Stunting CAN BE Smooth

PART ONE

by George Aldrich

For appearance, smooth flying in the wind, the author combined large size, greater weight, flaps, long nose, to win the Plymouth internationals, and just miss winning the Nationals. Here he outlines background for his design.

After four years of steady building, observing, then designing and building again, this person was beginning to believe he was just not meant to be one of the elite in contest winners. The 1940 Nationals really began my extreme experiments with stunt models for, there, I met Bob Palmer who taught me much of what I know today, As most stunt addicts know, he was the first person to use flaps working as a source of lift on models. This constitutes what I have learned from Palmer and what experience will teach anyone.

After the 1950 Nationals, when I placed fourth, I was determined to build a model that would fly in the wind. The wind at these Nationals was terrific; thus 1 lost valuable points for maneuvers that the model was not capable of performing due to weight added in obtaining a good finish. When I .sat down in December of 1950 and began the first drawings for my new model, there were three things in my mind: 1—smoothness; 2—appearance; 3—and a model that would fly under all weather conditions.

Finished model before painting. Covering has been water sanded preparatory to putting on the deep blue finish. With finish weight may hit 47 oz.

Before 1 go any further, I feel it necessary to explain why I use flaps for stunt flying. In the first place, flaps, when moved, add an extra large amount of lift to the wing. With this extra amount of lift, it stands to reason that this will cause a very decided change in flight—much more than is needed to perform the present A.M.A. stunt pattern, much less a smooth one. Since a model that is to be judged for appearance must have a good finish, it will naturally weigh more, A model that weighs & considerable amount (35-47 ounces) will not be efficient enough to perform a smooth stunt pattern when powered with the .29-.35 displacement motors. Some would say decrease the size of the model; others, Increase the power. Both give a model that travels too fast for a pattern that is easily seen. With the increase in lift, a model may weigh as much as three pounds (as mine did) and still do a pattern that is very slow but very close to faultlessness. In the months that I have flown my model, the first thing that anyone has said about it was, "Golly, it does everything so smooth."

I inverted my motor for one reason only, appearance! Since 1 did do this, I raised the thrust line high enough to cause a "pulling" effect while the model was in upright flight and in inside loops. To counteract this, along with a fairly long tail moment arm, I added considerable nose moment, as you will notice in the drawing.

Though my opinion is not shared by everyone, by any means. I think it is much harder to fly a pattern that is slow and easily seen than to fly one that is so fast that the judges only know that you did the maneuver. When you fly slow, the judges have every opportunity to see the maneuver. Thus you must be much sharper in the ways of precision flying. A model that is stunted at a speed over 70 mph can-not be made to fly precision acrobatics nearly as perfect as that is down at slower speeds. If one is willing to spend a few more hours practicing his maneuvers, he will he awarded flying ability he never believed possible. After all, the rules call for precision flying, not spectacular speed, and tightness.

All this data is worked out for a model of not under 495 square inches with a .29 or .35 for power. I believe a model any smaller than this in power to size will be too fast for accurate stunting. Out of all the models that 1 have seen flown in all contests, there have been few that 1 felt were really smooth.

Here are a few things that I find more than useful in my practice flying. I start flying a model on the drawing board. That is to say, I trim the model as much as possible while I am building it. You must trim a stunt model with as much care, as you would trim a free flight. You will note the sketch shows where the greatest amount of trouble arises in flap models. Notice the warps in the wing. These would cause the model to drop its inside wing panel. All you have to do is to place your thumb and forefinger over the spot on the flaps where the control horn is set into the wood. Apply pressure in the opposite direction of the warp by twisting. This will spring the horn wire and thus counteract the warps, I did this to a number

of contestants' models at the '51 Internationals and they were overjoyed with the results.

Besides all of the Sunday flying that one does with the gang, there is another kind he should take up. About a month before the contests start rolling around, he should go out and do some special exercises that will get his reactions really clicking. If you know how the pattern is supposed to be done, go by yourself. If you are not sure of it, dig up someone who does, to criticize the later stages. Whether windy or not, try to make the sessions every day.

