Shape with a knife and sandpapr block to the contour shown on the Fuselage Side and Top views on Plate One.

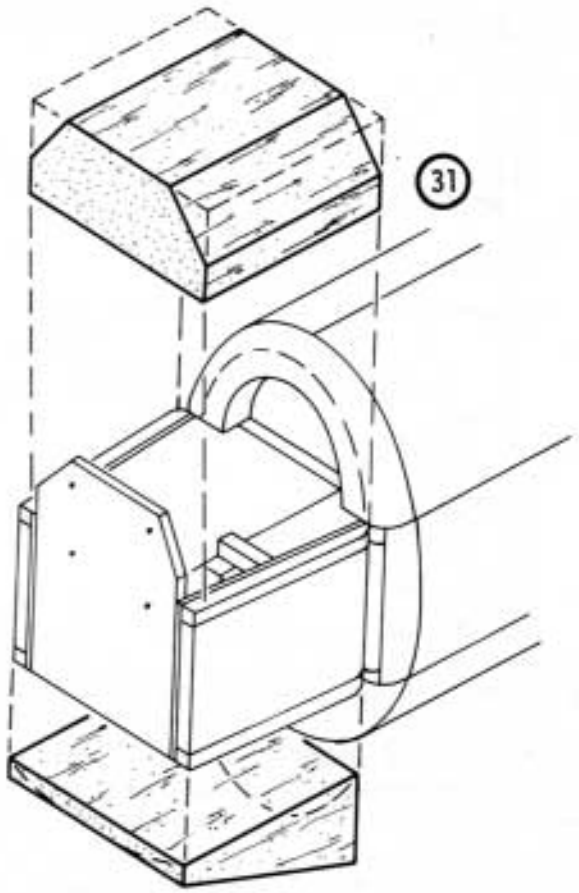
(b.) On the sides, at the front of the main frame, ¼" x ½" pieces are installed and shaped as in 25a.

(c.) Note that the completion of the proper contour on the sides requires cutting partially into the main frame sides.

30. (a.) Glue F-5T and Z-2 in place. (See the fully planked fuselage isometric view on the lower part of Plate One just to the left of the title block.)

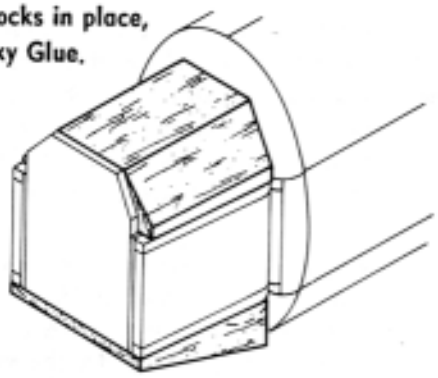
(b.) Sand the fuselage planking as described in the instruction paragraph called "Sanding of the Fuselage" which is located just below the isometric mentioned above in 30 a.

(c.) Add plywood parts Z-3 and Z-4 to the end of the fuselage, directly on top of F-5T and Z-2. These pieces are slightly smaller than F-5T and Z-2 and provide a recessed edge on which to fasten plastic part PF-2, with screws. PF-2 completes the fuselage end shape. If the fuselage sanding operation has reduced the size of F-5T and Z-2, Z-3 and Z-4 may also have to be similarly reduced to leave a recess to which PF-2 can be screwed and line up flush with the planked surface of the fuselage.

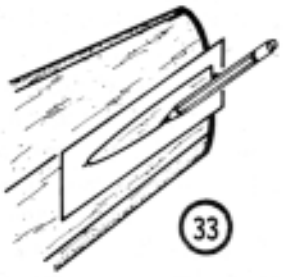


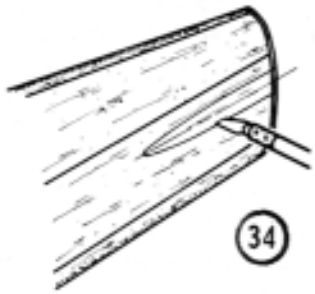
31. Two balsa blocks, 1½" x 4" x 5" are furnished to complete the nose in front of the 5/8" shaped rings. Shape as shown.

32. Glue blocks in place, using Sig Epoxy Glue.

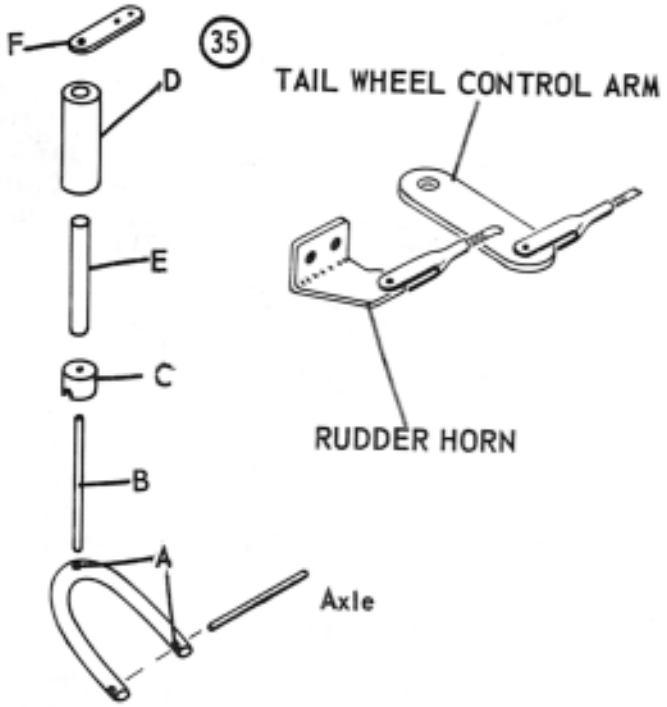


33. Trace a pattern of the stab cut-out from the Fuselage Side View on Plate One. Line up with the top side of the main frame and mark hole with a pencil or ball-point pen.





34. Cut out the stab opening with a razor knife.



35. Exploded view shows assembly of the tail wheel unit.

(a.) Drill 3/32" holes in the formed tail wheel fork.

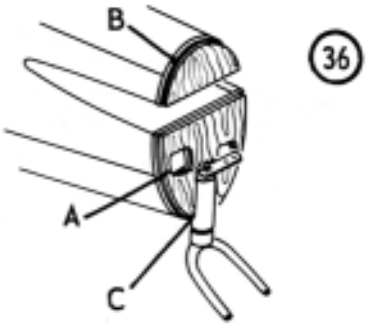
(b.) Solder the tail wheel fork to 3/32" wire.

(c.) Shape piece of 3/8" dowel to fit down over the soldered joint. (See also drawing of tail wheel on Fuselage Side View, Plate One).

(d.) Drill a 1/8" hole through the 3/8" dowel.

(e.) Epoxy 1/8" tubing into the dowel. Stuff tubing full of modeling clay to keep epoxy out of the center.

(f.) Solder control arm, made from brass, to the top of the assembly.



36. (a.) Holes are cut into plywood part Z-4 to pass plastic tubing control pushrods.

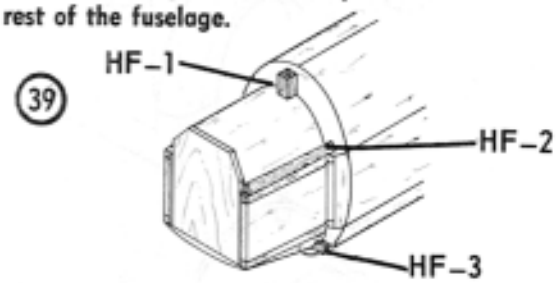
(b.) Note ledge formed by Z-3 and Z-4. These parts are slightly smaller than parts F-5T and Z-2 underneath them. This ledge provides a mounting place for screwing plastic parts PF-2 and PF-3 in place.

(c.) The completed tail wheel assembly is epoxied into the notch of plywood part Z-4.

(d.) A scrap balsa block is cemented over the tail wheel dowel to serve as an anchor for the lower rudder hinge. (See Fuselage Side View on Plate One for location).

37. The wing platforms (Z-5) are epoxied to the fuselage (Pattern for Z-5 is on Plate Three). Take care not to apply epoxy to the wing platforms close to the wing attachment screws or it may be squeezed into the threads. The wing must be covered with wax paper or plastic wrapping material to protect it from epoxy leakage. Put the wing in position and bolt in place. This forces the wing platforms Z-5 against the fuselage. Should any part of the platform not be contacting the wing curve, drive small wedges of wood between the platforms and the fuselage wing saddle to hold them against the wing contour while the epoxy is setting.

38. The wing fillet is formed on top of the wing platform from Sig Epox-O-Lite. Mix the putty according to the directions on the cans. Smooth into the fillet area with a paddle. As the putty begins to set up it can be smoothed with a wetted finger tip. Allow to set for forty-eight hours before sanding. Use fairly coarse garnet paper wrapped around a round object for initial sanding and shaping. Finish with fine garnet, or no-fill, paper. The Epox-O-Lite can be coated with sanding sealer and doped at the same time as the rest of the fuselage.

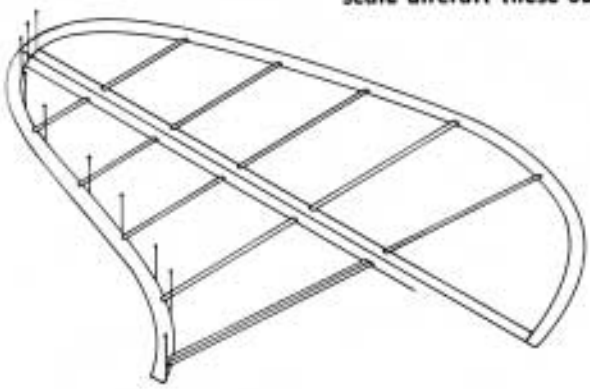


39. The hardwood blocks HF-1, HF-2 and HF-3 are epoxied in place to provide anchors for the wood screws used to hold the cowl to the fuselage. Shape carefully while trial fitting so that HF-2 in particular fits snugly along the inner face of the cowl. Refer to the instruction paragraph entitled "Mounting the Cowl", located just above the front of the Fuselage Side View, Plate One, for further information of attachment screws on Right Side of Cowl View, Plate Three.

FIN AND RUDDER

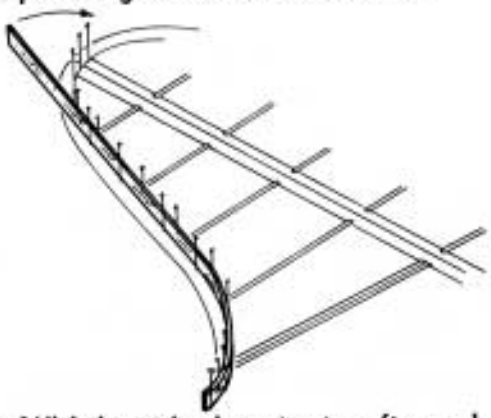
The laminated outline used on the tail and wing tips is not difficult and produces a strong and warp resistant unit. It enables close reproduction of the scale shape. In the full scale aircraft these outlines are formed by steel tubing.

(40)



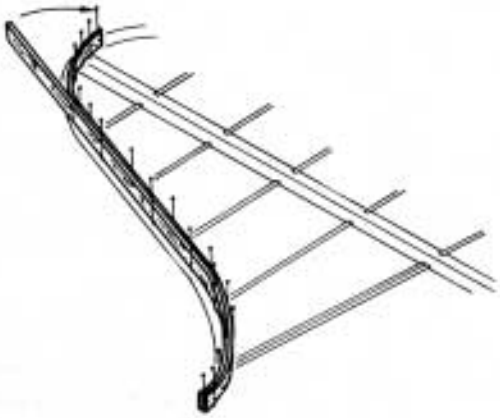
40. Place pins along the inside of the outline.

(41)



41. Soak ¼" balsa strips in water to soften and pin in place against the first line of pins.

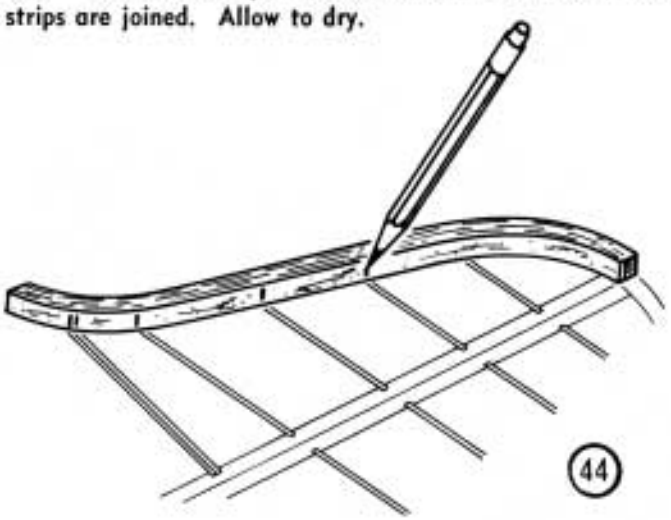
(42)



42. As the second strip is laminated against the first (use ONLY Sig Bond glue), remove the second line of pins one by one as you proceed along the outline and move them over to secure the 2nd strip in place.

(43)

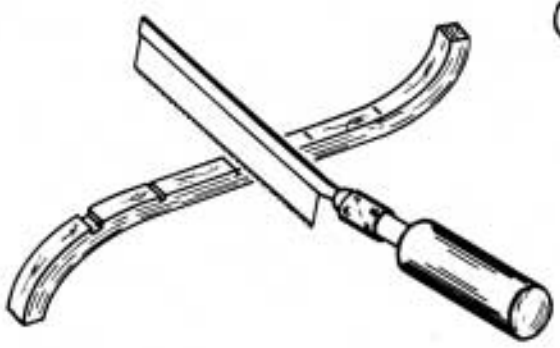
43. Continue the process described in 42 until all four strips are joined. Allow to dry.



