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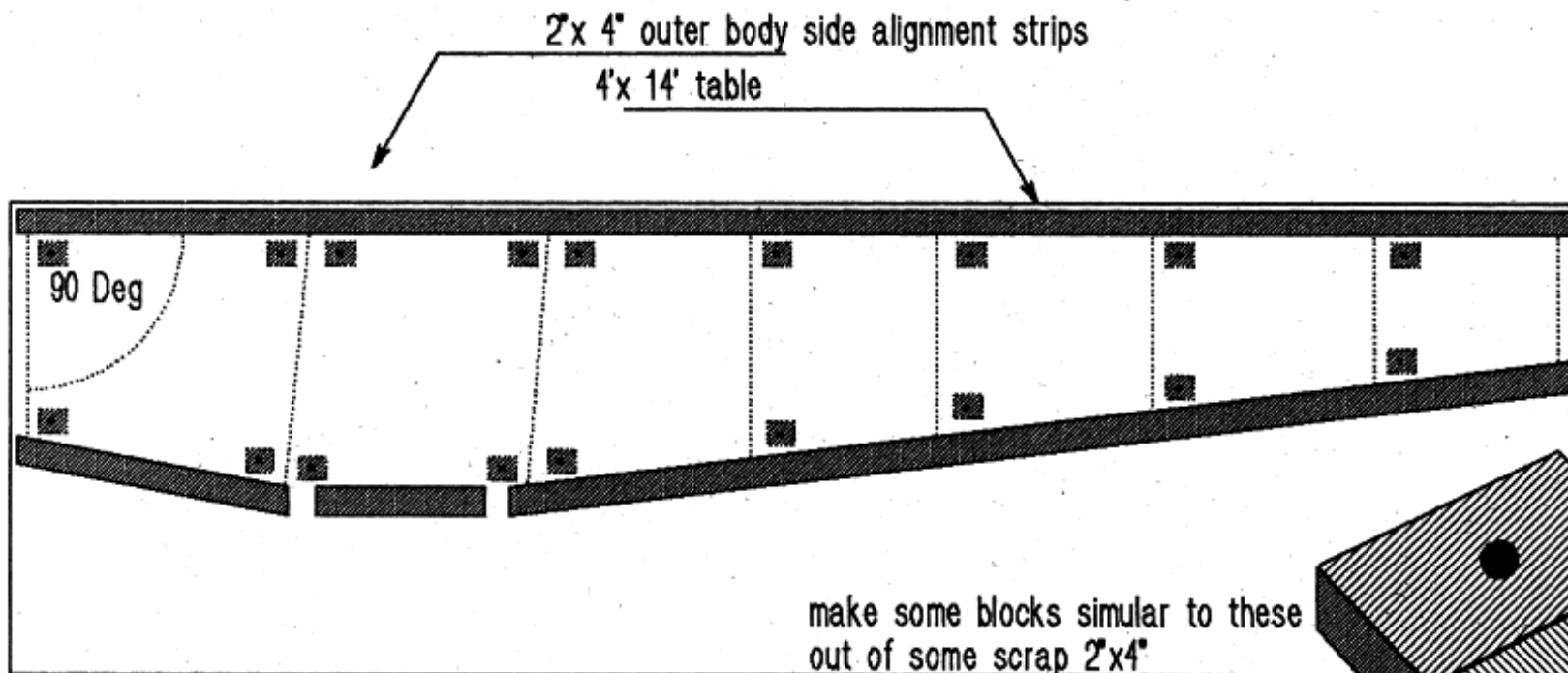
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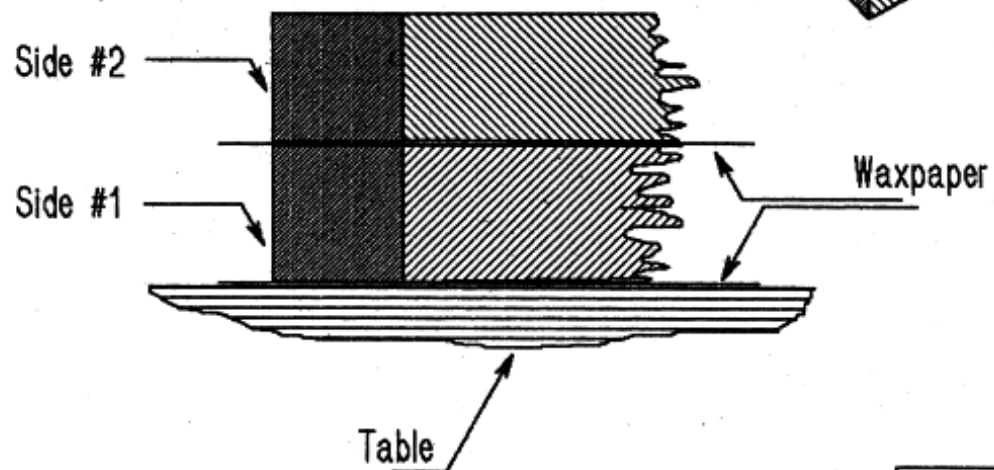
The Ultra Baby

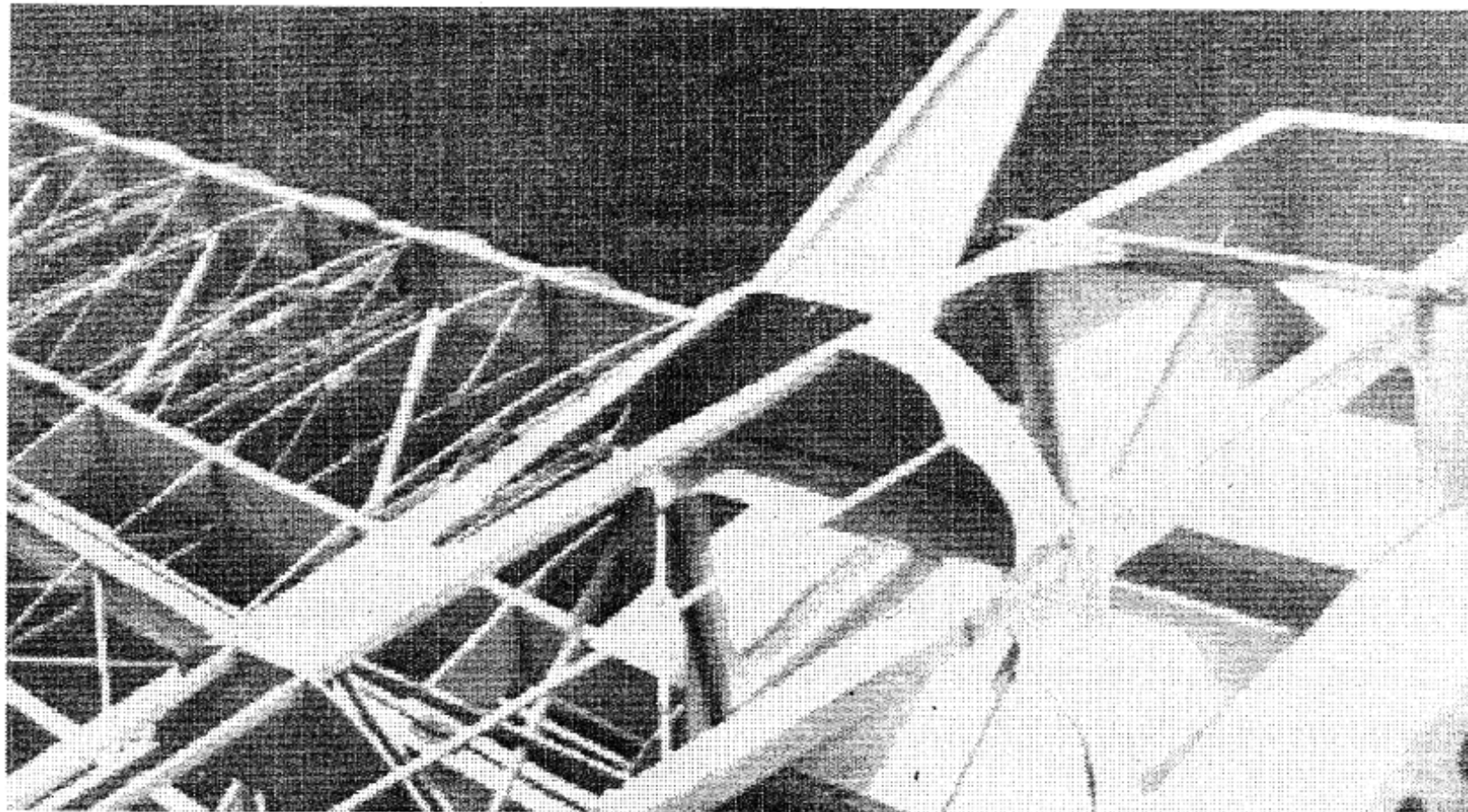
Wing Span 27.50 ft.	Range 150 sm
Wing Area 121.5 sq. ft	Takeoff Dist 250 ft.
Length 16.00 ft.	Landing Dist 400 ft.
Max Gross Wt 620 lbs	VNE 75 mph
Empty Wt 300 lbs.	Cruise..... 60 mph
Payload (full fuel) 280 lbs.	Stall 35 mph
Fuel Capacity 5 gal.	Climb Rate @msl 600 fpm
Seats1	Service Ceiling 10,000 ft
Engine 35-52 hp	Building time 700 hrs
Plans \$75.00	Construction: wood/fabric

This page has been ommited, due an
information about original plans` set owner

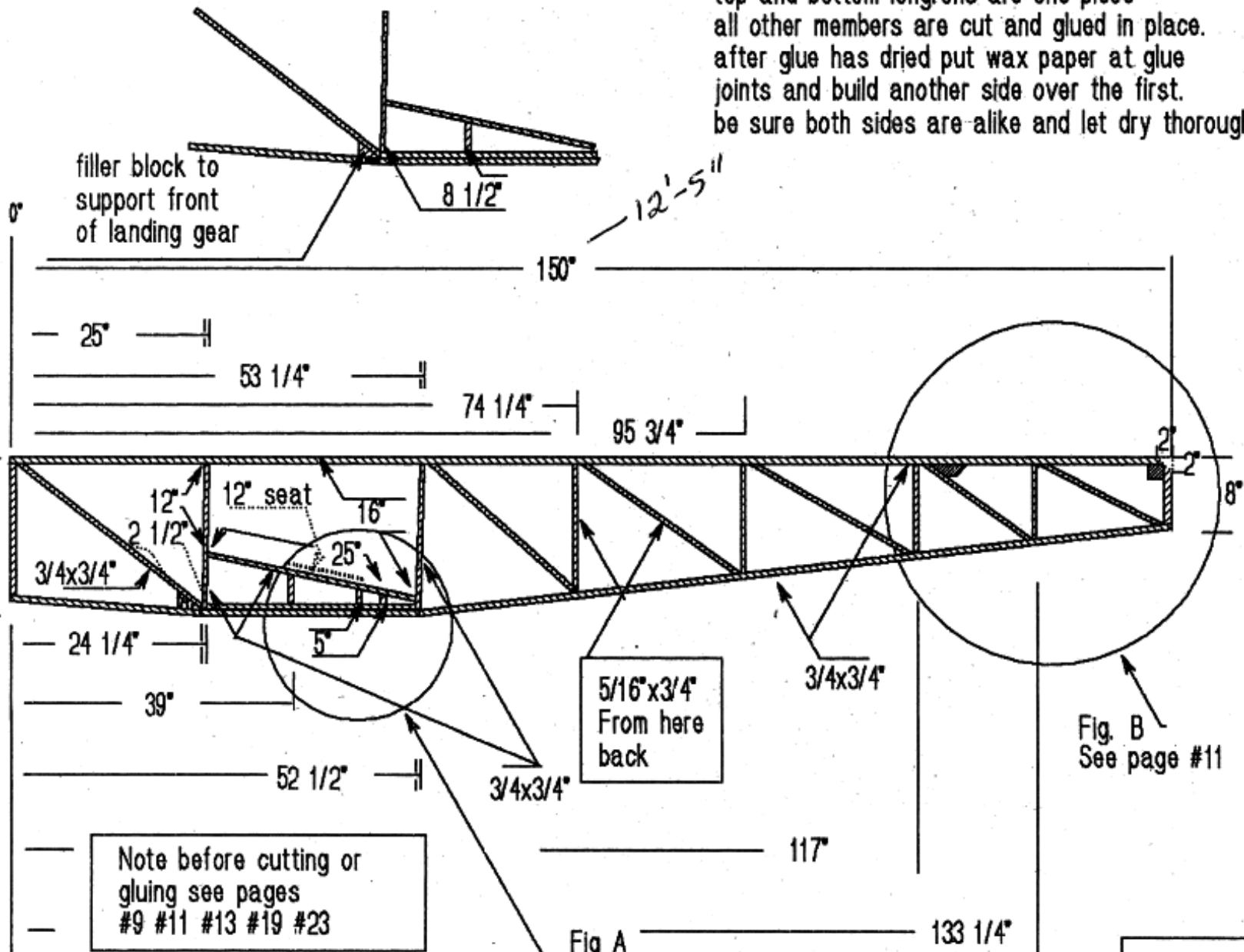


Draw an outline of the body sides on the table. Use page #7 as a guide. top rail must be perfectly straight. it would be a good idea to examine the plans carefully to be sure you understand them before you start. you can use waxpaper to prevent the wood from sticking to things you don't want it to.



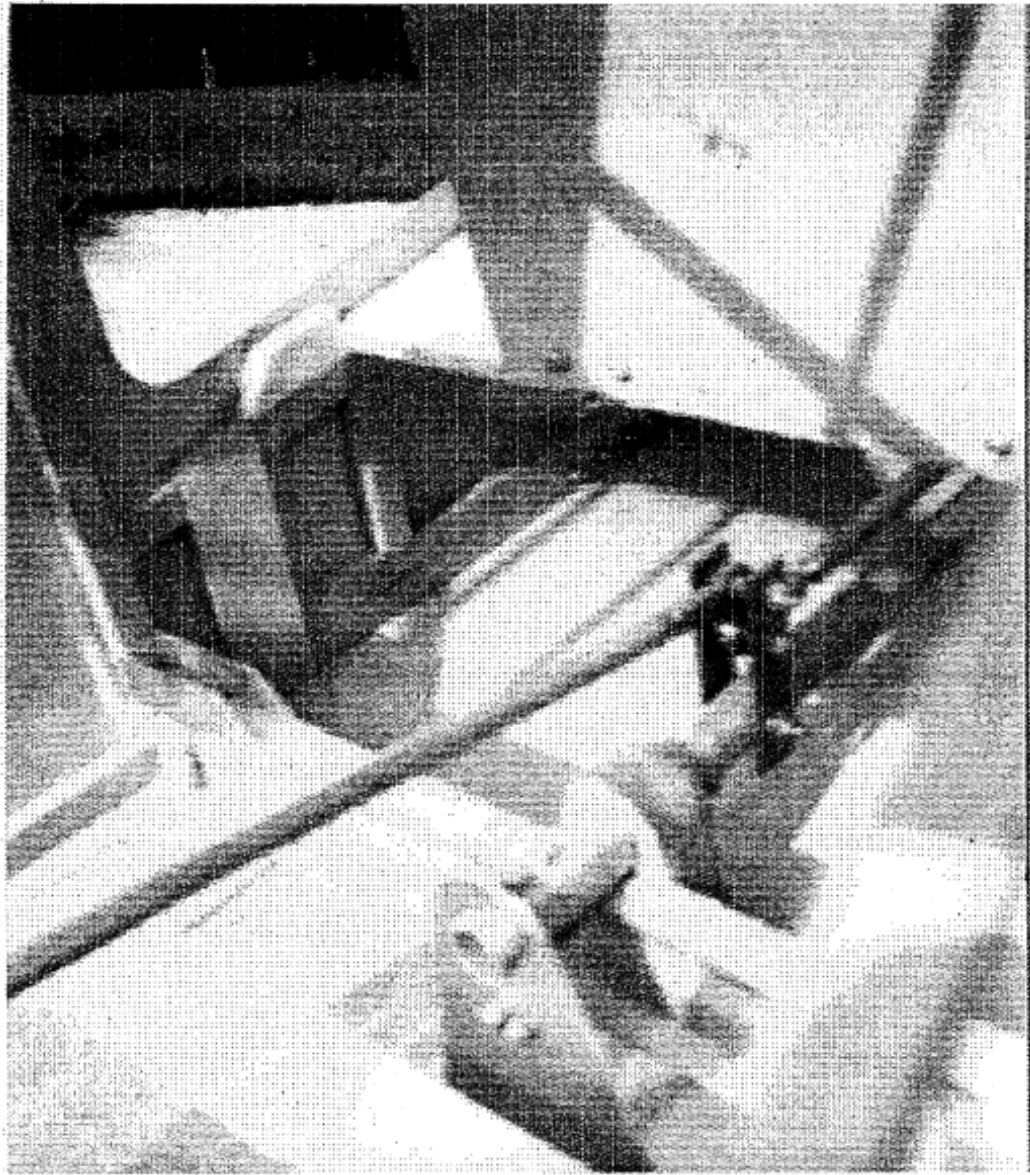


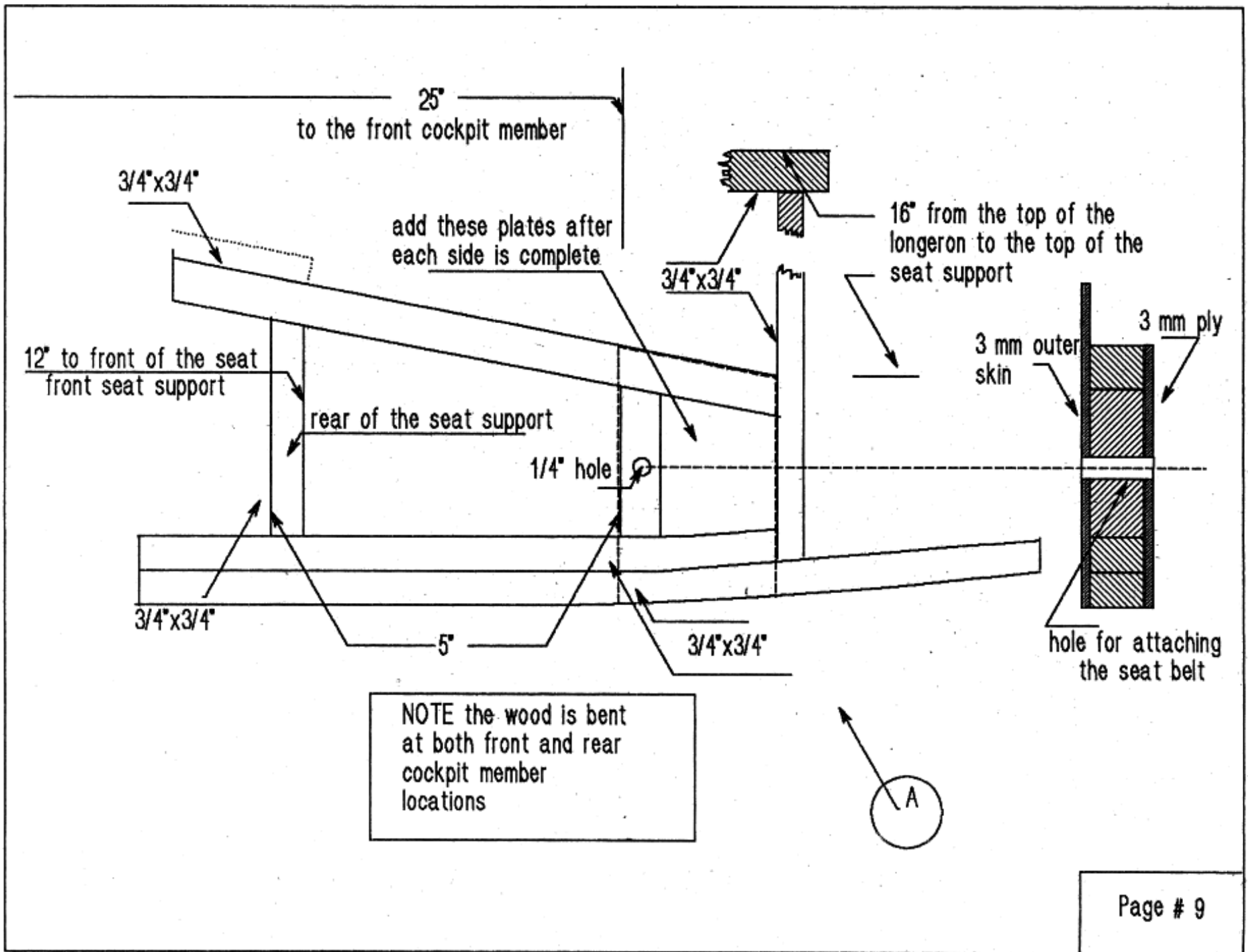
top and bottom longrons are one piece
 all other members are cut and glued in place.
 after glue has dried put wax paper at glue
 joints and build another side over the first.
 be sure both sides are alike and let dry thoroughly.

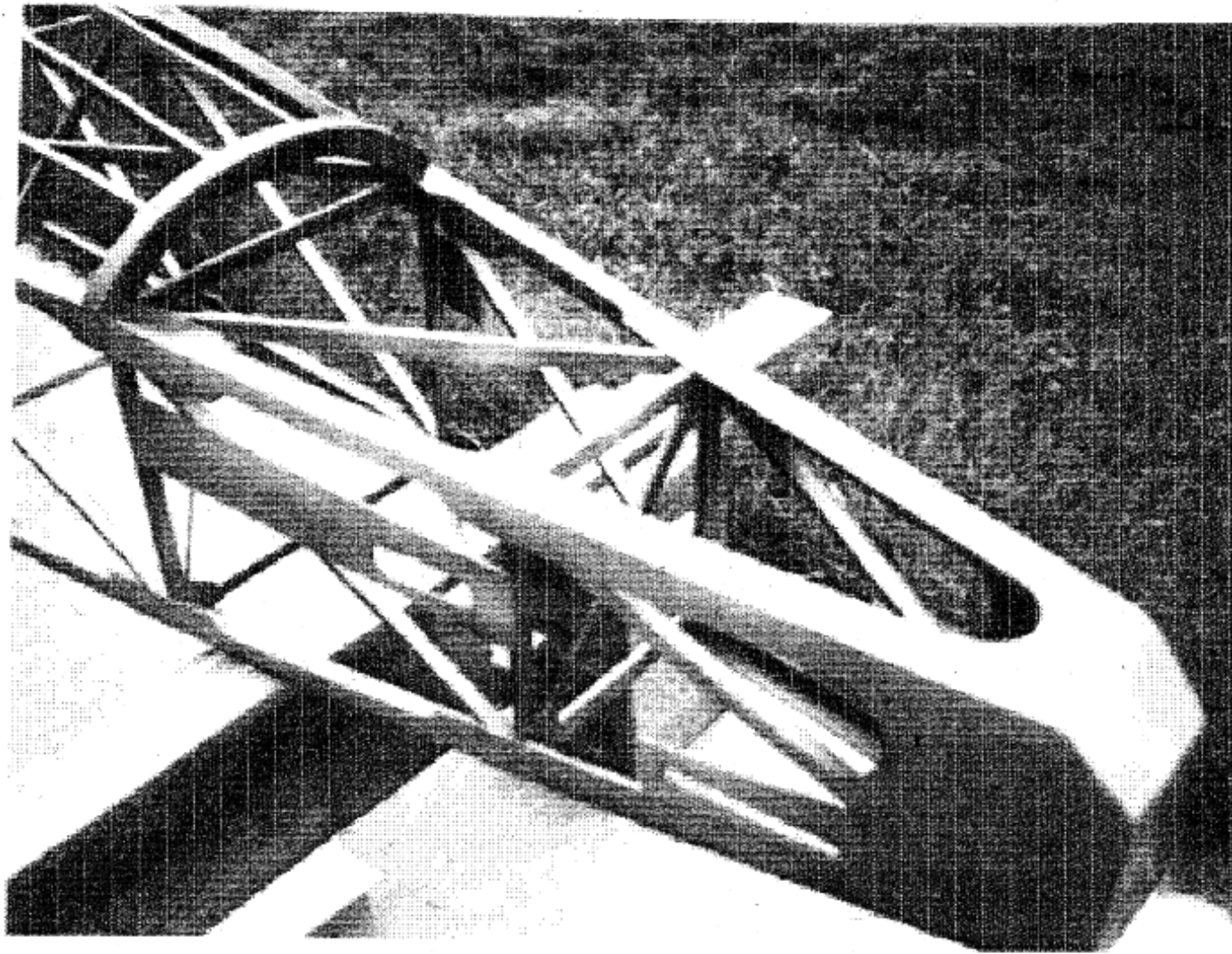


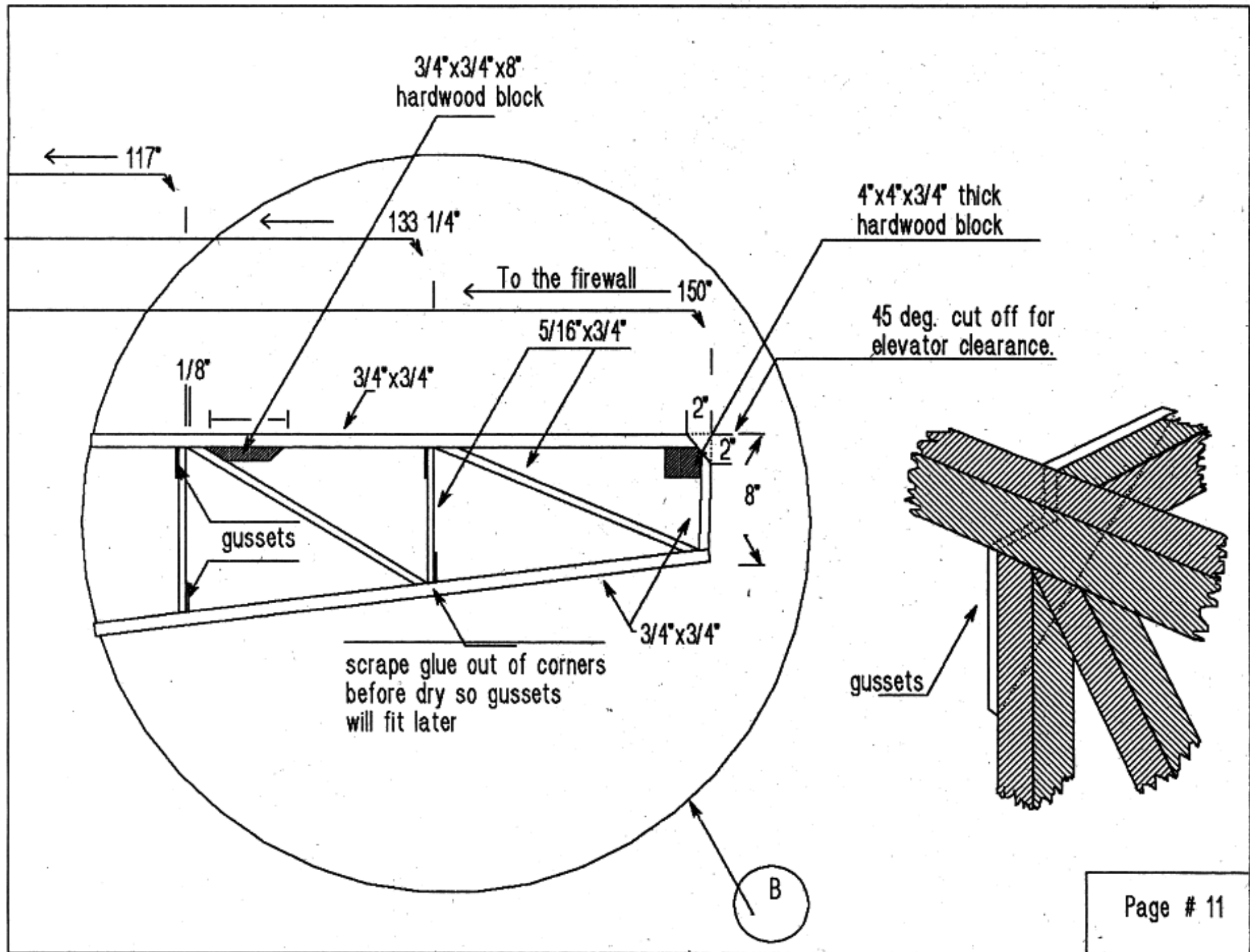
Note before cutting or
 gluing see pages
 #9 #11 #13 #19 #23