These exercises consist of eight flights, the first being the upright and inverted flight. Though these may seem rather simple, they are tricky and are costly in points. If you need something to go by, place about eight markers around the circle, I find that eight feet is a very convenient height. Pay particular attention to the entry and recovery. They should gain and resume level flight within a quarter of a lap without a jump or wobble. The second is the vertical climb and dive. This is done very much the same as the preceding, the important point being to keep the angle vertical for 15 feet or more, and recover the eight-foot altitude smoothly. Although the wingover is the easiest maneuver in my opinion, it is wise to give it a good work over; I found that the best place to start the wingover is when the model is sideways to the wind. This helps the model over the loop. You would do well to learn the wingover by giving the control only once. Just a sharp snap of the wrist. Inside and outside loops are next. I enter the out-side loops from the inverted position. For this reason, I do six loops instead of five so as not to confuse the judges. The horizontal eight is one of the hardest, so it might be advisable to add an extra flight for good measure. Start the eight from upright position. A much neater maneuver may be obtained if you do this. Little else can be said except to be very critical of this and all eights. The most important point in the vertical eight is to keep the height at least 10 degrees below the allowed 90 degrees. As the overhead eight is the second hardest particular care should be taken. Start the maneuver directly into the wind. Bring the model overhead in an inverted position at about a 70° position. When the model passes in front of you, bring it straight through the center of the eight. Then start and finish the three eights. As you complete the last maneuver, the model will be directly overhead. Dive it vertically as though you were finishing a wingover and retain the eight-foot altitude. Now, we come to the giant killer. This maneuver, I believe, can win or lose a contest. The square loop is done by making four, very sharp but smoothly executed, snaps of the wrist. Simple to say but so difficult to do. All that I can say to you is practice, brother, practice, In the time that I have flown and watched stunt, some four years, 1 have seen one person who could execute a square loop as I believe it should be done—sharp, smooth, square corners, smooth flight between turns, and a smooth recovery.

One last comment on the pattern—learn how to fly in the wind. Start the maneuvers with the wind to your back except elsewhere started,

Those of you who were fortunate enough to compete in this year's Plymouth Internationals will join me; I'm sure, in congratulating the work on this meet. This was by far the toughest, most sportsmanlike and most unbiased officiated competition it has been my pleasure to fly in. Naturally, 1 would be more closely associated with the stunt division. Here to mention only a few, I would like to give credit to Walt Stevensen. Art Van Laken, Rolland Mc-Donald, and Joe Howard.

On the morning the senior division was flown, I went out bright and early and made a couple of check flights for pre-caution, As previously mentioned in this magazine, I was dropped from first to fourth place at the Nationals because of an over-run on my motor, After processing and changing glow plugs and props, I made my first official—this eventually being my winning flight. The wind was very slight and I experienced no trouble. My next attempt was a delayed flight due to a faulty glow plug. By the time I walked into the circle for my last official, the wind was up to about 10 mph. Here I experienced the same old difficulty. My motor ran a minute and a half over time.

The point I want to bring out is that, whether I had won or not, 1 would still have the highest praise for the officials at this meet. They are, in my opinion, very close to the apex in the little appreciated judging field.

Some would say that winning a stunt contest depends on judges instead of how you fly. This is not altogether true.

Flying procedure is just as important as your flying. After all you can't win if you don't fly. Here is a list of things I checked before each flight:

(1) Change glow plug.
(2) Tighten the prop.
(3) Check the alignment of wheel tracking.
(4) Check controls,
(5) Check gas tank and fuel lines.
(6) See if needle valve in set (I always keep a positive setting).
(7) Check the control handle setting. This can cause a lot of trouble if you use an adjustable handle.

(*To be continued next month*)

NOBLER
Part 2

by GEORGE ALDRICH

Plans and directions for building the Nobler, outstanding stunt job that placed high at the Nationals and won Plymouth finals.

Take two sheets of sinewy-grained 1/8" sheet balsa and cut them to proper length. Cut inside doubler pieces of same type of stock. Firewalls are 1/8" plywood. Pin bracers onto inside of the sides and mark position of the motor mounts on bracers. Cut out the portion that motor mounts would ordinarily be cemented to. The mounts should now be cemented in place. (Full proof cement is recommended.) Make sure they are in proper position and cement all bracer pieces in place except those that fit in front of forward firewall. Drill holes that are to take "J" bolts into second firewall. Bend landing gear to shape; mount it on firewall. Cement firewalls into slots in doublers and place unit in clamps or vise to hold alignment until dry. Add 1/8" square piece at rear of fuselage.

Start wing construction. Notice that center four ribs are double covered with 1/16" sheet behind 3" leading edge sheeting. These four ribs must be recessed 1/16" more top and bottom than the others.

Number one rib outline is shown on side view of fuselage. Recessing on number two rib is not shown for clarity. Cut remaining ribs and sand smooth. Make notches in ribs, being careful to cut them in an every other one sequence. The position for all notches in the ribs is shown on end of number 13 rib.

Select a very hard piece of 1/16" sheet balsa for D-tube spar. Put sections together and cut spar to shape. Slip ribs on spar but do not cement. Take two sheets of medium grade 3/32" x 3" x 36" sheet and cut it down center so that you have four pieces 1-1/2" x 36". Mark the rib position on these pieces, remembering that one length runs through center and is spliced out in middle of each panel.

Remove two number one ribs and-cut 1/4" square holes to take bell-crank mount supports. Cut 1/4" square supports and have ready for assembly. You must now work very quickly. Pin the 3/32" trailing edge pieces on the board cementing the splice as you do so. Put a line of cement on each rib end and lay panels down on trailing edge as you slide the 1/4" square pieces in place and cement. Pin and cement each rib in position on marked places. Cement two spar ends together, double coating several times with cement. Each rib should be cemented in place now where they form a cross-lap joint on spar. Be sure to block up the tips to allow for wing taper.