(44)

44. Mark the rib ends on the fin outline with a pencil. Also mark the angle of the ribs as a guide in notching.

(45)



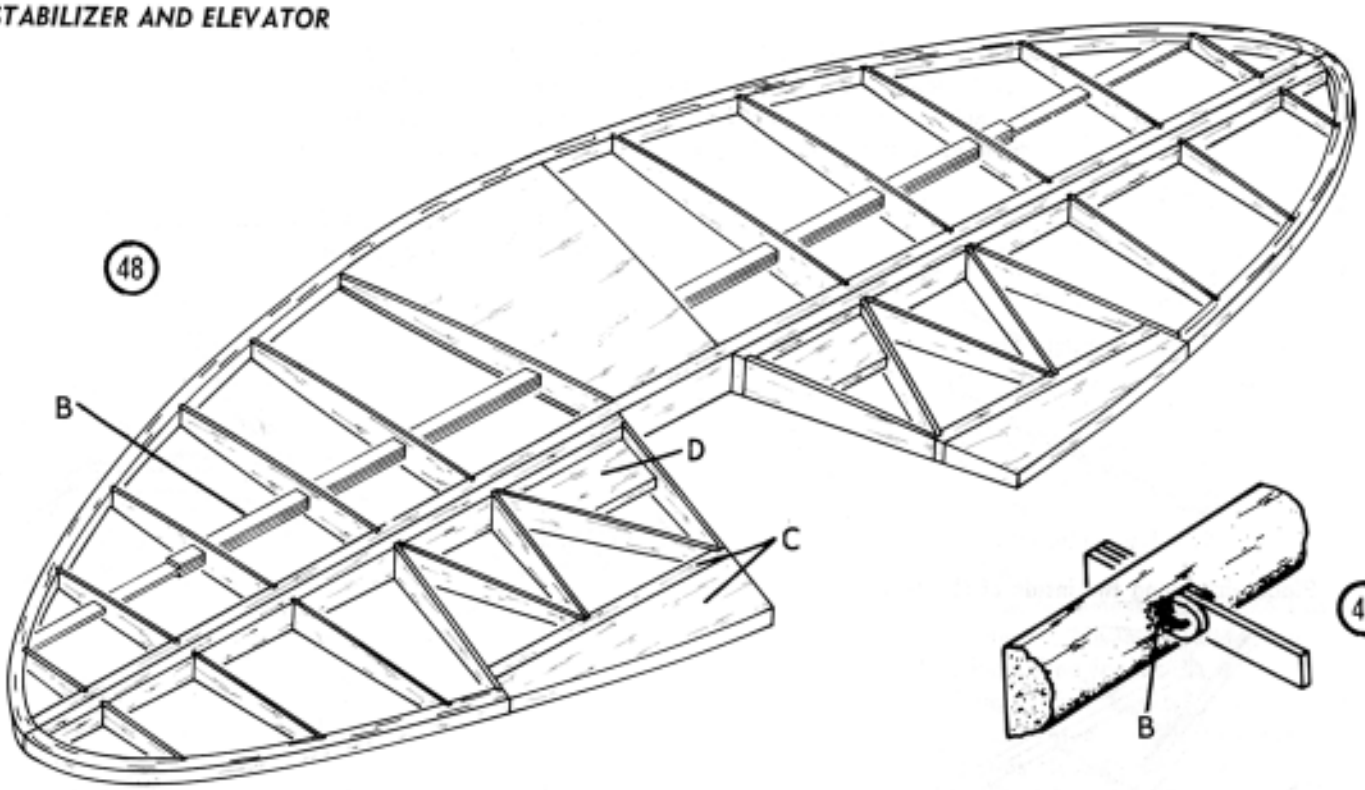
45. Saw 1/16" deep notches in the outline.

46. Refer to "Fin Construction" Isometric and accompanying instruction paragraph in the lower right hand corner of Plate One.

47. The rudder outline is constructed in the same manner as described above for the fin. The lower part of the rudder, below R-1, is filled in with ¼" sheet balsa. 3/32" sheet balsa is then laminated over the fill-in and outline on both sides. (See cutaway on Rudder layout drawing, Plate Two). Sand to airfoil shape while fitting PT-5. (See paragraph 82 and accompanying isometric.

(Note: The fin and rudder should be hinged and covered before cementing in place on the fuselage.)

STABILIZER AND ELEVATOR



48. (a.) The process described in steps 40 through 45 is followed to construct the stabilizer and elevator leading edge and trailing edge outline. The stab and elevator may also be assembled vertically, in the manner shown for the fin in the "Fin Construction" isometric and instruction paragraph on the lower right hand corner of Plate One. Because of their large size it may be preferred to construct them in the conventional manner, flat on the plan. In this case, shim up the leading and trailing edge outline with 3/16" scrap balsa to bring them to the proper height in relation to S and E.

(b.) The stabilizer spar is laminated from three pieces of 1/16" x 1/4" spruce strip. Note that only the center lamination goes through Ribs S-5. The top and bottom laminations end after passing through Ribs S-4.

(c.) E-9s are cemented to E-8s to form the trim tab and sanded to match the airfoil formed by the ribs.

(d.) Fill-ins E-7 are cemented between ribs E-1 and E-2 in both elevator halves to provide an anchor for epoxiing the elevator horn connector arms in place.

(e.) Plank the center section of the stab with 1/16" sheet balsa after removing from the building board.

(f.) The outline edges of the stab are sanded to the rounded shape shown in the cross section of the stab appearing on the fuselage side view on Plate One.

(g.) Stabilizer and elevator should be hinged and covered before cementing to the fuselage.

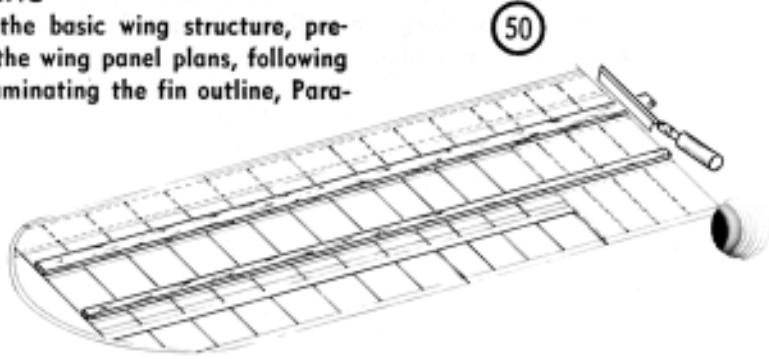
HINGING THE TAIL CONTROL SURFACES

49. (a.) The tail hinges are constructed from 1/16" ABS and are assembled by gluing up sections of plastic. (See "Plastic Part Pointers" section describing handling of ABS and the isometric showing hinges, top right hand corner of Plate One). Cut slots in the frames for installation and imbed the hinges in a bead of Sig Epox-O-Lite putty. Drill some extra holes in the bodies of the hinge components to anchor them securely in the bead of Epox-O-Lite. Note that an extra piece of plastic is added to the hinge sections of the elevator so they may be Epox-O-Lited directly to the adjacent rib.

(b.) The hinge pins are small "L" shaped pieces of 1/16" wire. To secure these in place after final assembly, cut a small notch into S, E, fin post and rudder post and imbed the end of the "L" in a bead of Epox-O-Lite in the notch.

WING

(Note: Before beginning the basic wing structure, premake the wing tip outline on the wing panel plans, following the same procedure used in laminating the fin outline, Paragraphs 40 to 45).



50. (a.) Cut the 1/4" x 3/4" balsa main spar and 1/4" x 1/2" balsa rear spar to exact length over the plan.

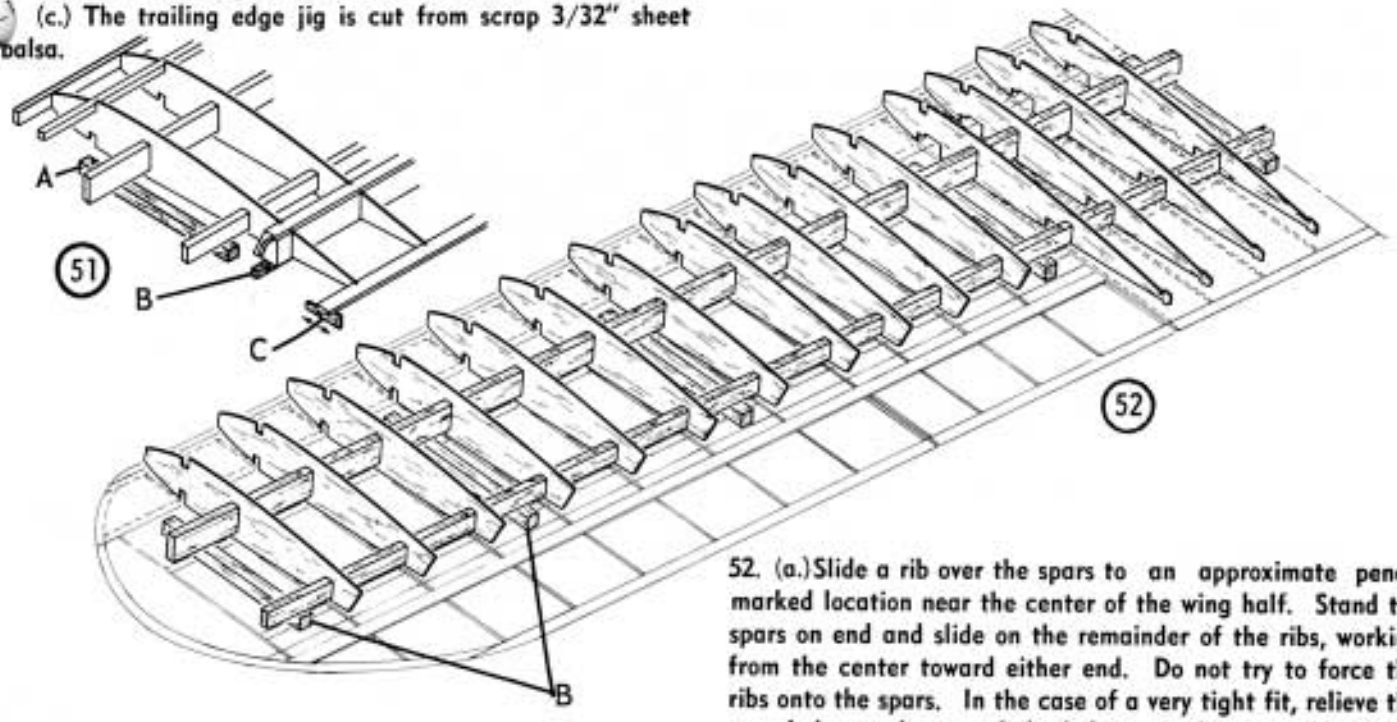
(b.) Mark approximate rib locations on each spar with a pencil or pen.

51. These are the jig blocks to be used in the following paragraphs.

(a.) The front block is a piece of 5/16" balsa.

(b.) The middle jig block is a piece of 3/16" square balsa.

(c.) The trailing edge jig is cut from scrap 3/32" sheet balsa.



52. (a.) Slide a rib over the spars to an approximate pencil marked location near the center of the wing half. Stand the spars on end and slide on the remainder of the ribs, working from the center toward either end. Do not try to force the ribs onto the spars. In the case of a very tight fit, relieve the spar holes at the top of the hole or at the rear. Note that the center section has different ribs than the rest of the wing and that the tip rib is fastened directly to the ends of the spars, not slid over them as are the rest of the ribs.

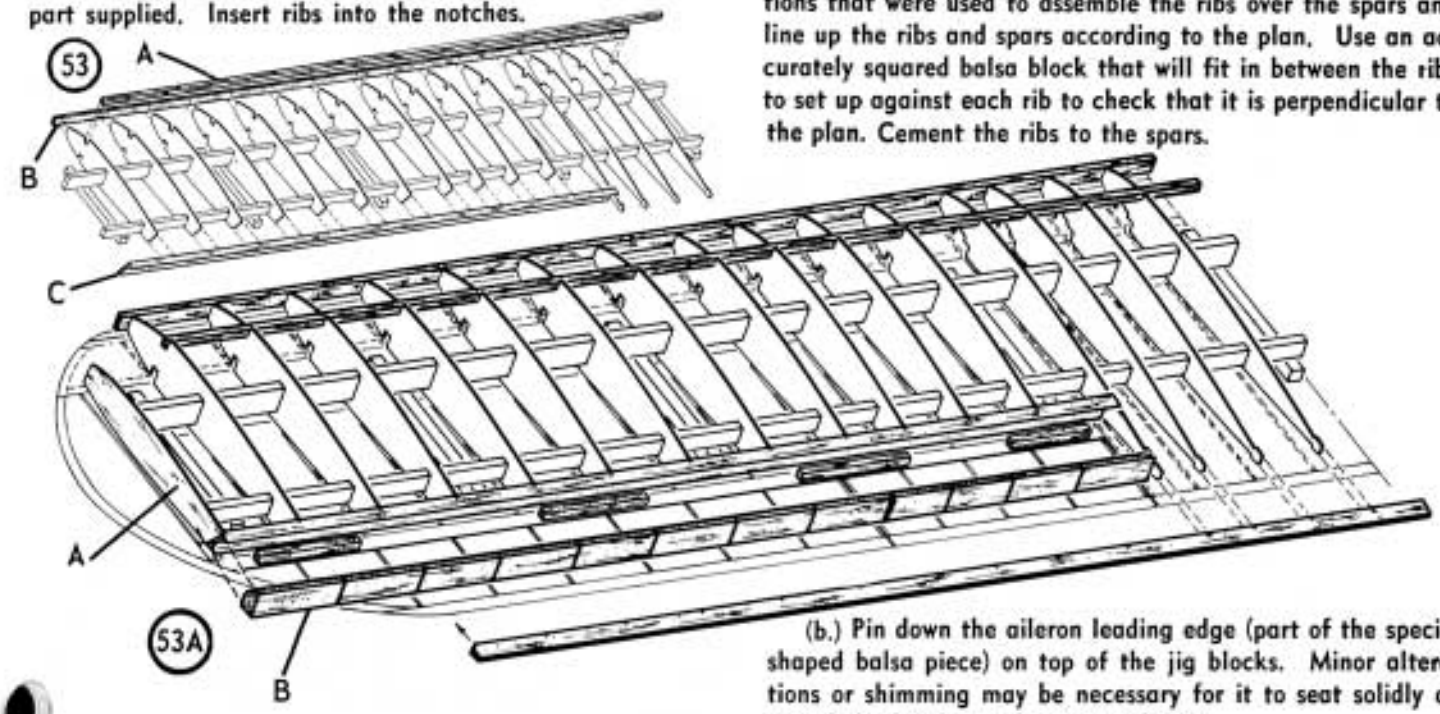
(b.) Set the spar-rib assembly onto the plan, with the spars resting on the top of the 5/16" balsa jig blocks.

(c.) Ignore the previously penciled approximate rib locations that were used to assemble the ribs over the spars and line up the ribs and spars according to the plan. Use an accurately squared balsa block that will fit in between the ribs to set up against each rib to check that it is perpendicular to the plan. Cement the ribs to the spars.