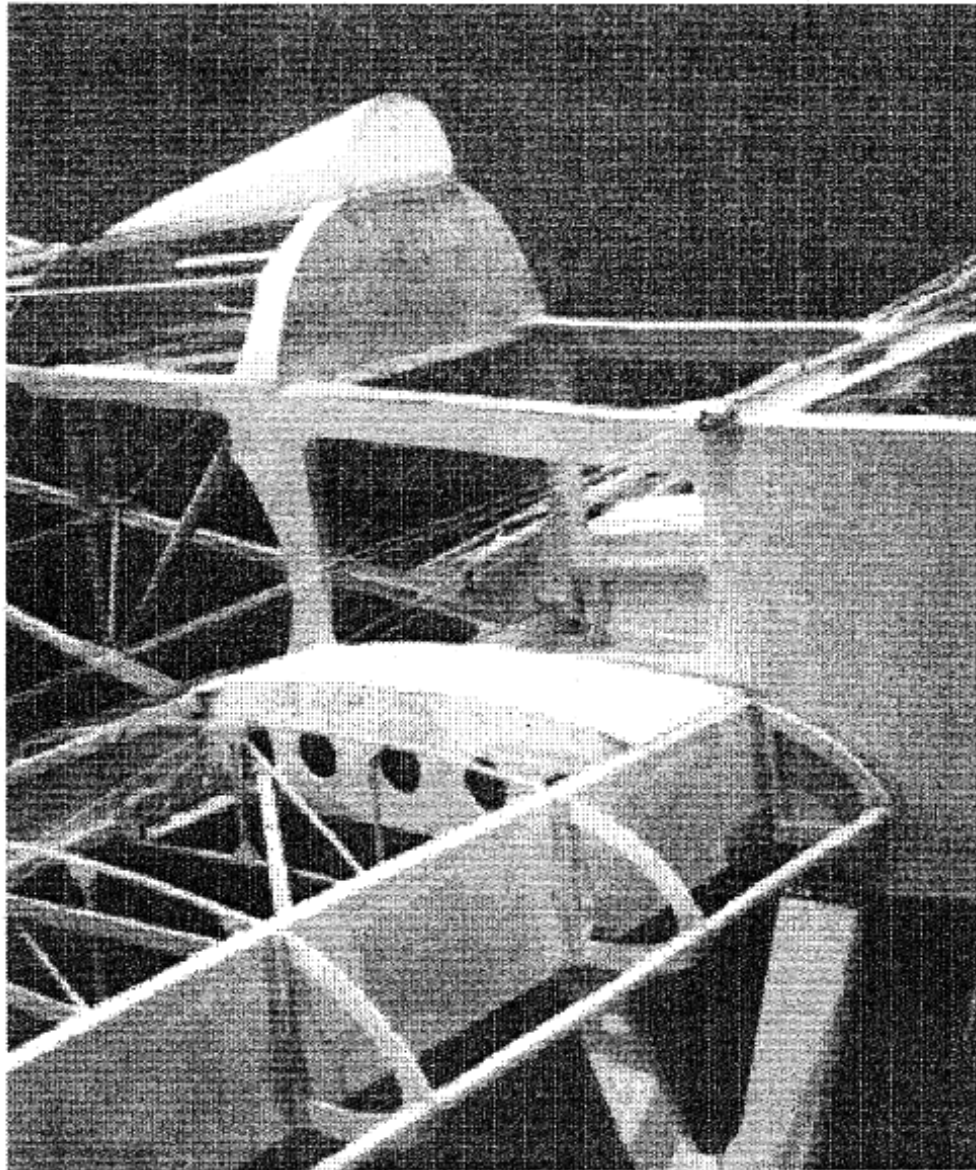
Fig A
 See page #9



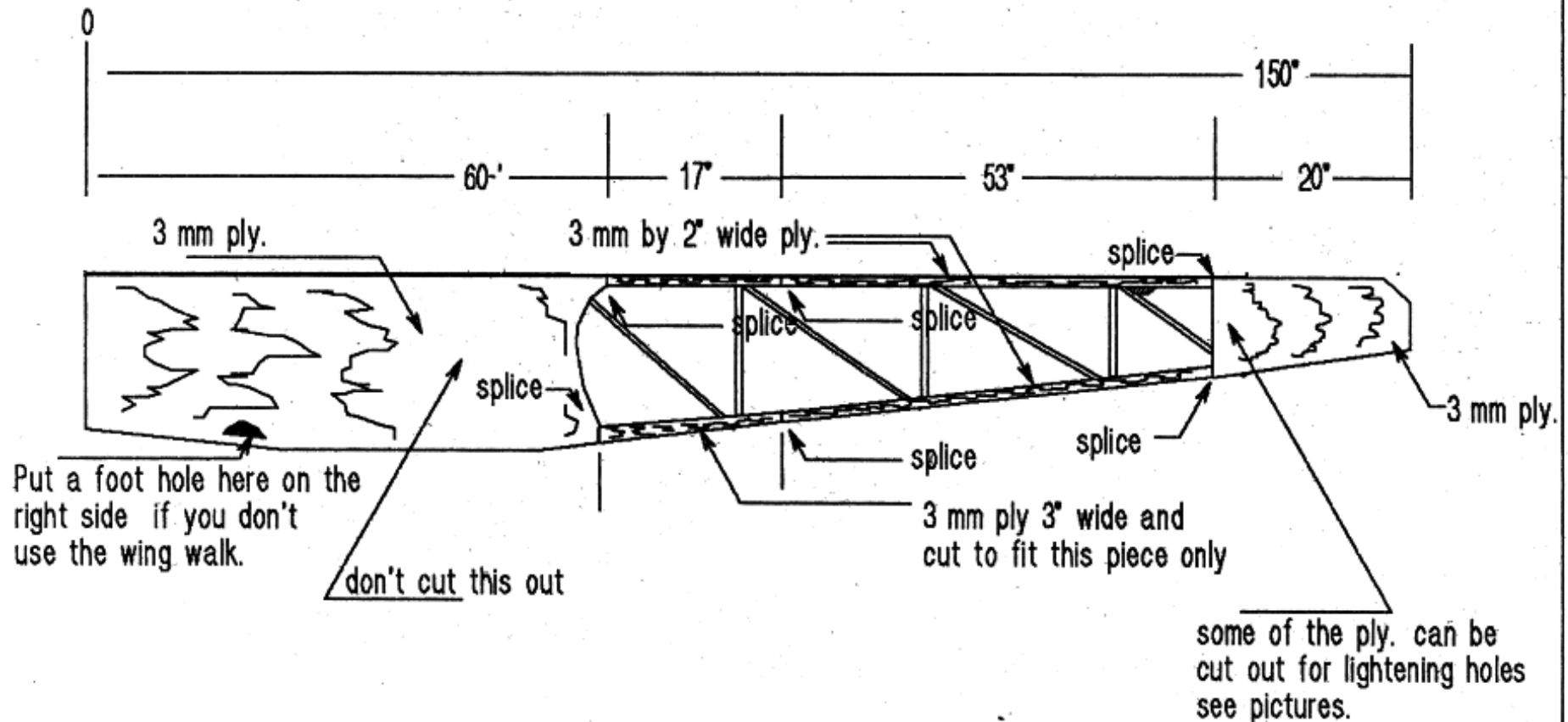




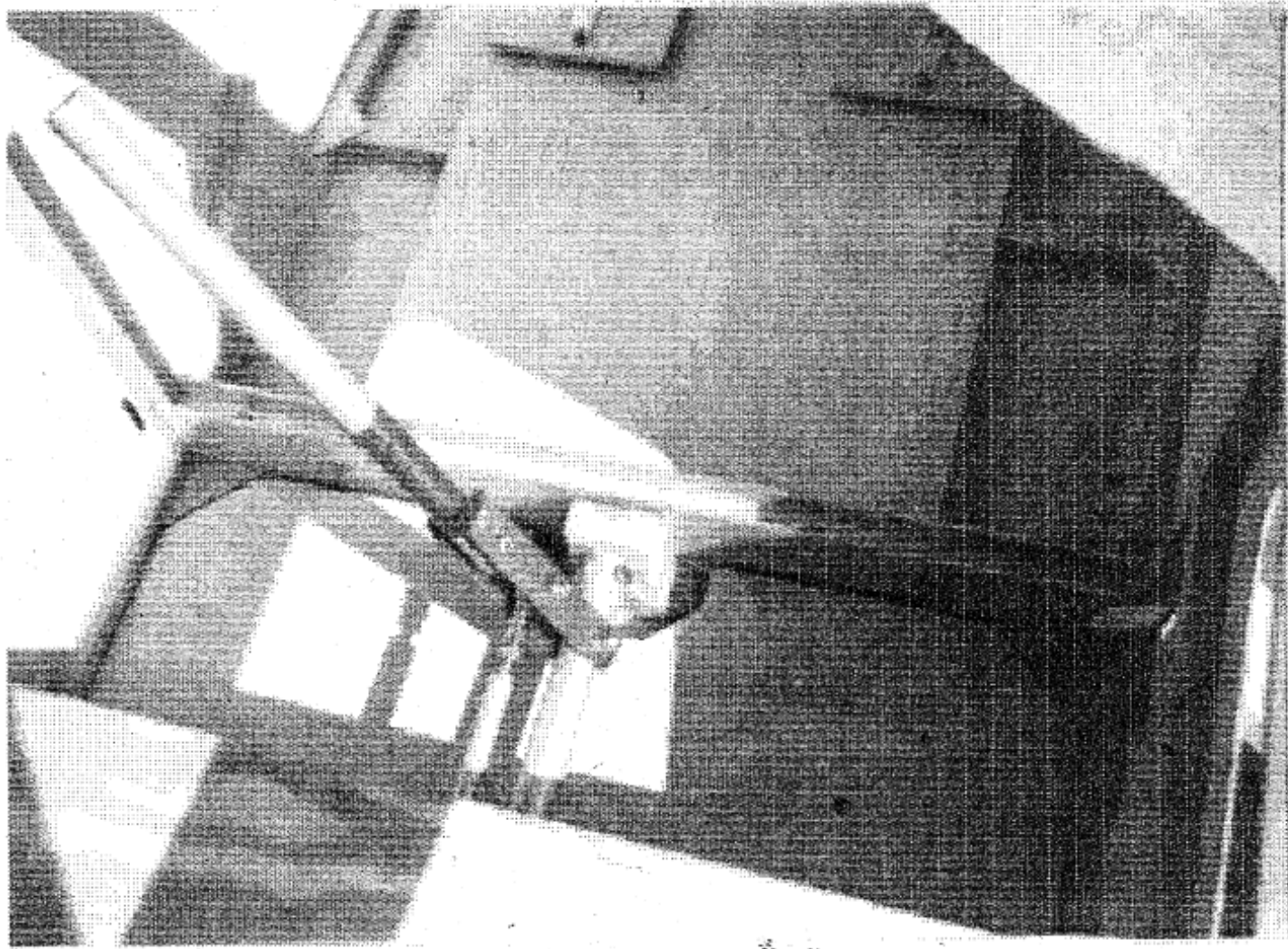


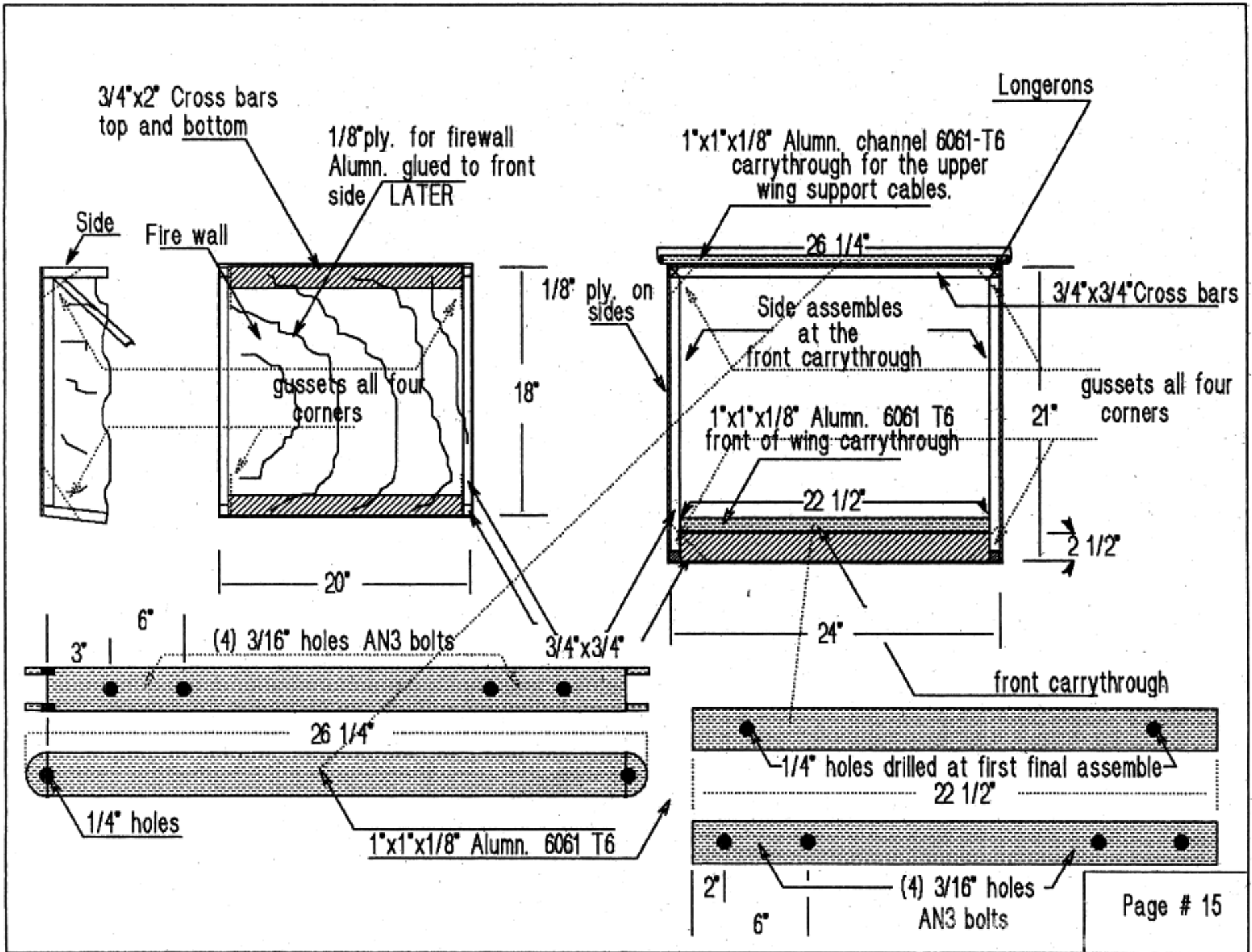


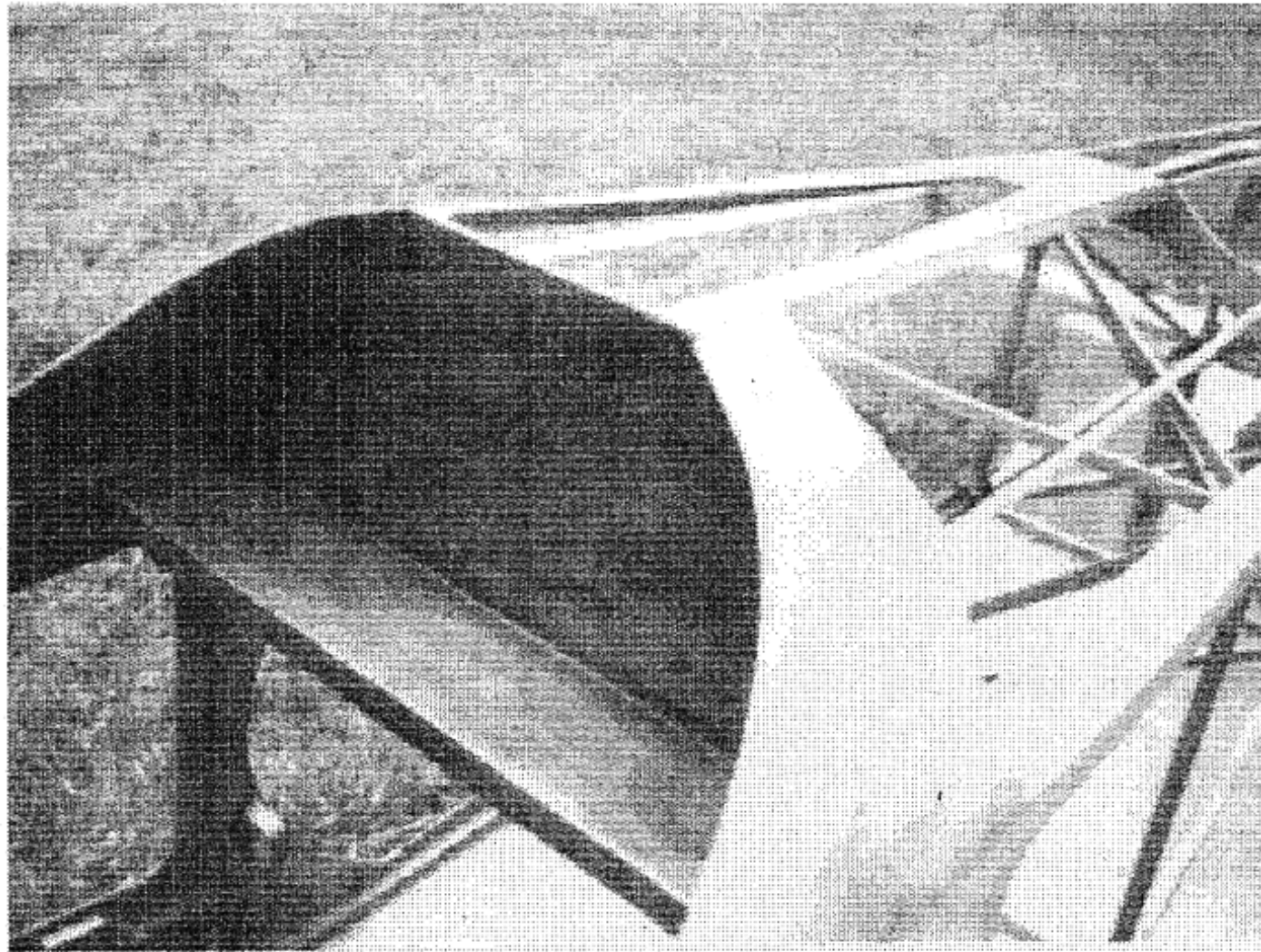
Before removing sides from the table, staple some 3mm plywood strips across each side so they keep their shape when they are taken up. Use page #7 and view the pictures then place your plywood under each side and mark their location. Be sure to make one left and one right side. Scarf the wood well where the glue is to go (the opposite side of the ply. you marked.) glue and make sure each piece of the ply is tight against the sides, and stapled and clamped in place. Let the sides dry.

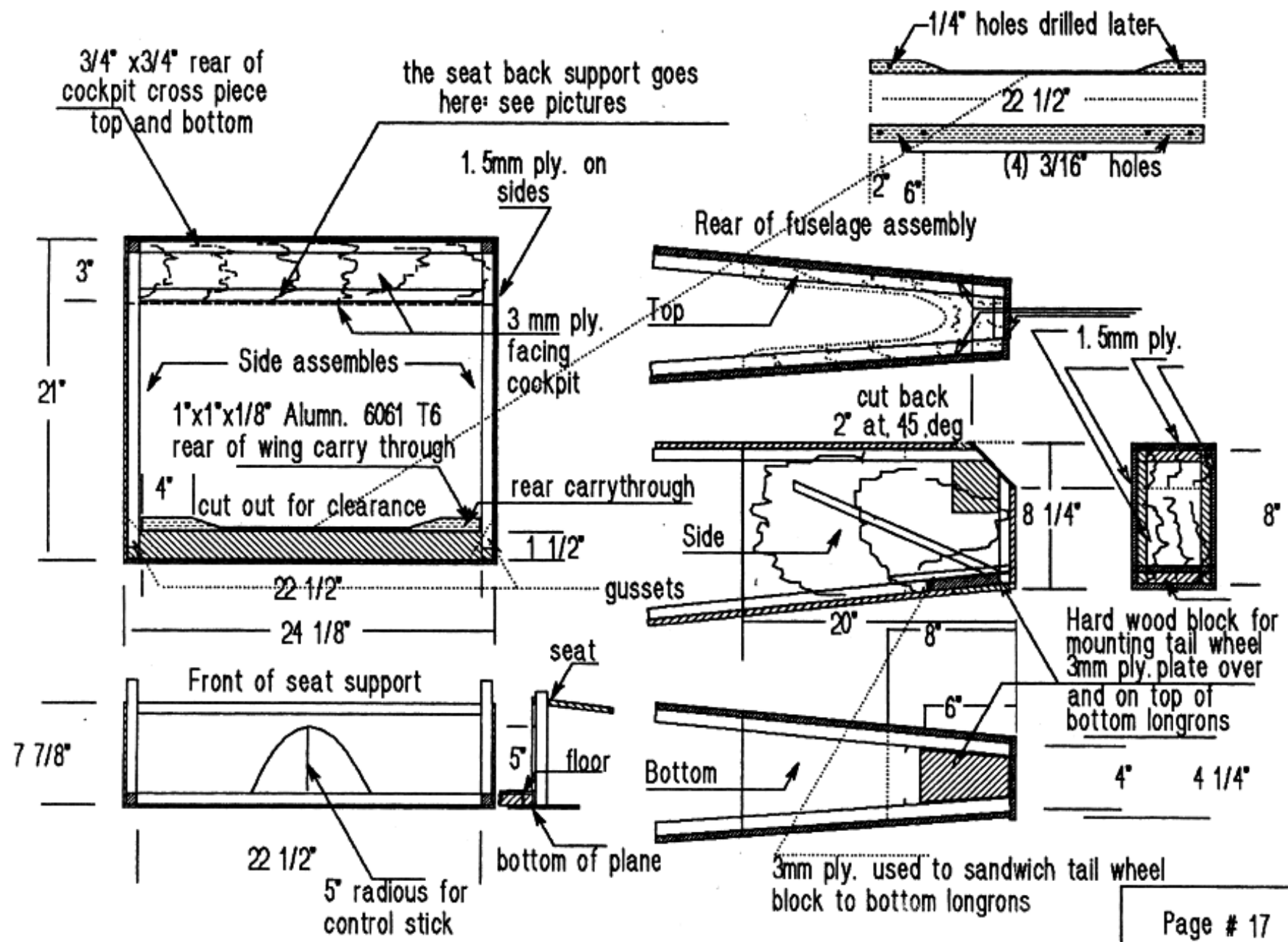


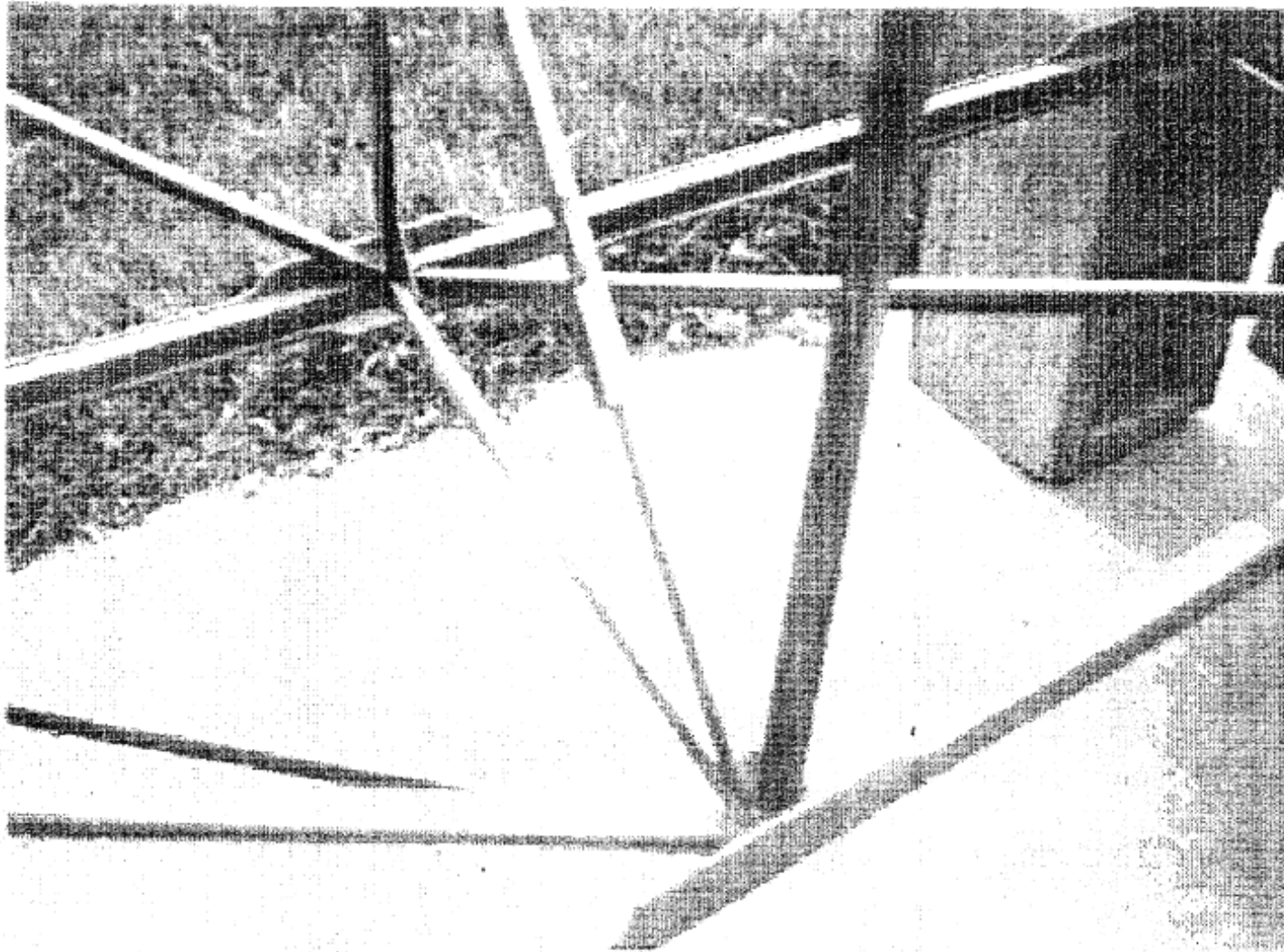
note ply. grain should run front to back



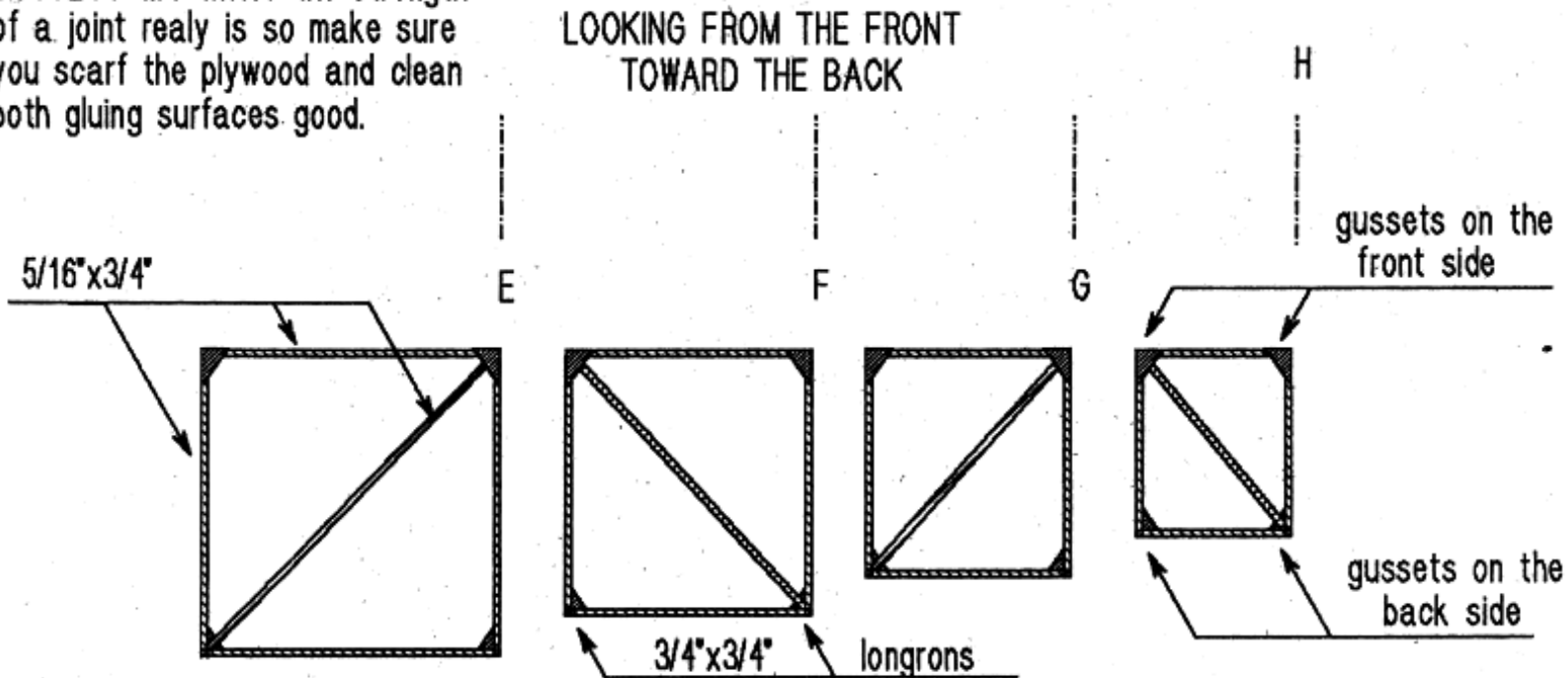








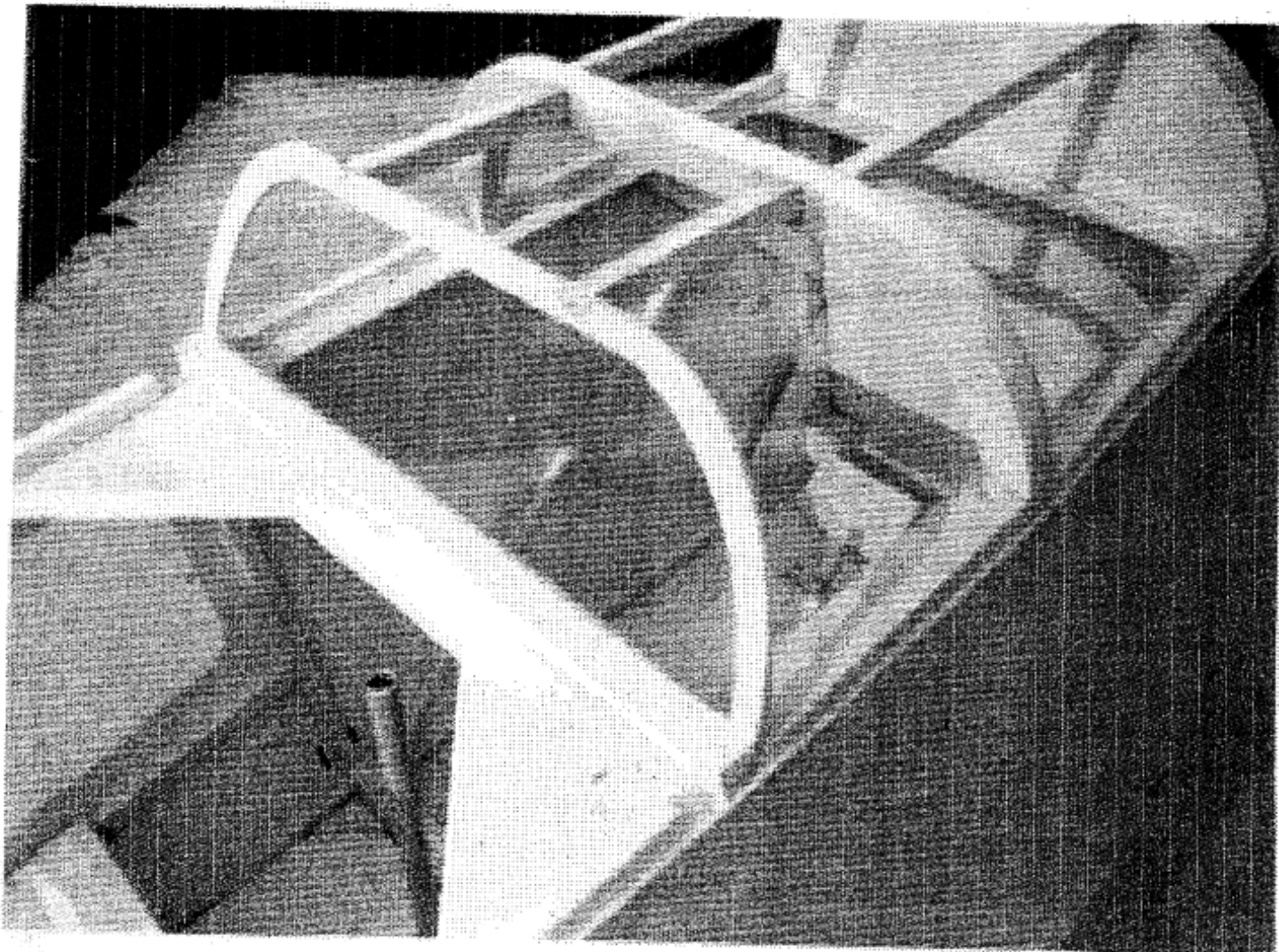
GUSSETS are where the strength of a joint really is so make sure you scarf the plywood and clean both gluing surfaces good.



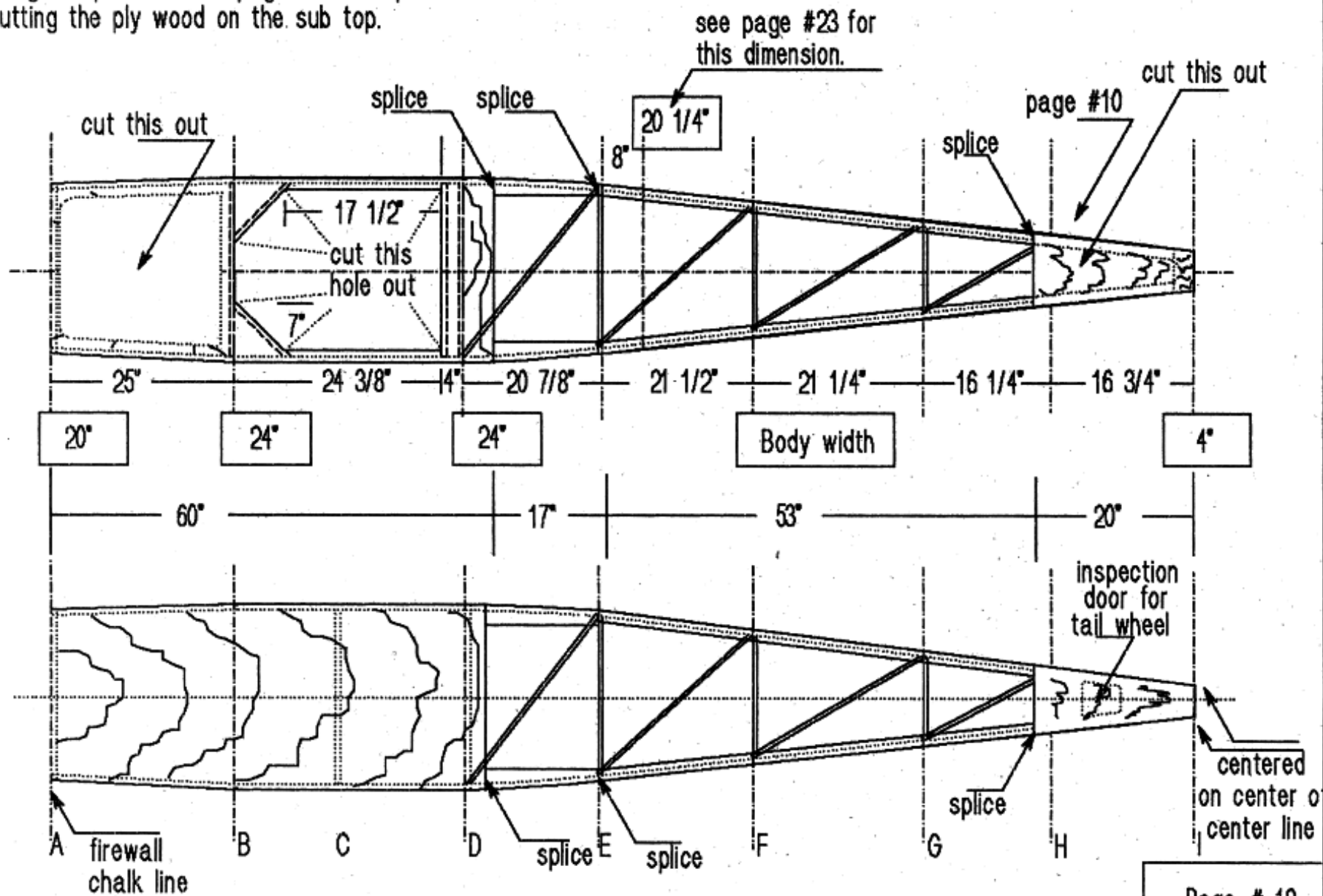
On the work table, using a chalk line, snap three lines exactly $12 \frac{1}{8}$ " apart. this $24 \frac{1}{4}$ " dim. is the outside of the body. Make a line at the end of the three lines 90 deg. to them to use for your firewall location, with the top longrons parallel and laying flat on the table. Use blocks of wood fastened to the table at sections B. C. D. on both outside locations. Cut, clamp, and glue sections B. C. D in place. Use a square and strips of plywood stapled to both sides to help hold things together. Let all this dry.