The fuselage should be dry by now. Cut 1/16" sheet balsa horizontal braces and cement in place. These serve only as supports until 1/16" plywood formers are put in place later. Blocks, both top and bottom, are of soft quality. Cement together and clamp 3/8" x 2" x 36", the 1/2" x 2-1/4" x 36" and 1-1/8" x 1-5/8" x 15" blocks and set aside to dry. Mark and cut off at 90 degree angle portion of the 1-1/8" x 2-1/4" x 36" block that will be used as removable cowl. Spot cement block in place and cut roughly to shape. Finish rear part of carving and sand roughly. Remove

this portion and hollow out to approximately 1/4" wall thickness and sand. Start on top block. In 3/8" x 2" x 36" block, cut a 1/8" groove 2-9/16" back of spinner line, 3/8" deep. This is for Fox only. Measure for different engine. As 2" wide block is centered on 2-1/4" block, you have 1/8" overhang, which makes a flush arrangement when top piece is set in place. Spot cement top block in place and carve to rough shape. Cut off excess wood, which overhangs rear of fuselage. Mark off space where rudder joins and finish cutting and sanding. Carve out space that cockpit will occupy and finish sanding except for nose. Remove block and mount engine with tin plates under the nuts. Solder nuts in place on tin so that engine may be removed without trouble. Replace top block on fuselage after cutting away space to receive mounting bolt nuts. Put 1-3/4” spinner on engine and finish off upper part of cowl by: adding two 1/2" x 1/2" x 11/16" blocks directly in front of mounts and sanding to shape. Top unit may be removed now and hollowed out to 1/4" wall thickness except where otherwise noted on plans.

Take the pins out of trailing edge. Cement 3/16" x 1/8" filler strip on lower half of trailing edge, making cement fillets on each rib. Add top half of trailing edge and pin it in place. Pin, weight or clamp trailing edge to board until it is thoroughly dry.

Cement 2-1/8" x 2-1/8" x 2-1/4" block to part of bottom block that is removable cowl. Remove engine and notch out wood to let block sit flush around protruding landing gear. Carve the cowl to outside dimensions and sand roughly. Mount engine again and hollow out cowl by trial and error method to illustrated thickness. Sand roughly and cut out cowl openings. Finish by hollowing out- remaining portion and sanding. Top block should also be hollowed to fit engine.

Wing should be dry enough now to remove from board. Add 1/4" leading edge, double coating center splice with cement. Next cut bell-crank mount of 1/8" plywood. Cut horizontal notch out of spar to receive the mount and cement in place on supports. Use several coatings. Drill hole for bell-crank bolt, mount bell-crank, cementing nut to bottom of plywood mount. Cut away insides of number one ribs until bell-crank rotates freely. Cut readout wires, allowing enough for wrapping and free movement. Remove whole bell-crank unit, except for nut on the mount, and. wrap readout wires to bell-crank. Cut holes in ribs at proper positions to take wires. Insert wires in wing and bolt bell-crank back into position. Now add the 1/16" sheet leading edge covering both top and bottom. Dampen the top of each sheet as it is pinned down. As water evaporates, wood will warp around leading edge, forming better point. Add first layer of 1/16" center section, top and bottom. Set aside to dry.

Before the stabilizer construction is started, prepare the Veco control horns by soldering brass bearings in place. This is shown in sketches. Stabilizer and elevator can be made of either 1/2" sheet or built up from 1/2" square and pieces of 1/2" sheet. The sheet method was quicker though more expensive. Cut two 1/2" x 3" x 21" pieces of medium softness and spot cement together for a 1/2" x 6" x 21" slab. Trace outline of both elevator and stabilizer onto this sheet. Cut, carve, and sand whole pieces to symmetrical airfoil. Split apart cement joints to have three pieces---two elevators, and stabilizer. Cut out center sections and notch to take 1/16" ribs. Do not cut out each rib separately. Cut ribs in rectangular form and cement in place. When dry cut and sand assembly to shape. Drill holes that take Veco control horn, cut slots and cement horn in place. Reinforce horn with strip of pinked aircraft tape over spot where each prong is set into wood. Hinge two together at this point with pinked tape.

The 1/16" top or double covering is added to center section of wing. While drying, add 1/16" sheet tips and tip braces. Cut cap strips and cement in place. Allow to dry.

Like stabilizer, rudder can be built up, instead of cutting shape out of one sheet. Cement together two pieces of 1/2" sheet, one 3" x 5-5/8", other 3" x 5". Trace rudder outline and add remaining section, which is lower tip of rudder. Allow unit to dry, carve, sand to airfoil. Note that this is lifting airfoil. Now cut out portions shown, notch and add ribs as described in stabilizer construction.

Wing may now be sanded to final shape. Particular care should be taken as it will go a long way toward appearance. By sanding center section against grain with 280 wet or dry paper on a block, a very clean, even surface is obtained. Cap strips should be separately sanded, gently rounding edges. 1/8" brass tubing should be cemented in place on inboard wingtip. These serve as lead-out wire guides.