[redacted]. (a.) Add the 1/4" square balsa top front spar.

(b.) Cement the 3/16" x 5/8" leading edge to the front of the ribs.

(c.) Apply glue to the notches in the special shaped balsa part supplied. Insert ribs into the notches.



53A. (a.) Mark the spar locations on the inside of Rib W-4 with a pencil. (See cross-sections of W-4 on Plate Two). Glue W-4 to the ends of the spars.

(b.) Pin down the aileron leading edge (part of the special shaped balsa piece) on top of the jig blocks. Minor alterations or shimming may be necessary for it to seat solidly on top of the blocks at the correct height.

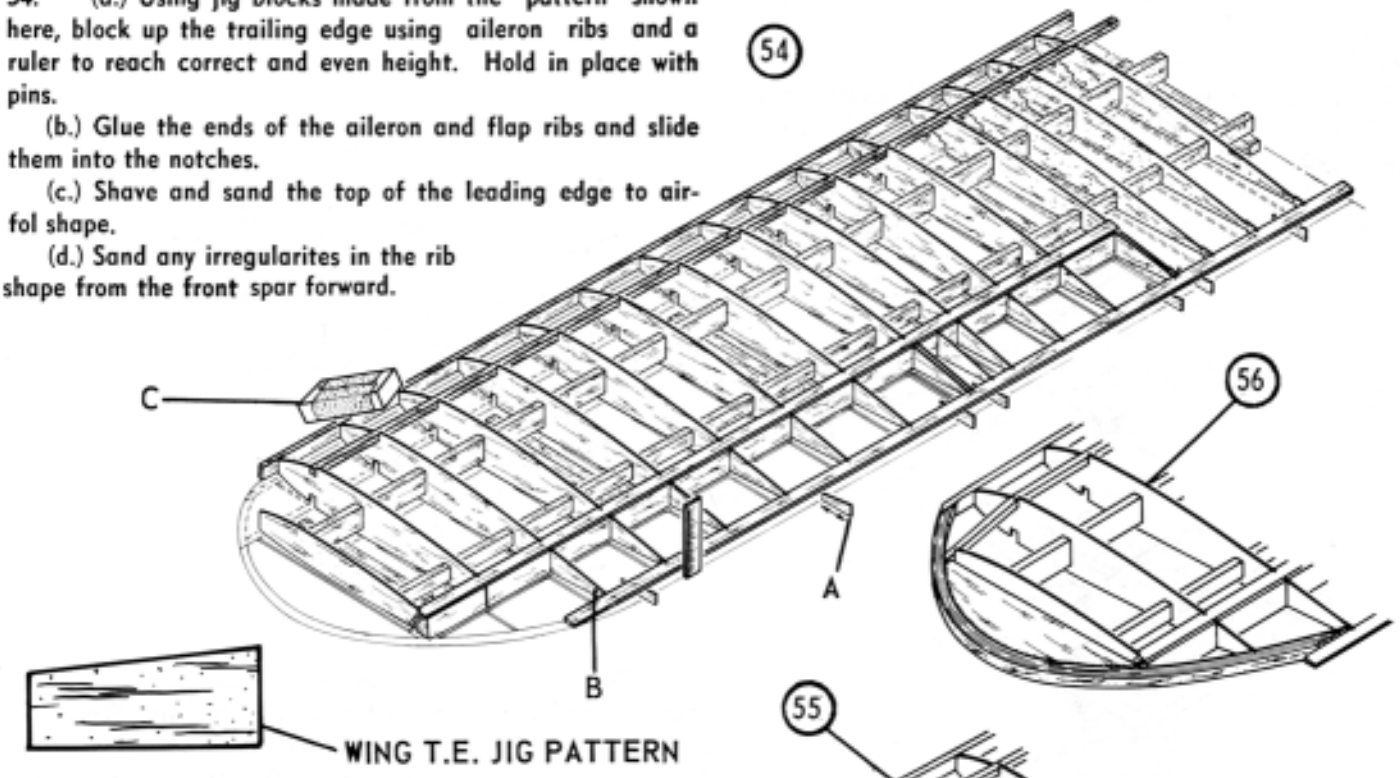
(c.) Push pins through the leading edge of the aileron and flap into the wing structure. This helps hold these in place during later operations.

54. (a.) Using jig blocks made from the pattern shown here, block up the trailing edge using aileron ribs and a ruler to reach correct and even height. Hold in place with pins.

(b.) Glue the ends of the aileron and flap ribs and slide them into the notches.

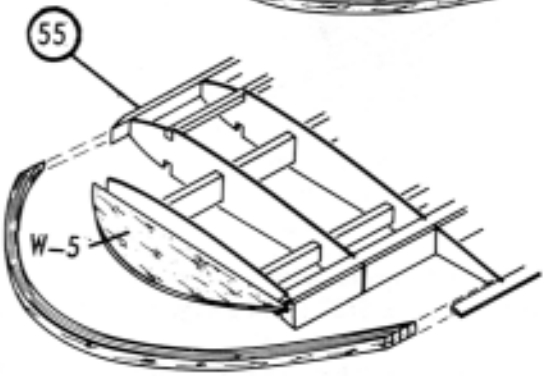
(c.) Shave and sand the top of the leading edge to airfol shape.

(d.) Sand any irregularites in the rib shape from the front spar forward.



55. Cement the 3/32" sheet balsa wing tip W-5 on the chord line of Rib W-4. (See cross section view of W-4 above the right wing panel drawing on Plate Two).

56. Add the pre-made laminated wing tip outline, centering it on W-5.

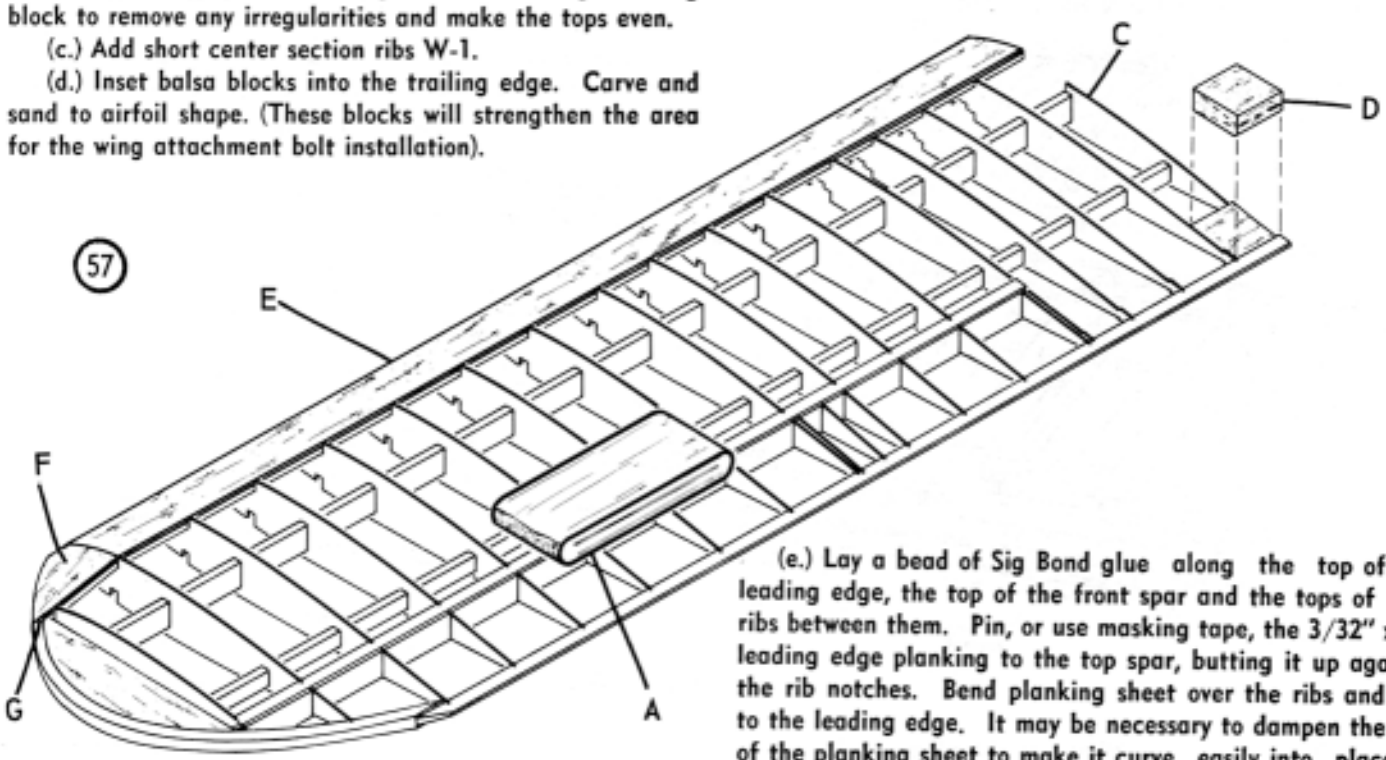


57. (a.) Carefully sand the top of the special shaped wing part. Watch that the top of the ribs are not nicked or damaged during this operation.

(b.) Sand the top of the wing ribs with a large sanding block to remove any irregularities and make the tops even.

(c.) Add short center section ribs W-1.

(d.) Inset balsa blocks into the trailing edge. Carve and sand to airfoil shape. (These blocks will strengthen the area for the wing attachment bolt installation).



(e.) Lay a bead of Sig Bond glue along the top of the leading edge, the top of the front spar and the tops of the ribs between them. Pin, or use masking tape, the 3/32" x 2" leading edge planking to the top spar, butting it up against the rib notches. Bend planking sheet over the ribs and pin to the leading edge. It may be necessary to dampen the top of the planking sheet to make it curve easily into place on top of the ribs. Pins may also be required to hold the sheet down to the ribs until the glue sets.

(f.) The tip section may be cut off the leading edge planking sheet and installed separately to make it easier to fit.

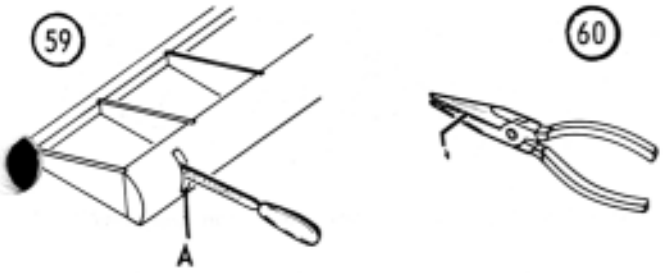
(g.) Cut a tapered notch into the wing tip outline to receive the planking sheet. (See Rib W-4 Cross-Section on Plate Two).

58. (a.) Add flap and aileron 3/32" sheet reinforcing pieces. (See Rib Reinforcement instruction paragraph on Plate Two).

(b.) Note the taper sanded into the rear portion of the wing tip outline in order to smoothly blend the shape into the trailing edge.

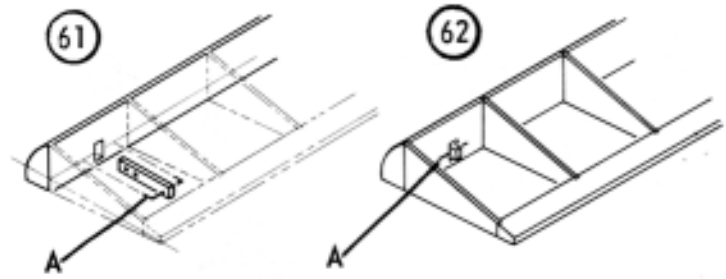
(c.) Saw through the trailing edge and tip outline to separate the ailerons and flaps from the rest of the wing.

59. (a.) Cut and file 3/32" wide notches into the leading edge of the ailerons and flaps at hinge points indicated on the plan to pass the 3/32" thick hinges through the leading edges.



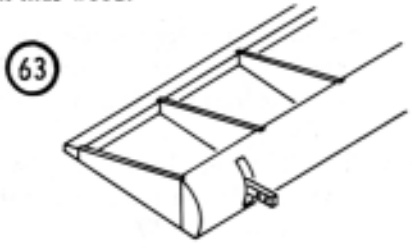
60. Bend "U" shaped hinge pins from 1/16" wire.

61. (a.) The ends of the wire "U" are pushed into the aileron and flap leading edges when installing the completed hinge. (View as seen from rear).

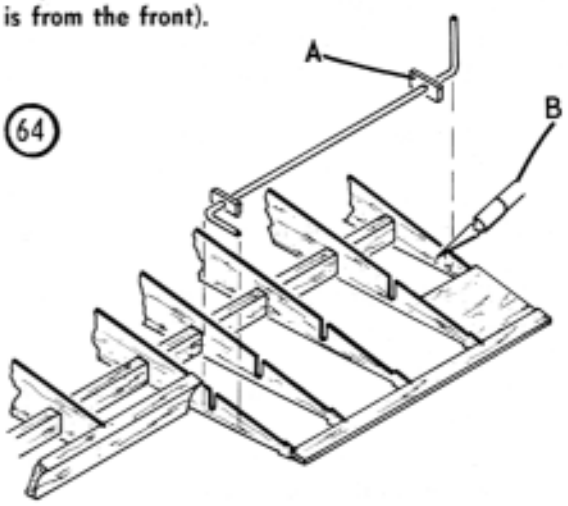


62. (a.) The base of the hinge wire "U" is pushed half way into the wood. (View is from rear).

(b.) Pull hinge partially out and coat with Sig Epoxy Glue. Push back into wood.



63. The extra holes lock the hinge into the bead of Epoxolite putty used to fasten the aileron and flap to the wing. (View is from the front).

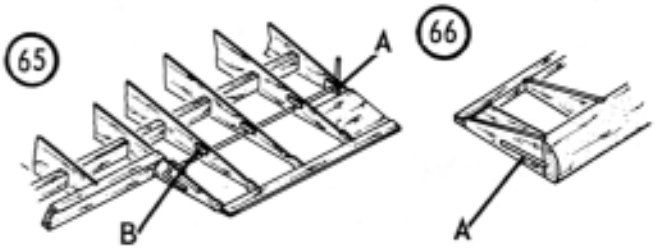


64. (a.) Slide the 3/32" plywood bearings over the prebent 1/8" wire flap torque rod.