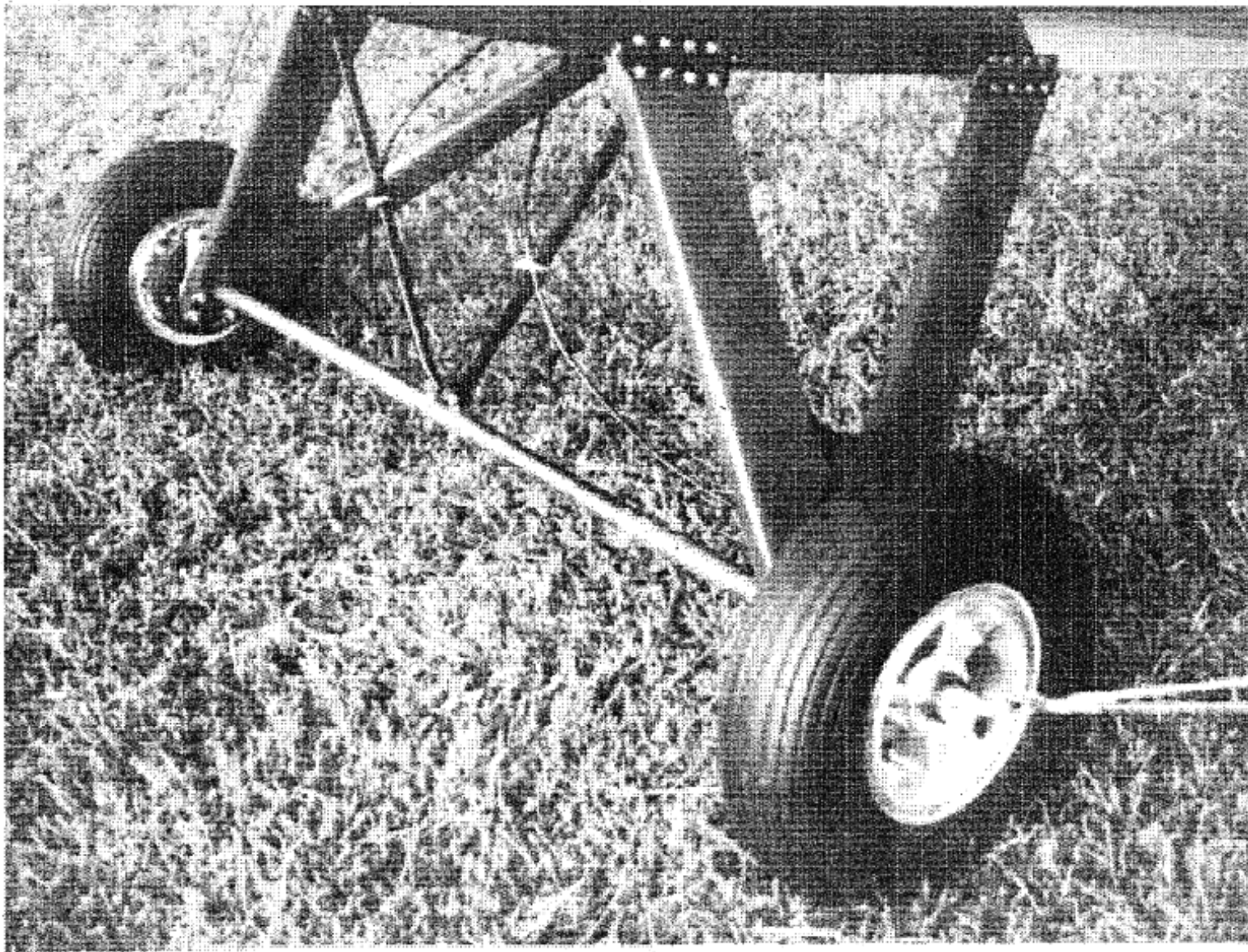
When dry see pages # 10 17 19 and pictures to complete joining of the halves.

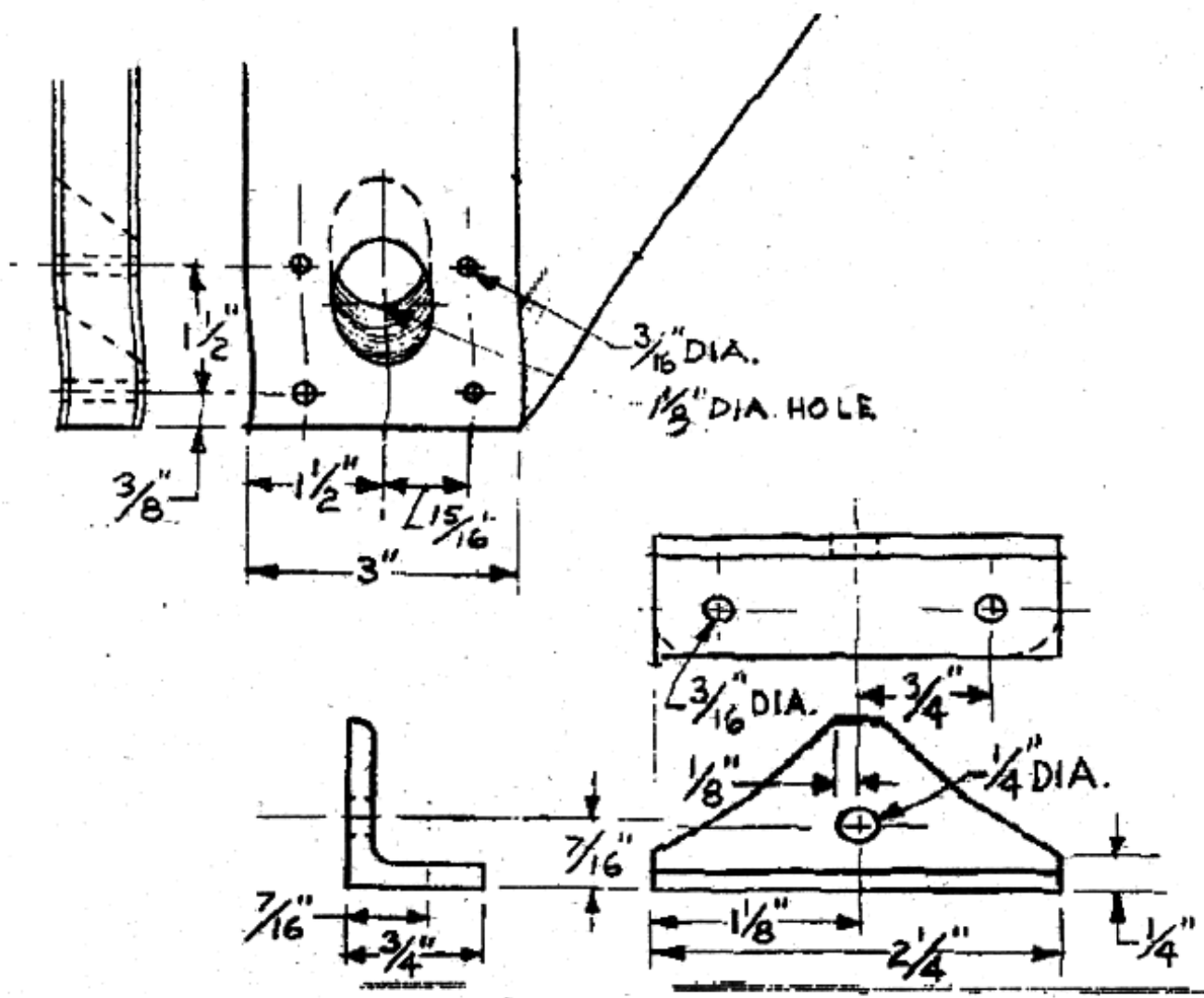
While still held in place and square on the table put the bottom plywood on. Take the time to scarf, clean, glue, and clamp the surfaces together for a strong body. Anywhere two pieces of wood are butt jointed and glued there probably is a gusset holding them together, too.

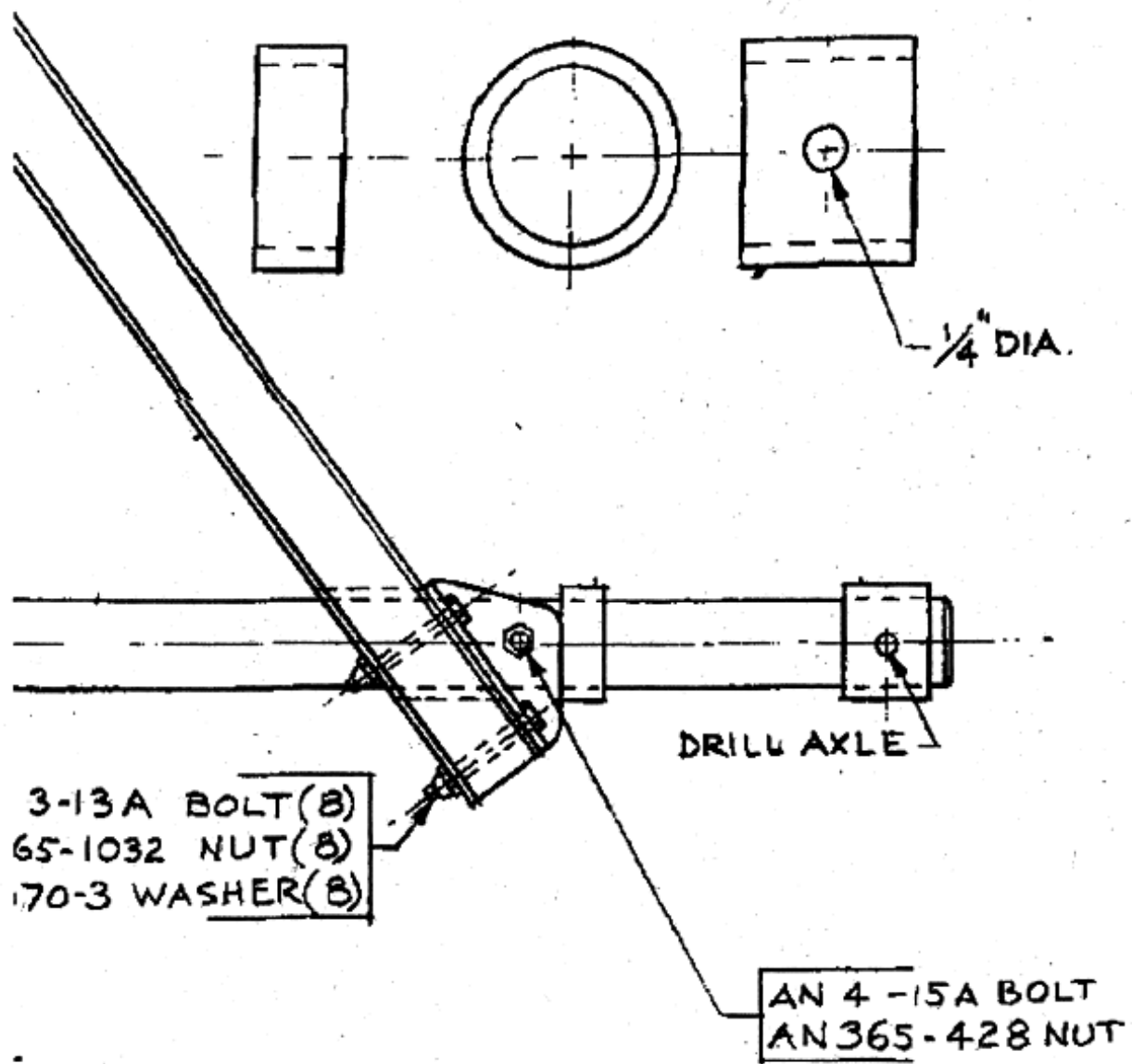


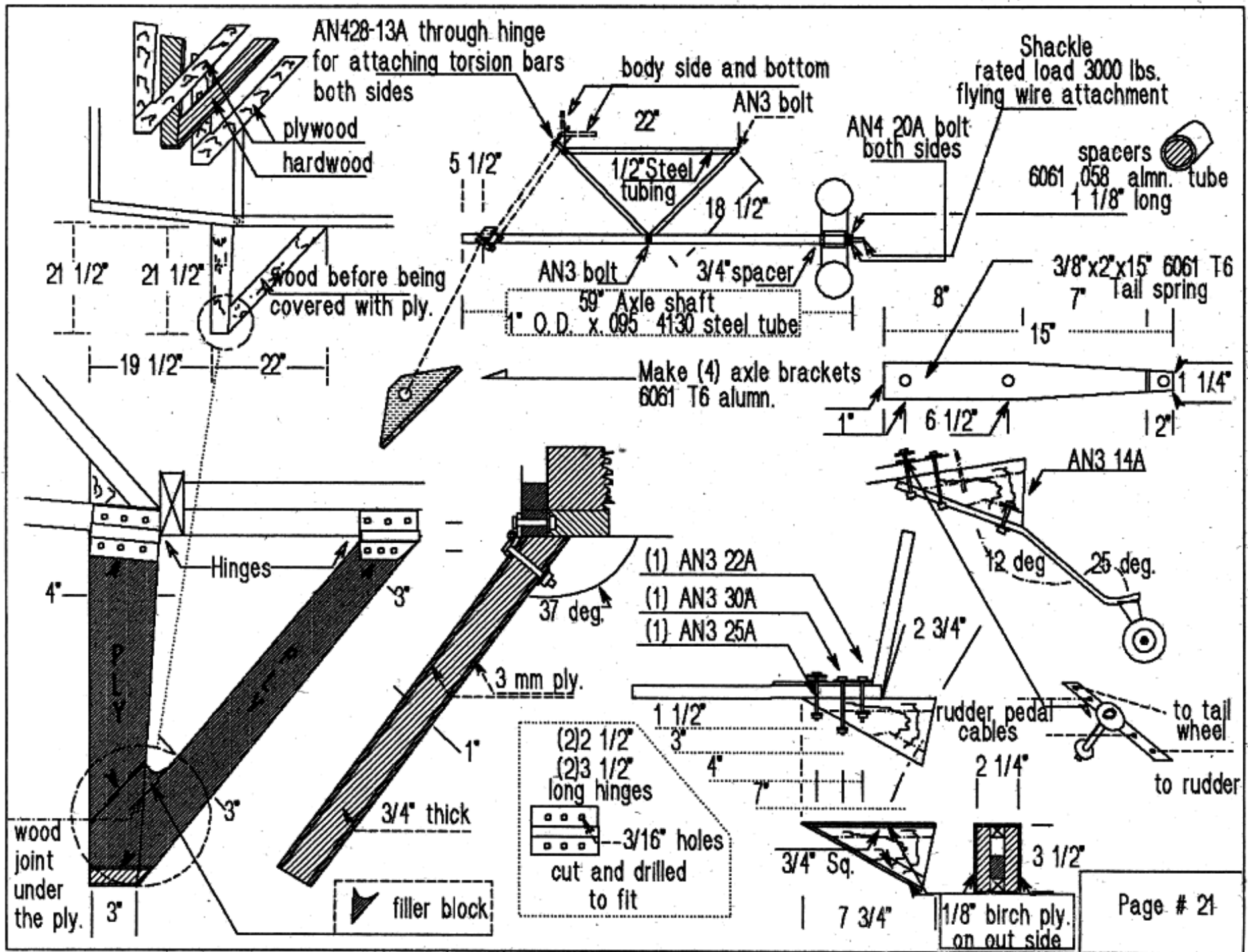
Turn the body over and clamp to the table.
 using the pictures and page # 19 complete
 putting the ply wood on the sub top.

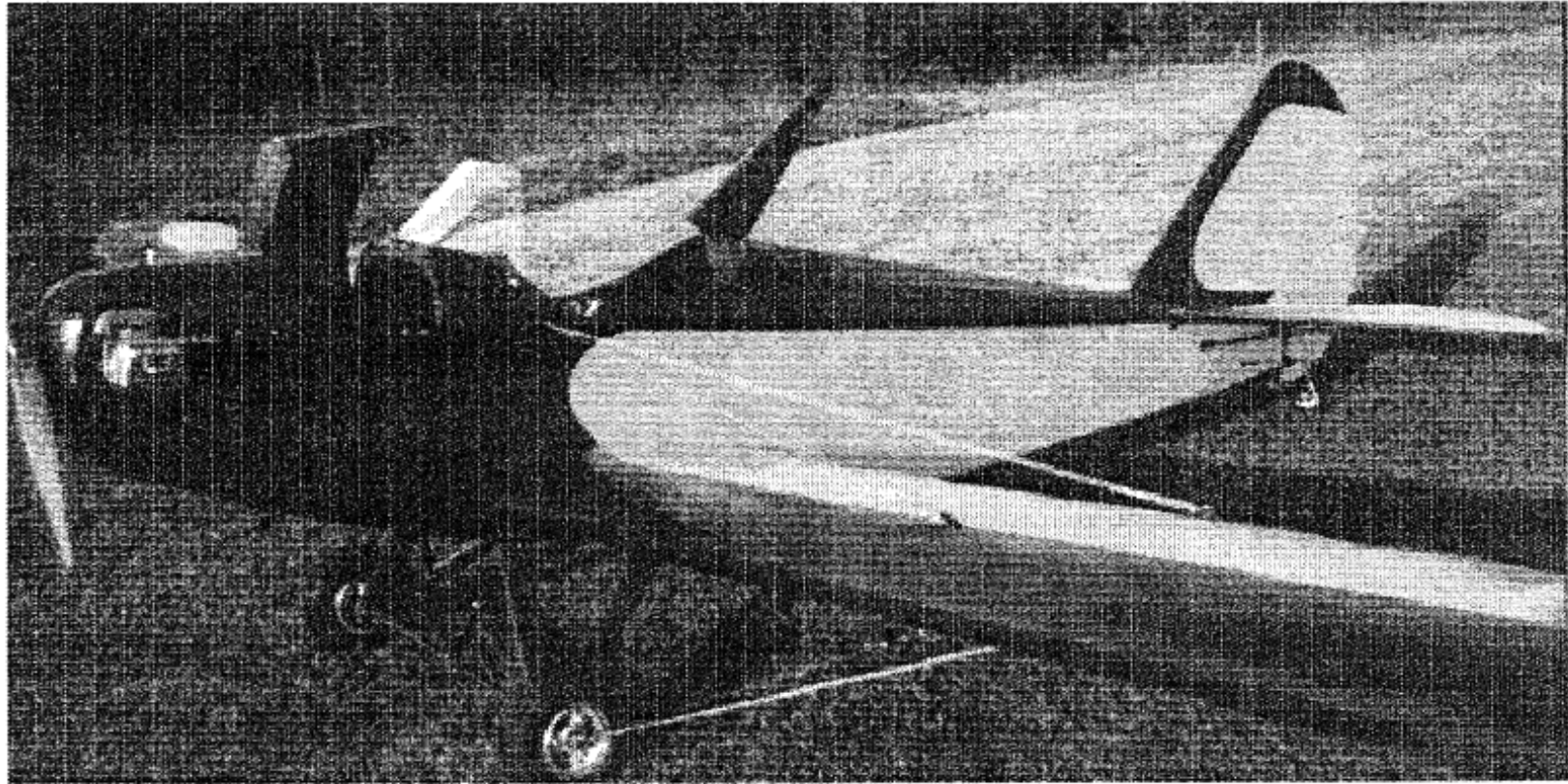




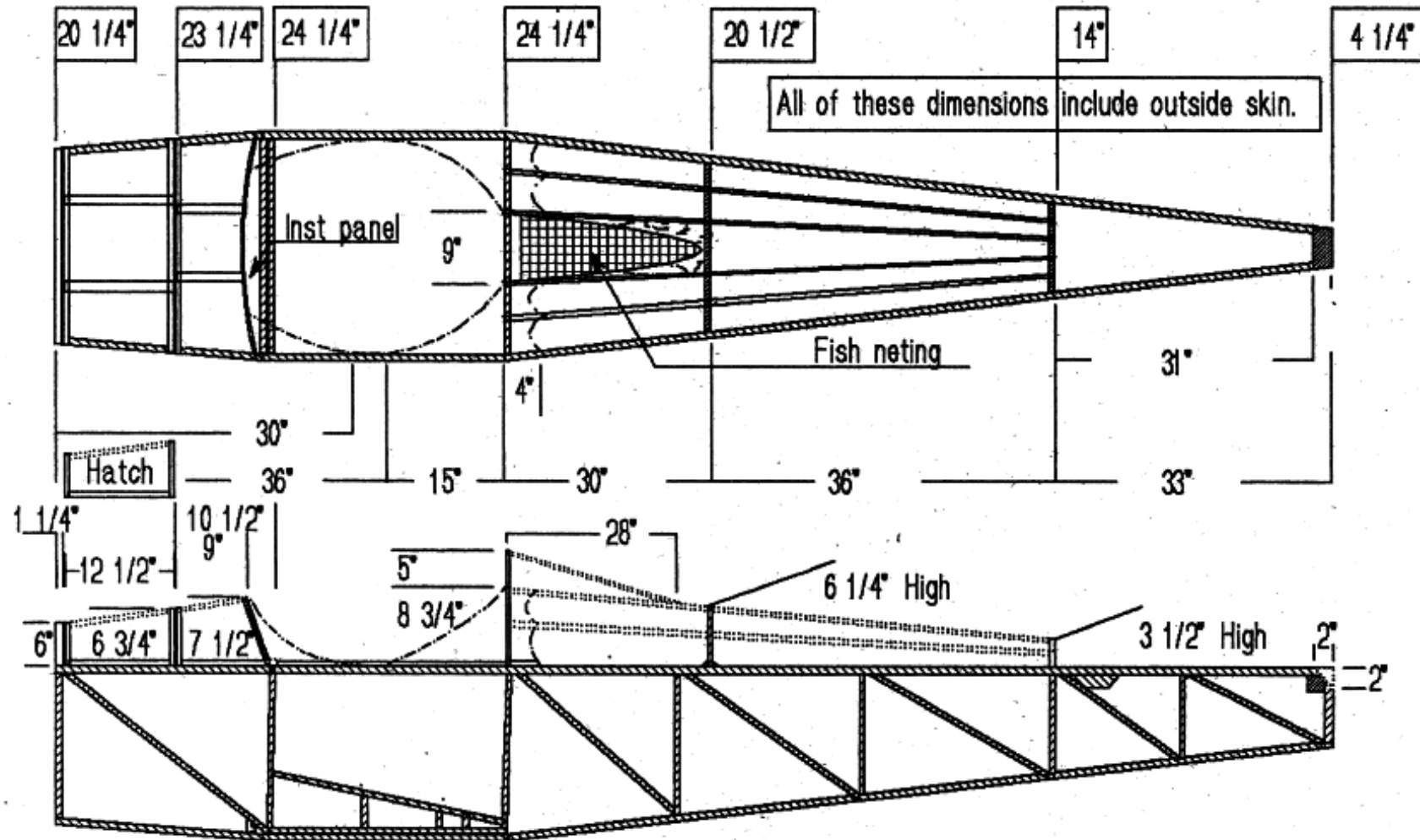








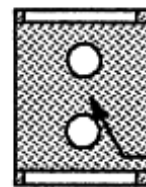
Using page # 23 and pictures 6 10 12 and 18b, complete the body top decking
 It isn't as hard as it looks. Make cardboard templates and adjust the fit. Then
 make your wood parts. The headrest and storage area are optional.



One way to make a handle to help you in and a safety bar all in one.

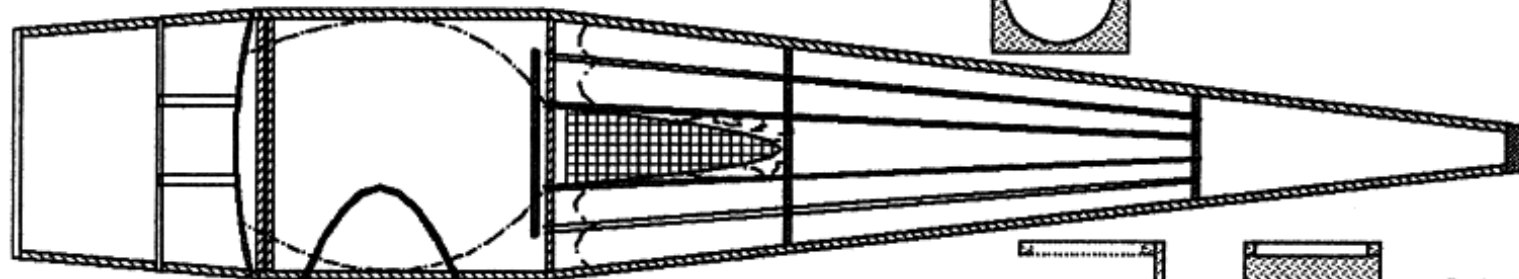


Epoxy two ply. wood plates to the back of and top of seat back. Use these plates to bolt the top bracket to



Bolt only the bracket to the plane but not the tube on the top brackets

Use AN4-bolts



1"x. 058 6061-T6
Alumn tube

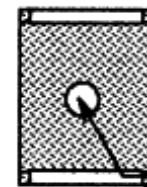


(4) Brackets

1"x1 1/4"x1/8" 6061 alumn. chanel

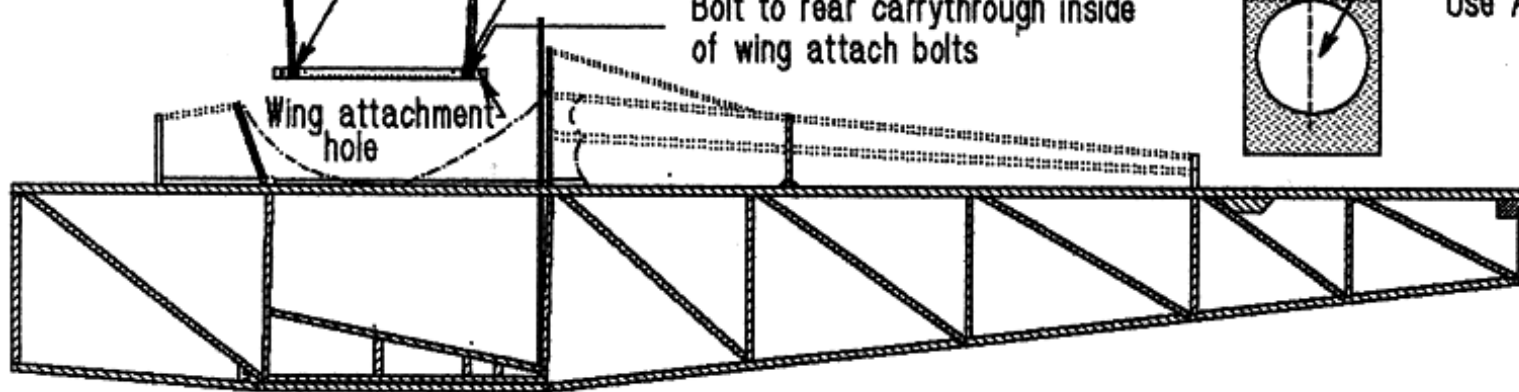
Bolt to rear carrythrough inside
of wing attach bolts

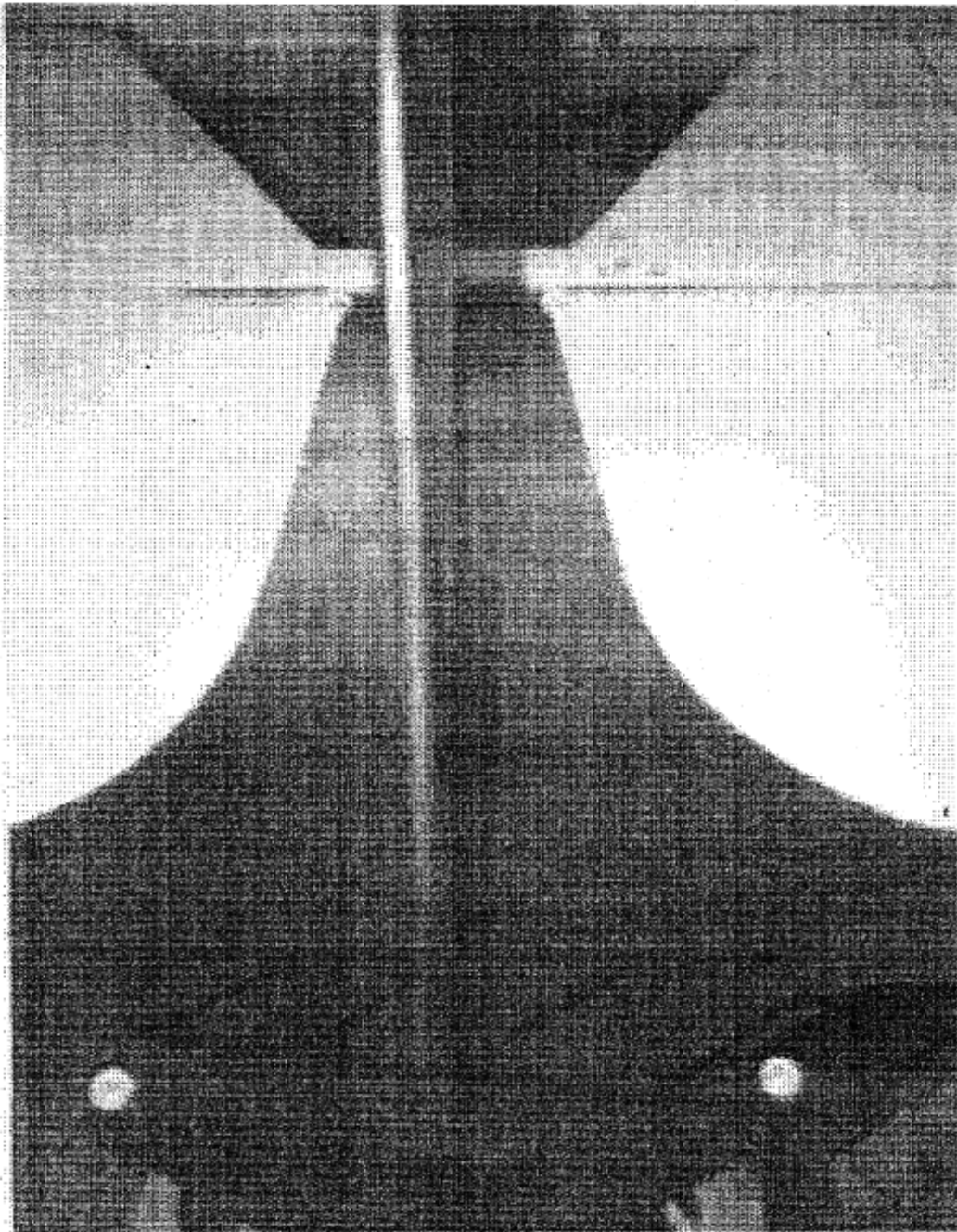
Wing attachment
hole

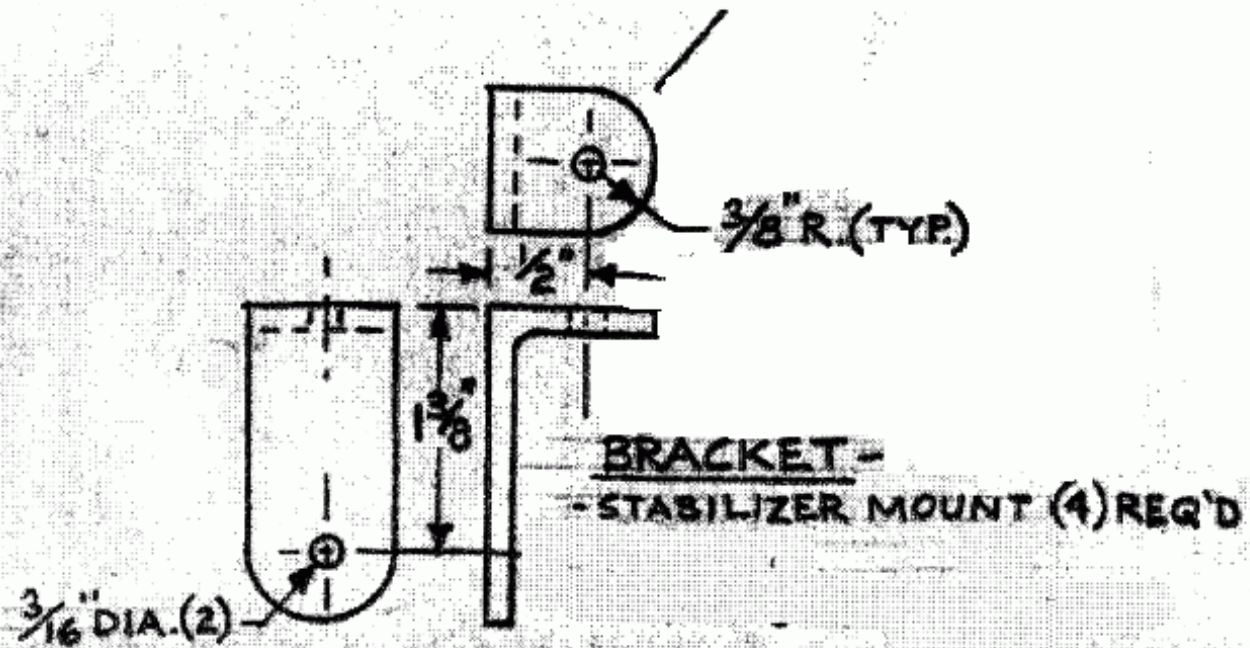


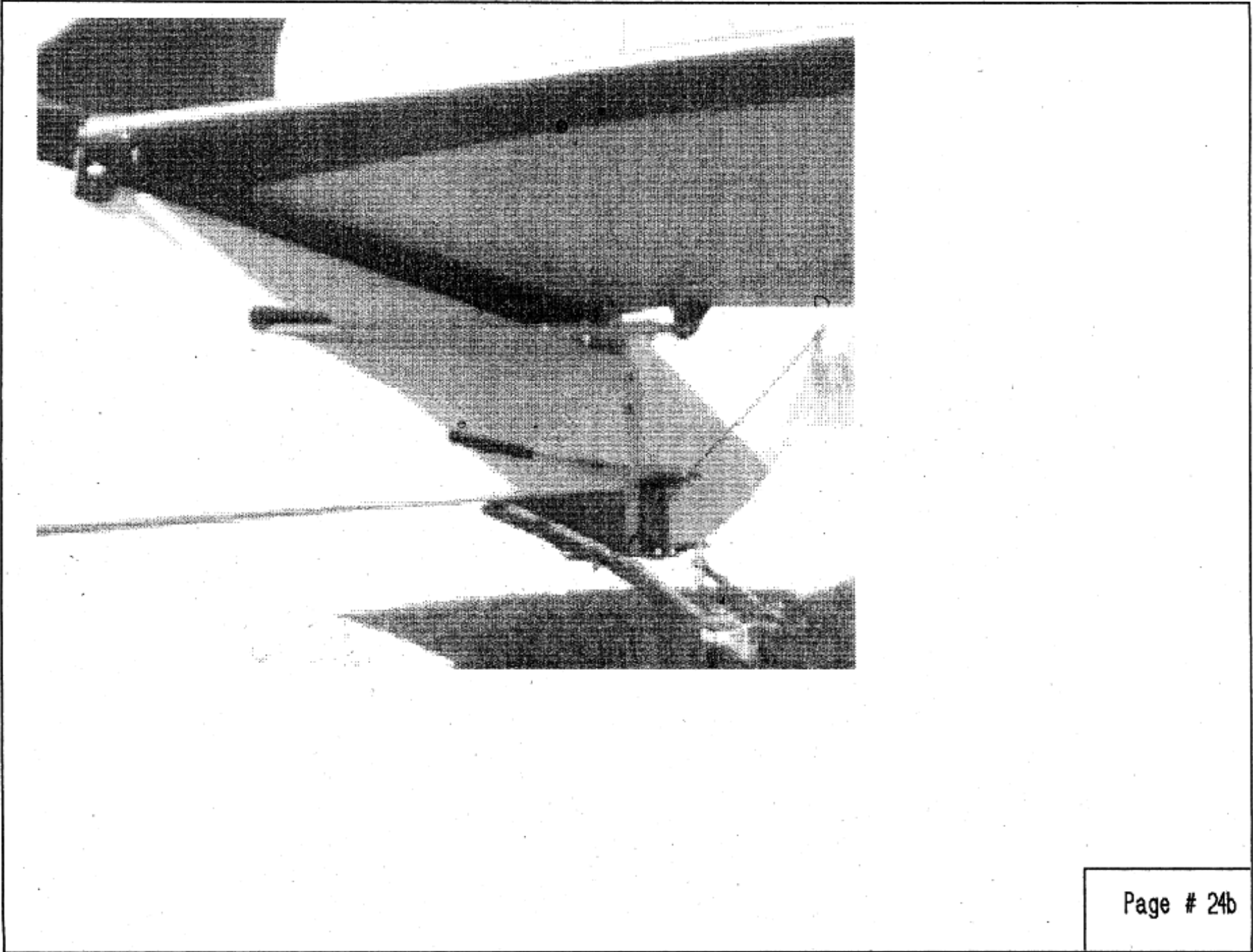
Bolt bracket and
the tube to the
plane.