Select two medium firm 1-3/8" x 3" x 36" C-grained sheets of 3/8" x 3" x 36" for flaps. Cut to shape, carve and sand. Also drill holes and insert Veco control horn as described in elevator description. Cut twelve 3" x 1-1/4" hinges of pinked aircraft tape. The hinges nearest to fuselage on either side are sewed together and cemented in place. Done correctly, hinge material will show on both top and

bottom of wing and flaps. Wing is covered and doped except for upper half of outside wingtip. This is left open for weight. Do not add now. I covered with wet, heavy duty Silkspan, but silk or nylon may also be used. One coat of dope is sufficient.

Coat the space between firewalls several times with a 50-50 mixture of clear dope and cement. Cover joints, and motor mounts thoroughly.

To assemble wing and fuselage cut a slot in each fuselage side as shown on plans, 2-7/8" long and 7/16" wide. On right hand side, cut a 5/16" x 7/8" slot to allow control horn to pass through. Save these three pieces, as they will be replaced when wing is cemented in place. Cut out two small portions in the center section of wing to allow for pushrod. Bend flap pushrod of 1/16" music wire and place in position. Once sure that it works freely, remove until wing is cemented in place. Slide wing into fuselage and center using cement generously, cement and pin it in position. Replace pushrod and solder in place using 1/4" washer. Stabilizer is now covered. I used heavy duty Silkspan. Apply one coat of dope only at this time.

Go back to fuselage and cut out section that is to receive stabilizer. Cut out 1/16" plywood formers and set into position but do not cement. Pin stabilizer in place and cut piece of 1/16" music wire to approximate length of pushrod. By making a small mark on side of fuselage at height at hole in elevator control horn, then doing the same with flap control horn position, you will establish first means of locating holes in 1/16" plywood formers. Draw a line connecting these two points. Measure distance between line and top of fuselage sides at point where the formers are located. Remove formers now and, with stabilizer in place, bend pushrod to shape and place in position. Looking down from top, mark position of pushrod onto formers where they sit in fuselage. Add other measurements on formers and drill a 1/8" hole where marks intersect. Remove pushrod, cement formers in place and connect pushrod to flap horn by means of 1/4" washer and solder. Stabilizer is connected to pushrod by same means and cemented into position. If both flaps and elevators are not neutral when bellcrank is, slide stabilizer forward or backward until they are. Proper control linkage on a flap model is most essential.

Before cementing top and bottom blocks in place, make these final adjustments. Notch out top block so that it will fit over the 1/16" plywood formers. Add 1/16" sheet balsa cockpit bottom at this time. Cut tail wheel mount out of 1/16" plywood and mount brace out of 1/8" sheet balsa. Bend tail wheel gear out of 1/16" plywood, drill 1/32" holes in mount around gear shape, and sew in place with soft copper wire or nylon thread. Cement 1/8" sheet brace and tail wheel in place as shown on the plans. When this is dry aft part of bottom block can be cemented in place. So that block will fit around the tail wheel gear snugly, drill a 1/16" hole and thread it on gear before doing any cementing. Also replace three pieces that were removed for wing installation.

At this time that gas tank should be made and installed. Do not use acid core solder on the tank or any other part of model. The acid flux will cause wheels and controls to freeze and become immovable. Resin core solder and a good grade of soldering paste gives a strong neat joint. Use 1/8" brass tubing as it gives better air pressure and fuel flow. When bulk of the tank is finished, rear end of tank will be left open. Install all tubes and make cover plate for back end.

Top block is cemented into position now. Before installing the tank, smear inside of top block between two firewalls with 50-50 mixture of clear dope and cement. Tank should fit snugly in place but to make sure it stays put, cement a sheet of 1/8" balsa over top, this too should be smeared with dope and cement mixture. Add cowl, hold down block by notching fuselage bracers and cement it in place.

Give rudder a final sanding with 320 wet or dry sandpaper and cover wet with heavy duty Silkspan. Brush on one coat of clear dope and set up to dry. Cut out the slot in top block that houses rudder, being sure to have lifting side of rudder on proper side. Also make sure slot is cut with correct offset. Cement rudder in place.

Cover the portion of fuselage from wing leading edge forward with silk and the rest with Japanese tissue. However, you may cover entire fuselage with silk. I would advise it now, as tissue did not hold up too well on original model. Remove engine. Do as much as possible in large portions. Lay the silk in position and dope it to wood. As silk is very porous, you can dope right through it. Before covering around wing first, make fillets of either plastic balsa or some other similar substance. If you do use something else for fillets, use full proof clear dope to adhere silk to them if you are intending to use full proof dope for finish. Also add flap and elevator fillets. These are made of balsa and carved to shape of surfaces. After entire model is covered, including flaps and cowl both inside and out, add just enough weight to outer wingtip to make it slightly heavier

than inboard tip. Cover remaining part of tip and give it a coat of clear dope. For an undercoat, I used fuel proof filler coat. There are several types of wood filler on the market.