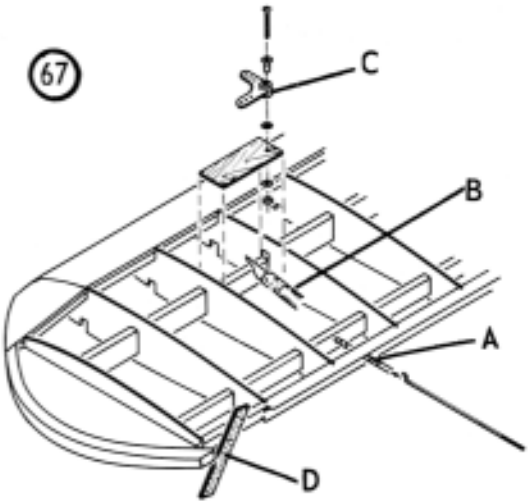
(b.) Cut into the ribs from the top down to the flap torque rod hole. (See right hand rib cross-section view on the upper part of Plate Two).

65. (a.) Glue flap torque rod bearings in place. These are cut from 3/32" plywood scrap from the die-cut plywood sheets.

(b.) Cover installation slots with a scab of scrap balsa.



66. (a.) Cut a slot into the end of the flaps to receive the torque rod arm. During assembly, Epox-O-Lite the arm into this slot. Also put a bead of Epox-O-Lite on the back side of the slot, inside the rib re-inforcements.



67. (a.) Drill a hole through the special shaped part to pass the aileron clevis push rod.

(b.) Notch into the spar to receive the 3/32" plywood bellcrank platform. (See the rib cross-section view on the upper left hand side of Plate Two).

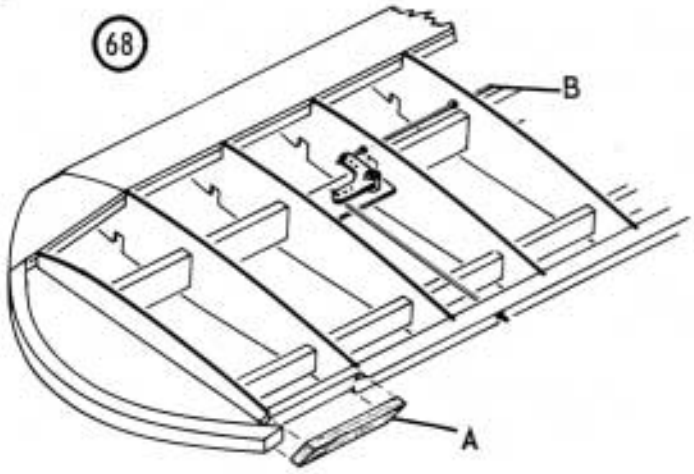
(c.) Assemble the bellcrank, as indicated by the exploded view, on the plywood floor and epoxy to the spar and ribs on each side.

(d.) The change in thickness caused by the wing tip taper makes the special shaped part inaccurate between the last Rib W-3 and Rib W-4. Sand out a portion of the shaped part. (See Rib W14 cross-section view on Plate Two for the exact depth of the cut).

68. (a.) Fill in the notch that was just cut into the special shaped part with a piece of 3/8" balsa sheet.

(b.) Reshape this area so that the trailing edge of the new 3/8" sheet balsa section is straight with the trailing edge of the shaped part.

(c.) Run the 1/16" wire push rod through the ribs. (See location of the hole on the right hand rib cross section view on the upper part of Plate Two). Note: Some types of RC equipment may require locating the pushrod in a different spot.

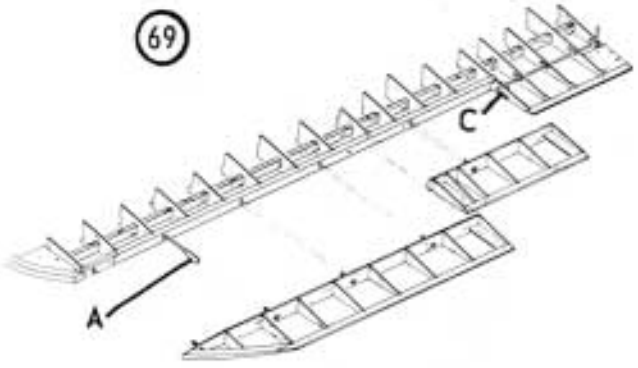


69. (a.) File notches into the wing to match hinge locations in the ailerons and flaps.

(b.) Insert the flap hinge into a bead of Epox-O-Lite in the wing.

(c.) Fit torque rod arm into notch in end of flap. (See Paragraph 66).

(d.) Install aileron by inserting the hinges into a bead of Epox-O-Lite in the wing.



70 View shows wing half, ready for joining with the opposite half.

71. (a.) Add bottom 1/4" square spar to each wing half.

(b.) With one panel laying flat on the working surface; fit the opposite half, raising with blocks to a height of 5¼" at the bottom of the last Rib W-3. (See Front View on Plate Three).

(c.) Bevel all mating surfaces to make a good match.

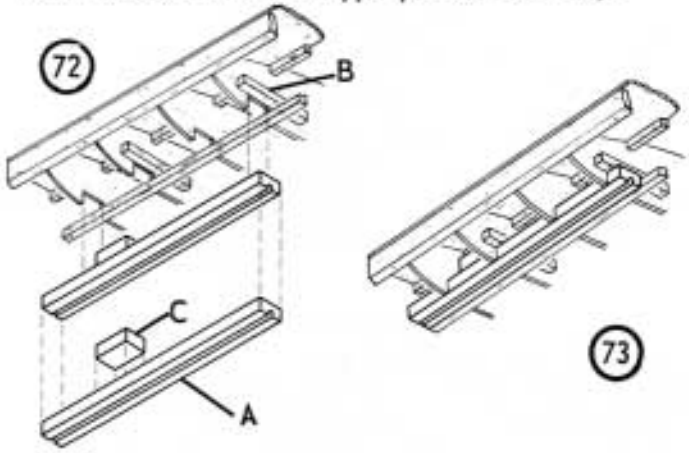
(d.) Epoxy Glue together.

(e.) Before glue sets up, check alignment of the wing panels by measuring from the bottoms of the main and rear spars to the working surface. The measurement from the bottom of one spar at any point should be the same as the measurement to the bottom of the other spar at the same point.

72. (a.) Glue landing gear hardwood mounting block into the wing.

(b.) Pieces of ¼" square balsa help support the landing gear block.

(c.) The landing gear torque rod anchor block is epoxied to the top of the landing gear mounting block. (See right hand Rib Cross-Section on upper part of Plate Two).



73. View of landing gear block after installation.

74. (a.) Inset balsa blocks into the center section between the landing gear block and the leading edge. (See Wing Panel layout drawings, Plate Two).

(b.) Install the 3/32" x 2" sheet planking on the leading edge of the bottom of the wing in the same manner as the top planking was applied in Paragraph 57 e.

(c.) Plank the top and bottom of the center section with 3/32" x 2" sheet balsa.

(d.) Trim leading edge planking flush with the front of the leading edge. Sand with a sanding block.

(e.) Cement and pin the 1/4" x 5/8" leading edge cap to the leading edge. (See rib cross section on the upper left hand part of Plate Two).

(f.) Bring the leading edge cap to rough shape with a knife and finish with a sanding block to airfoil shape.

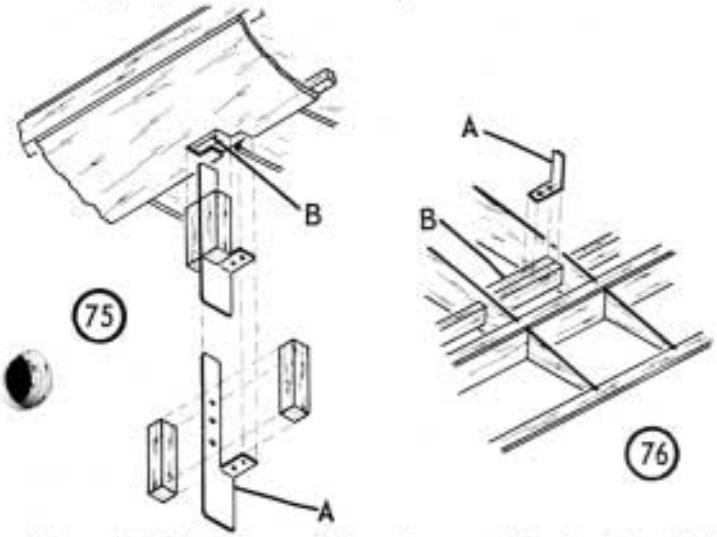
(g.) Fine sand the entire wing.

(h.) Cut holes for servo installation. (See Isometric View in upper right hand corner of Plate Two).

75. (a.) Cut out front flying wire metal bracket from .030" aluminum and sandwich between two pieces of 1/4" square balsa.

(b.) Cut an opening in the planking and glue to the adjacent rib.

(c.) Epoxy brace arm to the spar.



76. (a.) The top rear flying wire metal bracket is a 1/4" wide strap of .030" aluminum.

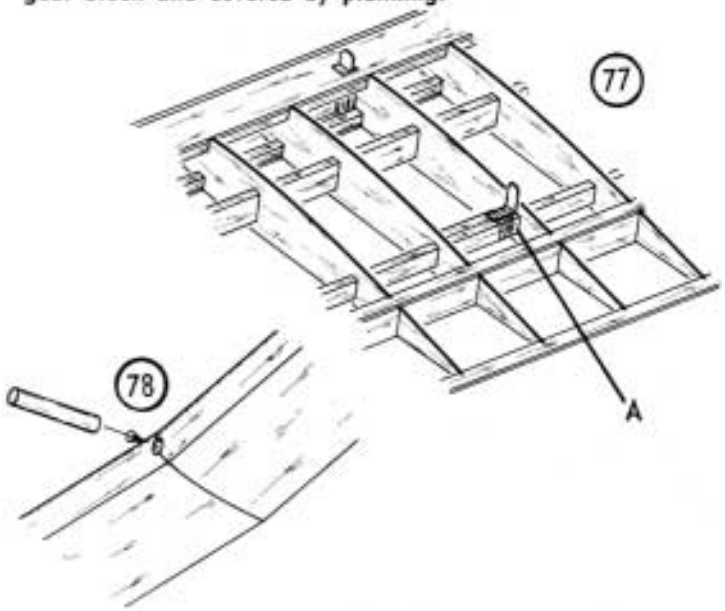
(b.) The spar is doubled by a piece of 1/4" x 1/2" balsa.

(c.) The bottom rear flying wire metal bracket is installed in the same way as the top rear bracket, but is 1/2" wide to accomodate the double flying wires on the bottom of the wing.

77. (a.) Wrap the top and bottom rear brackets to the rear spar and doubler with heavy thread. Coat with glue.

(b.) The brackets are cut to exact length during fitting of flying wires.

(c.) The flying wire brackets on the center section, between the landing gears, is a 1/2" wide strap of .030" aluminum, fastened with wood screws to the hardwood landing gear block and covered by planking.



78. Epoxy the ¼" dowel into the leading edge of the center section. (See paragraph 23 for instructions on locating the hole point before drilling).

79. Balsa fill-in blocks are fitted to the bottom of the wing center section at the leading edge to blend the fuselage contours into the wing. (See Fuselage Side View, Plate 1).

The model wing requires less incidence than the full-scale Ryan. This leaves a small area at the back of the center section that must be filled in with scrap balsa sheet. Carve to match the contour of the fuselage former F-1B at the wing T. E. On the full scale airplane this area is covered with a sheet metal fairing and this can be duplicated on the model with .010" plastic sheet (not furnished) if desired. (See the bottom view of the aircraft on the Color Scheme 3-view).

KEY TO PLASTIC PART NUMBERS

(L equals Left Half, R equals Right Half. Pilot's left and right, as if seated in the cockpit).

PLASTIC COWL (PC)

PC-1 - Cowl front.

PC-2 - Cowl body, in left and right halves.

PC-3 - Oil filler cap, top of cowl.

PC-4 - Top scoops on cowl front. (No left or right, same part used for both sides.

PC-5 - Lower side scoop, left side of cowl body only.

PC-6 - Front exhaust pipe exit, right side of cowl body.

PC-7 - Rear exhaust pipe exit, right side of cowl body.

PC-8 - Bottom cooling exit, bottom of cowl body.

PLASTIC GEAR (PG):

PG-1 - Wing landing gear fairing, in left and right halves, for landing gear leg on left wing.

PG-2 - Wing landing gear fairing, in left and right halves, for landing gear leg on right wing.

PG-3 - Rear landing gear fairing, in left and right halves, same assembly for both landing gear legs.

PG-4 - Wheel pant fairing, in left and right halves, same assembly for both landing gear legs.

PG-5 - Wheel pant, in left and right halves, same assembly used for both landing gear legs.

PG-6 - Front wheel pant cap, same part for gear on both wings, provides scale seam effect.

PLASTIC TAIL (PT).

PT-1 - Dorsal Fin.

PT-2 - Fin fairing.

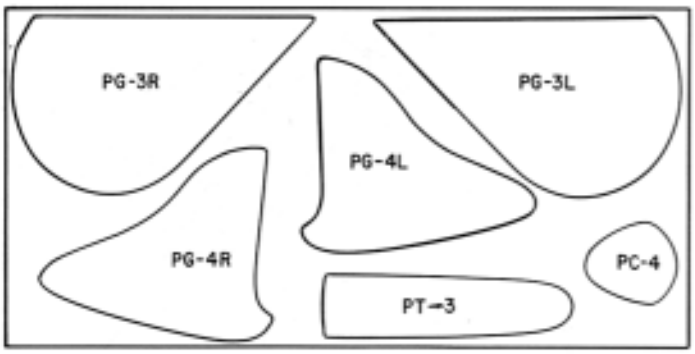
PT-3 - Stabilizer fairing, left side.
PT-4 - Stabilizer fairing, right side.
PT-5 - Rudder cone, in left and right halves.