Use AN4-bolts







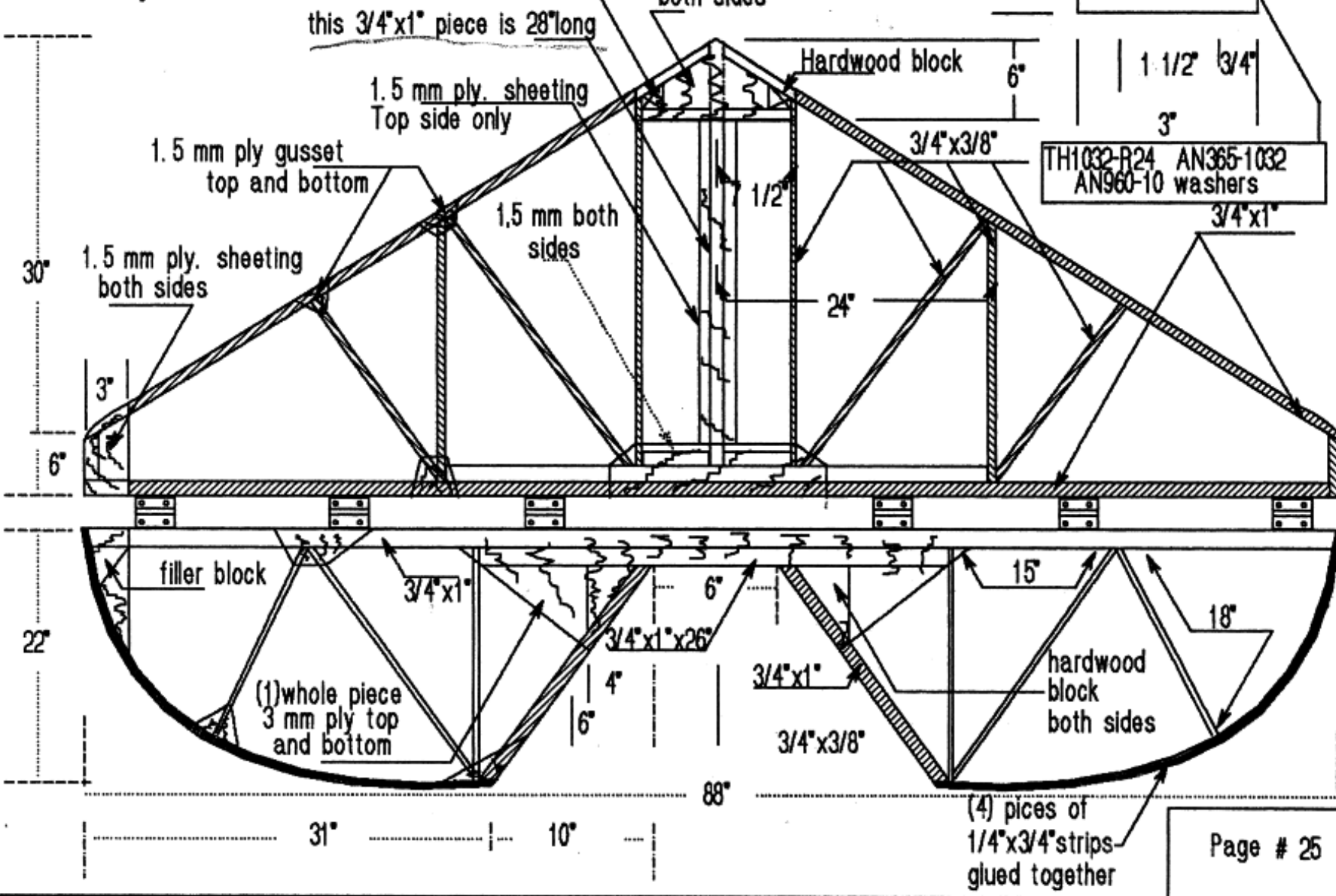
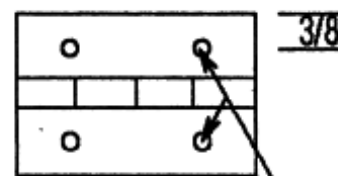


4-11-11

Make the alumn. brackets and finish the stab., trim the stab. to the body before drilling mounting bracket holes in body and stab.

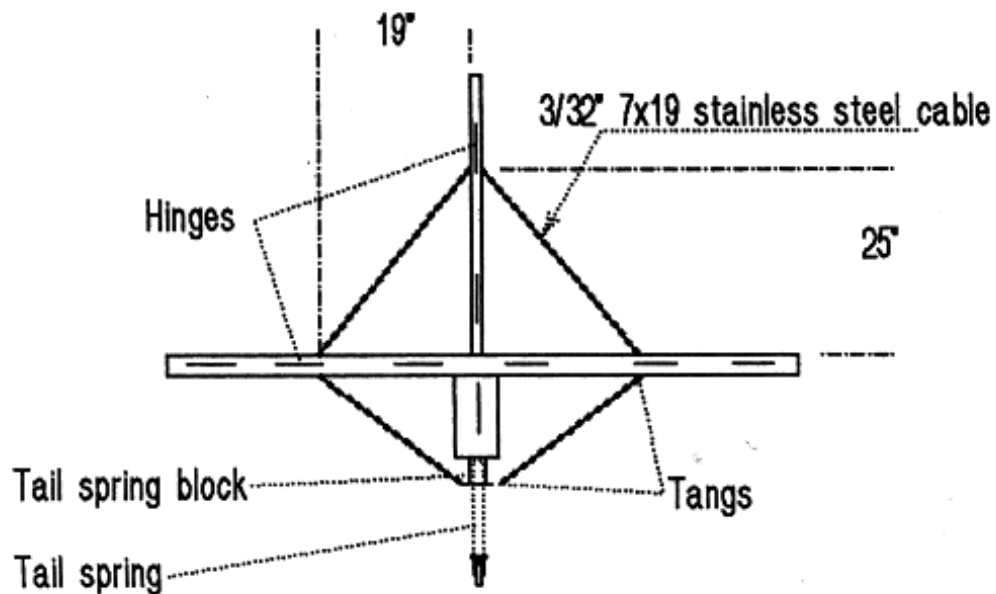
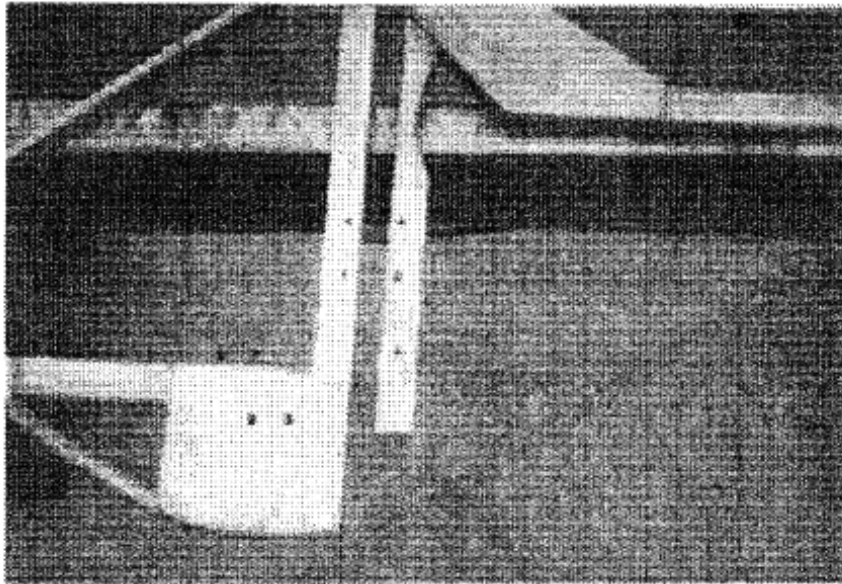
hardwood block for stabilizer attachment.

make 15 hinges

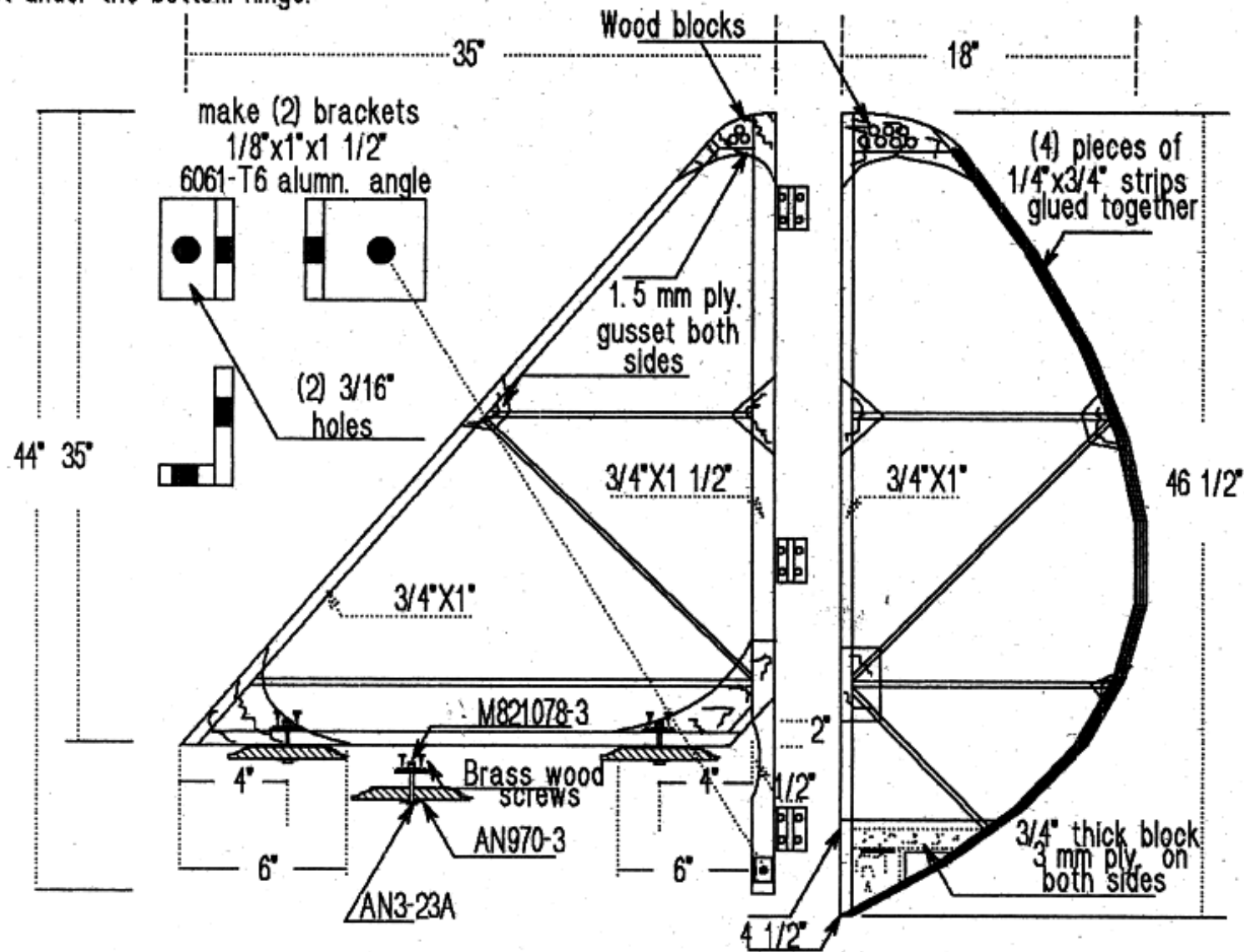


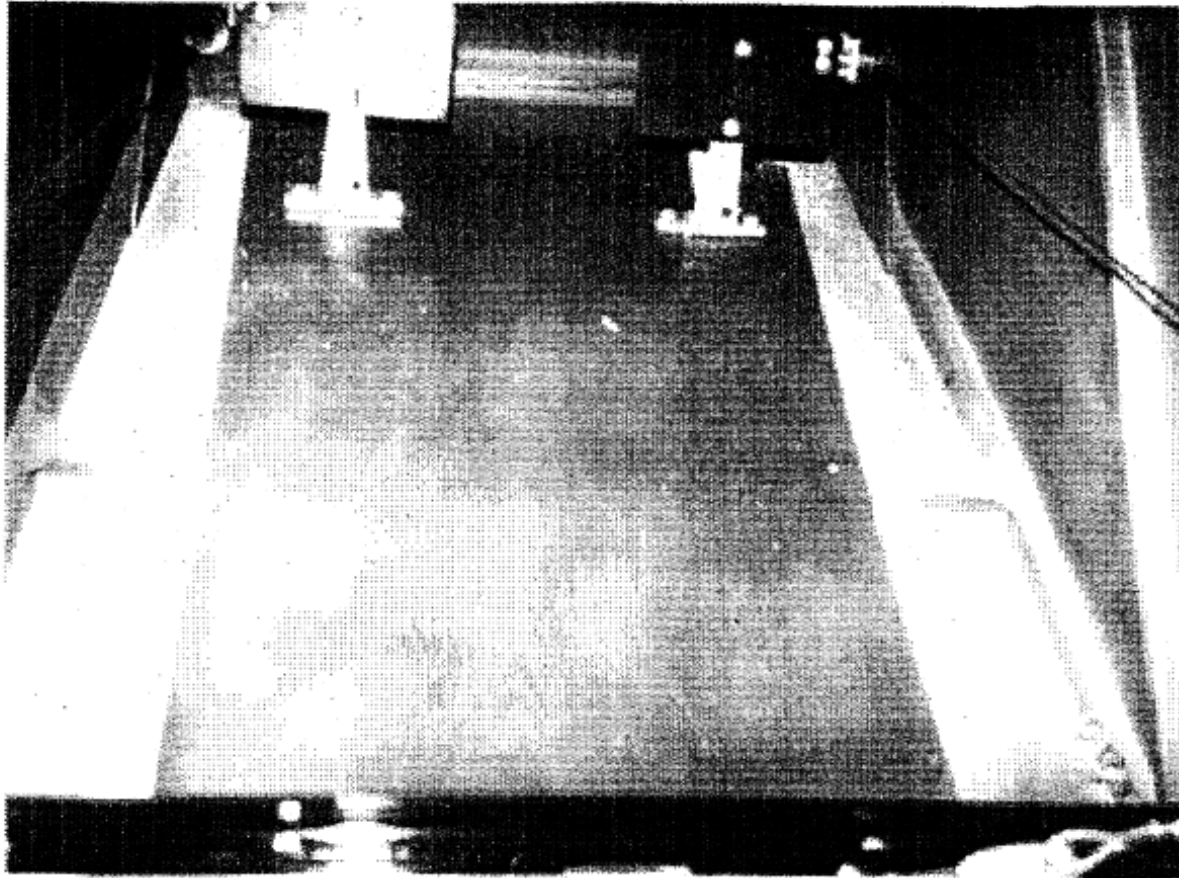
TH1032-R24 AN365-1032 AN960-10 washers

(4) pices of 1/4"x3/4" strips glued together

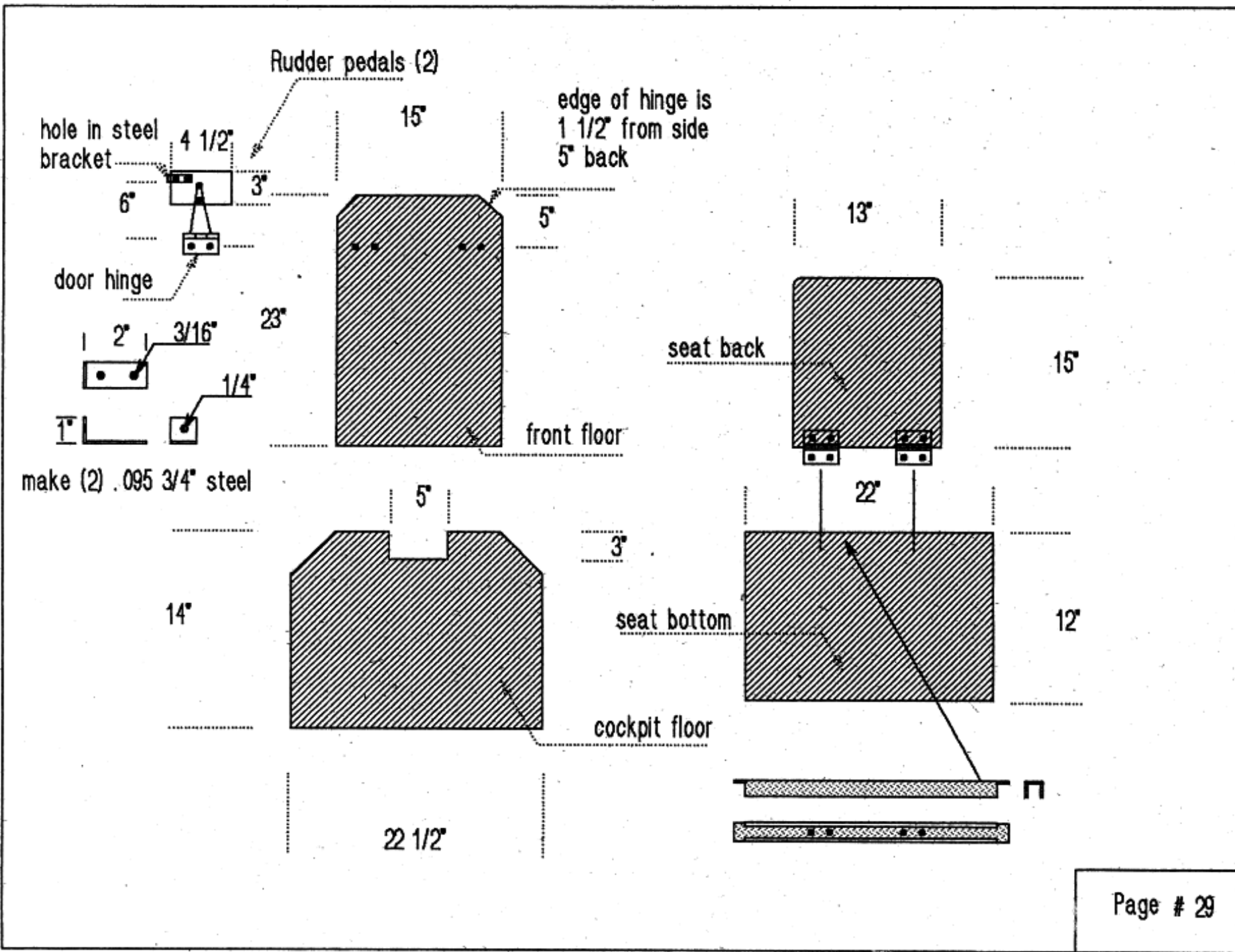


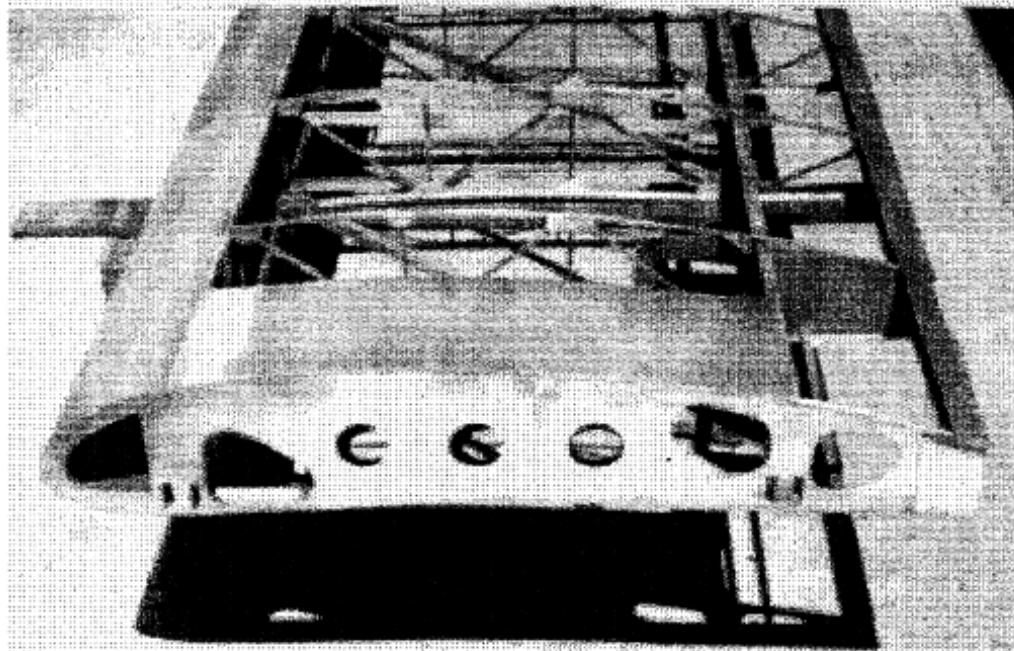
After completing the fin and rudder, the fin is connected to the stab. in two places, and the back of the body in one. Use brass screws to secure the blind nuts to the inside of the fin and AN3 bolts to connect the fin to the body just under the bottom hinge.



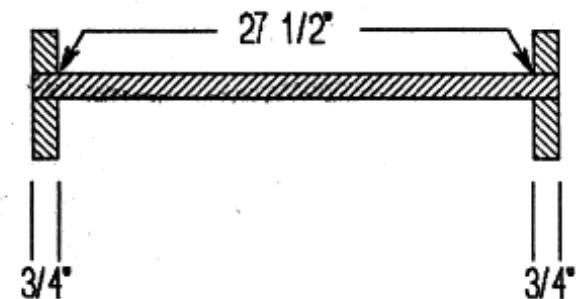


I used heavy duty door hinges for my rudder pedal hinges and made two steel brackets to connect the rudder cables. The floorboards are 1/4" ply. The seat is 1/4" (5) ply aircraft ply, or marine ply. Be sure they have plenty of varnish on them. You should put a piece of 1/8"x1"x1" 6061-T6 alumn channel across the back of the seat bottom, notched so it rests on the seat rails above the seat support.





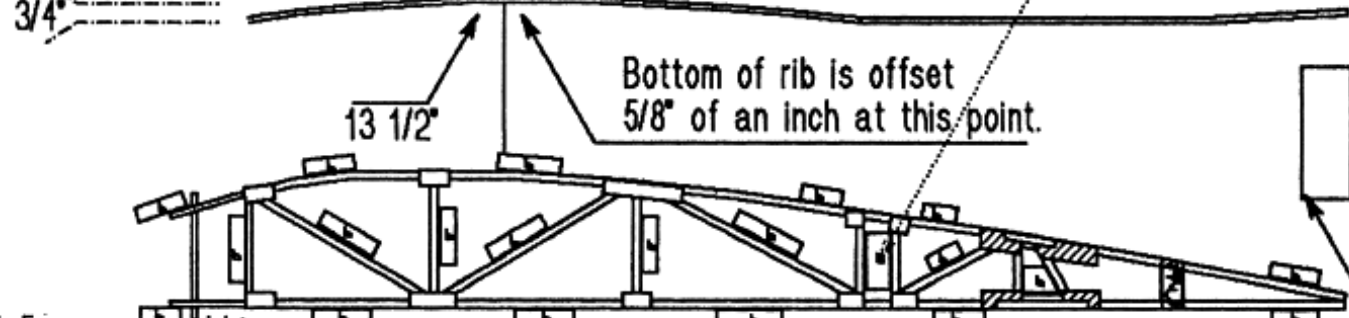
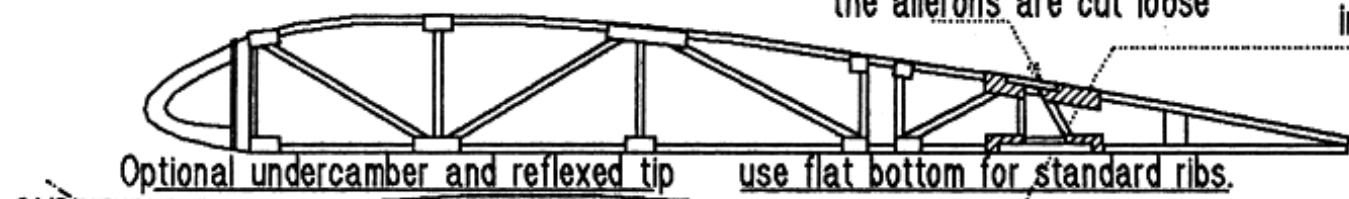
Making the ribs is probably the most troublesome thing there is to do in building an airplane. So when you start, keep at it until you're finished. You'll need about 100 pieces of $1/4 \times 1/4 \times 60$ " long, straight, and close grain spruce or northern white pine, about 100 strips of 1.5mm birch ply, cut to $7/8$ " wide and 20" long. Using the full size rib drawing as a guide, make a rib jig. Cover it with plastic film and wax it good before nailing the blocks on. Make a spar guide to check your front and rear carrythroughs to your rib jig. See below. Let each rib dry completely before removing it from the jig. Be sure to scarf the ply before gluing.



Rib drawing not to scale
Use FULL SIZE DRAWING.

this section will
be cut out later when
the ailerons are cut loose

this block has to be
right at 27/32" wide
in <---> this direction



A hole drilled in a
1" dowel offset 1/4" makes
A good clamp.

Screw the dowel
To the jig board

Use this method to
hold the sticks in
place

before nailing the wing rib
blocks to the jig board
cover the wing rib
board with plastic

spar doubler

1.5mm spar webbing
3mm spacer
root rib only

spacer

27 1/2"

3mm spacer blocks
at root rib
only

1.5mm web 3mm spacer
3/4"x3/4" main spar

18 1/2"

3/16" bars
used to bolt
the wing to
the body

spar
channel

front body
cross member

use 1/4" staples
remove after glue dries

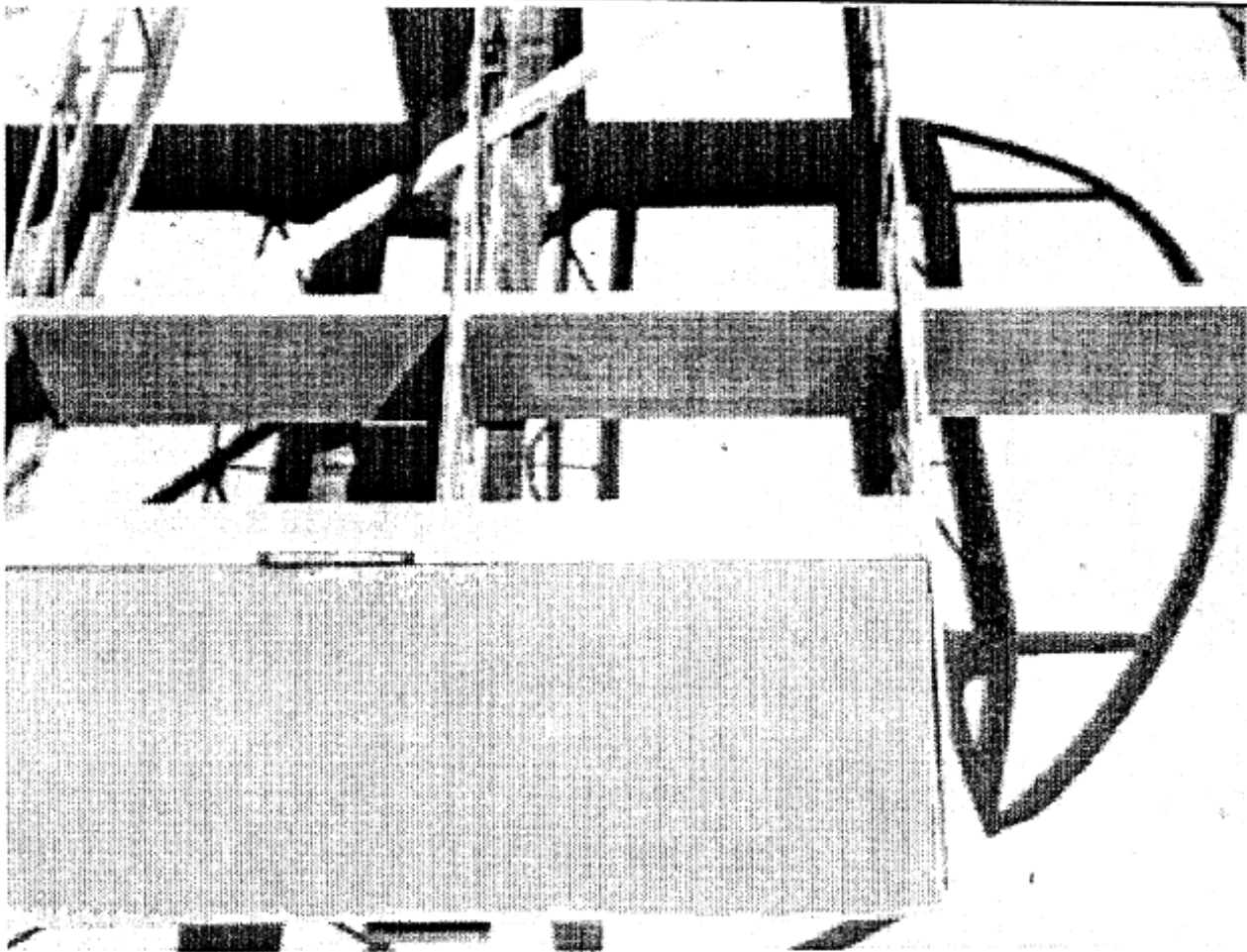
6061 T6 Alumn. channel
1"x1"x1/8"

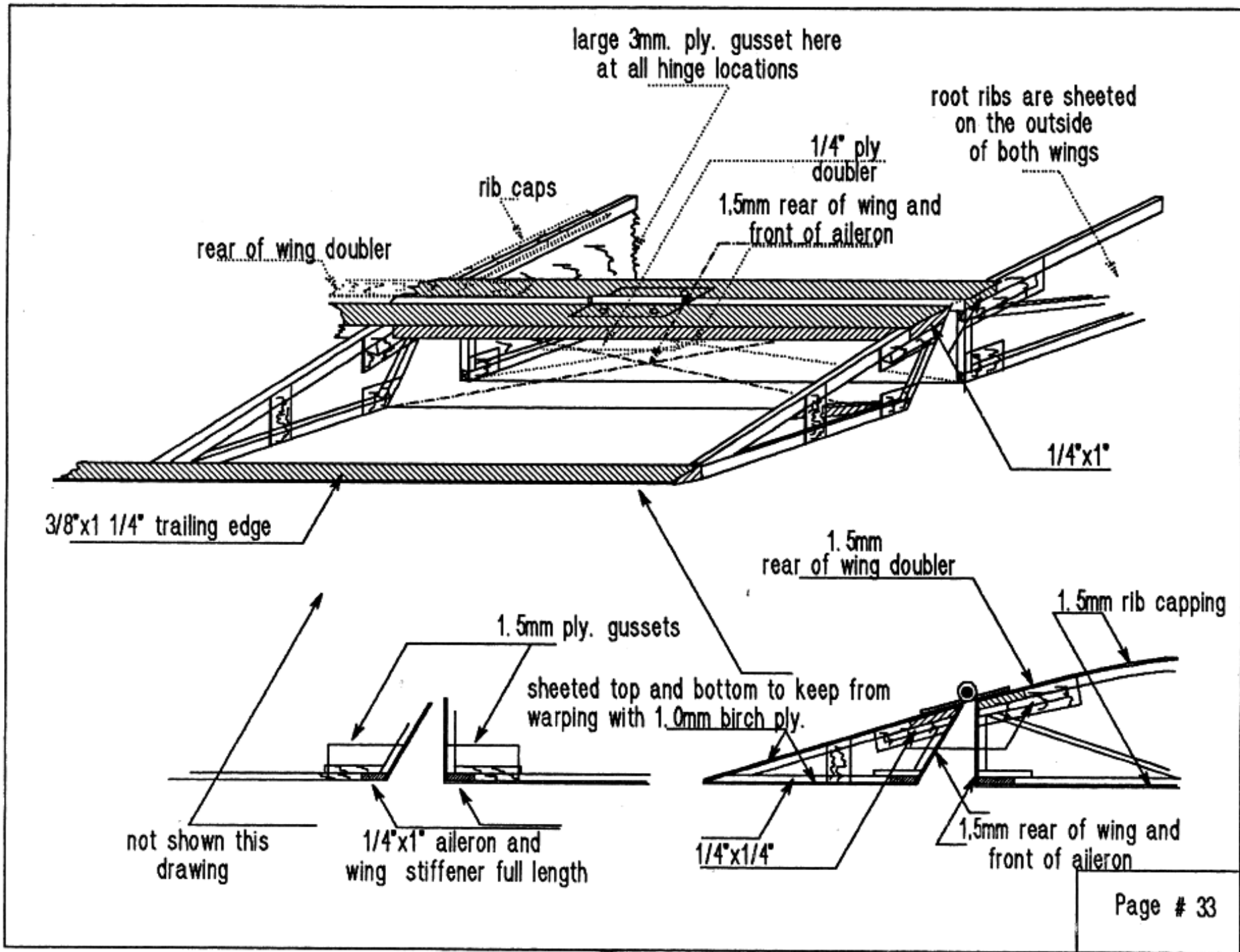
with 3/16"x3/4"
2024-T4 wing
attachment bars