First brush two or three coats of fuel proof clear dope on fuselage, cowl and fillets, sanding between each coat. Now add a coat of undercoat to these surfaces and allow to dry about 45 minutes. Wet sand this with 280 sandpaper. Repeat this action two more times, using 320 sandpaper second time, and 400 third time. Take special care in taking out all bumps and small pits that will mar the finish. Any parts that don't look satisfactory should be touched up and sanded again.

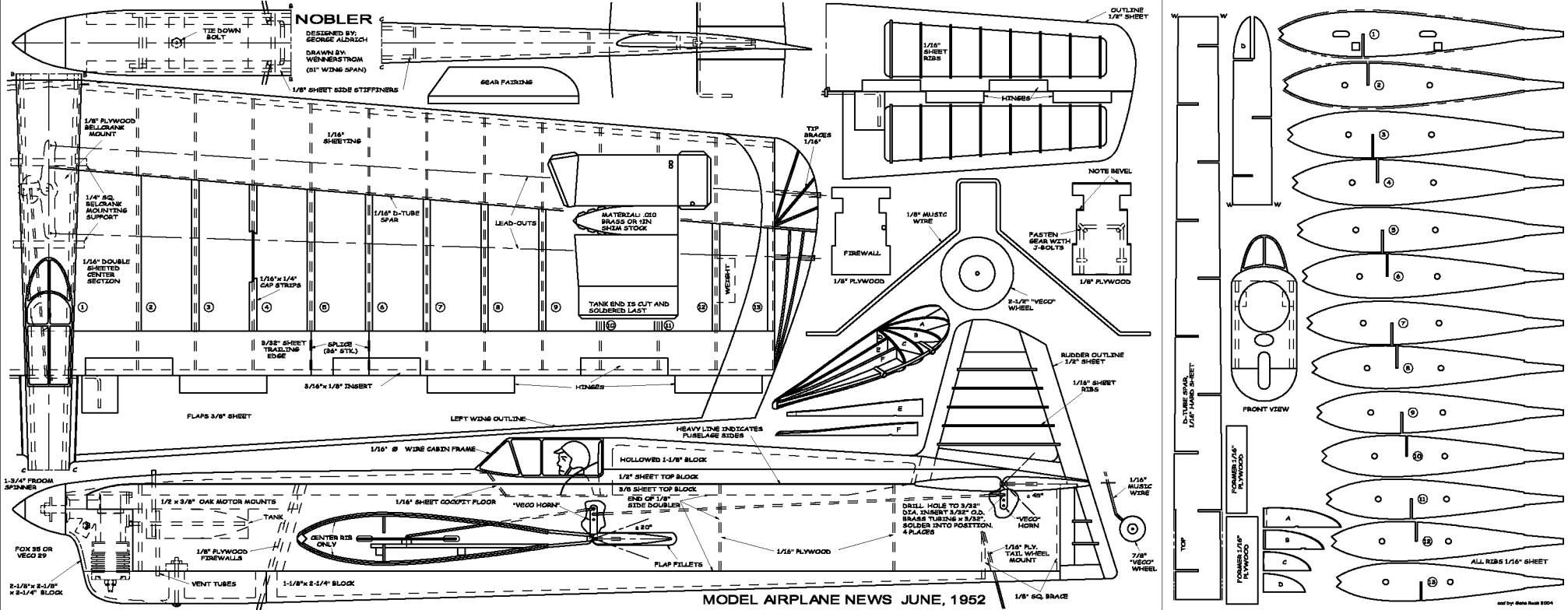
Wing, rudder elevator and stabilizer are given four or five coats of fuel proof clear dope. To acquire a very smooth finish, sand very lightly between each coat with sandpaper.