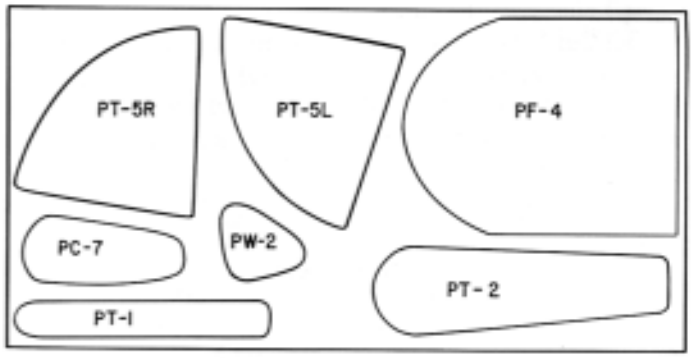
PLASTIC WING (PW)

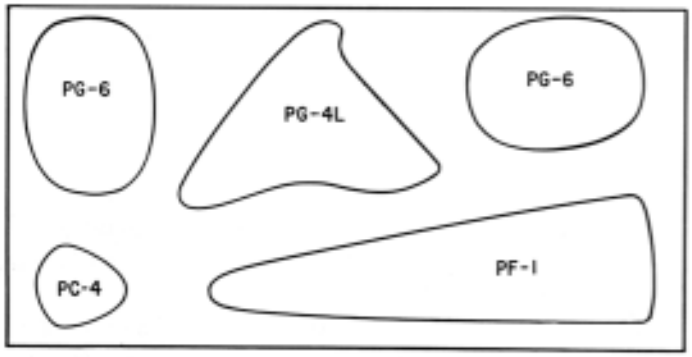
PW-1 - Flying wire cover, top of left wing.
PW-2 - Flying wire cover, top of right wing.
PW-3 - Flying wire cover, bottom of left wing.
PW-4 - Flying wire cover, bottom of right wing.
PW-5 - Circle of scrap plastic. Cement to silk covering around flying wire access hole. Two required on top of wing only, rear flying wire.

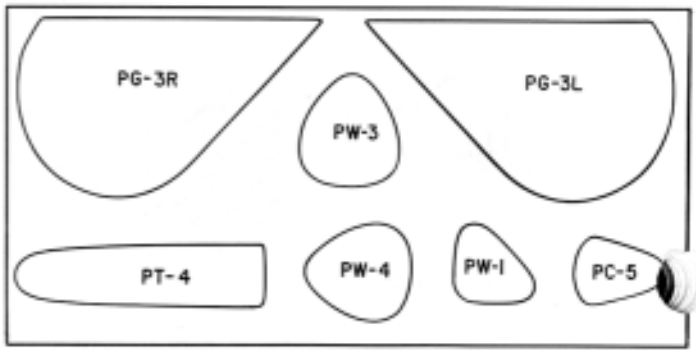
PLASTIC FUSELAGE (PF)

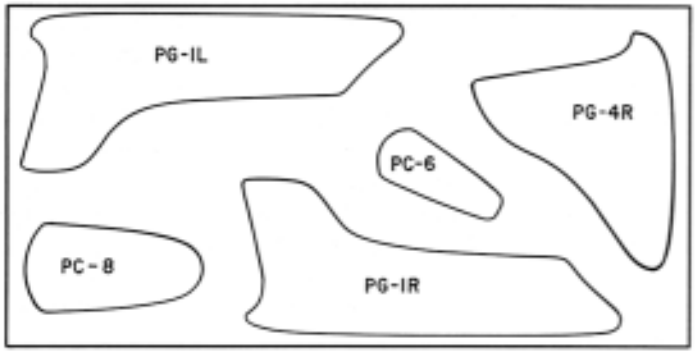
PF-1 - Headrest
PF-2 - Fuselage rear fairing, left side.
PF-3 - Fuselage rear fairing, right side.
PF-4 - Cockpit rear wall.

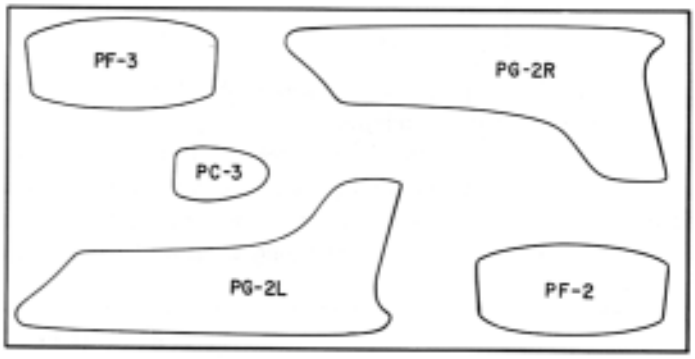












PLASTIC PART POINTERS

The vacuum formed parts in the Ryan kit are made from ABS plastic and are compatible with Sig Supercoat butyrate dope, as well as many other types of finishes. Parts may be welded together using acetone or butyrate dope thinner. (Acetone, obtainable at drug stores, is the best bonding fluid, but butyrate thinner is quite satisfactory also).

Before beginning to work with the actual parts, practice with pieces of scrap plastic to gain experience in estimating the right amount of fluid or cement to do the job without damaging the material. Give the type of finish you plan to use on the completed model a test application on the plastic.

Parts in left and right halves should be matched to each other by sanding the edges with a sanding block. The halves of the cowl and wheel pants are joined with a 1/4" wide connector strip of plastic. (See isometric views on the plan). Sandpaper the gloss off of areas to be joined to improve adhesion. Hold connector strip in position on one part half, leaving half of the strip extended over the edge so as to lap over onto the other part half when it is attached. Using a small brush, flow a few drops of thinner under the edge. It will spread along the seam by capillary action. (Don't let thinner get under your fingers, it will leave a fingerprint).

After letting the thinner soak in for a few seconds, press the two pieces together so that the melted plastic on the t surfaces flows together. If a few droplets of plastic do not ooze out of the joint while it is being squeezed, chances are not enough thinner was applied. On the other hand, avoid flooding with bonding fluid, for it is possible to overdo and

soften the plastic excessively, in which case it may warp or distort, particularly in thin spots.

In about thirty seconds the strip will hold itself in place but allow to dry thoroughly before further handling. Because of the curvature of the parts the connector strip may be slightly at the wrong angle for mating perfectly to the opposite half. Scrape the protruding edge with a razor knife blade so that a better match occurs when joining to the other half. Tape the opposite half in position, bond together with thinner and apply pressure as before. When dry, scrape any irregular joint edges level with a knife blade and finish with sandpaper. A good crack filling putty may be made from shavings of waste plastic dissolved in acetone or thinner.

Study the plans and isometrics carefully before cutting up the sheet of vacuum formed parts. Some must have flanges remaining, others have considerable waste to be removed. Be careful not to cut or tear into the parts. A small pair of curved manicure scissors is handy for following curves. Try to remove all parts slightly oversize and bring them to exact shape with a sanding block.

COWL ASSEMBLY DETAILS

Cowl half joining instructions are given in the upper left hand corner of Plate One.

Sand the gloss and any scratches or imperfections off the cowl surface before attaching the oil filler cap (PC-3), scoops (PC-4, PC-5) and exits (PC-6, PC-7, PC-8). Sketch the scale markings on the cowl with a pencil, checking against the construction plans and the three-views Cut holes in the cowl body under the scoop and exit positions. A Dremel type tool is handy at this point or drill a series of holes around the edges of the holes as an aid in cutting them out. Match the cowl accessories for exact fit against the cowl body by sanding the bases and flanges. Tape in place and bond with thinner. If any spots around the edges are not quite touching the cowl, push them into place until they are attached. The outlines around the edges and hinges are cut from the 8" x 12" x .010" plastic sheet and attached with thinner.

The cowl front ring (PC-1) may be cemented in place on the flange at the front of the joined cowl body halves (PC-2). It is best to attach it with small model railroad bolts (not supplied in the kit) located in the scale positions of the cowl screws of the full size Ryan (see three-view). This allows access to the engine without removal of the entire cowling. Although the cowling is not difficult to remove, it may be desired to disguise the attachment screw heads as Duz fasteners as was done on the original Ryan model, in which case it is an advantage not to have to remove the main cowl body very often.

WHEEL PANTS

Cut out the hole in the bottom of the pant for the wheel before joining the halves. The holes in the sides for access to the flying wire brackets are not cut out until after joining the halves. Since the bottom seam for about one inch behind the wheel hole must be left unconnected to permit passing the pant over the landing gear, do not use connector strip at this point. An alternate method of passing the pant over the gear is cutting a short slot in the wheel pant behind the wheel hole just large enough to pass the back end of the flying wire bracket arm (G-3).

The seams running around the front of the cowl are formed by the front cap, PG-6. The vertical seam was formed on the original model by sawing apart the pant at this point and re-joining with the front section slightly overlapping the back section. This seam can also be applied by scribing an indentation into the plastic with a pointed tool.

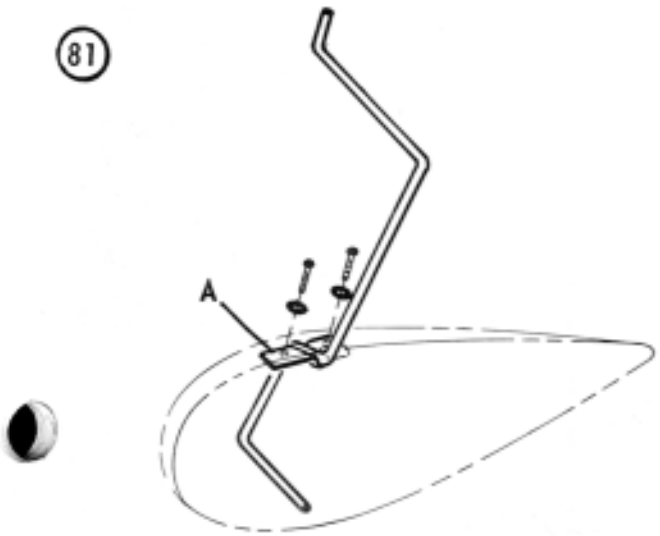
81. Attaching pant to landing gear.

(a) Bend bracket from 1/32" brass sheet to fit over wire and solder to L.G. leg.

(b.) Solder 4-40 nuts to bottom of bracket.

(c). Bolt pant to bracket.

The assembled pant is passed over the gear from the top down. Do not solder the brass sheet flying wire bracket onto G-3 until the pant is on the landing gear. This bracket can easily be reached through the opening in the sides of the pant.



GEAR FAIRINGS

The fairings must be mounted so as to allow flexing of the landing gear. PG-1 and PG-2 are attached to the wing and lap over PG-4 but are not glued or otherwise fastened to PG-4 or to the landing gear wire. PG-4 is fastened to the wheel pant top surface. PG-3 is underneath both PG-1 or PG-2 and PG-4 but is only attached to PG-1 or PG-2. Alternately you may attach PG-3 to a scrap block mount on the wing surface inside PG-1 or PG-2. In this case a small balsa block should be inserted into the front part of PG-3 to keep the sides in place against the inside of PG-1 or PG-2. The top of the wheel pant inside PG-4 can be opened up to allow PG-3 to pass into the pant during extreme gear movements.

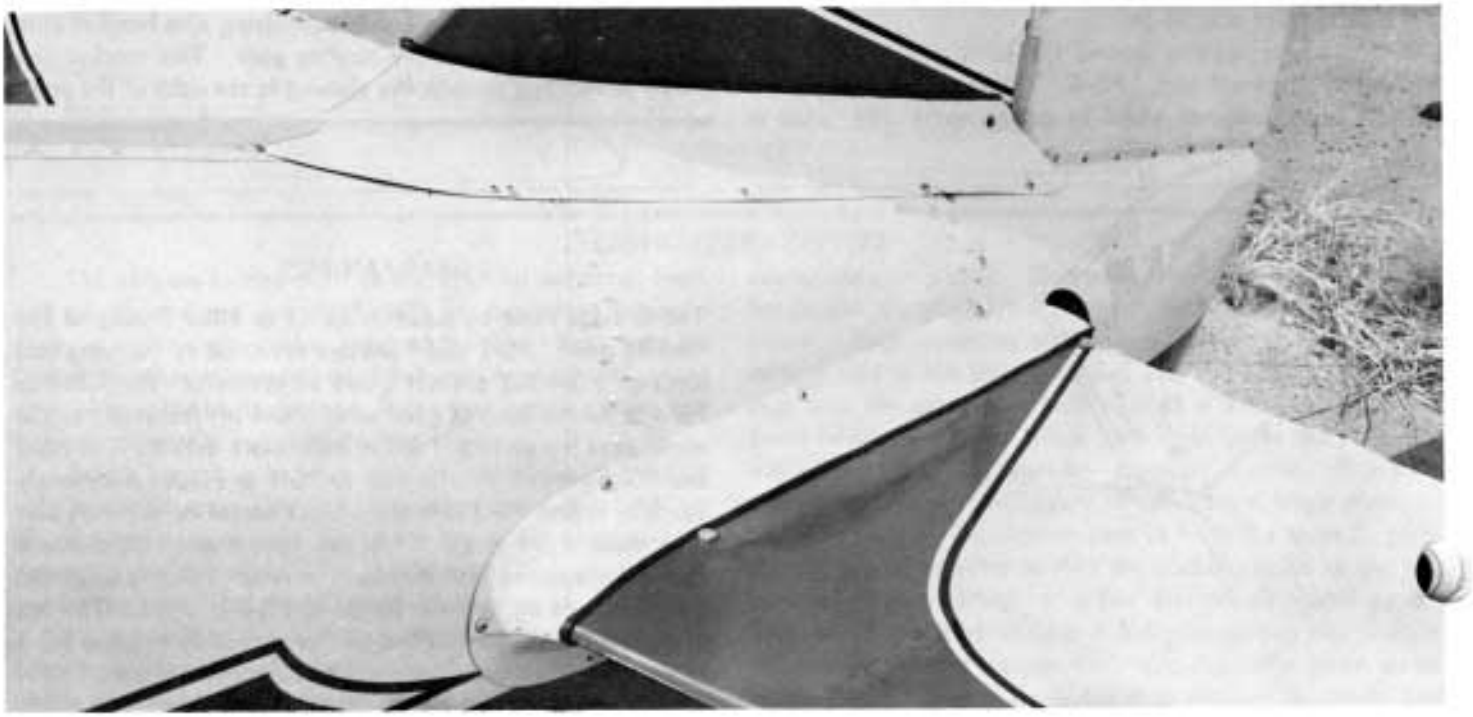
GEAR FAIRINGS

PG-1, PG-2 and PG-4 have an overlapped seam effect at the front and can be assembled in this manner rather than with a connector strip on the center line. If they are assembled on the centerline, a connector strip can only be used at the top portion, above the point where PG-1 and PG-8 lap over the L. G. wheel pant fairings (PG-4). This will allow PG-4 to fit snugly into PG-1 and PG-2. Note that the halves of PG-1, PG-2 and PG-4 are joined only at the leading edge, the halves of PG-3 only at the trailing edge.