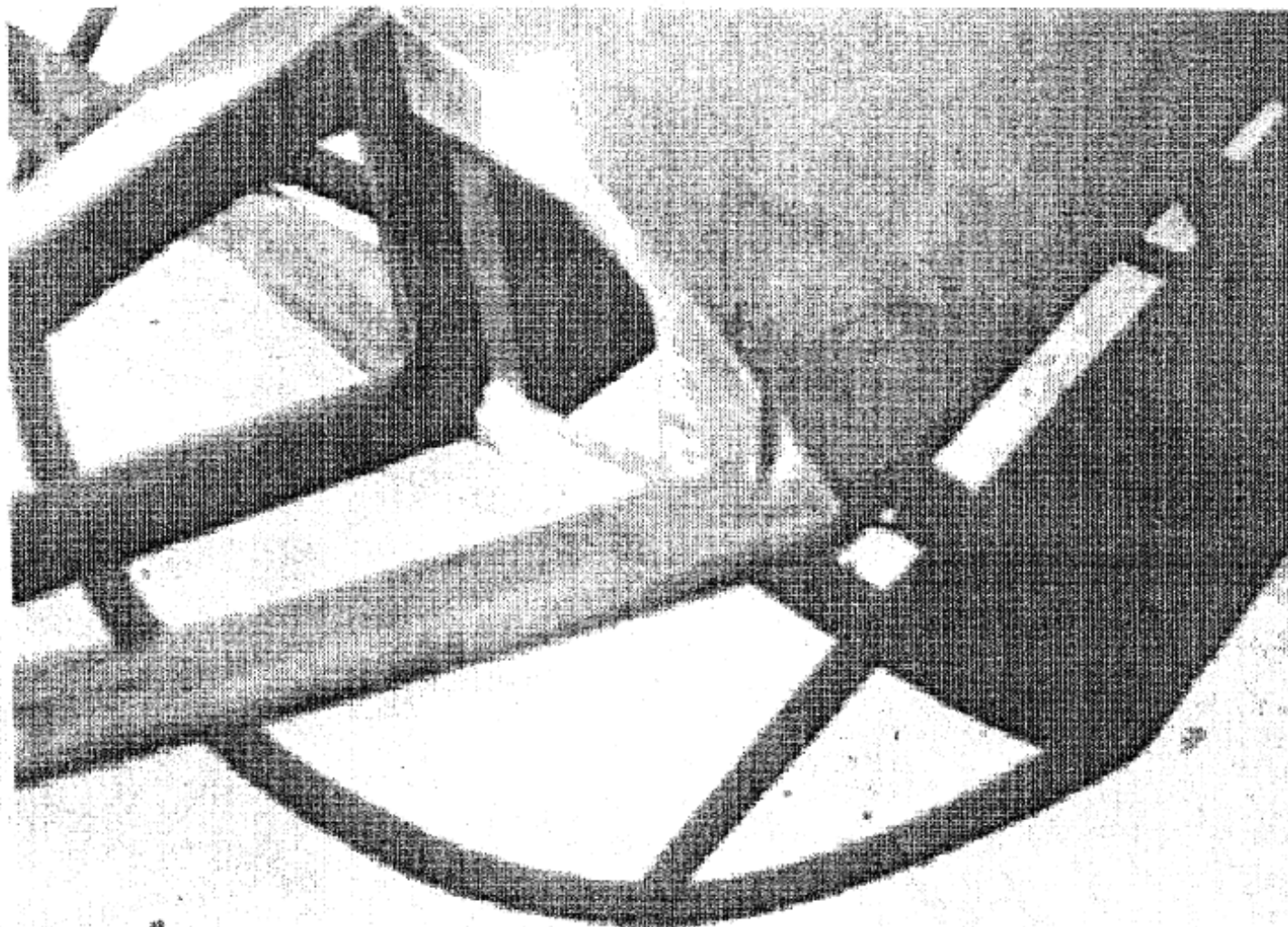
shows how wing and body is attached

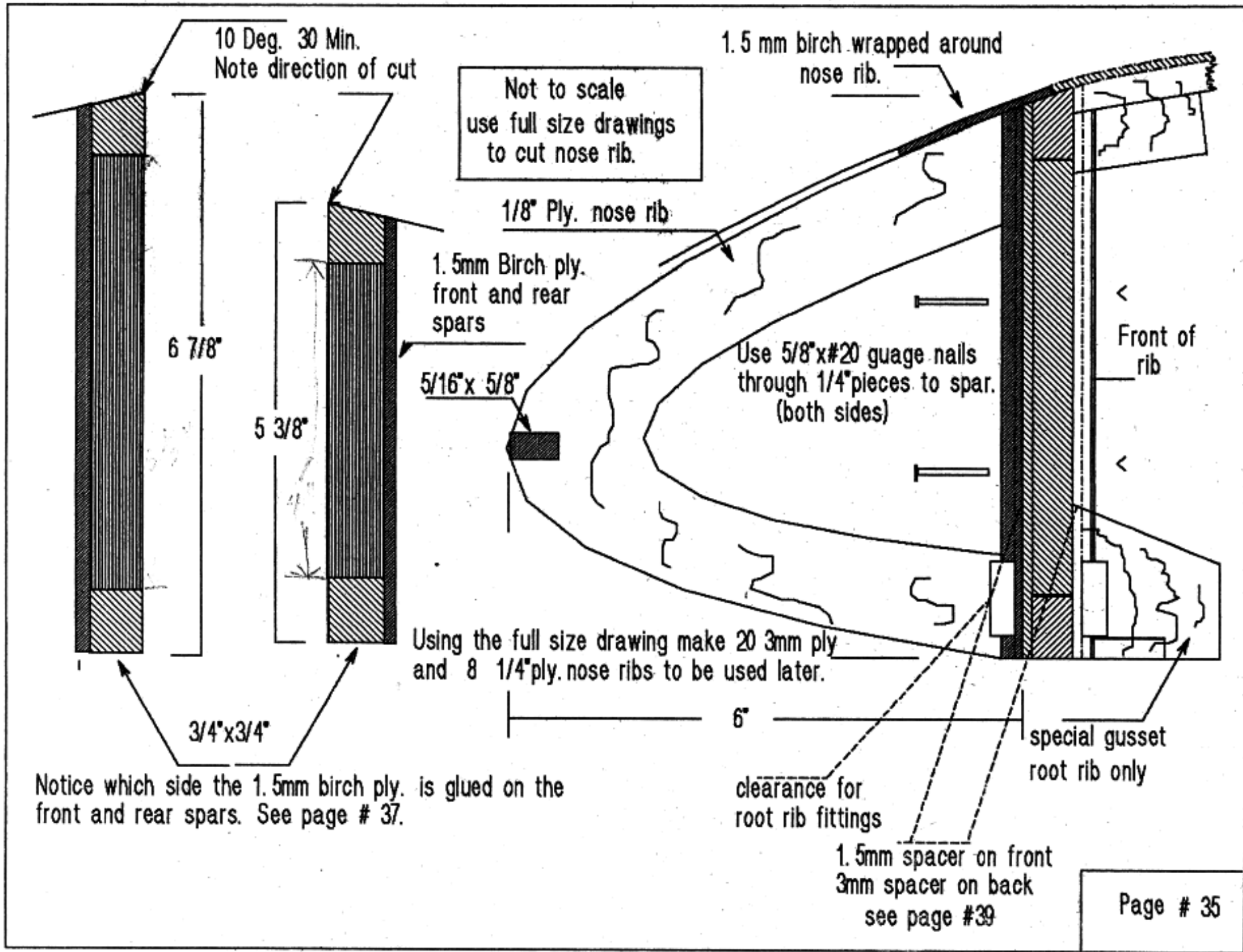
Gussets are 1.5mm birch

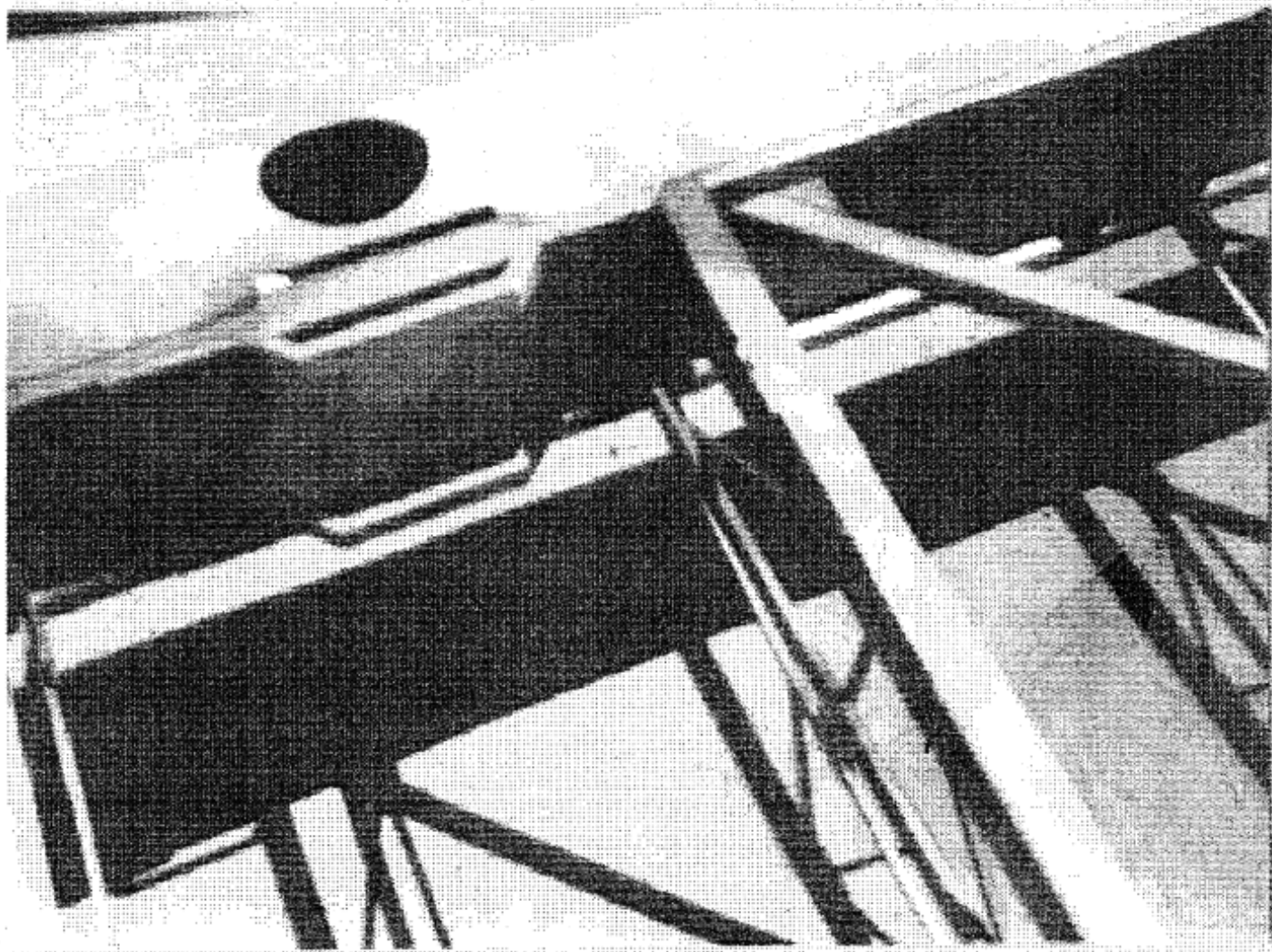
airfoil NACA 4414 and modified









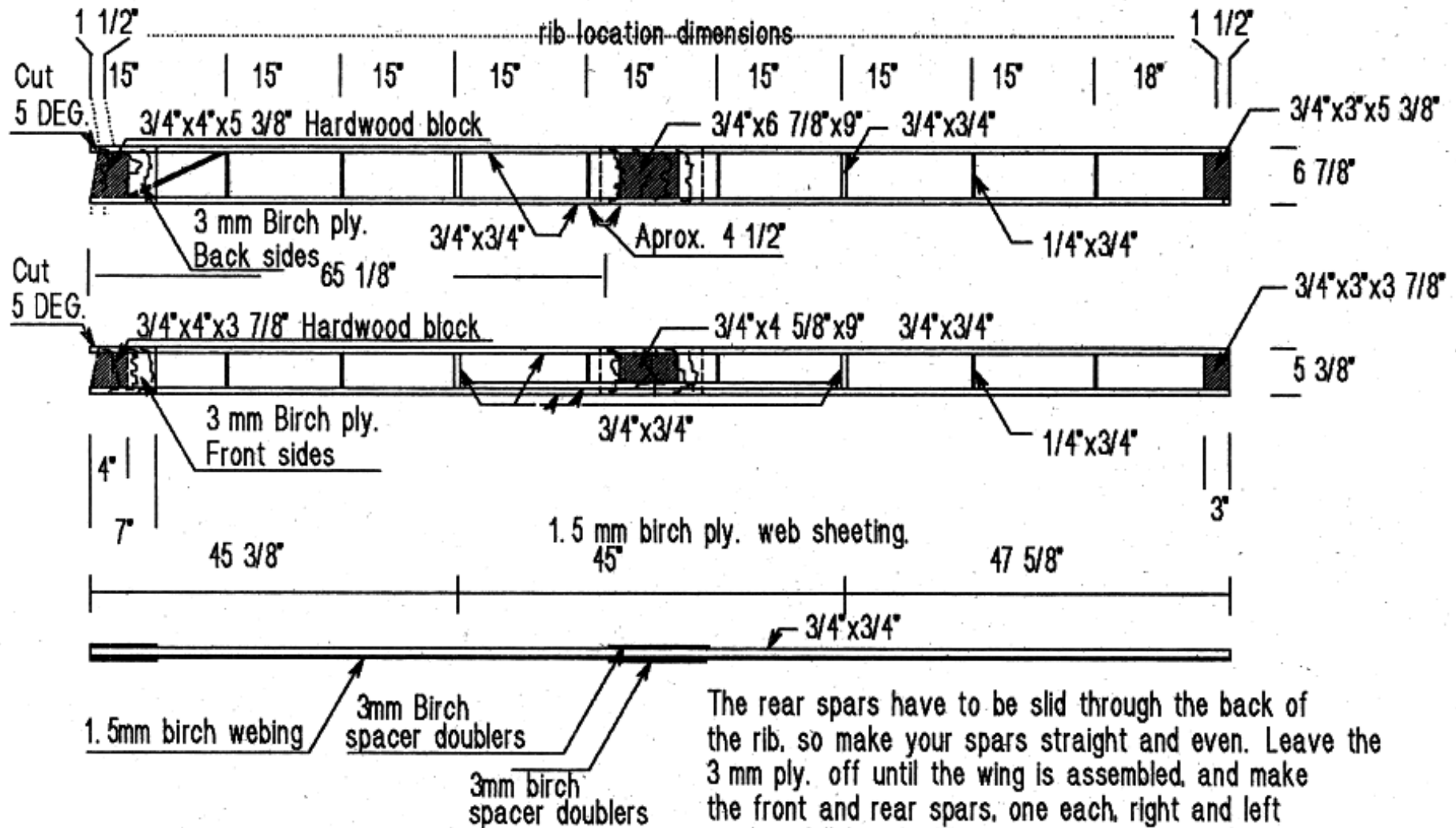


Make one front right hand and left hand
one rear right hand and left hand

see page #39 #41 for spar
attachment detail's.

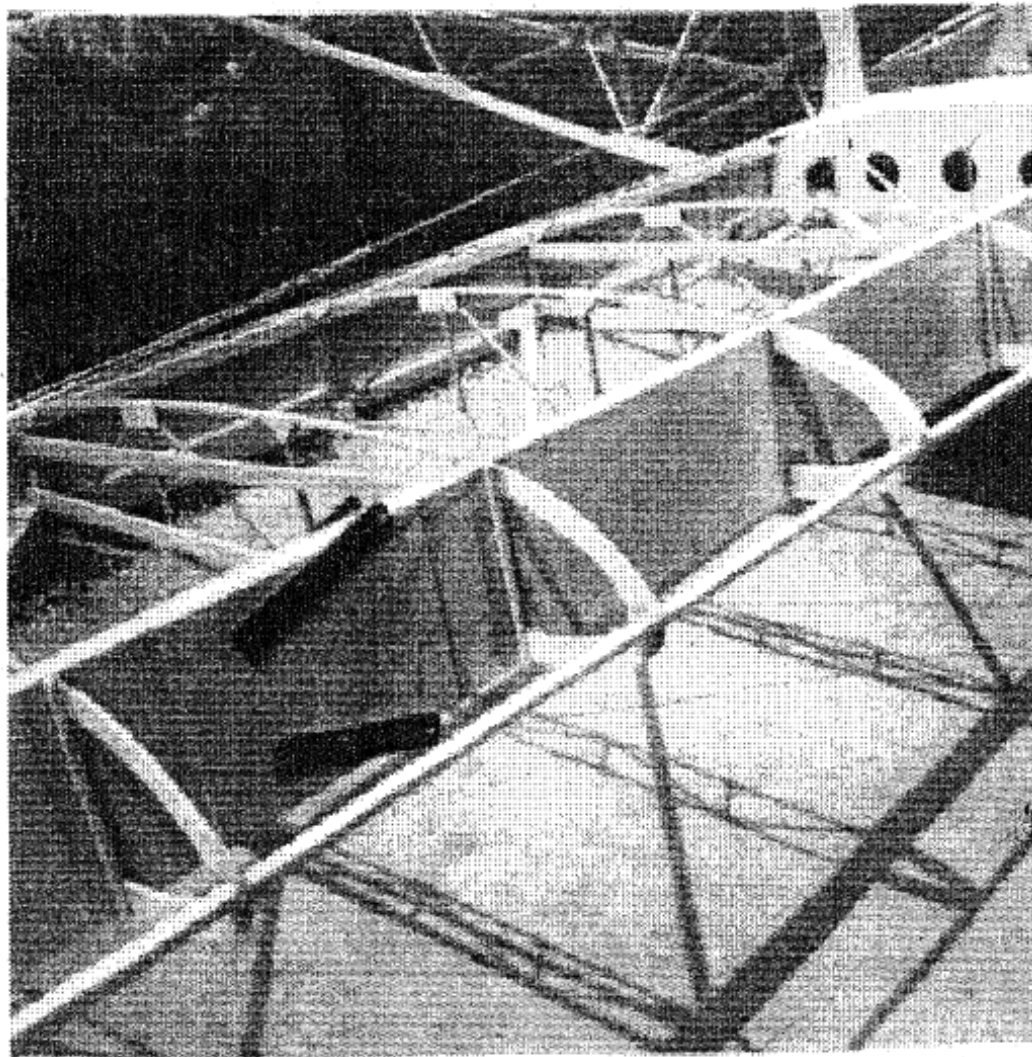
see page #35 for end
view of spar and web attachment

90
47
117
12/118
1048



Don't glue spar doublers on
at this time

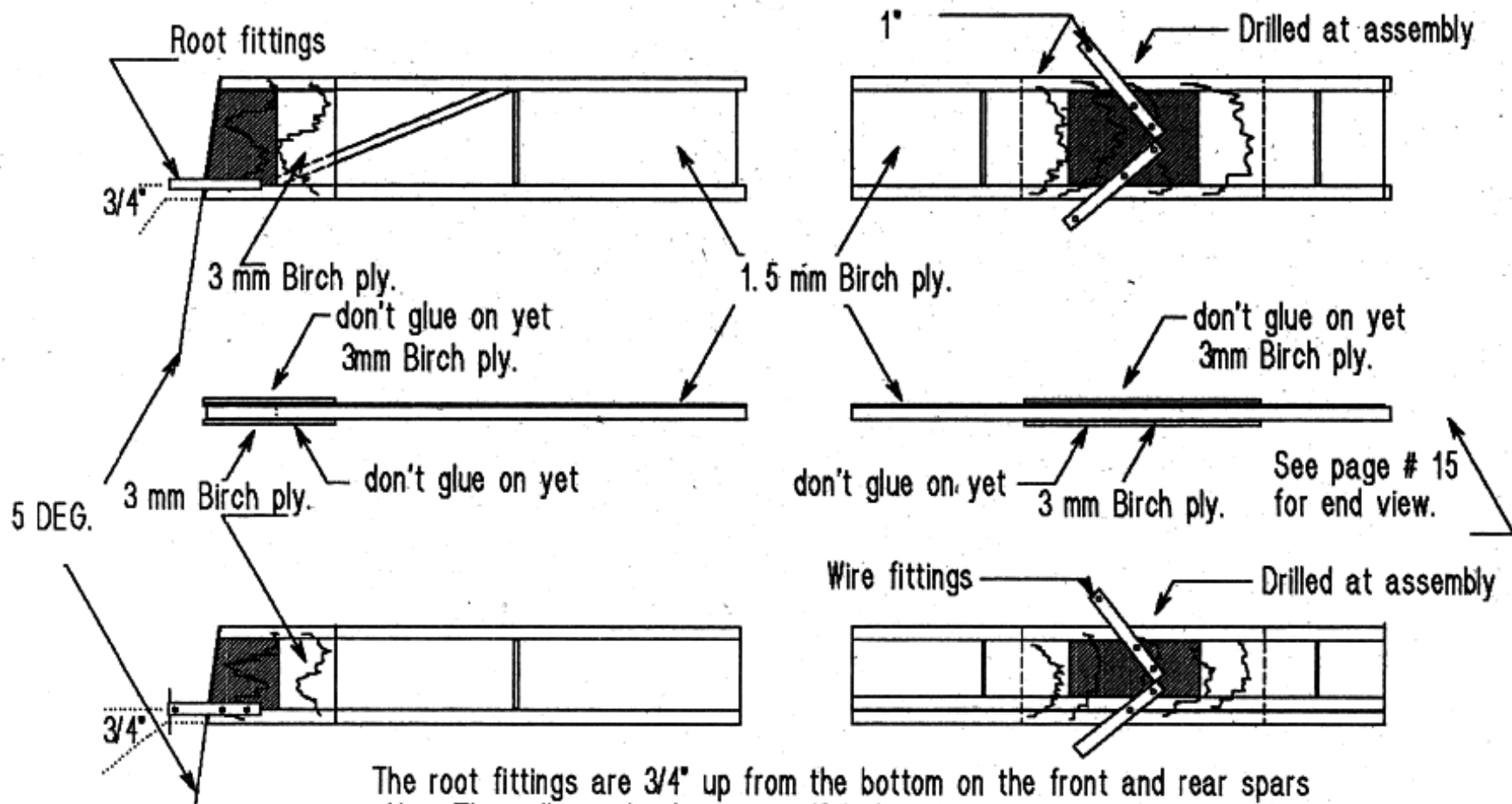
The rear spars have to be slid through the back of the rib, so make your spars straight and even. Leave the 3 mm ply. off until the wing is assembled, and make the front and rear spars, one each, right and left to their full length. Then cut the 5 DEG. angles, so you will have all your angles the same.



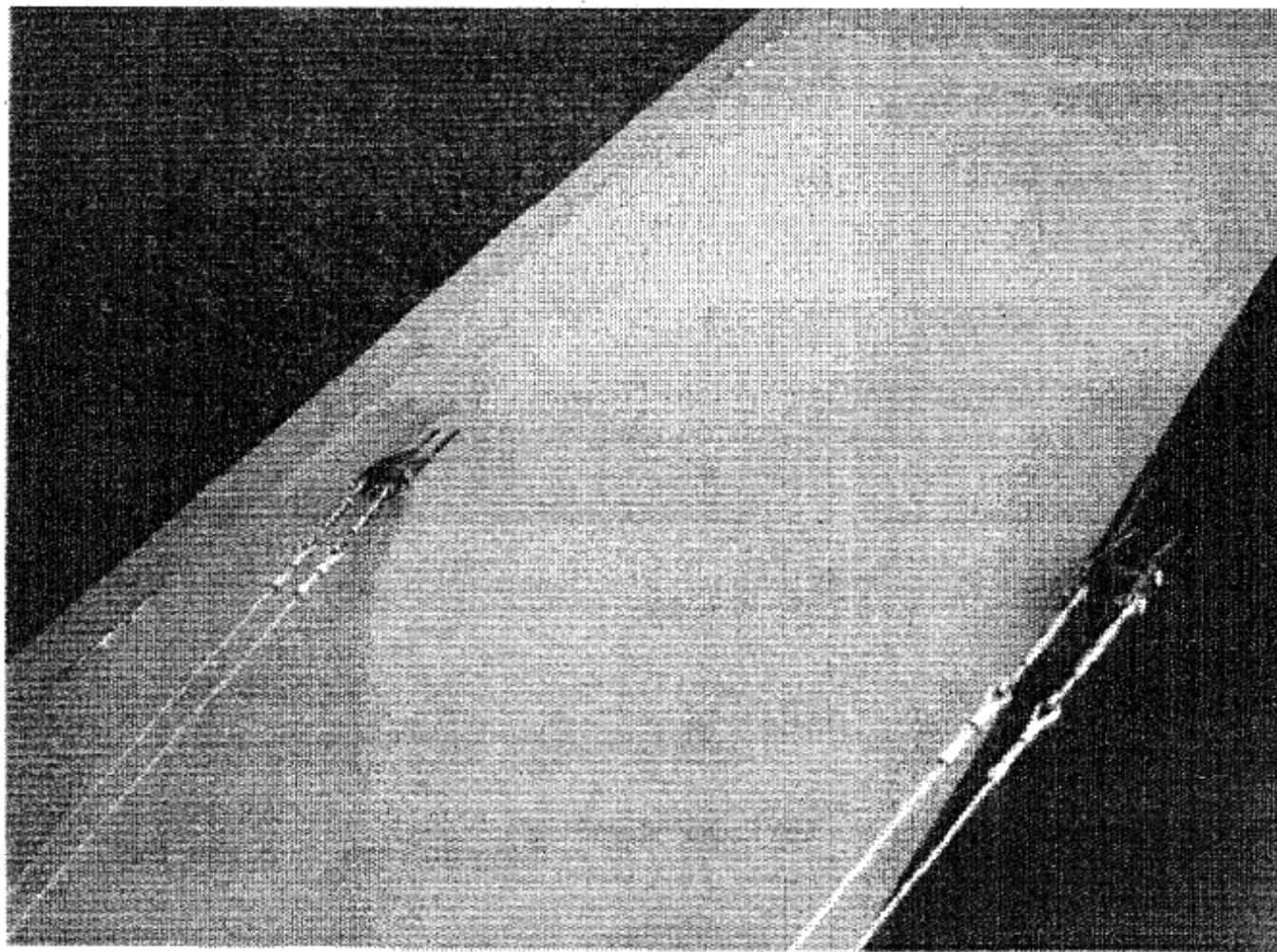
As you can see by the picture, in order to get the right angle on the outer brackets the wing should be put on and held to the proper angle using fence wire and the carrythrough bolt before the front sheeting is put on. This can be done at wing assembly by clamping the outer brackets to the spar. You need to make your root rib and outer brackets at this time. If you want to make a wing walk make the two long ones for that side only.

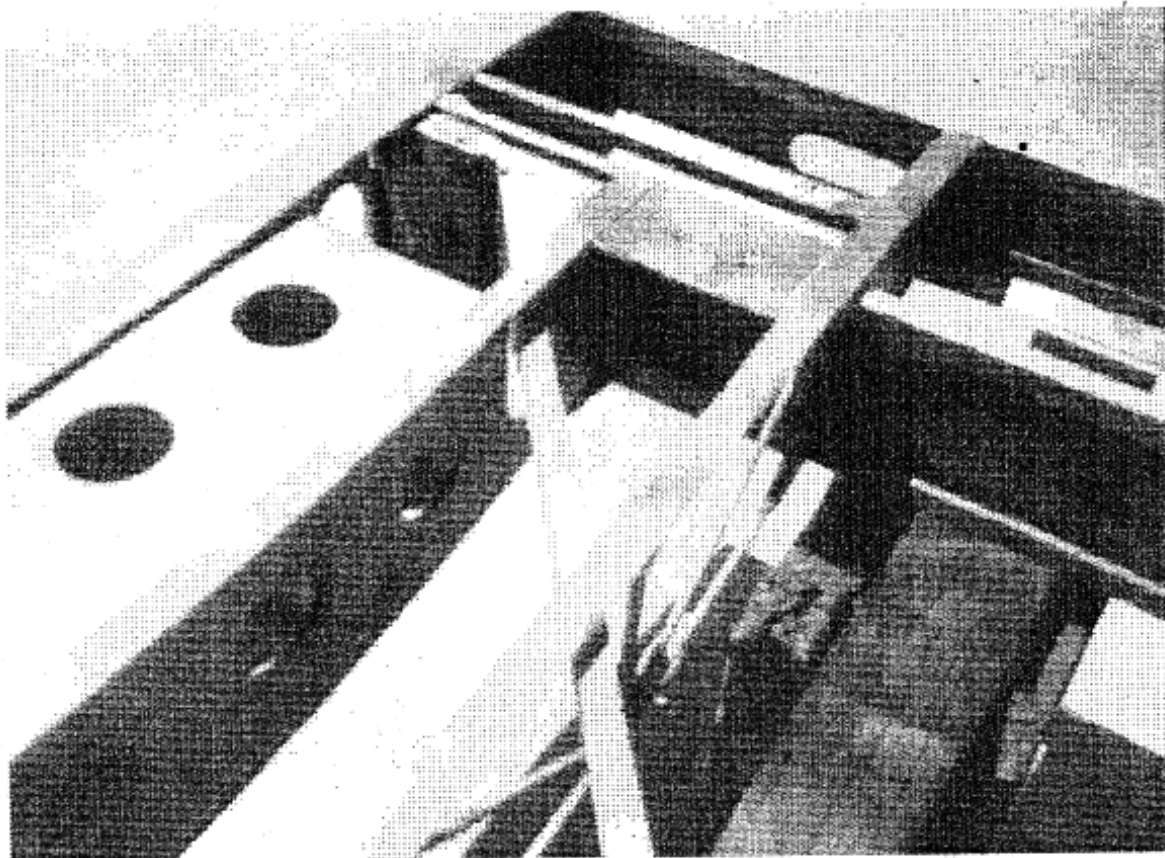
WING ASSEMBLY: Cut the ribs to length as shown on the full size drawing. Sand any glue off the top and bottom of each rib, keeping them all the same. Start the nails in the front and rear of each rib just enough to stay there. Place the front spar on the table with the ply against the fence. Hold in place with blocks nailed to the table. Set rear spar on the table with the ply facing back, and slide the ribs on, making sure the cut off angles are at the same end. Don't glue any ribs until everything is aligned and squared. Mark the spar blocks with a pencil where the rib touches it. Use your spar guide gage to check the width of the spars.

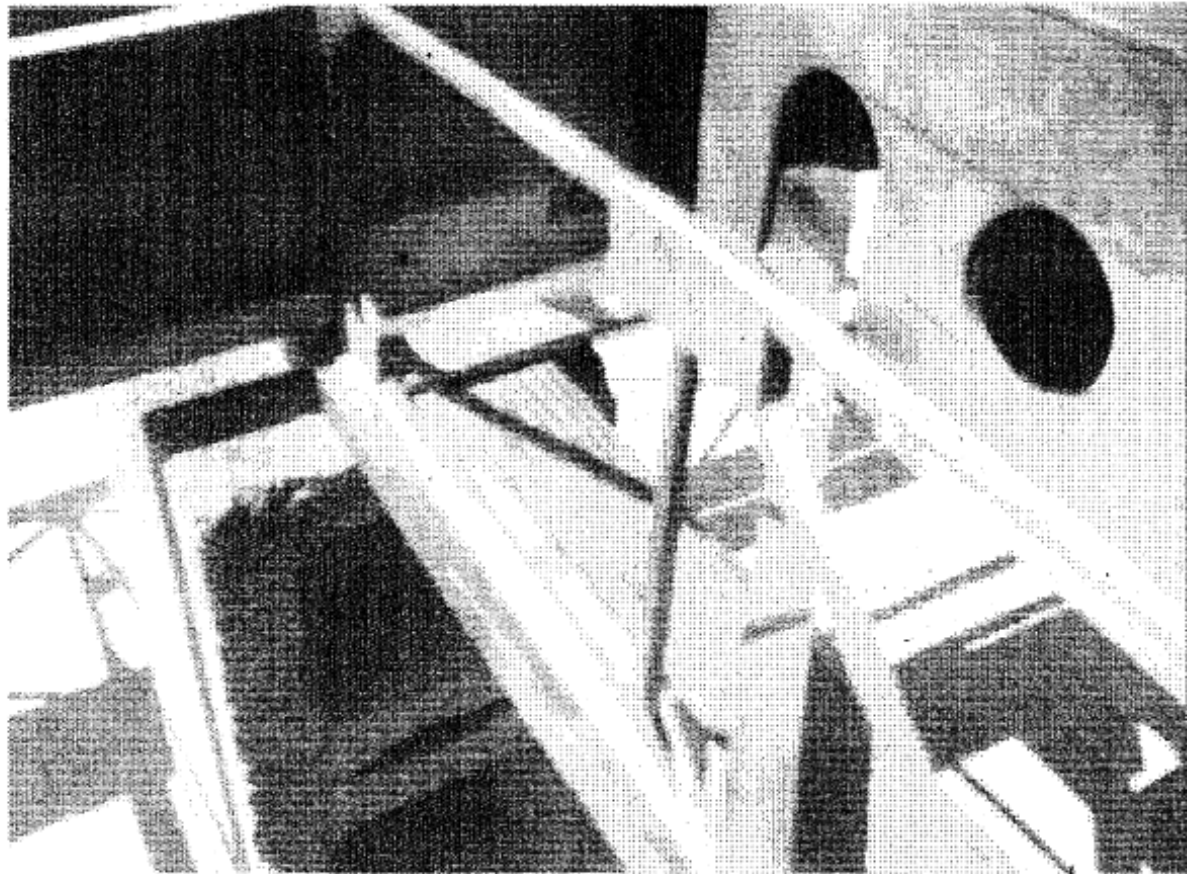
See page # 41 for
root and strut
fittings detail.