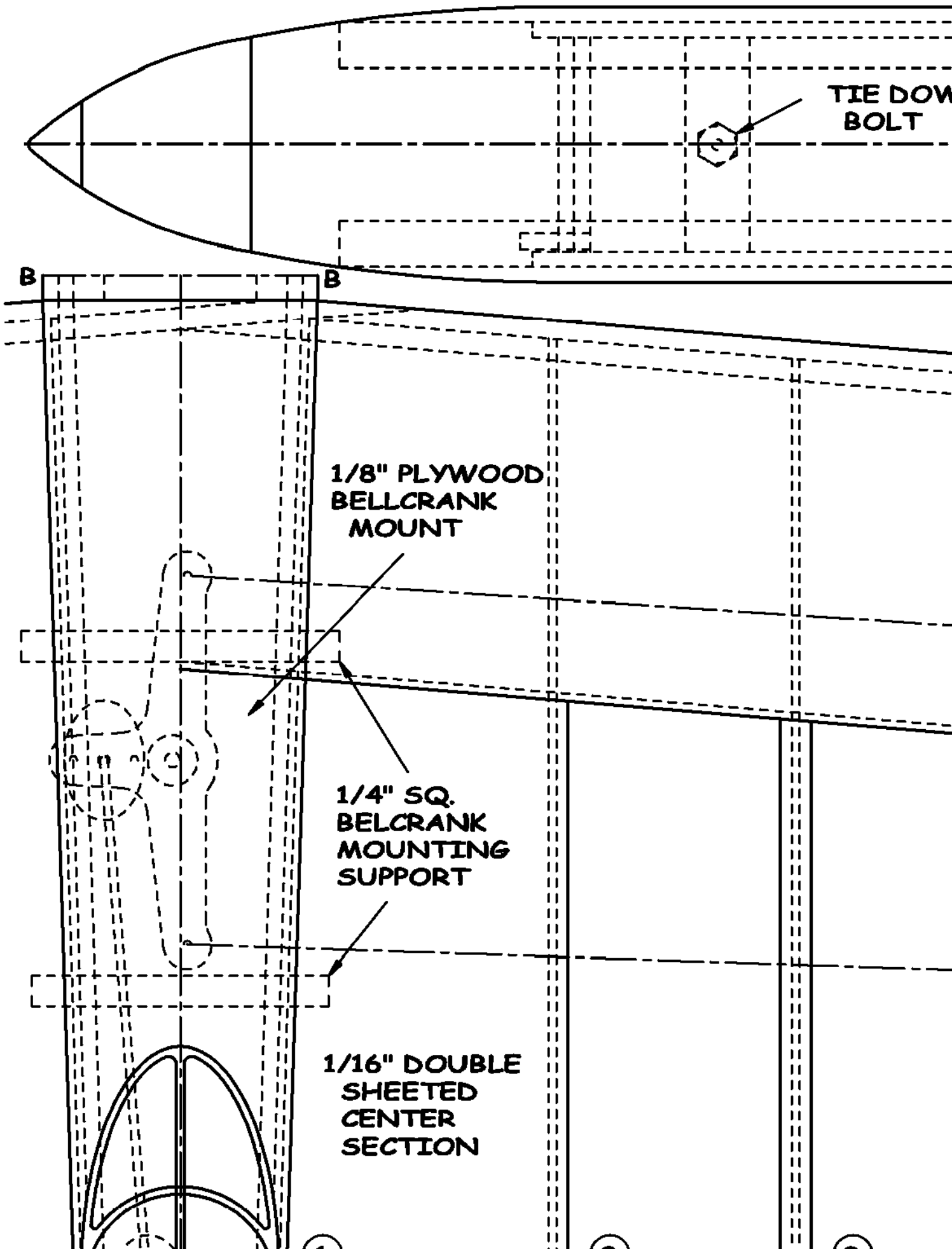
If you do not wish to make canopy of wire, a bubble canopy may be purchased. By trial and error method, you can shape a very neat looking canopy of 1/16" music wire or brass tubing. After each piece is shaped, tie them together with fine copper wire and solder. Celluloid can now be sewed in place with thread and cement. Add as much detail to the cockpit as desired and install pilot. Drill holes in fuselage to receive canopy, cement and sew it in place. Drill hole in cowl to take tie-down bolt and insert a grommet in wood to hold bolt.