The centerline of all half pieces of landing gear fairings on the vacuumed formed sheets is ¼" above the bottom surface of the sheet (the surface touching the table). Pieces to be overlapped for scale effect should be cut about 3/16" above the bottom to allow material for overlap.

PG-1 and PG-2 may be fastened to the wing at the scale screw locations with small 00-90 or No. 0 size wood screws (not provided). If this course is followed you may wish to inset some plywood or hardwood scabs into the planking for anchoring some of the screws. They can be screwed directly into the balsa center section planking but may not hold as well although the large number of them provides a lot of attachment strength.

The fairing can be glued in place with Sig-Ment and the screw heads done as dummies, rather than functionally holding the fairing. This will make it more difficult to remove the landing gear since the glue seam will have to be broken.



TAIL FAIRINGS

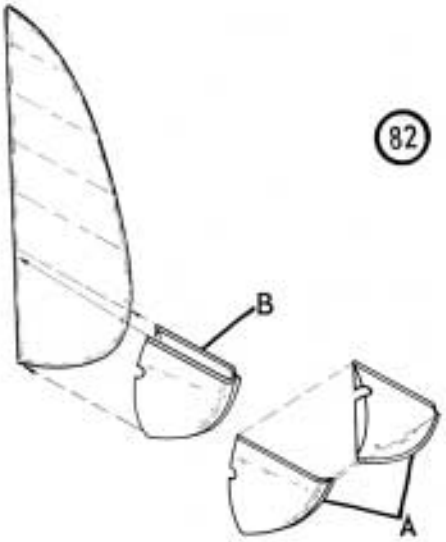
The tail fairing mouldings must be trimmed down to the sizes indicated on the Fuselage Side and Top Views. Fit to the tail while trimming to insure correct cuts.

The back end of the dorsal fin (PT-1) must be cut into the leading edge of the fin so that the fin fairing (PT-2) will fit closely over it. Notch the front of PT-2 to go over PT-1.

82. (a.) Trim the left and right halves of rudder cone PT-5 down to an approximately ⅛"wide flange on top and back. The notch in the front is to pass the elevator horn rod when the rudder is in extreme positions (see 3-view).

(b.)Join halves together on the back edge with thinner.

(c.) Slide over rudder and fasten with a line of 00-90 bolts (not provided) along the top flange or cement in place with contact cement and apply dummy screw heads with glue. (Note: Some of the front face of the PT-5 mouldings must be cut away to pass over the rudder, but only enough to do so.)



FUSELAGE FAIRINGS

Cut the Headrest (PF-1) out, leaving approximately a ⅛" flange.

PF-2 and PF-3 have centerlines ¼" from the bottom surface of the vacuum formed sheet but more must be cut away while fitting to Z-3 and Z-4. (See Top View of Fuselage on Plate One). Don't cut PF-2 and PF-3 to length until the rudder, with PT-5 installed, can be held in position.

PF-4 forms the rear wall of the cockpit and must be trimmed slightly to fit against the planking and around the stringers. The open part of the cavity faces forward. This means that the top of the part as it appears on the vacuum formed sheet faces the rear of the fuselage.

SUPER DETAILING

The Ryan kit has been designed to enable construction of a high quality scale model with all major building items included. The nature of some of the things required for a very fine, super-detailed model, such as the model railroad bolts, make it impractical to supply these, particularly since some builders will not want to build this elaborately. However, as an aid to those who want to duplicate the World Championship detailing of the prototype model, instructions and suggestions are included. Only where it is specifically stated are the materials furnished in the kit. All other su[per] detailing items are NOT furnished.

INSTRUMENT PANEL

Included in the kit are the major items necessary for duplication of the prototype model's top-rated instrument panel. The dials have been photographically reproduced to insure maximum shapness and clarity. Most of the rest of the cockpit items must be hand-made from various bits and scraps of plastic, wire, sheet metal, cloth, etc.

83. (a.) Trace the pattern shown here onto .030" ABS plastic sheet and cut out. It is best to drill the instrument holes out under size and then carefully open up until the instrument faces fit snugly into them. A tapered reamer makes a handy tool for opening up the holes. Paint the panel flat black before mounting the instruments.

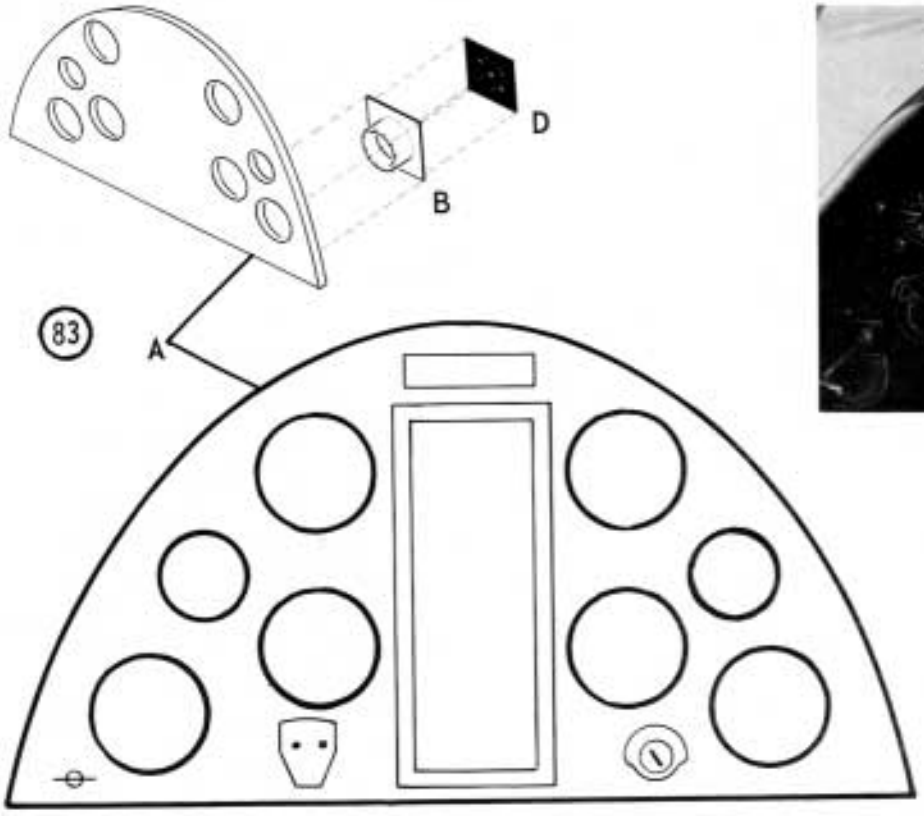
(b.) Cut the vacuumed formed instrument rings from the clear plastic sheet. Do not cut around them but cut straight through the sheet between each row of dials, leaving the ring on a square of plastic.

(c.) Find a washer that will just fit up against the glass face. Cover it with masking tape and cut out the circle of masking tape with a razor knife. Stick this over the glass face of the instrument ring. Paint the edges of the ring gloss black to provide a scale contrast with the flat black panel.

(d.) Cut out the instrument dials from the photo sheet, also in squares. They are placed on the backs of the instrument rings. Do not cut them out and put them into the rings against the glass face. The spacing provided by mounting them on the square backs of the vacuum formed rings adds to the appearance of depth. It is also easier to get them exactly centered on the ring before tack gluing them in place.

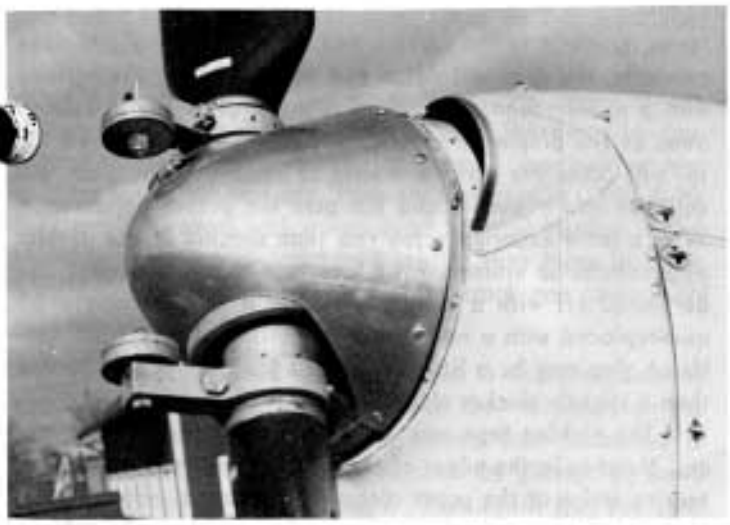
(e.) The stunt chart of Aresti aerobatic pattern maneuvers in the center of the panel is mounted in a frame bent from .010" ABS plastic, with 00-90 bolts (not furnished) around the edges. Round headed 00-90 wood screws or model railroad bolts are used around each instrument to duplicate the scale attachment screws. (See the Ryan 3-view for positioning of bolts). The identification plate lettering on the dial sheet is first contact-cemented to a small rectangle of plastic before gluing to the panel to provide a raised effect. Paint the edges of the rectangle black to match the identification plate. Cut and bend the stop watch holder from thin aluminum. Ignition key and body are from ABS plastic as are some other small items. The flooring is a piece of felt. Patterned aluminum foot floor plates are simulated with paper toweling painted silver.

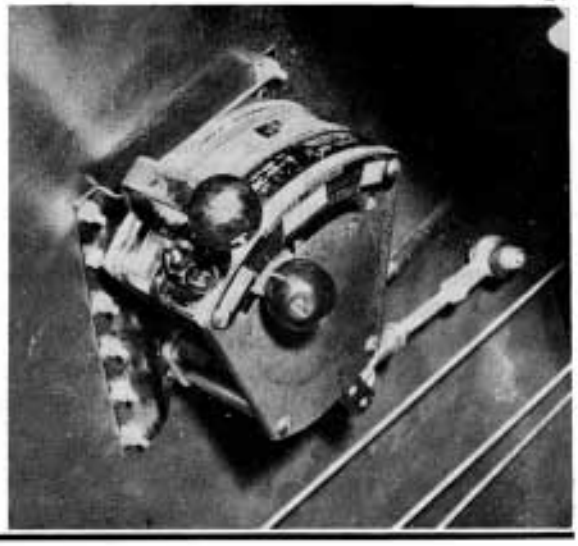
Pieces of wire, tubing and plastic can be combined for various small cockpit parts such as the mixture control ha[n]dle. Cover the cockpit sides with grained black leatherette from the yard goods store. Cockpit edge is medium size black fuel tubing, split open and contact cemented in place.



Sig has 1/32" x 5/32" round head rivets for detailing purposes. (See Sig Catalog)

1/32 x 5/16 Rd. Hd. Alum.	
# 434 per 100	$ .69
# 435 per 500	2.75
# 436 per 1000	5.25





RUDDER PEDALS

84. An exact duplication of the real pedals can be made from brass tubing. Dimensions are given on the isometric drawing.

85. (a.) File notches in the tubing ends with a jeweler's needle file.

(b.) Tin tubing pieces with solder in advance so that soldering can be done without large blobs adhering to the joint.

(c.) The heel brake rod is bent from a longer piece of tubing. Using your fingers, shape to the desired radius. Cut out a piece of the required length.

(d.) Rear bracket is bent from shim stock, soldered on.

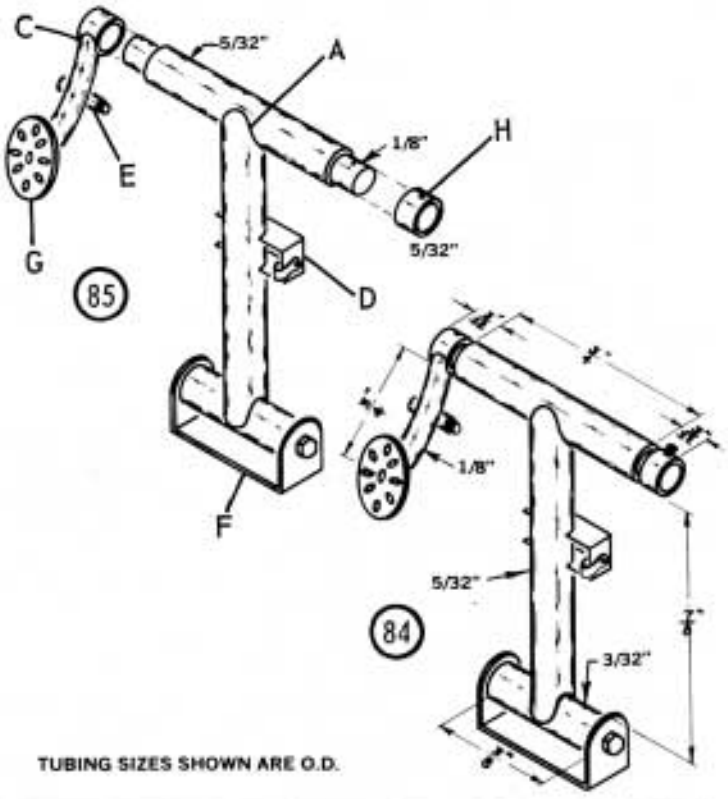
(e.) Piece of tubing with model railroad bolt is soldered in place.

(f.) Lower bracket is bent from shim stock and fastened to the complete assembly with an 0-80 Hex head bolt.

(g.) Brake pedal is cut from plastic sheet and glued to tubing. Bumps are simulated with drops of Sig-Bond glue.

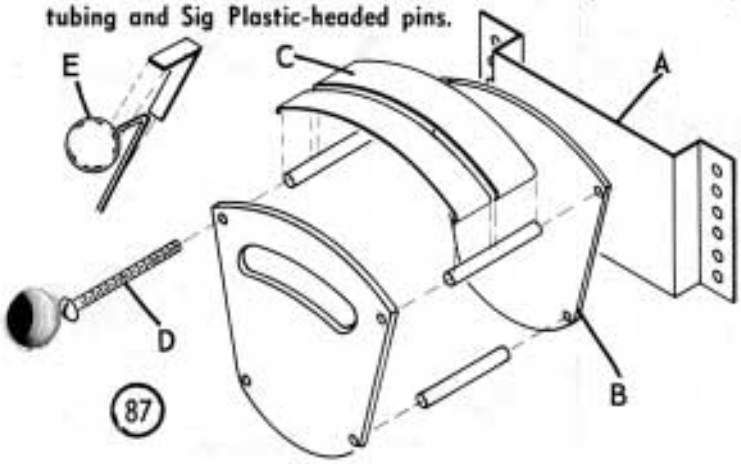
(h.) Drill holes through collars into tubing. 00-90 bolts to retain the collars will cut their own threads into the brass enough to hold the collar.