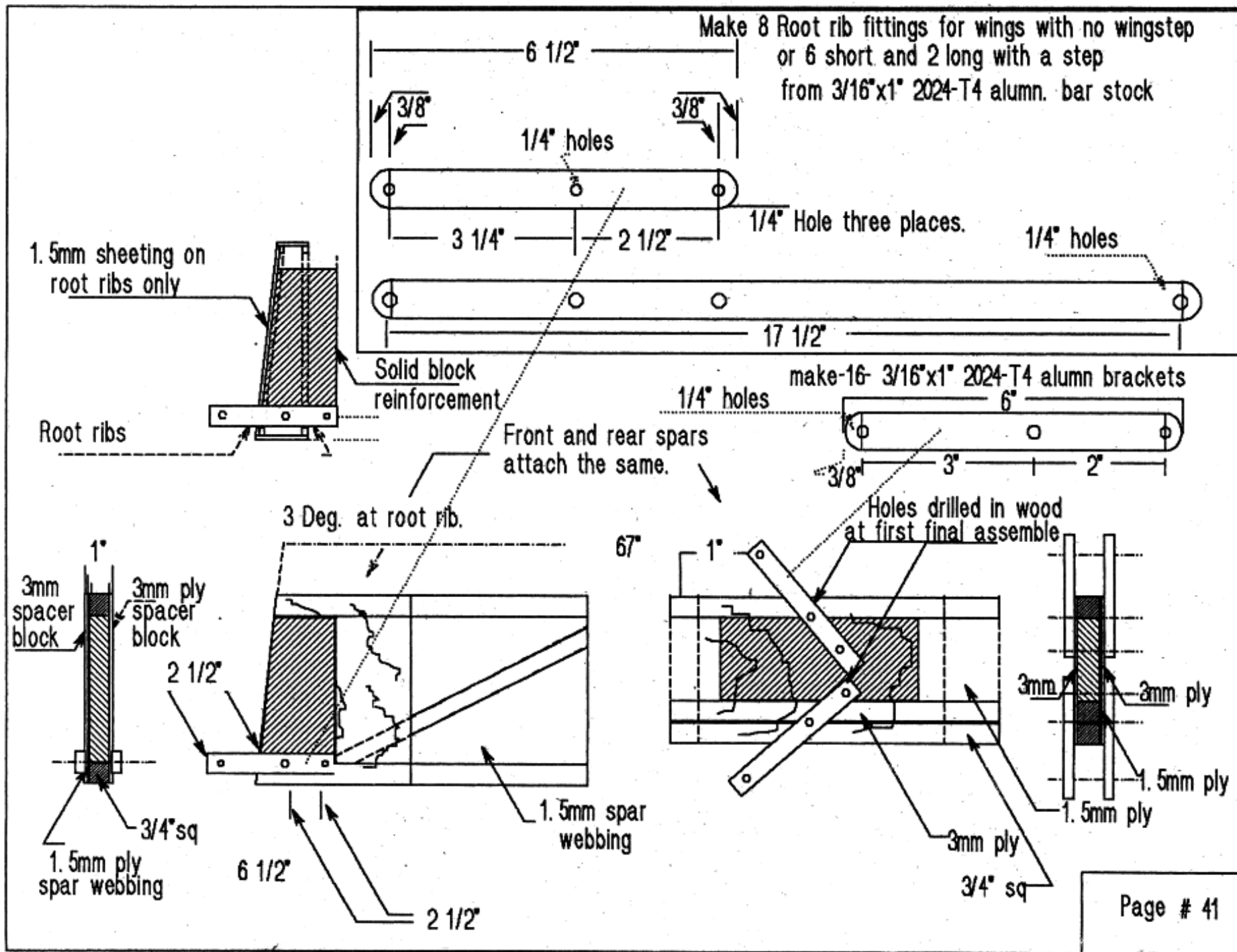


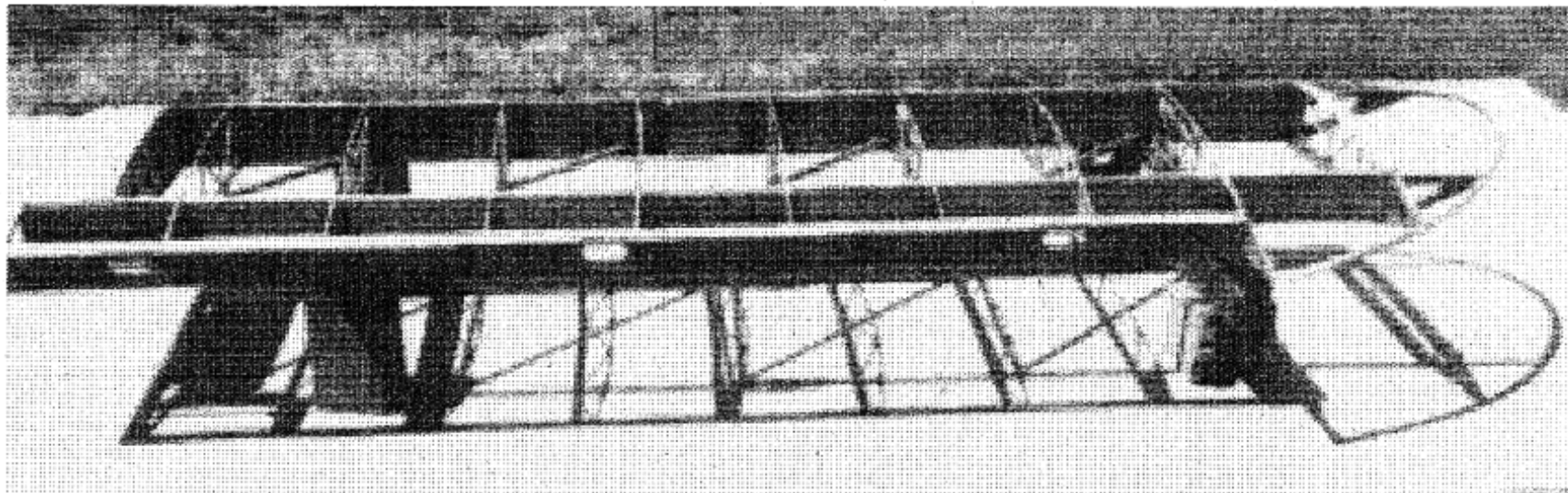
The root fittings are 3/4" up from the bottom on the front and rear spars alike. This will put the front spar 1" higher than the rear. See pages #16 #17 and note the 1 1/2" and 2 1/2" dimension.







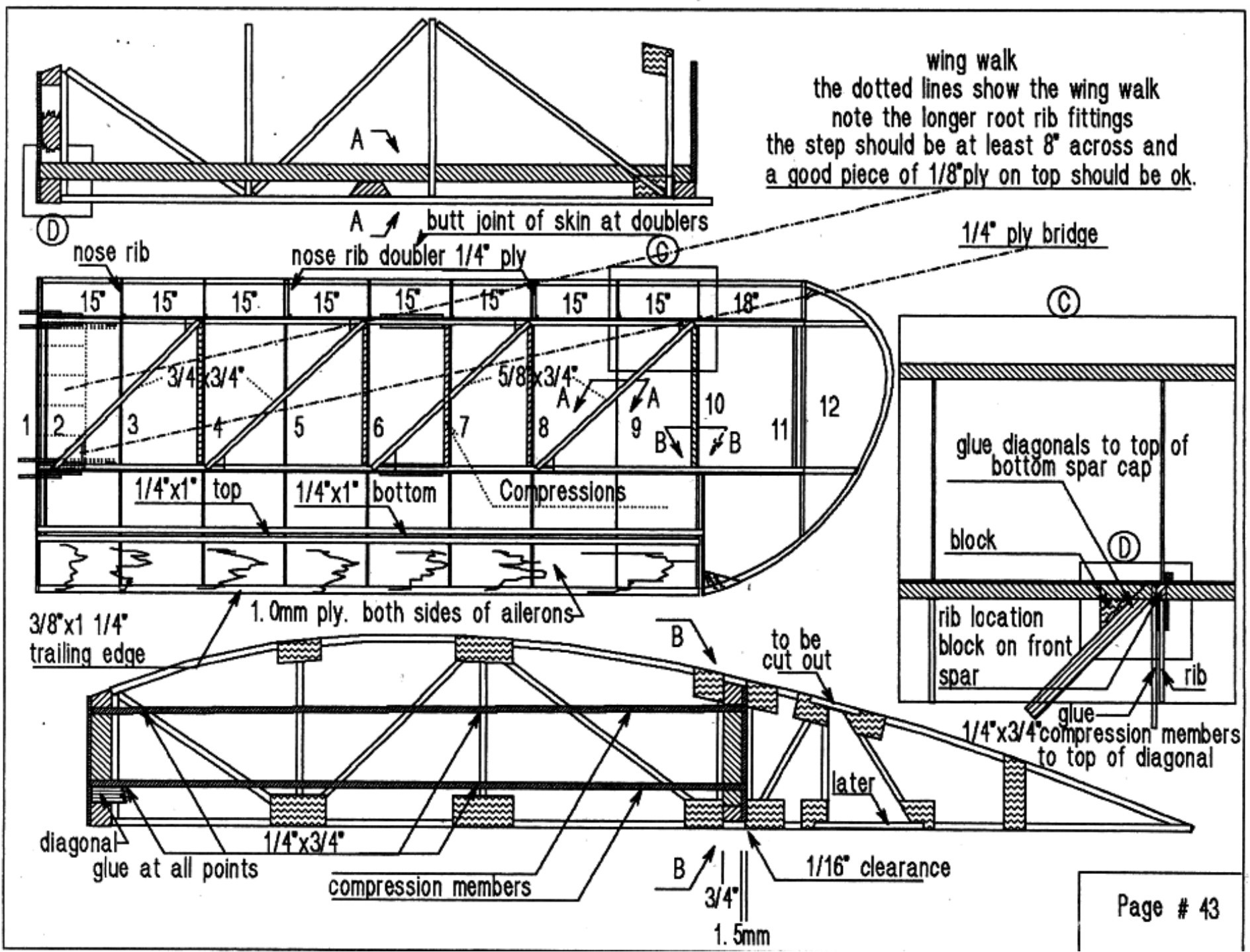




Nail blocks on both sides and at both ends of the rear spar to hold it in place. Slide the ribs off the pencil marks at the front of the ribs one at a time and put glue down the pencil mark. Reposition the rib and nail in place. Complete the front and then do the back. Check squareness and let dry. Anti-drag diagonals are installed to keep wing square. Cut and glue to the lower caps of the spar. see page # 36, 43. Compression members are $1/4 \times 3/4$ and are located at the ribs shown on pages # 38, 42, 43. They are glued to the inboard side of the ribs. Check the alignment and that all filler blocks and gussets have been installed. Let dry. Loosen the wing from the table and turn it around. Cut two trailing edge pieces $3/8 \times 1 1/4$, see page # 33. Place trailing edge against fence and block up the front of spar so rib matches the trailing edge. Using waxpaper at glue spots tack-nail the trailing edge down and align ribs. You'll need to cut the backs off the two tip ribs where the bow wraps around. See pages # 43, 44, 45. You will need to glue one of these to the out side of rib # 10. Glue ribs 1 through 10 to trailing edge.

WING WALK

If you wish to use the wingwalk you should replace the two root ribs, right wing only, with $1/4$ " (5) ply plywood and $1/4$ " ply web between them. The anti-drag diagonal at the back of the root rib has to be cut so the long root rib bracket can fit through. The diagonal should be bridged to the rear bottom spar cap with $1/4$ " (5) ply plywood and the outer rib has to have a notch cut in it. see pages # 40a and 40b.



wing walk
 the dotted lines show the wing walk
 note the longer root rib fittings
 the step should be at least 8" across and
 a good piece of 1/8" ply on top should be ok.

1/4" ply bridge

C

glue diagonals to top of
 bottom spar cap

block

D

rib location
 block on front
 spar

glue
 1/4"x3/4" compression members
 to top of diagonal

to be
 cut out

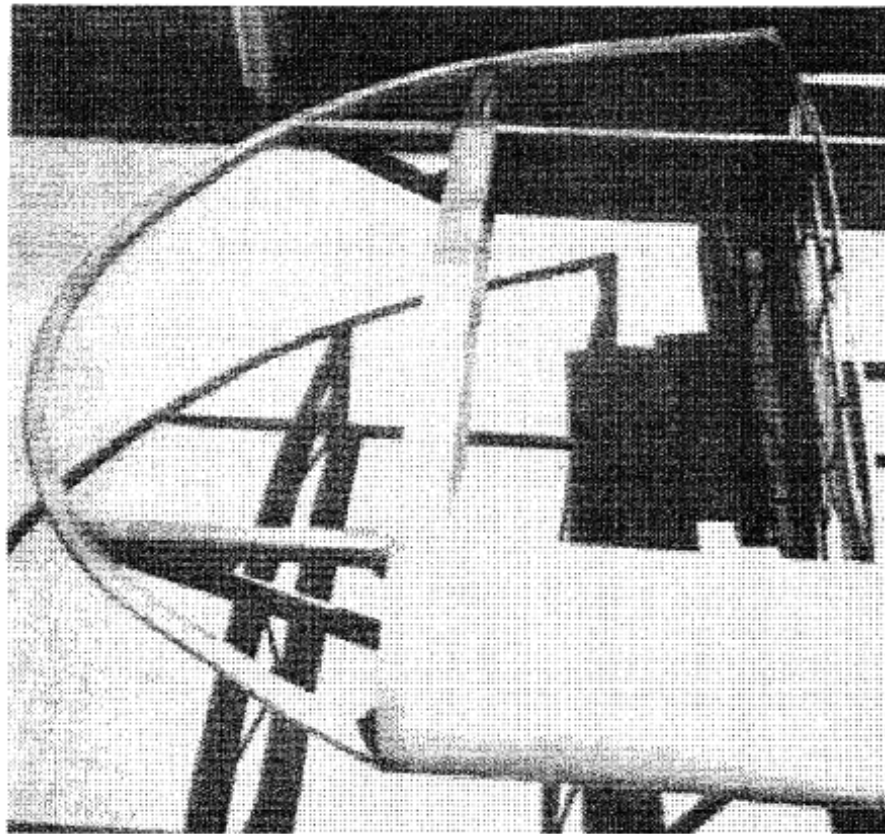
later

1/16" clearance

B

3/4"

1.5mm

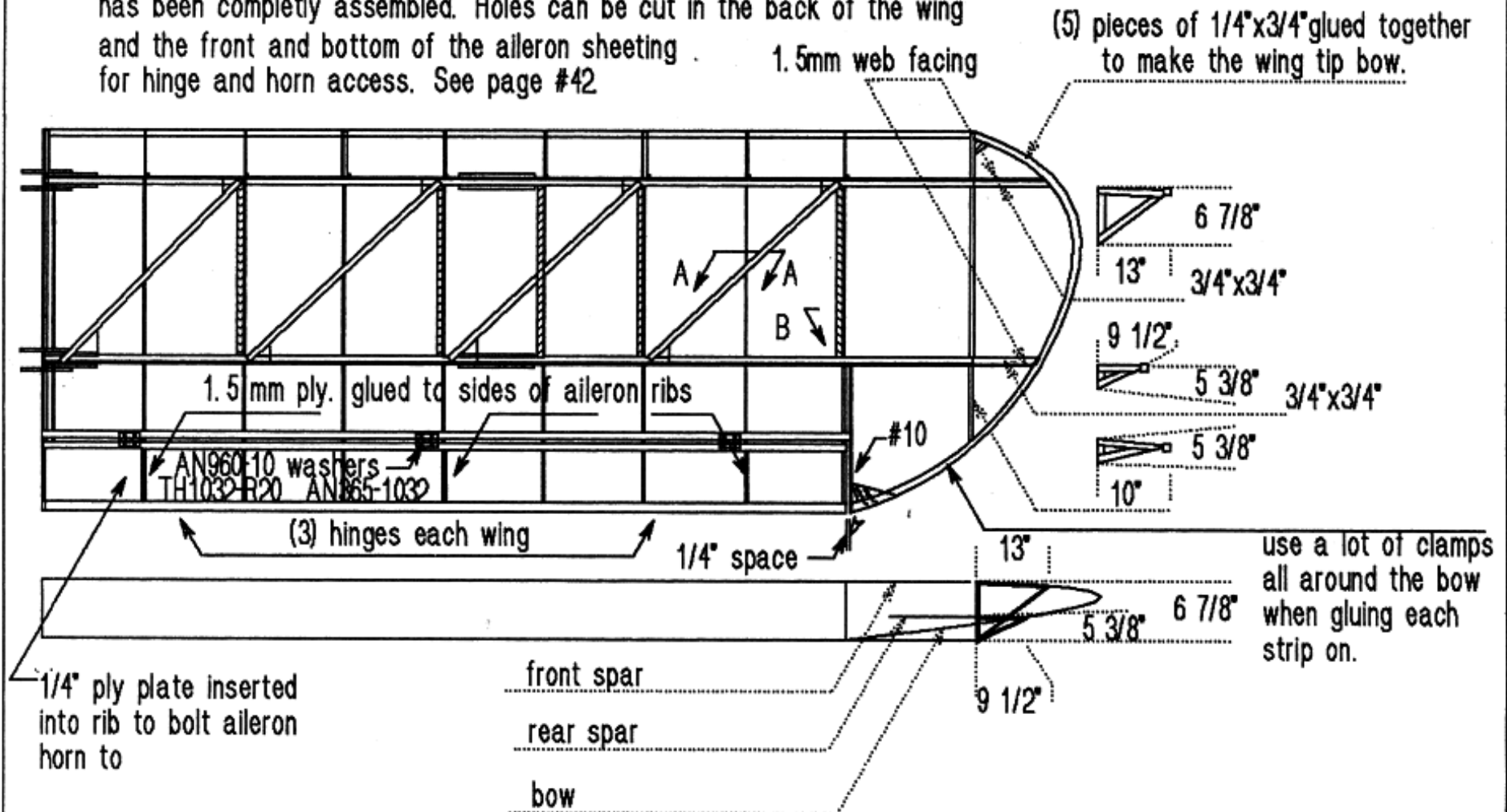


Cut four strips of wood 1/4"x1" straight grain, no knots 10 foot long, to use for aileron hinge cap at rear of wing and front of ailerons. Cut out the notches on the top of the ribs only, as shown on page # 43. Notice how the wing tip and the aileron goes together. While gluing, put 1/4"x1" doublers under the cap where the hinges go, see page # 33. attach and glue 1/4"x1/4" spruce pieces to the back of the nose ribs and allow to dry. Attach the nose ribs to the front of the spar. Use nails and glue. Let dry. Cut and install the 5/16"x5/8" piece at the front of the nose rib, keeping nose rib 90 degrees to the spar. The 1/4" ply doubler nose ribs should be put on at this time, too.

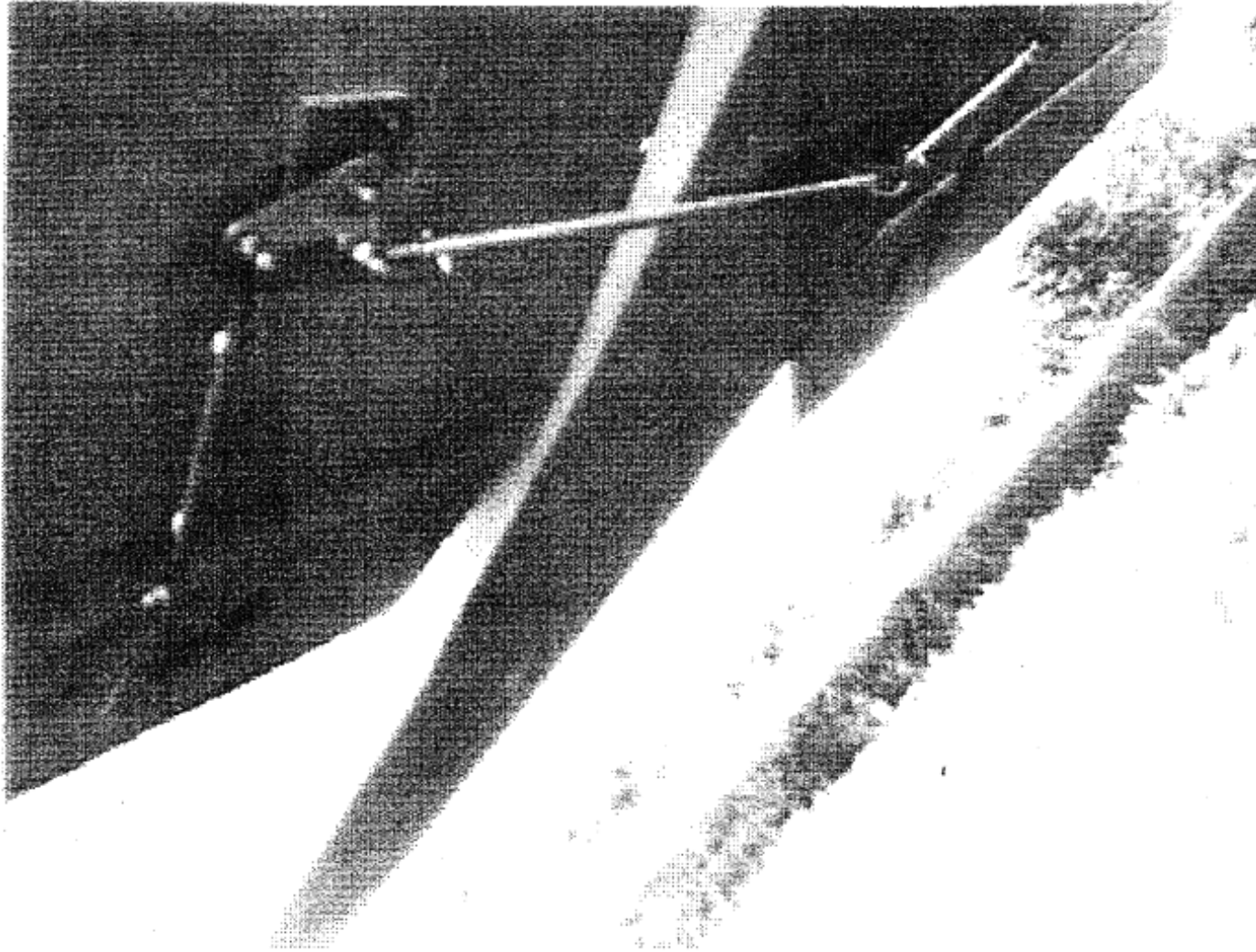
It is best to bring the other wing along to this point now and assemble the wings to the body. Use fence wire and the brackets clamped to the spar to get the 5 DEG. Now you can drill the mounting holes in the wing and body. See page # 38. Now put wing back on table and Make sure the wing is flat and true sitting on the table. Secure with blocks so the leading edge wrap can be put on. Make the wing wire bracket exit holes and glue to the back of the front spar, top and bottom. See page # 36. Use 1.5mm birch wrapped around the nose ribs as shown on page # 35, back to the middle of the top and bottom spar caps. Each wing will be done in three sections. Butt joint sheets at ribs # 5 and # 8. Starting in the middle, first cut a piece of ply to fit, with the grain running lengthwise of the wing. The other two sections can hang over and be cut off later. Sand the nose ribs so the ply will fit tight against them, leaving enough room at nose ribs #5 and #8 to glue the other sheets on. The front side of the front spar nose ribs and the inside of the sheeting should be varnished. Glue won't stick to varnish well, so put masking tape where the glue will go. Apply glue to both surfaces and staple to top spar. Now, using two strands of nylon string at each rib, pull the sheeting up as tight as you can and tie it off. Use 3/4"sq. pieces of wood and twist the string as tight as it will go and not break. Secure the stakes. Staple the sheet to the bottom spar cap also. Do the same thing to the other two sheets. Let all this dry for at least 24 hours. Glue the aileron top sheeting on and staple in place. It is best to put the hinges on now. They should go on top see page #33 Turn the wing over and secure.

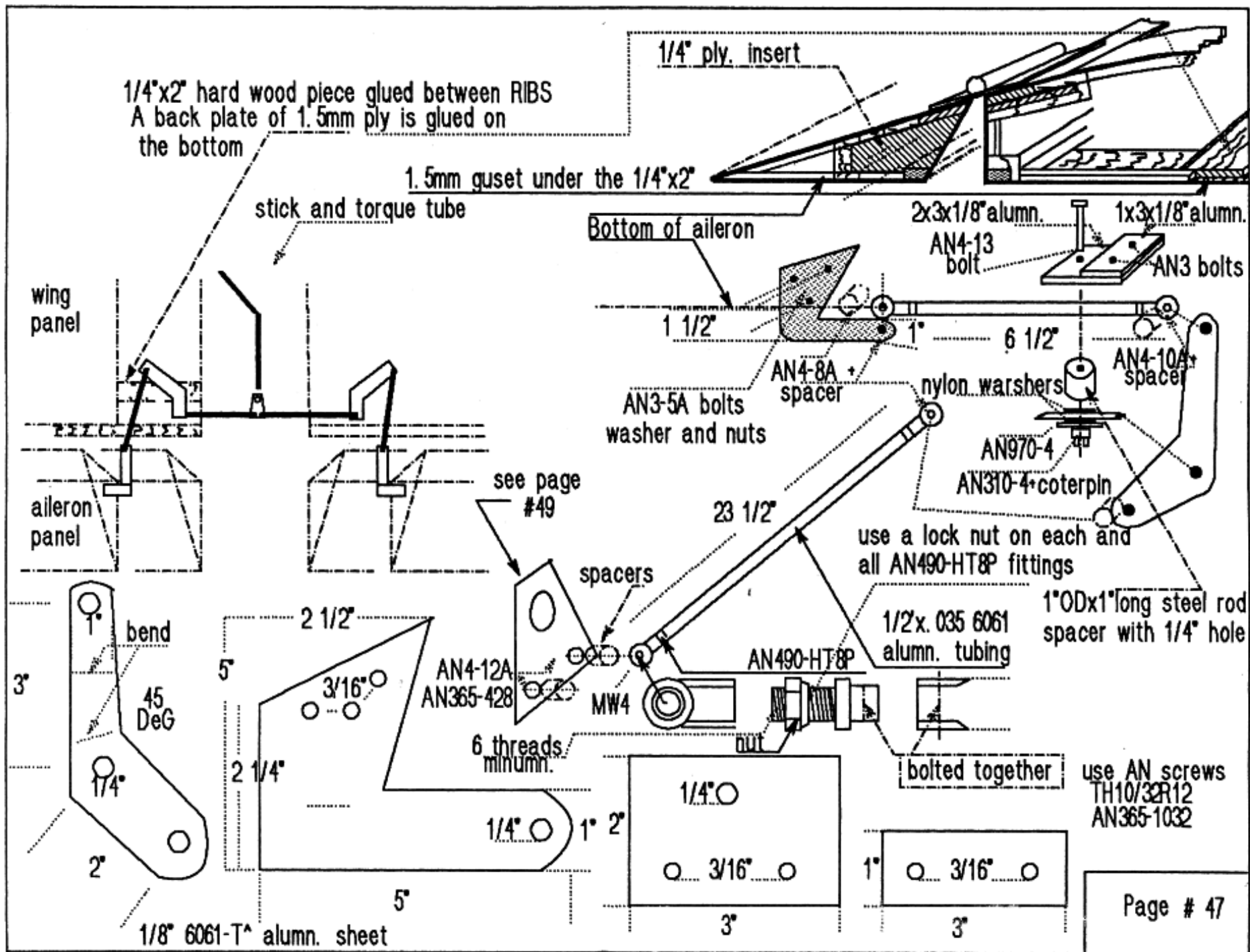
Cut four pieces of 1/4" X 1" X 10 1/2 feet.

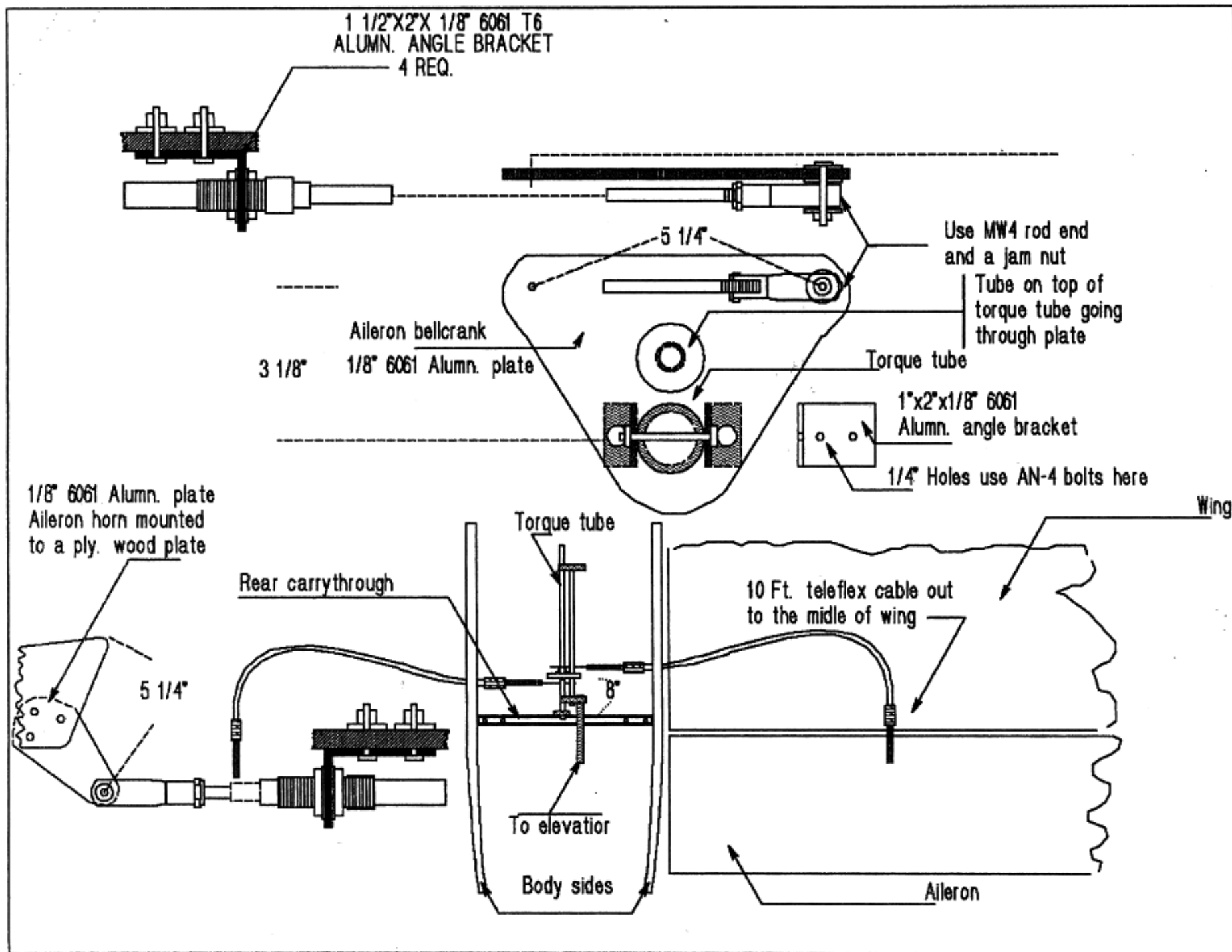
And make sure the trailing edge is completely supported and hinge bolts are up snug. After cutting the notches out of the bottom of the ribs LEAVING THE ONE WHERE THE BOW ATTACHES You can now glue in two of the bottom pieces just cut out See pages # 32, 33. Glue the 1.5mm rear of wing and front of aileron. See page #47 Install aileron ply and horn. Before gluing the bottom sheeting on, varnish all inside surfaces. Put cap strips and ply doublers on the back of wing hinge strips for added strength after the wing has been completely assembled. Holes can be cut in the back of the wing and the front and bottom of the aileron sheeting for hinge and horn access. See page #42



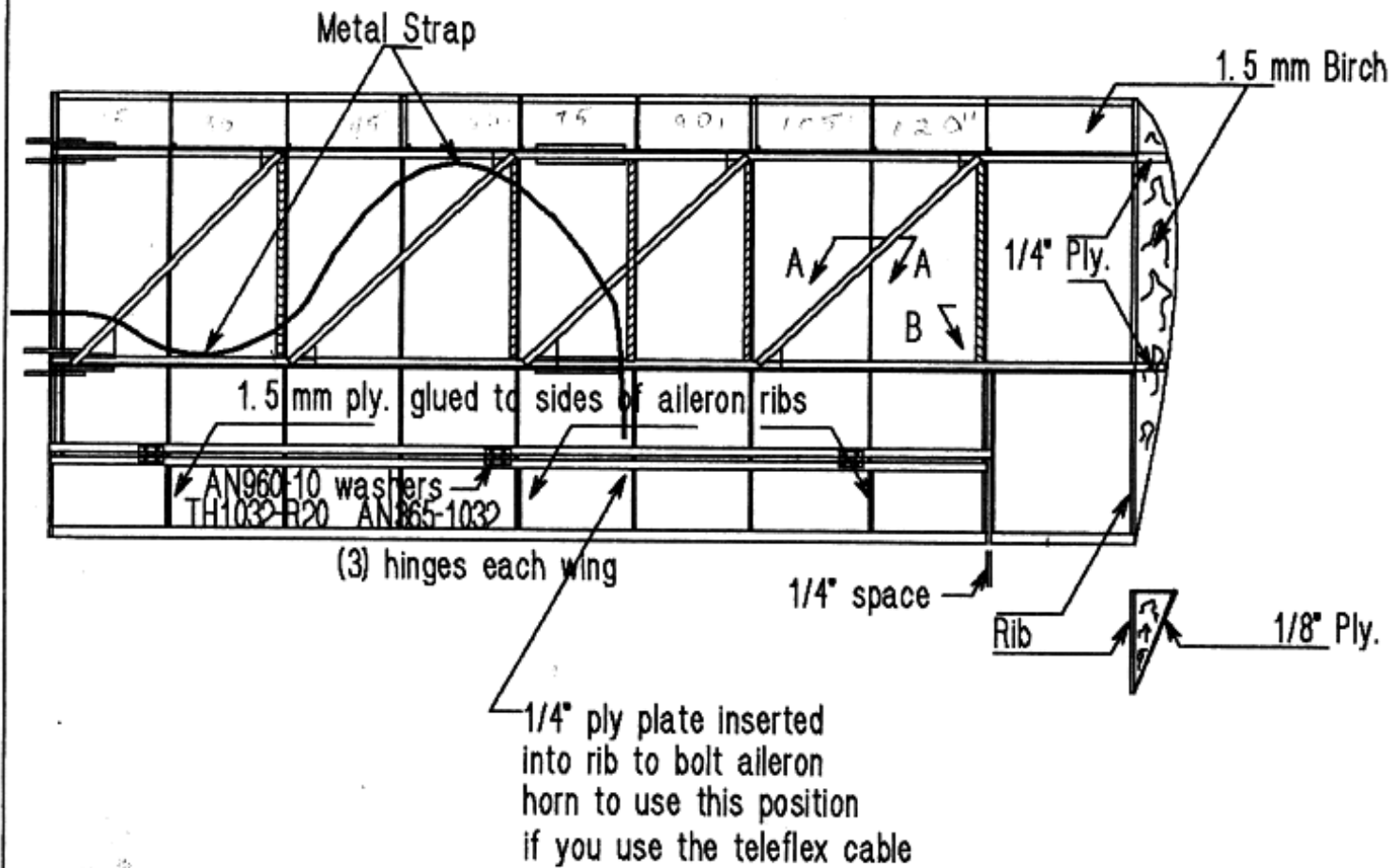
The bow is made up of 1/4"x3/4" strips of northern white pine glued together around spar extensions See pages # 32, 34, 44. Make two sets of extensions and glue on wings. Glue strips on one at a time and together to make the bow. Clamp rib # 10, using a spacer, to the aileron for support while bending.