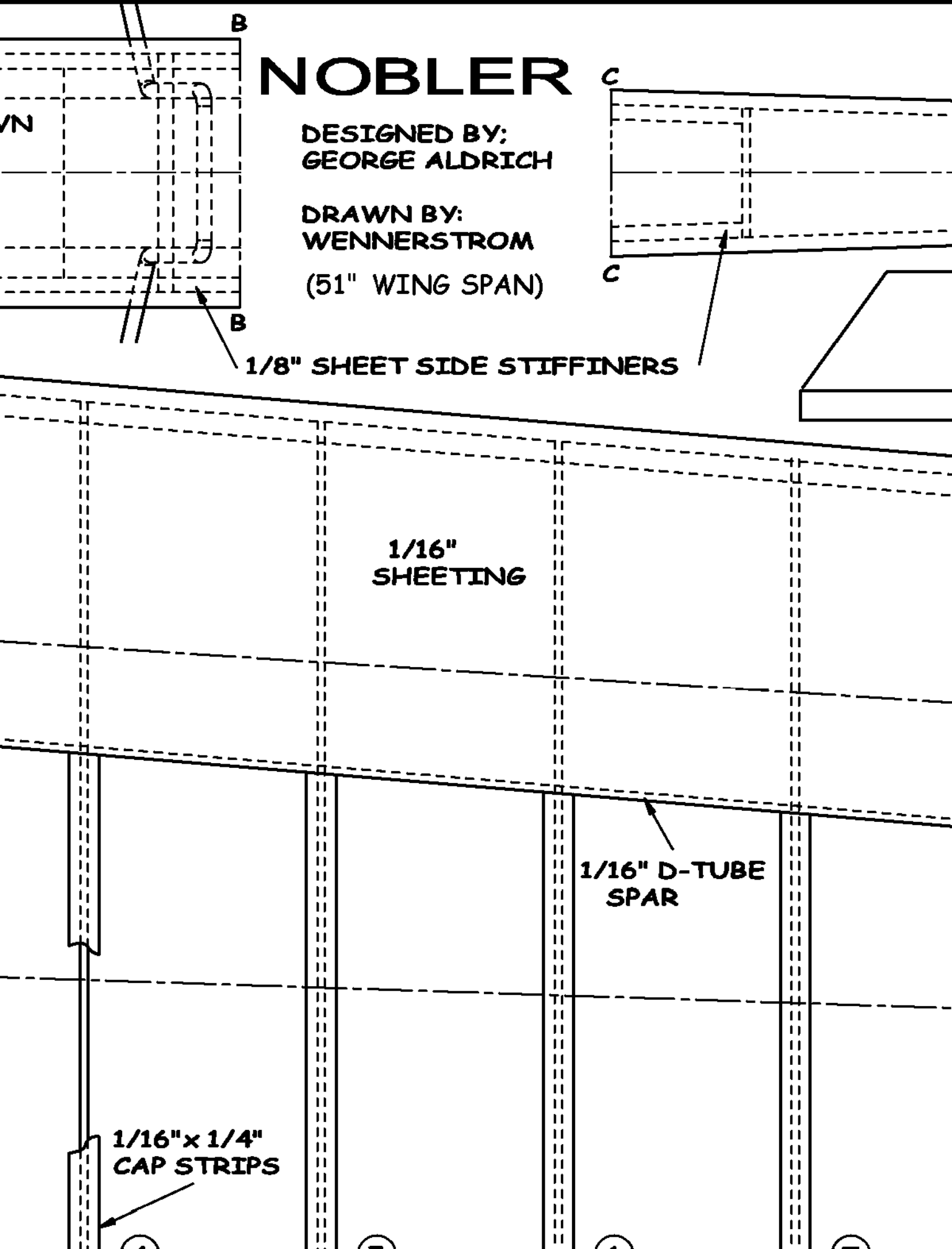
Spray or brush on final coats of colored dope. Spraying requires much less work, spreads dope evenly. If you brush, you will have to both wet sand and rub the model with rubbing compound. Rubbing compound and wax is all that is needed when you spray. Be sure to cover the cockpit with masking tape before painting. Use your own discretion about color and trim. However, don't put white over red, as red will bleed through white, making it pink.

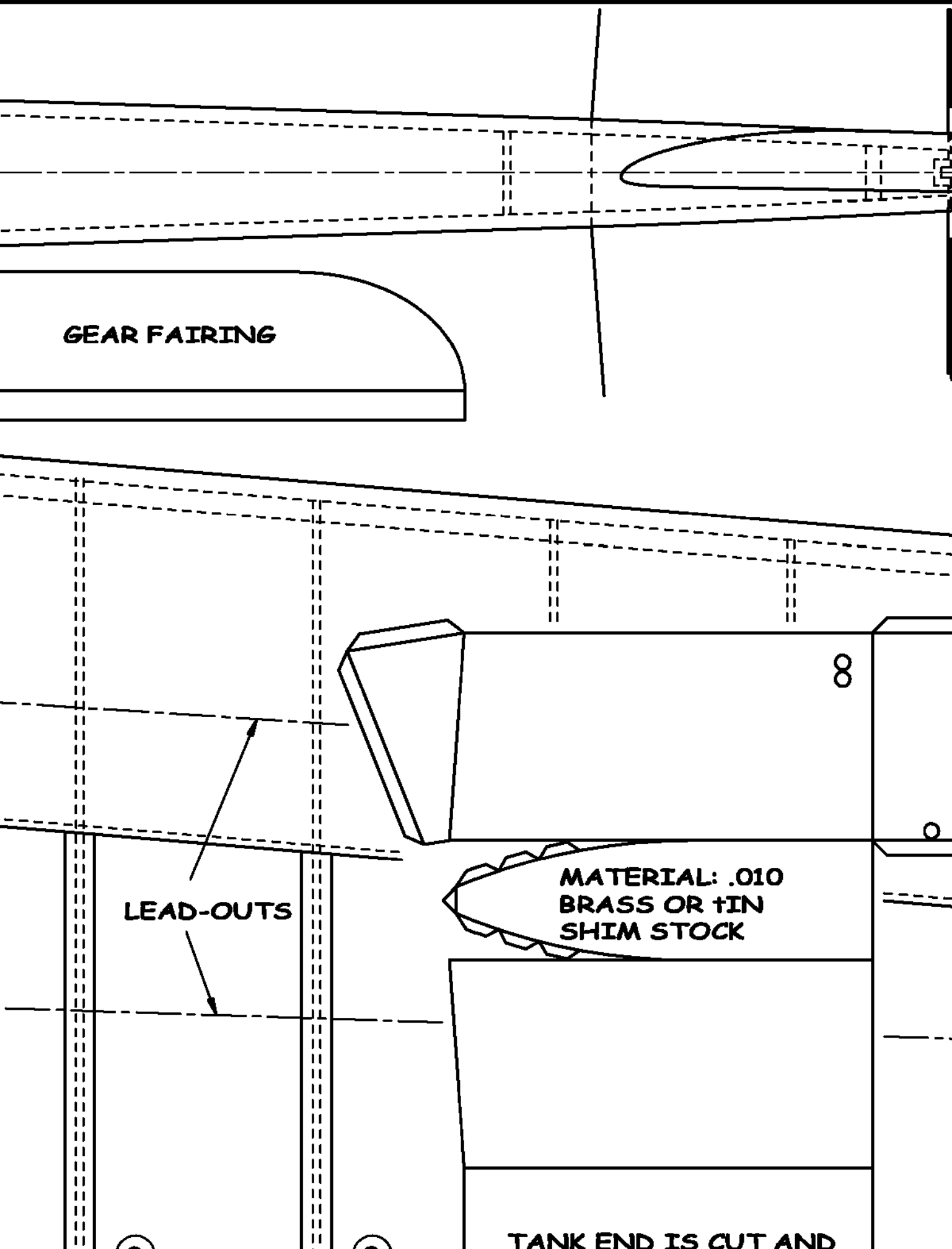
Wheels may be soldered on along with landing gear fairings. Install engine and cut spinner to fit propeller. With the Veco, Torpedo and Fox motors install a 9" x 7" and 10" x 6" Veco, and the 10" x 5" Y and O propellers.