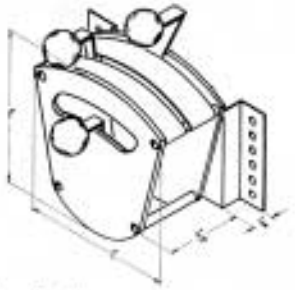
Note: Since the pedals actually hinge upon assembly like the full-size counterpart it will be necessary to lock them in the desired position with a drop of solder if you do not wish them movable. Cables hooked to the pedals were made from .012 stranded control line wire.



THROTTLE QUADRANT

86. The quadrant is made up from pieces of plastic sheet, tubing and Sig Plastic-headed pins.





87. (a.) Bend the mounting bracket from sheet plastic, drill holes.

(b.) Cut body parts from sheet plastic.

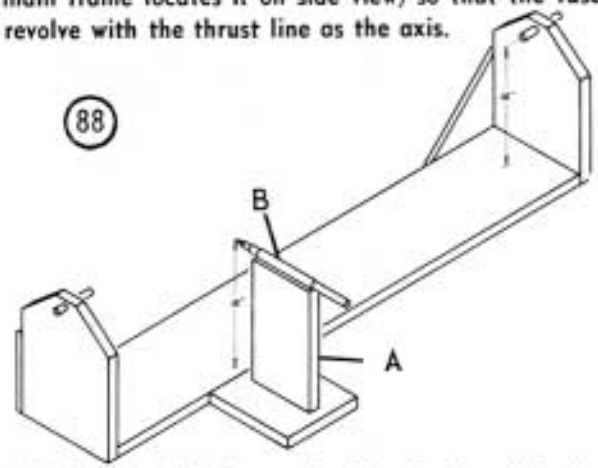
(c.) Bend ends of top round with a pair of pliers. (ABS plastic sheet cold forms easily).

(d.) Model railroad bolts through pieces of brass tubing join the assembly to the mounting bracket.

(e.) Control levers are Sig Plastic Headed Pins with a glued-on piece of heavy paper.

SMALL DETAIL

88. Rivet detail on the model is not as difficult at it looks and adds an impressive touch of realism. To get the right effect they must be put on straight and true. Crooked lines of rivets are worse than none at all. The isometric view shows a simple plywood stand in which to mount the fuselage for addition of guide lines for rivets and panel seams. Screw a plywood scab to the firewall to receive the spindle dowel of the jig stand. At the rear, balsa blocks must be added temporarily on each side of the fin post to provide a base for attaching a piece of plywood for a bearing. Drill holes in the plywood pieces directly on the thrust line (the top edge of the main frame locates it on side view) so that the fuselage will revolve with the thrust line as the axis.



(a.) The pencil-holder stand slides back and forth along the side of the jig stand.

(b.) A piece of brass tubing, telescopes into another and carries the pencil.

Test alignment by rotating the fuselage planking seam at the 5/8" sheet balsa rings just behind the cowling. Allow the pencil to follow along the seam by sliding the tubing in which it is mounted back and forth in the outside tube. Small corrections in the setup may have to be made to get the pencil to track perfectly around the front seam. The tubing must be at exactly 90 degrees to the thrust line.

Apply pencil lines around the fuselage at all points where rivet lines or panel seams appear. Rule horizontal lines on the surface with a straight edge and soft pencil.

At this point the overlapped metal panel effect should be added. This process is illustrated in an isometric view just below the Fuselage Top View on Plate One and described in an accompanying instruction paragraph entitled "Simulating Panel Seams".

The scale distance between nearly all the rivets is 1" on the fullsize airplane or 1/5" apart on the model. A locating guide can be made from a piece of clear plastic with the holes spaced to permit marking each rivet quickly with a pencil point along the lines on the fuselage. Or, a special cardboard ruler marked off in 1/5" increments can be used. After rivet points are located, erase the rest of the pencil lines. They will show through several coats of dope if not removed.

Rivets are formed from drops of Sig-Bond aliphatic resin glue applied with a standard Austin-Craft glue gun. Practice rivet forming on a test surface. Put about an inch of glue into the gun and don't use the plunger that comes with the gun. Allow the glue to drip from the end. As each droplet forms, touch it to the surface and then pull away. If done correctly, the drop will catch and stand up from the surface with a nicely rounded shape. Too much of a lag in pulling away as the droplet is applied, or pushing the drop down too far will cause the surface tension to break and the glue will collapse into a puddle and not give the proper appearance. With a little experience you can time spacing of the droplet applications so uniform rivets are formed. A bad rivet can be picked off with a knife point after it has partially dried and replaced with a new drop. Sometimes a very fresh bottle of glue may be a little runny and tend to puddle worse than a slightly thicker older bottle.

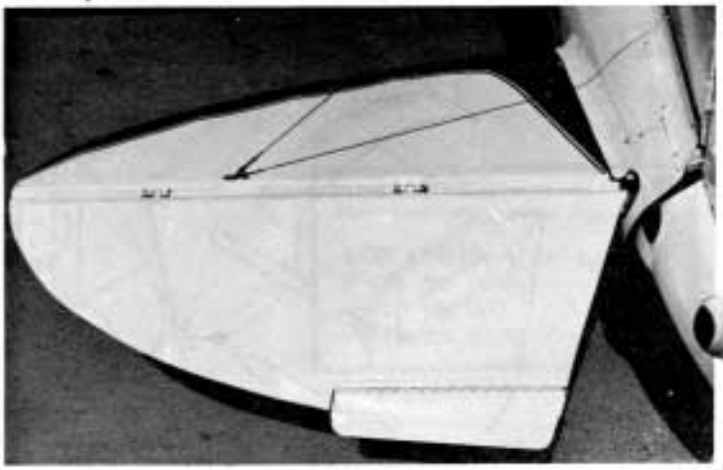
The pinking tape was made from onion skin typing paper. Notches in the edges of the full size tape were copied by tearing strips of the paper along the serrated edge of an aluminum foil or waxed paper box. This light weight cutting edge material will have to be bolted to a piece of strap or angle iron so that even pressure can be exerted against the onion skin for tearing strips of paper.

Lay the onion skin against something resilient, like a table cloth. Hold it down with the serrated edge tool and tear off 7/16" wide strips.

Silkspan covering paper was also tried, but proved to be more difficult to tear. Silkspan strips did work better when wetted and applied around curved areas such as the wing tips. (Pinking tape is applied over all edges as well as over all ribs). Onion skin tapes were not so easy to fit on the curved areas and sometimes had to be cut to lay down evenly, much like handling Japanese tissue. Wetting will help. Our suggestion is that you try both types of paper to see which gives the most acceptable results.

Coat the area to be taped with clear dope and lay on the tape. Brush clear dope over it and stick down all the edges. Silkspan will require extra clear dope to fill the paper pores.

Rib stitching gives the final touch to the fabric covered areas. The same technique used in applying rivets with drops of Sig Bond glue is adapted to simulating rib stitches but instead of a round drop, a thread the width of the rib thickness is required. Practice on a board. Catch the droplet of glue against the surface as it comes from the glue gun and pull away to form a thread. It soon will be possible to get the right length and thickness of stitch nearly every time. Unsatisfactory stitches can be picked off when partially dry, and replaced.



After taping and rib-stitching, spray on one more coat of the base color.

On an airplane like the Ryan there are many screws, fasteners and bolts in the surface detail. These can be duplicated in most cases with the tiny sizes of machine screws sold for model railroad use. They are available in 00-90, 0-80, 1-72 and 2-56 brass with a variety of types of heads. Model shops carrying a train stock will usually have these in stock. Mail order houses featuring model RR stock can also supply this miniature hardware.

The model railroad bolts were used in such areas as the cowling and fairing strips to simulate the fasteners on the full scale aircraft. The cowling screws were converted to scale representations of a Dzus fastener by gluing a small piece of plastic to an 00-90 head. This could also be done by soldering on a small piece of shim stock. The flying wires can be bolted to their brackets with 00-90 bolts. Some larger sizes are required in the cockpit. Taps are available for these sizes so that threads may be cut, for example, into the plywood scab under the wing strut (WS) plate and hex headed bolts used instead of wood screws for increased scale appearance. Fairly good threads can be cut by putting the bolts into undersized holes.

Number 0 or Number 1 size wood screws will be useful for screwing down the front cockpit cover and screwing on the special plastic spinner to the special backplate furnished in the kit. Extra backplates and spinners are available for those builders who do not wish to use the same set for both flying and scale judging.

The scale prop is carved from balsa blocks. The pattern appears on Plate Three. The side view should be cut out on a jig saw and the waste pieces pinned back in place so that the top view pattern may be traced onto the block and cut out.

The shape of the block provides the basic outline of the prop blade with simple carving technique. It is just like whittling a prop for a rubber-powered model. The hub end of each blade plugs into plastic tubing and this should be carved round and inserted into the tubing early in the shaping process so that the blade shape will blend smoothly into the tubing. Don't try to carve away too much wood at once, particularly near the hub. See finishing instructions by the scale prop view on Plate Three.

Much of the scale prop detail was made from telescoped sections of Plastruct butyrate tubing. If not available at a hobby shop selling trains, a mail order catalog is available for 50c from Plastruct, Inc., 1621 N. Indiana St., Los Angeles, California 90063.

On the real airplane, some of the fairings and fillets have a rubber protected edge. These were simulated on the model by cutting a strip of black Scotch Plastic (not electric) Tape and rolling it over the edge of the plastic formed fairing. Cut the tape by applying it to a piece of glass and using a straight edge and a razor knife.

There is a long tube running from the cowling to the tail wheel along the bottom centerline of the fuselage. Plastic tubing (not included) is suggested for this detail. See three views for the location.

COVERING AND FINISHING

A good finish starts at the framework. Fine sand carefully. Fill all nicks and imperfections with Sig Epox-O-Lite Putty.

Brush a coat of clear Sig Supercoat over all parts of the framework that will contact the covering. When dry, resand with fine sandpaper. Brush on a second coat of clear and allow to dry and again sand.

Silk is hard to beat as a covering material for a scale model. The bottom of the wing is a good place to start. Cut a piece of silk about 1" larger than half of the wing, with the grain running lengthwise (grain of the silk runs parallel to the finished bias edge). Dip in water and apply. Work around the edges, pulling out all of the wrinkles and stretching it smooth. Brush around the outside edge with clear dope. It will soak through the silk and adhere to the dope already on the framework. After drying, trim off the edges with a sharp, double-edged razor blade. Go over any areas that have not completely adhered with more dope. The top half is done in identical fashion except that the silk should be brought down over the edges and lapped over the silk on the bottom at the leading edge and over the back of the trailing edge.

Use the same process on the tail section.

The fuselage requires more care in stretching the silk over the deeper curves, but basically the operation is the same as described above. Overlaps will disappear during sanding and fillercoating. All exposed wood parts should be silk covered. Plastic parts should not be covered.

The first coat of clear dope over the entire silk surface must be brushed on sparingly. As the brush rubs across the ribs on the open sections, dope is rubbed off the brush and through the silk and will run down the ribs on the inside. An excessive amount will run completely through the framework and puddle against the covering surface on the other side. When these puddles dry, the large amounts of dope solids in them causes more shrinkage than in the rest of the covering and a scarred area results. So apply dope very lightly the first time over. A second coat will seal most of the pores of the silk and from this point, running through will not be a problem.

Sig Sanding Sealer provides a good base for color dope. Thin to spraying consistency and apply an even coat to all silk-covered parts of the model, including the open framework. Sand with no-fill sandpaper, such as 3-M Tri-M-Ite (See Sig catalog), about 220 grit. Don't bear down on the edges of the ribs or the silk fibers will be cut through. Spray a second coat and sand again. A third or fourth coat may be necessary, depending on how heavy a coat is applied, to completely fill the silk grain. The ideal is a completely smooth and even base. Keep in mind that weight can build up fast in finishing and restraint must be used in applying, as well as a lot of sealer removed during the sanding.

The sanding sealer may be brushed on but more sanding may be required to remove brush marks. Go easy on edges of ribs and stringers - don't cut down into the silk.

Spray on two coats of the basic color, in this case, white. At this point, if super-detailing is desired, rivets, panel lines, rib stitching and pinking tape effects are added. Refer to the Super-Detailing section for instructions on these operations. After all the above listed super-detailing has been added, spray on one more coat of the basic color.

Lay out the areas to be painted red with pencil and mask off (see the color scheme three-view). Brush around the edges of the masking tape with thin clear dope and allow to dry. This seals the tape, preventing leakage of red under the tape. Spray on two coats of Sig Tennessee Red Supercoat dope.

Use ⅛" wide masking tape to cover the white area between the red and the black pin stripes. Lay down two more ⅛" tapes, side-by-side, against the first. Pull up the second tape to expose a ⅛" wide area to be painted black.

Lay out the rest of the black markings and the checkerboard pattern on the bottom of the wing and stab with a pencil. Mask off and spray with two coats of black Sig Supercoat.

Spray one or two coats of clear over the completed color scheme. Add decals and a good waxing to duplicate the air show shine of the prototype aircraft.

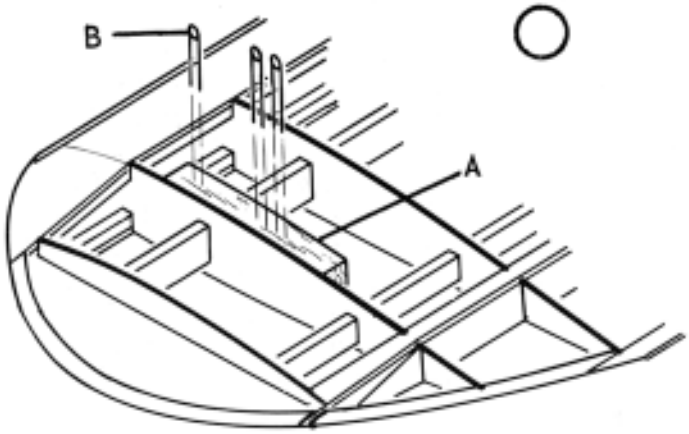
CONTROL LINE CONVERSION

Only minor changes are necessary to build the Ryan as a controliner. On Plate Three are views showing installation of a J. Roberts three-line bellcrank. During fuselage construction, a fill-in of two laminations of ⅛" sheet balsa is added to the main frame on the side toward the lines to help distribute stresses on the 3/16" plywood bellcrank mount. Only a single plastic pushrod is required for the elevator and this must be re-positioned to a higher location than the R-C installation to arrive at the bellcrank mounting height with a minimum of bending. The pushrod can most easily be mounted in the best position with the bellcrank installed. Trial operation will disclose the most friction-free layout. The use of a plastic tubing pushrod instead of a conventional pushrod allows passage along the side of the cockpit, thus not interfering with installation of complete cockpit detail. The rudder hinges can be epoxied to hold the rudder in a five degree offset to pull against the lines.