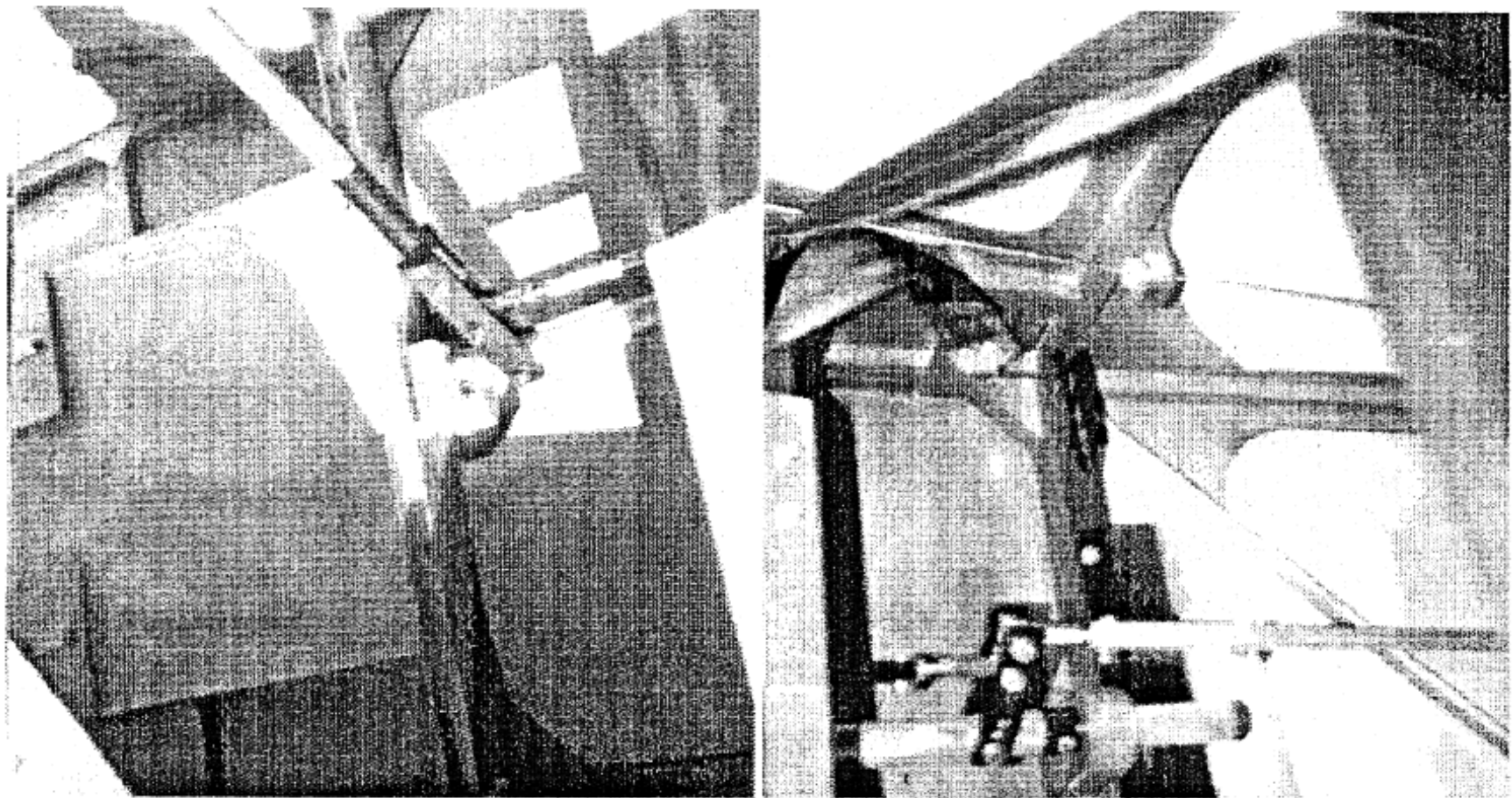






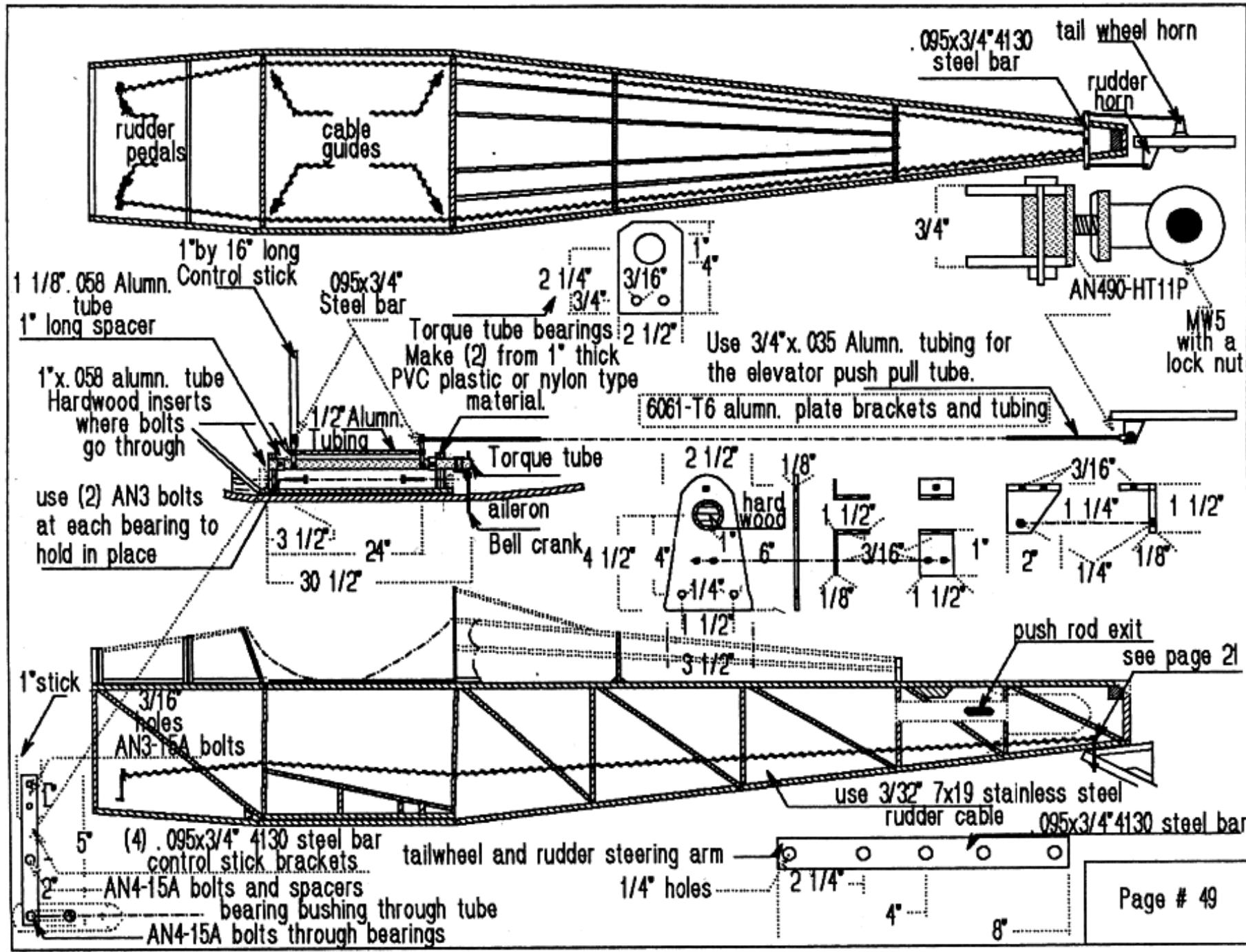
10 Ft. teleflex cable
insted of the linkage

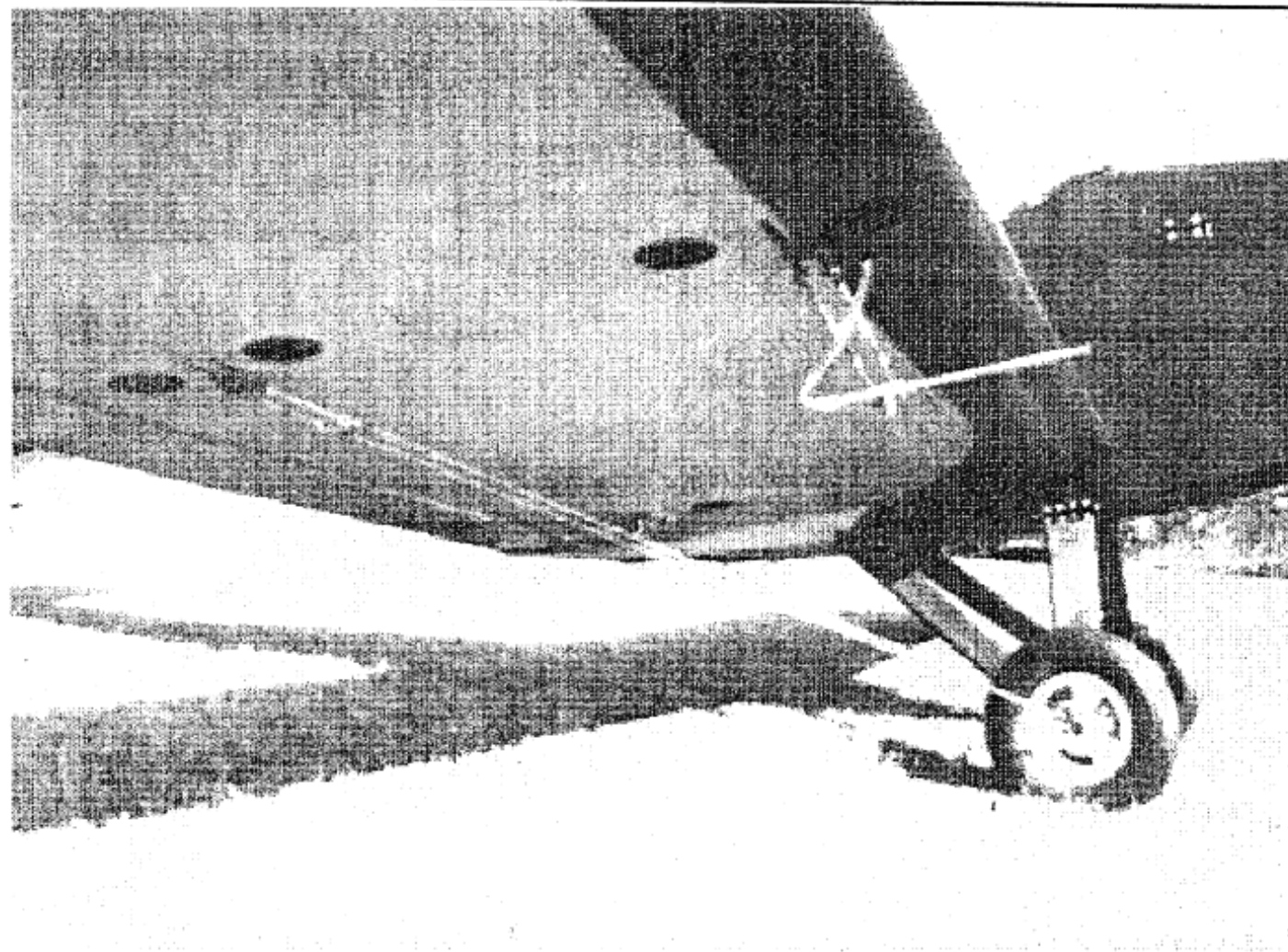




After gluing on the wing bow gussets check to see if everything is to your liking. Now we can start putting on the aileron control fittings, see page # 47. Cut all alumn. parts out of 6061x1/8" alumn. sheet. Use all AN-bolts and hardware. Page # 49 shows the rudder peddle setup and the control stick elevator and aileron hook up. See picture # 46

7/11





Wing dihedral may be set without using a Protractor.

Method No. 1

Using the Sine .0175 multiply each inch laterally on the length of the panel by the Sine. The product will be equal to ONE degree of dihedral.

Example: A ten foot panel equals 120" .

$$\begin{array}{r} 12" \\ \times 10 \\ \hline 120" \end{array}$$

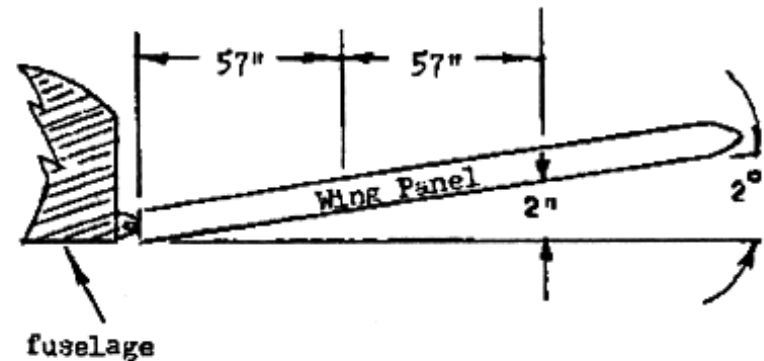
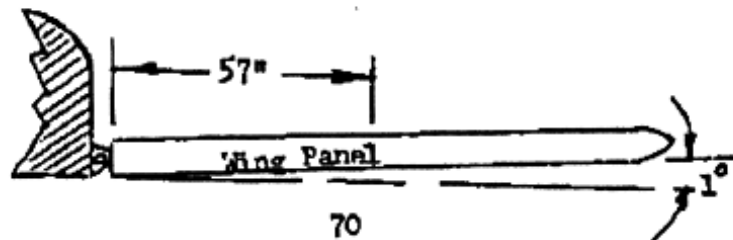
120" is now multiplied by .0175

$$\begin{array}{r} .0175 \\ 120" \\ \hline 3500 \\ 175 \\ \hline 2.1000" \end{array}$$

When the tip of the wing panel is raised 2 inches above its parallel to the ground it will have ONE degree of dihedral.

Method No. 2

Measuring each 57" along the length of the panel and raising it ONE inch vertically will produce one degree of dihedral.



root tip

tip high wash in (NO)

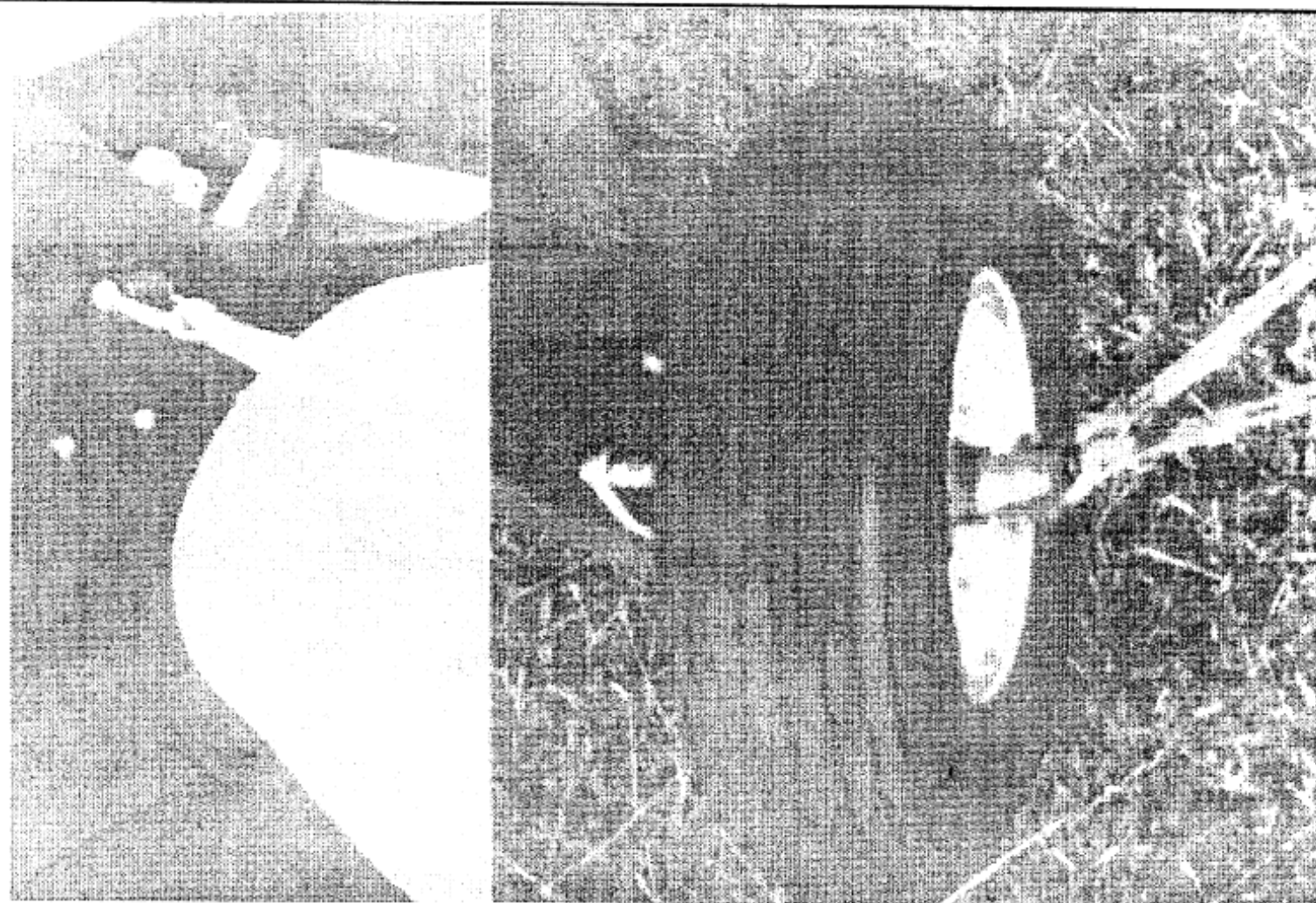
root tip

trailing edge high wash out (NO)

root tip

both even (OK)

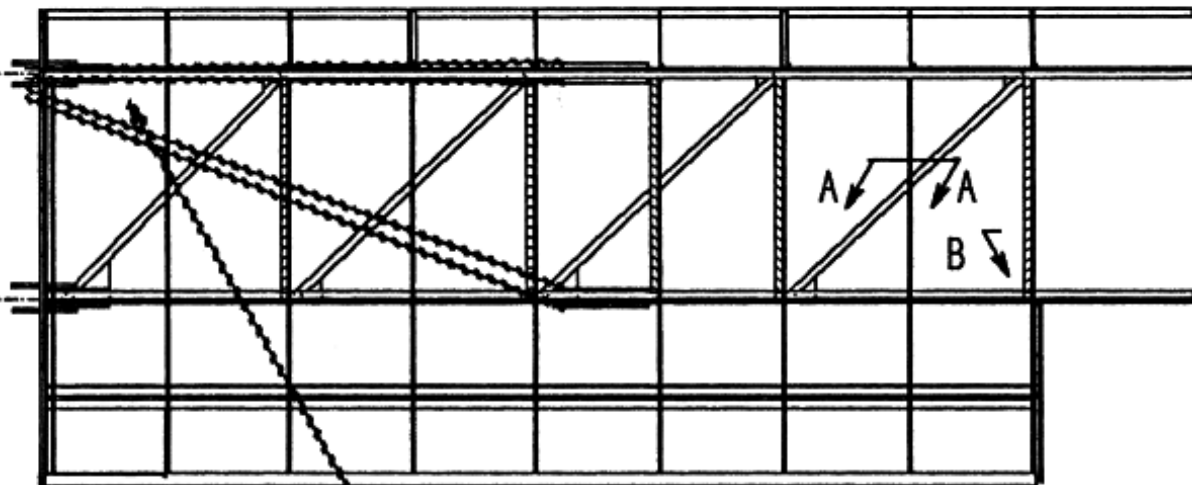
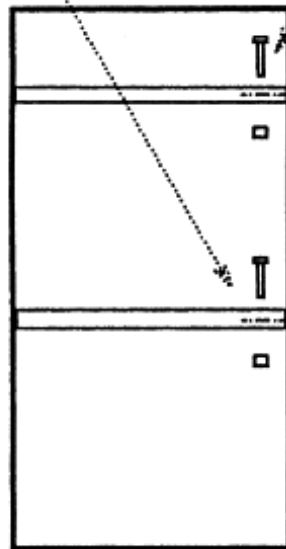
Cables not adjusted properly
can twist the wing.



Cut a piece of plywood with a 3 DEG. angle on it to use as a guide when putting on the top landing wires. Turnbuckles do make it easier to adjust the wires. Put the bottom flying wires on and snug them up. Go back and check the top again and if everything is o.k., safety wire everything. Mark each wire as to its location.

AN4 bolts and nuts

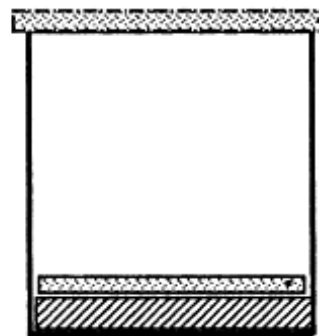
AN4 bolts and nuts



AN4 bolts and nuts

Use four(4) 1/8" 1x19 or 7x19 stainless steel cables, top and bottom each wing

need (4) 3000 lb. tension load shackle



3 deg

see pages #39 #41

AN4 bolts and nuts

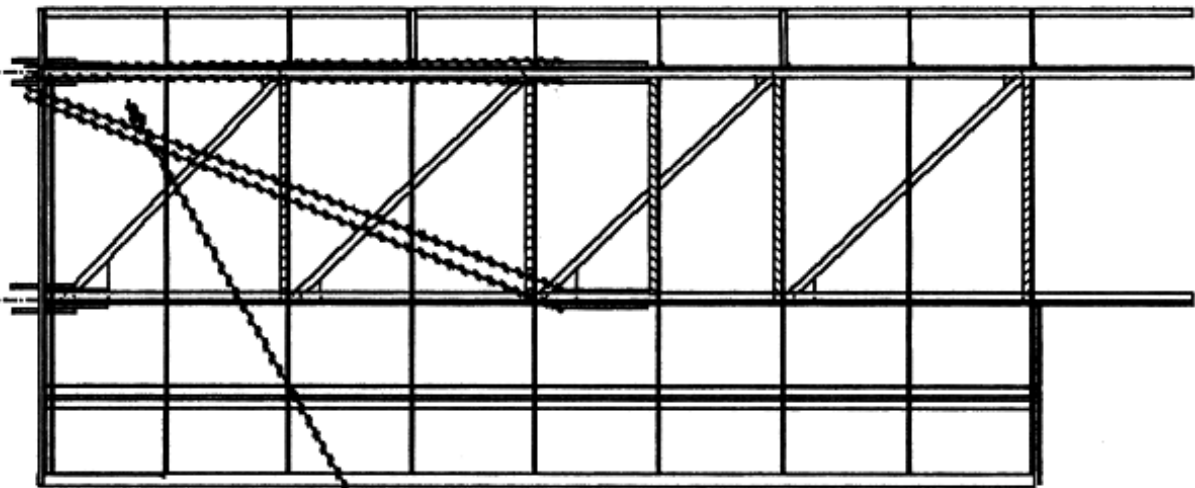
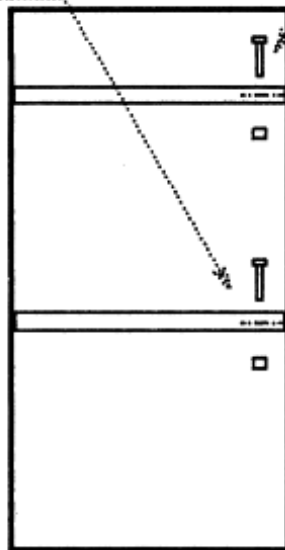
need (16) AN13016S Turnbuckles

the flying wires will stretch a little when in the air so set the wing at 3 DEG so you will have no more than 4 DEG while flying. 4 DEG should be the max dihedral and no less than 3 DEG.

AN4 bolts and nuts

AN4 bolts and nuts

AN4 bolts and nuts



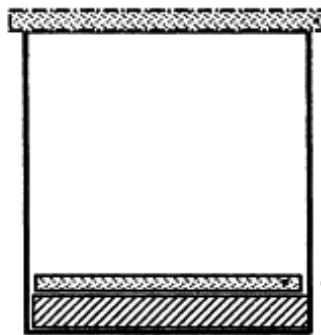
AN4 bolts and nuts

Use four(4) 1/8" 1x19" or 7x19 stainless steel cables, top each side

need (2) 3000 lb. tension load shackle

see pages #39 #41

need (8) AN13016S Turnbuckles



3 deg

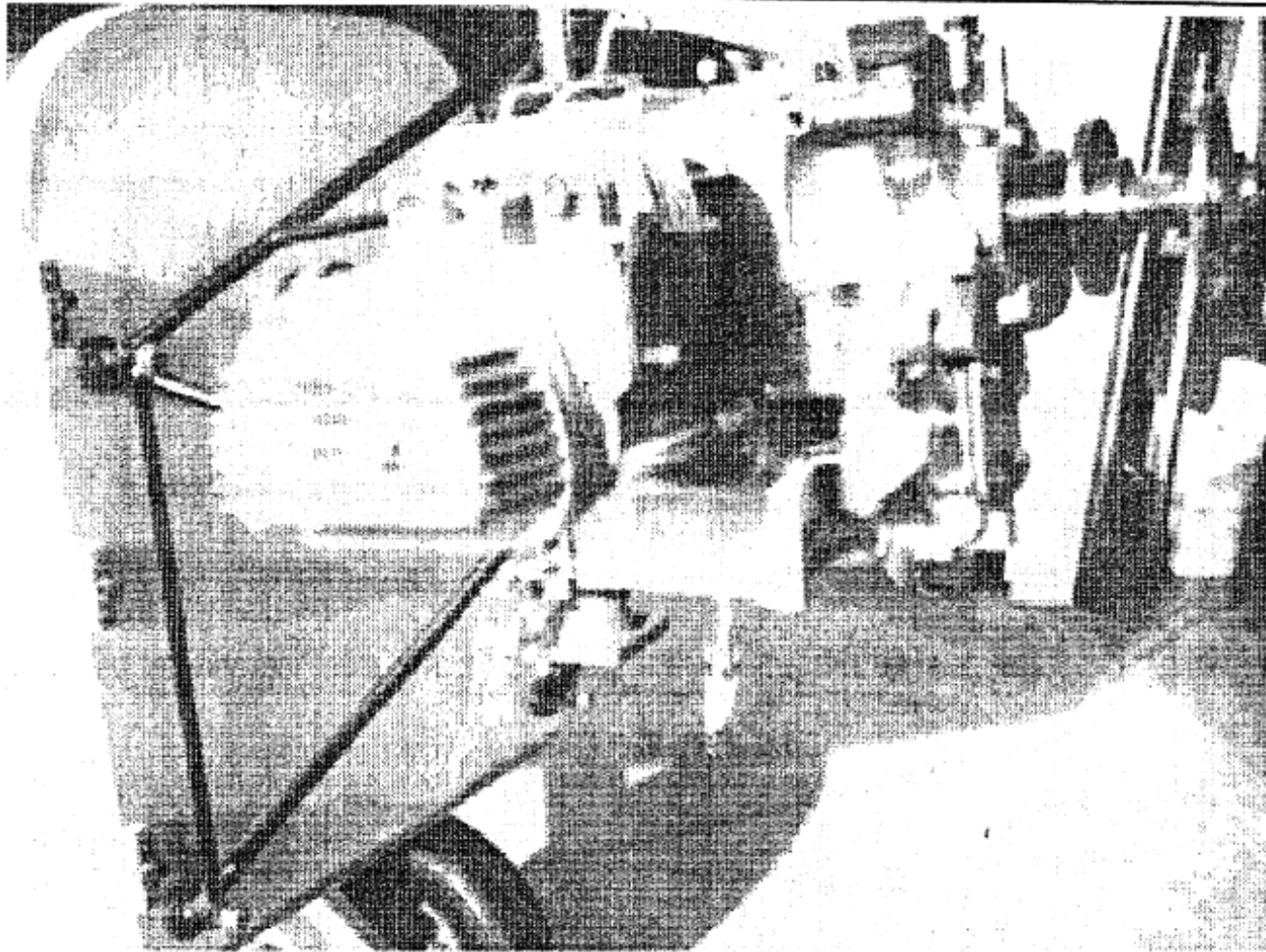
AN4 bolts and nuts

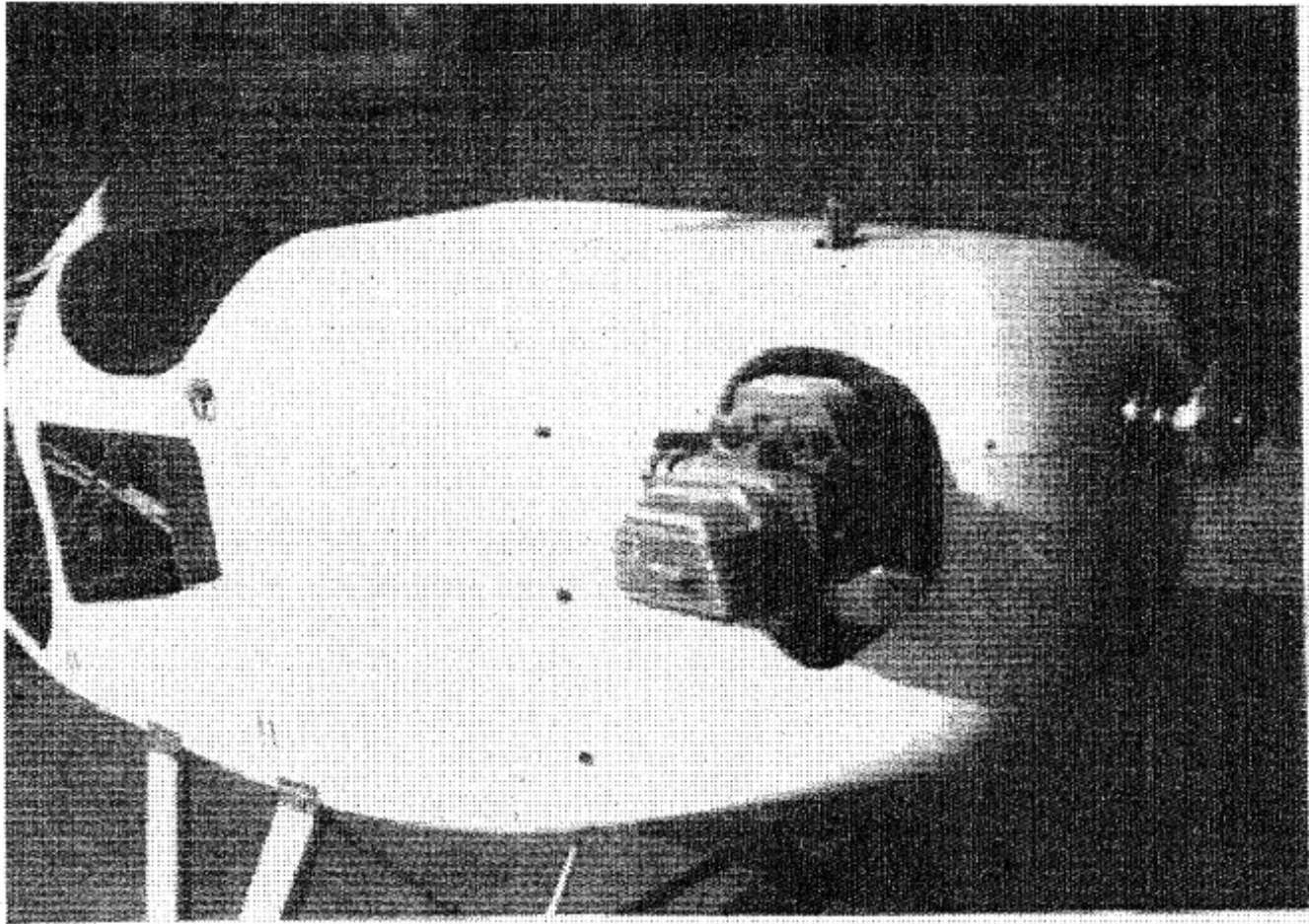
AN4 bolts and nuts

Alumn struts on the bottom see Drawings

AN4 bolts and nuts

set the wing at 3 DEG so you will have no more than 4 DEG while flying. 4 DEG should be the max dihedral and no less than 3 DEG.