89. (a.) Before covering the wing, add a balsa block to the inside of Rib W-4 to provide a mount for the lead-out guide.

(b.) The lead out guide is bent from 1/16" wire.

The Fuselage Side View on Plate One shows the C. G. position for the R-C version. DO NOT use this position for control line flying. Balance about 1" further forward. It will probably be necessary to add some lead in the nose to bring the C. G. forward. Care during construction and painting to keep the tail as light as possible will hold down the amount of ballast required. Mount batteries for a flap servo (if used) as far forward as possible.

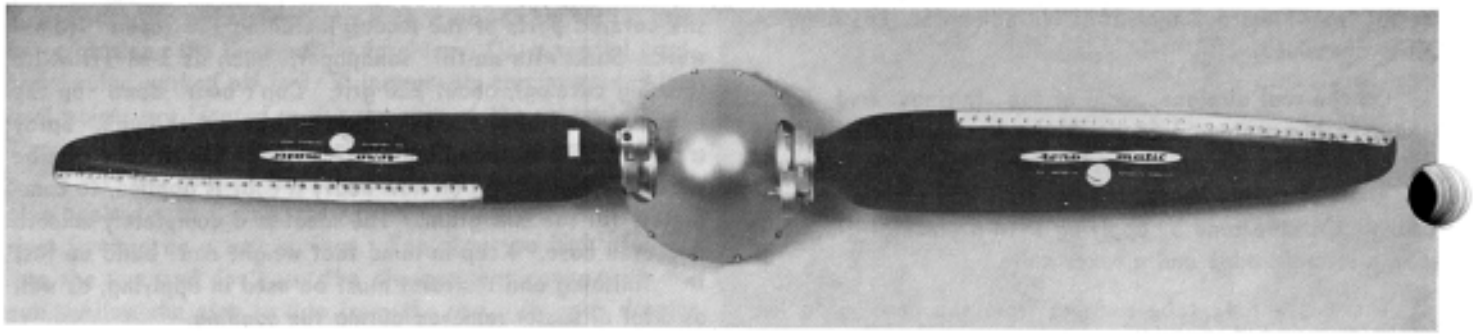


R/C FLYING

Balance at the point indicated on the Fuselage Side View. Add lead to the nose if necessary to reach this point.

The model has excellent flying characteristics. Control reactions are not sensitive or jerky. Hold a small amount of up elevator during the first part of the takeoff run to keep the tail wheel steering effective until air speed is high enough for the rudder to take over. Like many two-wheel gear airplanes, the Ryan will drift to the left from torque during takeoff. Feed in some right rudder from the beginning of the take-off run. There is no bad ground-looping tendency, in fact on the first test flight, lift-off was made while drifting to the left without any correction. It flies around a loop nicely with full elevator. Rolls are slow, smooth and scale-like.

I used full flap deflection (about 35 degrees) and it was possible to put the nose down and aim right at the spot without building up excess speed during the landing approach. It can be slowed down during the flare-out without trouble. Touch-down is like a feather and should be made with the tail slightly down. Having this model Ryan is the next best thing to flying Gosney's big bird.



ALUMINUM FLYING WIRES

Clamp the end of a an aluminum flying wire strip in a vise and pull with a pair of pliers, twisting slightly as necessary and stretching to straighten. Round and smooth the edges with a file and/or sandpaper. Ends may be made up from the plastic strip provided and fastened to the aluminum with epoxy. Drill holes through the plastic and aluminum so that the epoxy forms a retaining pin.

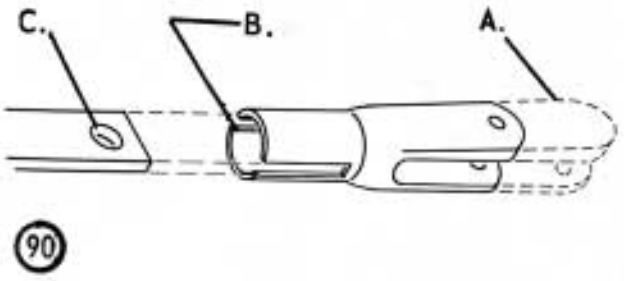
The ends may also be made from standard R/C miniature nylon clevises (not furnished).

(a.) Cut off about 3/16" of the pin end.

(b.) Saw a slot into the threaded end of the clevis, wide enough to insert the flying wire.

(c.) Drill a 1/16" hole in the end of the flying wire.

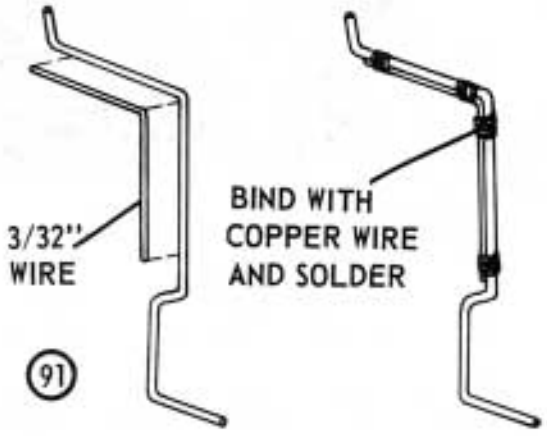
(d.) Epoxy glue the clevis to the aluminum strip, making certain that the glue is forced through the hole into the clevis threads to securely lock it. Glue the opposite end while fitting the wire to the model. Fit the wires after the model is finished and fully loaded, while sitting on the landing gear, so that they will be tight.



90

LANDING GEAR STIFFENER

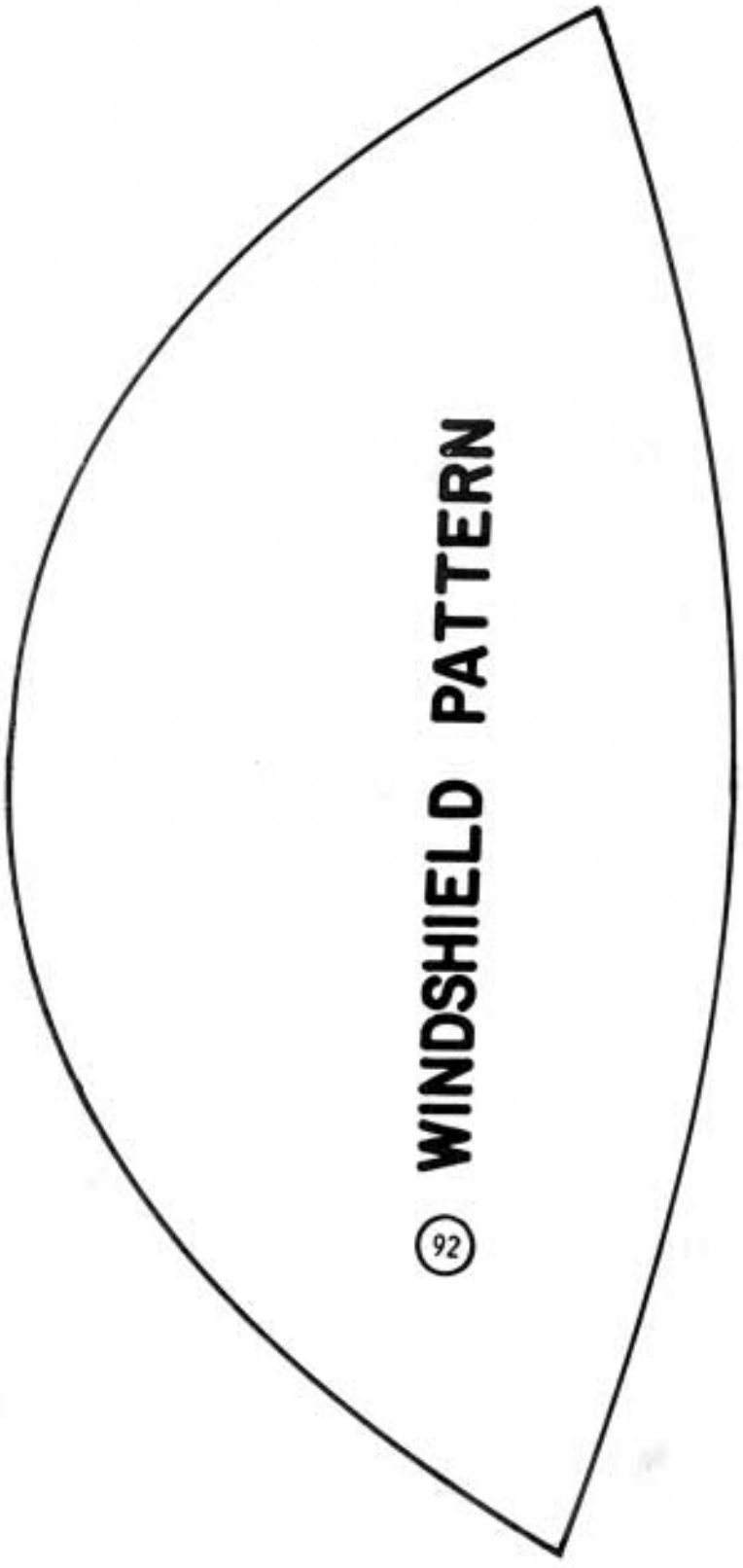
91. The gear shown on the plan worked well on the prototype model. For use on rough flying fields, it may be desirable to fasten a 3/32" wire doubler to the leg as shown in the isometric.

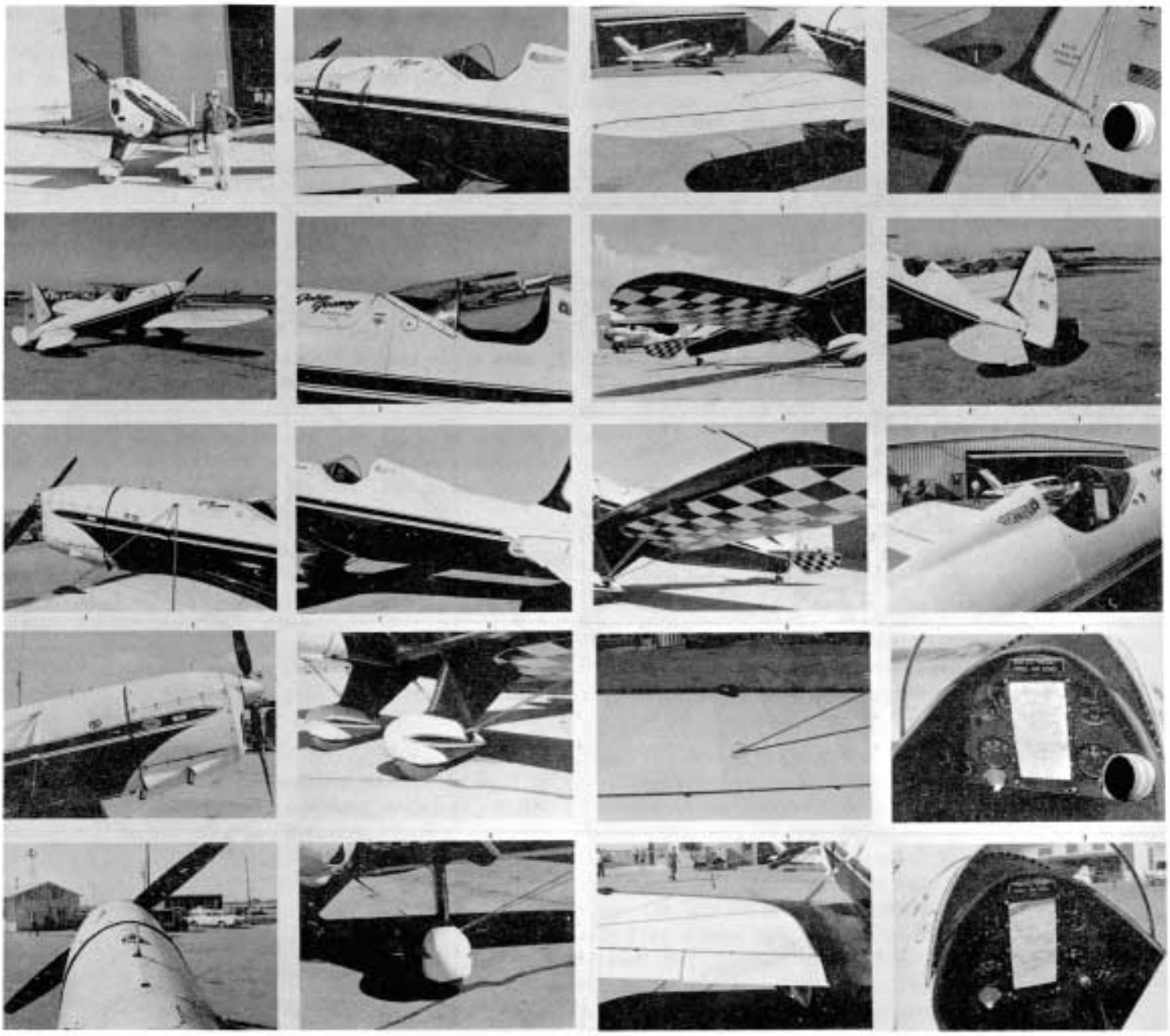


91

WINDSHIELD

92. Cut the windshield for the clear plastic sheet provided. The bottom framing strip is from the .010 white plastic piece furnished in the kit. The top framing strip is chrome Pro-Stripe tape. 00-90 model railroad bolts complete the scale detailing.





JOHN GOSNEY'S RYAN STA SPECIAL

FOR SCALE FANS - WE HAVE AVAILABLE A SET OF 18 DETAILED 3-1/2" X 5" JUMBO PRINTS IN FULL COLOR OF THE FULL SCALE AIRPLANE. CAN BE USED AS A CONSTRUCTION AID AND TO COMPLETE YOUR SCALE PRESENTATION.

SET OF 18

SIG MANUFACTURING CO., INC.

401 South Front Street

Montezuma, Iowa 50171