COVERING AND PAINTING

After you have put the whole plane together, check to see that everything fits properly, all the control surfaces move smoothly with no binding. Recheck to make sure the wings, tail, and engine are good and secure and the linkages work freely. Check all bolts (which should be AN-bolts and hardware, if not, change right now) and make sure at least three to four threads are showing past the lock nut. When you are satisfied with everything, with a lead pencil, mark the places where you need to do some more sanding.

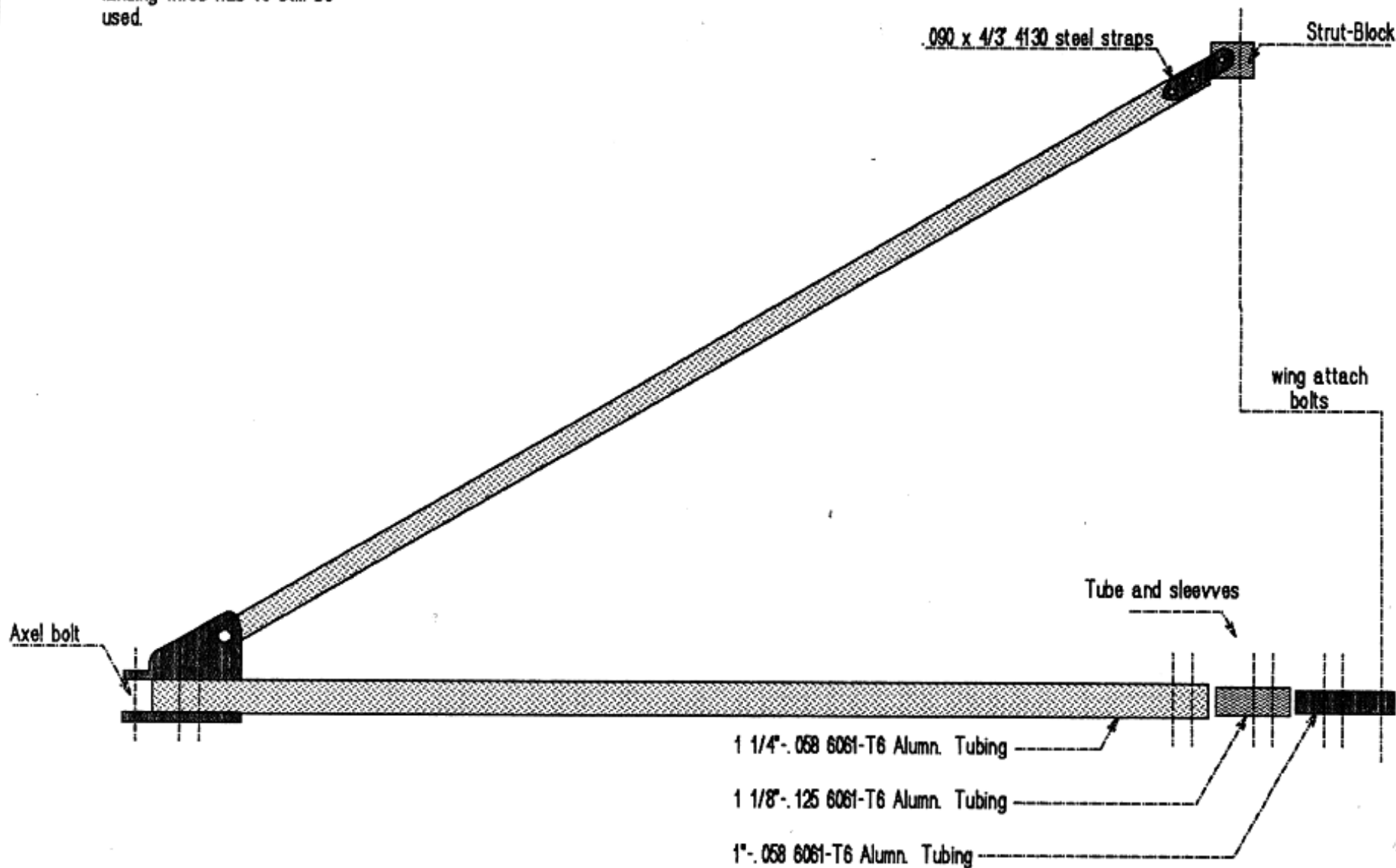
(NOTE)

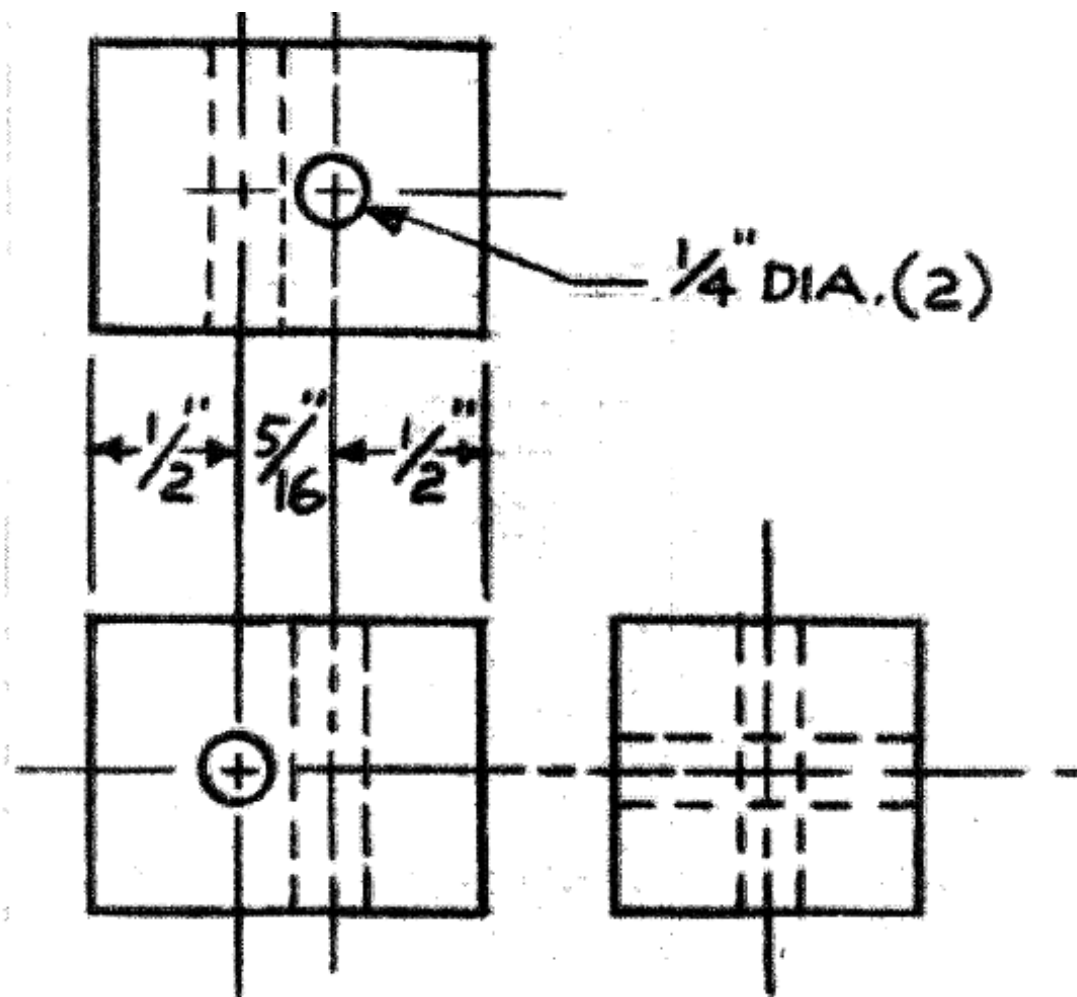
The pictures don't show a frame around the wind screen but I am planning to put one there. It will serve as a handle when getting in, and as a roll over bar. Make it sturdy, going all the way down to the top longrons. The cowling is one that I purchased already made.

Take everything apart, being carefull to mark and label everything. Put hardware in plastic bags and label so you will know where it all goes later.

All wood surfaces have to be coated to protect them. You should decide on what kind of finishing system you want to use and aquire the necessary material and instructions to do your finishing job.

Alum. lift struts can be used instead of the flying wires the landing wires has to still be used.



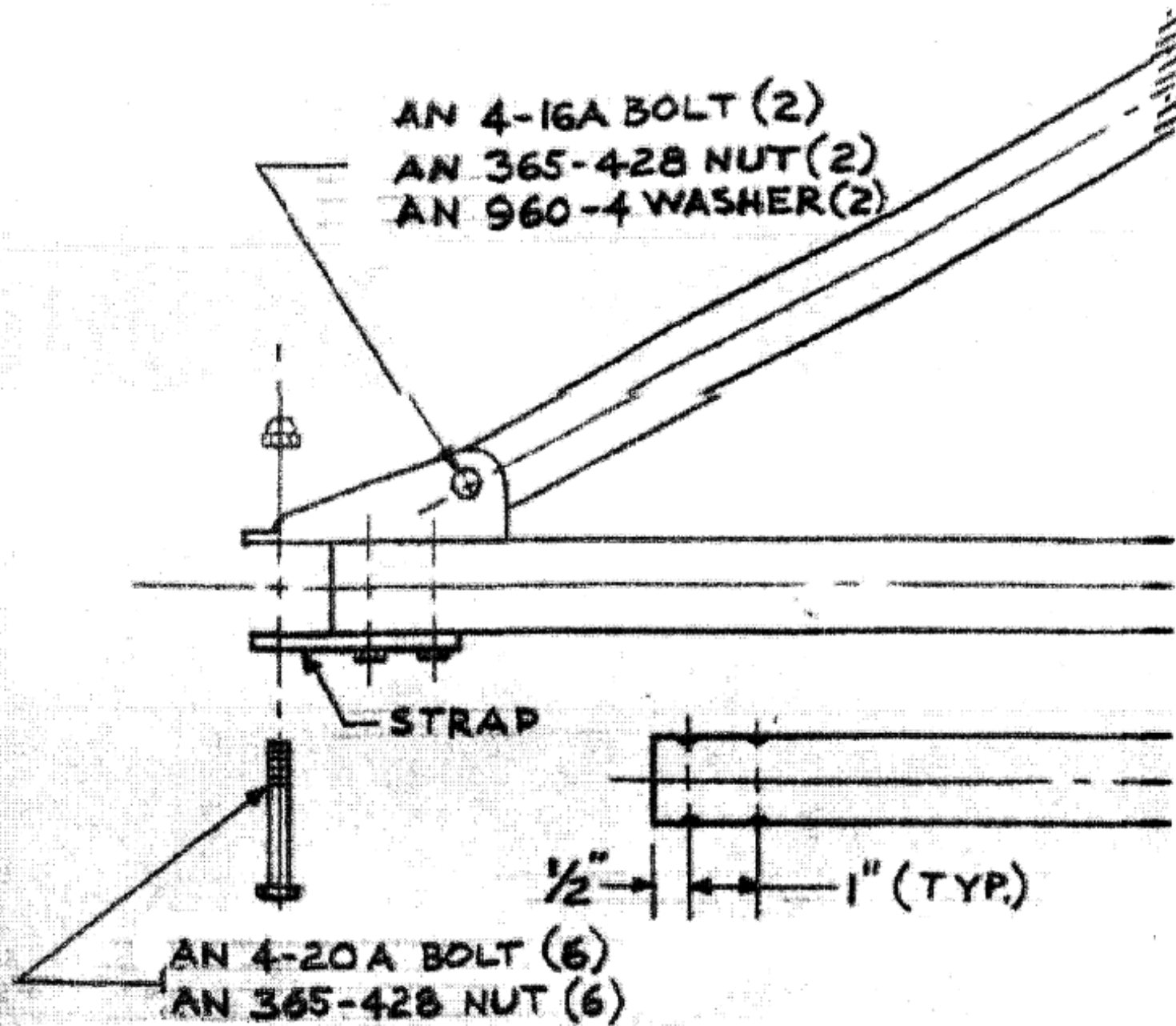


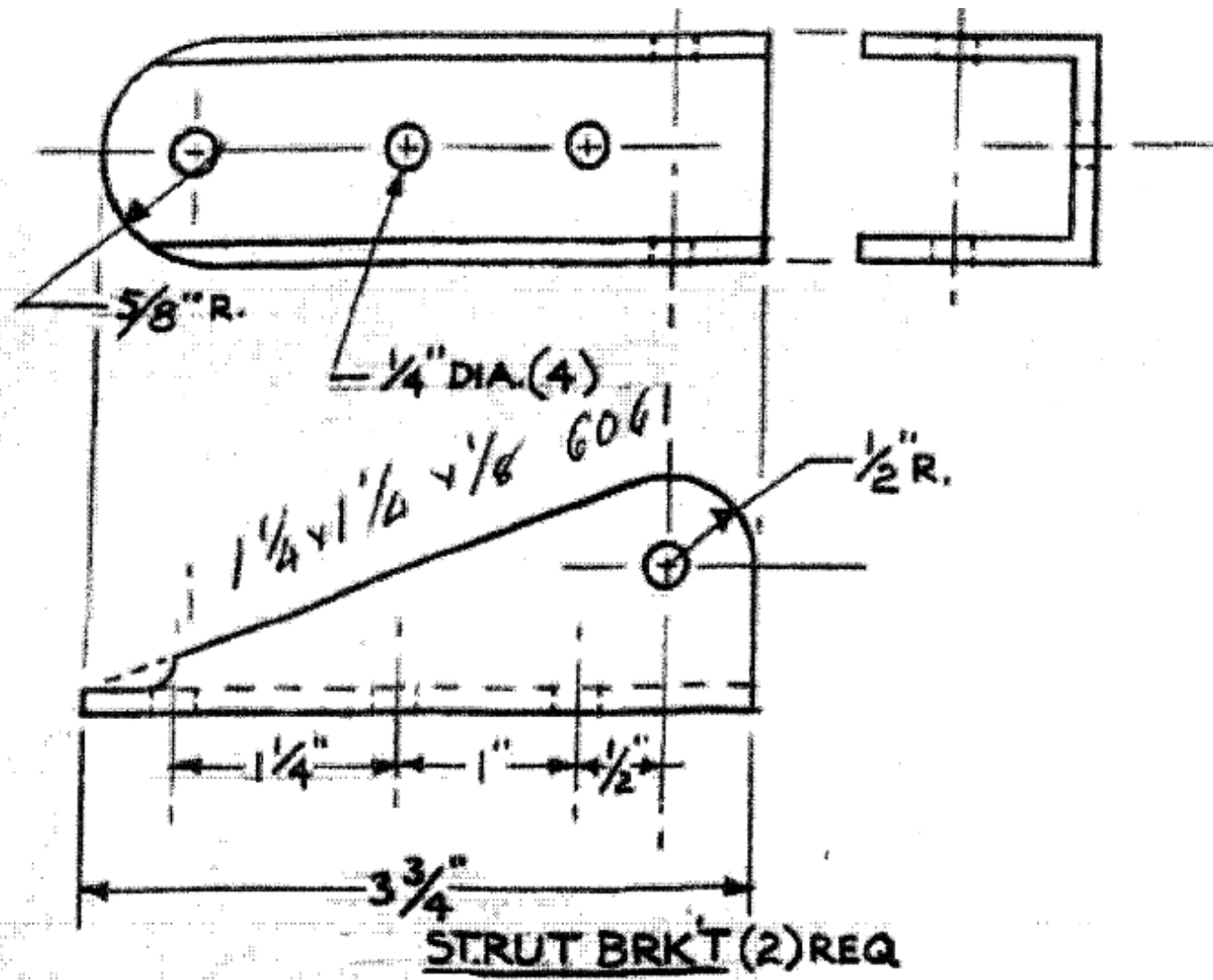
BLOCK-STRUT

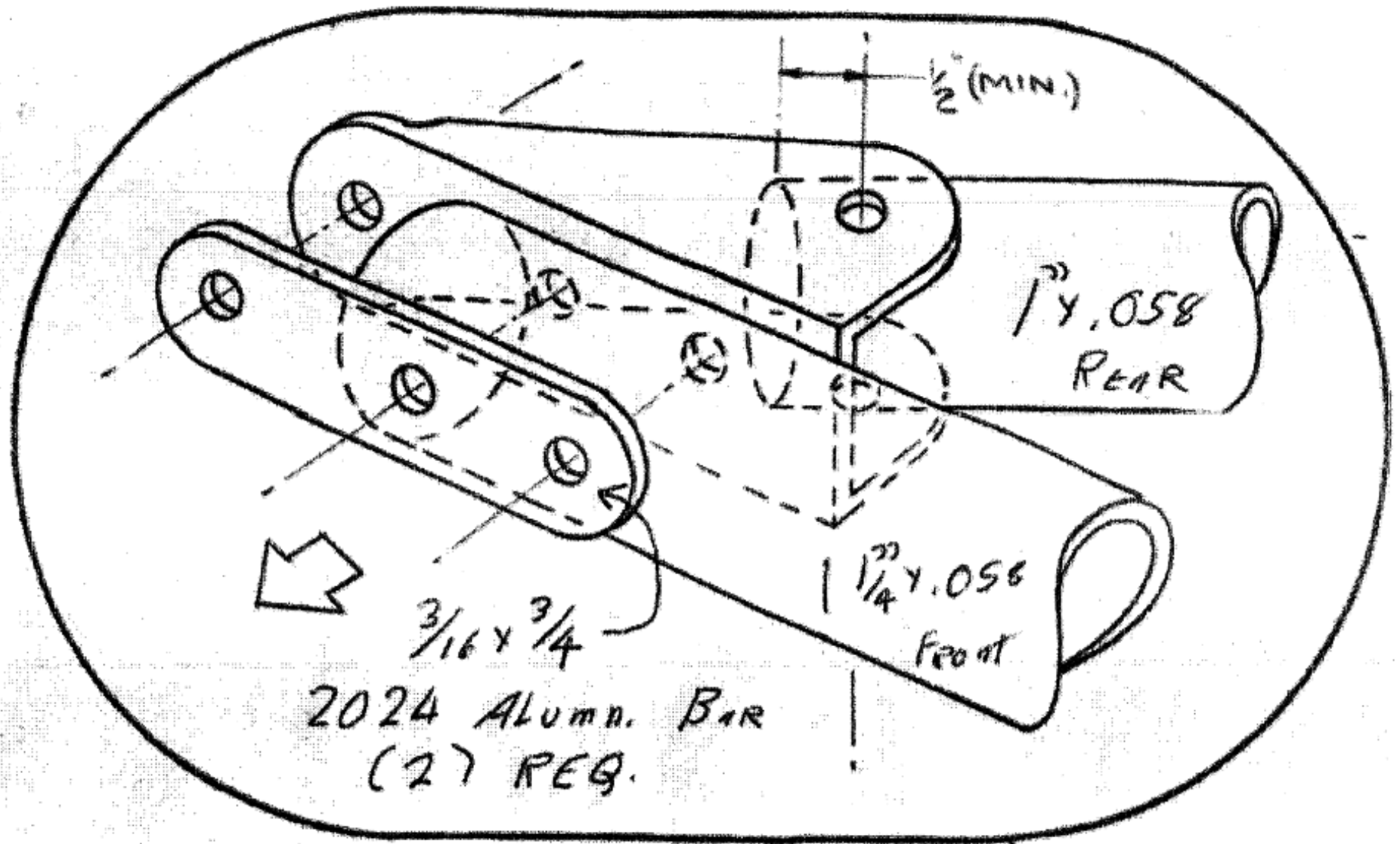
(2) REQ.

**1"x1"x1 1/2" 6061
Alumn. Bar**

AN 4-16A BOLT (2)
AN 365-428 NUT (2)
AN 960-4 WASHER (2)







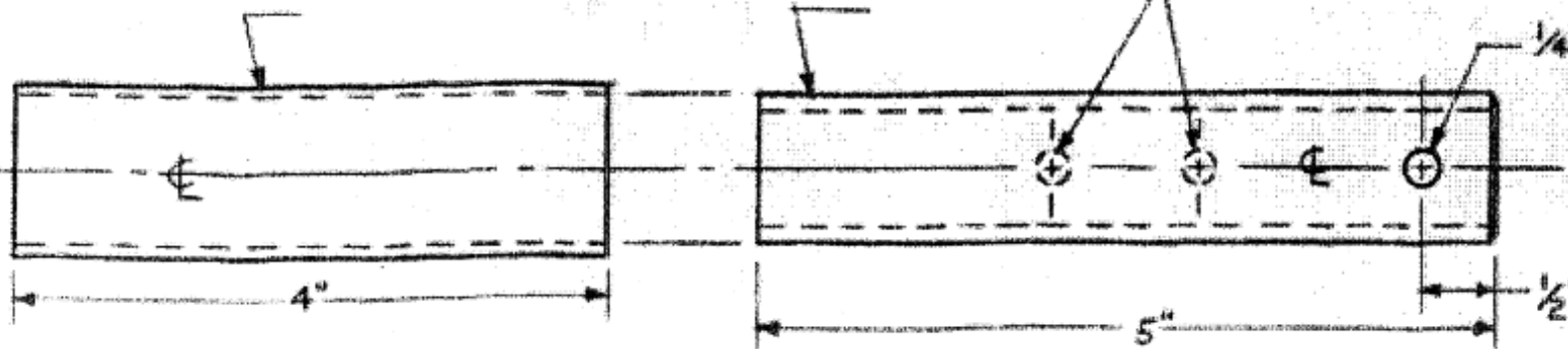
1 1/8" x .054 6061

1" OD x .125 6061

DRILL ONLY AT ASSEMBLY

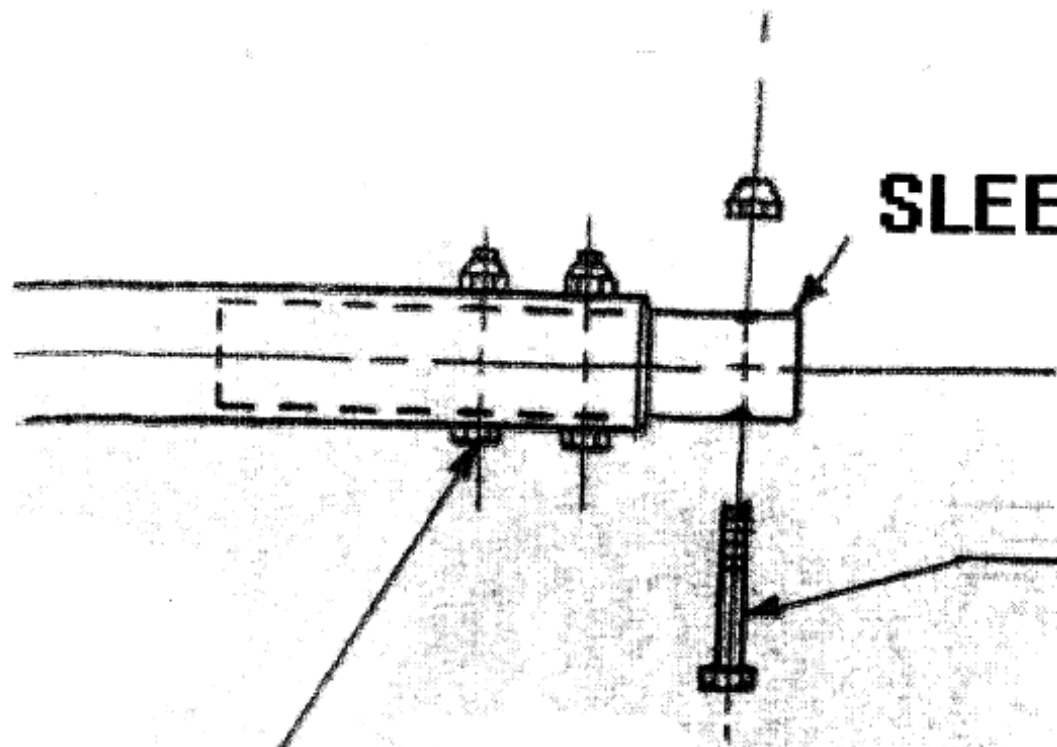
1/4" DIA.

1/2"



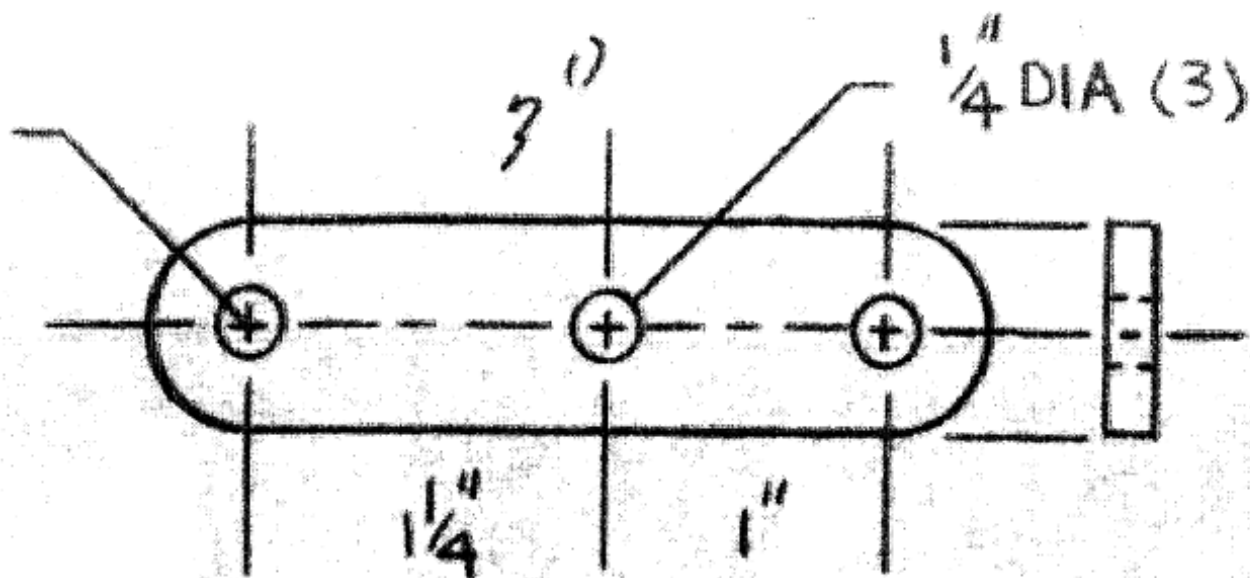
TUBE & SLEEVE ASSY (2) REQ.

SLEEVE ASS'Y



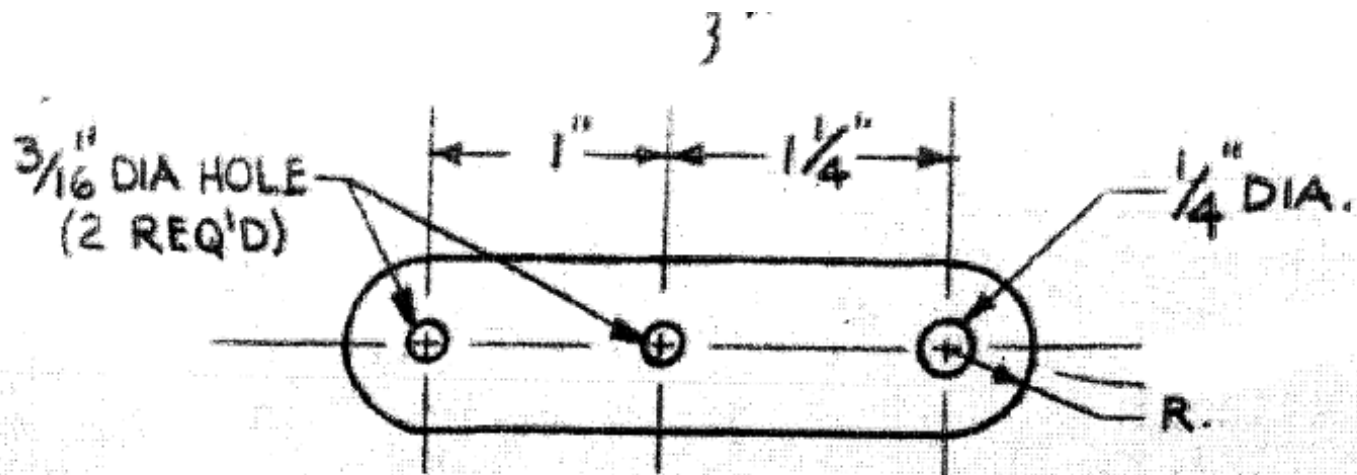
AN 4-17A BOLT (4)
AN 365-428 NUT (4)

AN 4-16A BOLT (4)
AN 365-428 NUT (4)



3/16" X 3/4" 2024 ALMN.

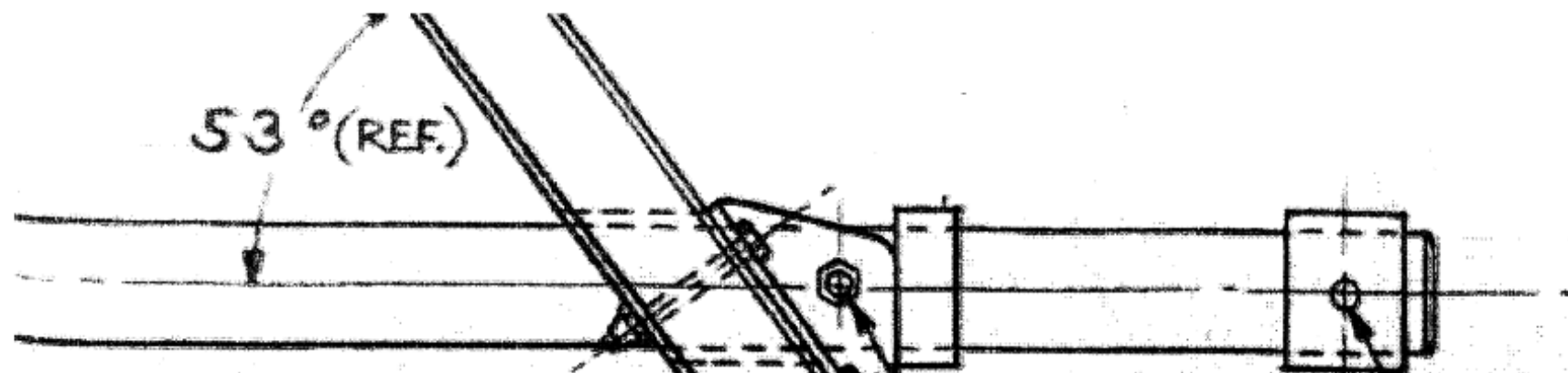
FRONT STRUT BRACKETS



STRAP REAR STRUT (4) REQ.

.090 x 3/4
4130 STEEL

1 - 1/4 x 1/2
GRID - 1 3/16



53° (REF.)

AN 3-13A BOLT (8)
AN 365-1032 NUT (8)
AN 970-3 WASHER (8)

DRILL AXLE
AT STRUT
ASSEMBLY
FOR AN 4-20A
BOLT

AN 4-15A BOLT (2)
AN 365-428 NUT (2)

It has been brought to my attention that it would be nice to have an materials list. So i am working on one and will send it to you as soon as it is done. I am interested in what you are doing with the ultrababy and would like to know if you would like to be kept up with what's going on.

After flying the Ultrababy for a long flight i noticed my arm was getting tired. So i started playing around with different linkage ratios. The one that worked the best is on the new drawings. Sorry that i missed that on the first ones. If you have any questions please feel free to contact me. I am working on a Rotax 277 engine package that should put out enough thrust to pull the ultrababy right along . I'll let you know how that turns out . hope to here from you soon. Please use your plans # when corresponding with me thank you.

Duane Patrick
226 Melton Rd.
Liberty S.C. 29657
~~803-843-3732~~

864-843-2447

2 ea. $\frac{3}{4} \times 5\frac{1}{2} \times 12'$	about \$130.00	\$ 5.38 per ft.
2 ea. $\frac{3}{4} \times 3\frac{7}{8} \times 12'$	✓ 94.00	3.90 ✓ ✓
TOTAL \$ 224.00		