Select calm weather for initial flight. Check model for warps and test run motor. If any warps are present, remove them as described. First time I flew the model, the wind was blowing gently at about 35 mph. Regardless, I took model directly overhead and proceeded to do overhead eights experiencing no trouble with slack lines.


NOBLER
DESIGNED BY: GEORGE ALDRICH
DRAWN BY: WENNERSTROM
(81" WING SPAN)
TIE DOWN BOLT
1/8" SHEET SIDE STIFFINERS
GEAR FAIRING
1/8" PLYWOOD BELLCRANK MOUNT
1/4" SQ. BELCRANK MOUNTING SUPPORT
1/16" SHEETING
1/16" D-TUBE SPAR
LEAD-OUTS
TIP BRACES 1/16"
MATERIAL: .010 BRASS OR TIN SHIM STOCK
WEIGHT
TANK END IS CUT AND SOLDERED LAST
1/16" DOUBLE SHEETED CENTER SECTION
1/16"x1/4" CAP STRIPS
3/32" SHEET TRAILING EDGE
SPLICE (36" STK.)
3/16"x1/8" INSERT
HINGES
FLAPS 3/8" SHEET
LEFT WING OUTLINE
OUTLINE 1/8" SHEET
1/16" SHEET RIBS
HINGES
NOTE BEVEL
1/8" MUSIC WIRE
FASTEN GEAR WITH J-BOLTS
FIREWALL
1/8" PLYWOOD
2-1/2" "VECO" WHEEL
RUDDER OUTLINE 1/2" SHEET
1/16" SHEET RIBS
HEAVY LINE INDICATES FUSELAGE SIDES
1/16" Ø WIRE CABIN FRAME
HOLLOWED 1-1/8" BLOCK
1/2" SHEET TOP BLOCK
3/8 SHEET TOP BLOCK
END OF 1/8" SIDE DOUBLER
1-3/4" FROOM SPINNER
1/2 x 3/8" OAK MOTOR MOUNTS
1/16" SHEET COCKPIT FLOOR
"VECO" HORN
TANK
CENTER RIB ONLY
1/8" PLYWOOD FIREWALLS
FOX 35 OR VECO 29
2-1/8"x 2-1/8" x 2-1/4" BLOCK
VENT TUBES
1-1/8"x 2-1/4" BLOCK
FLAP FILLETS
1/16" PLYWOOD
DRILL HOLE TO 3/32" DIA. INSERT 3/32" O.D. BRASS TUBING x 3/32". SOLDER INTO POSITION. 4 PLACES
± 45°
± 20°
"VECO" HORN
1/16" MUSIC WIRE
1/16" PLY. TAIL WHEEL MOUNT
7/8" "VECO" WHEEL
1/8" SQ. BRACE
MODEL AIRPLANE NEWS JUNE, 1952
D-TUBE SPAR, 1/16" HARD SHEET
TOP
FORMER 1/16" PLYWOOD
FORMER 1/16" PLYWOOD
FRONT VIEW
ALL RIBS 1/16" SHEET


TIE DOW
BOLT
B
B
1/8" PLYWOOD
BELLCRANK
MOUNT
1/4" SQ.
BELCRANK
MOUNTING
SUPPORT
1/16" DOUBLE
SHEETED
CENTER
SECTION


B
B
NOBLER
DESIGNED BY:
GEORGE ALDRICH
DRAWN BY:
WENNERSTROM
(51" WING SPAN)
C
C
1/8" SHEET SIDE STIFFINERS
1/16"
SHEETING
1/16" D-TUBE
SPAR
1/16"x 1/4"
CAP STRIPS


GEAR FAIRING
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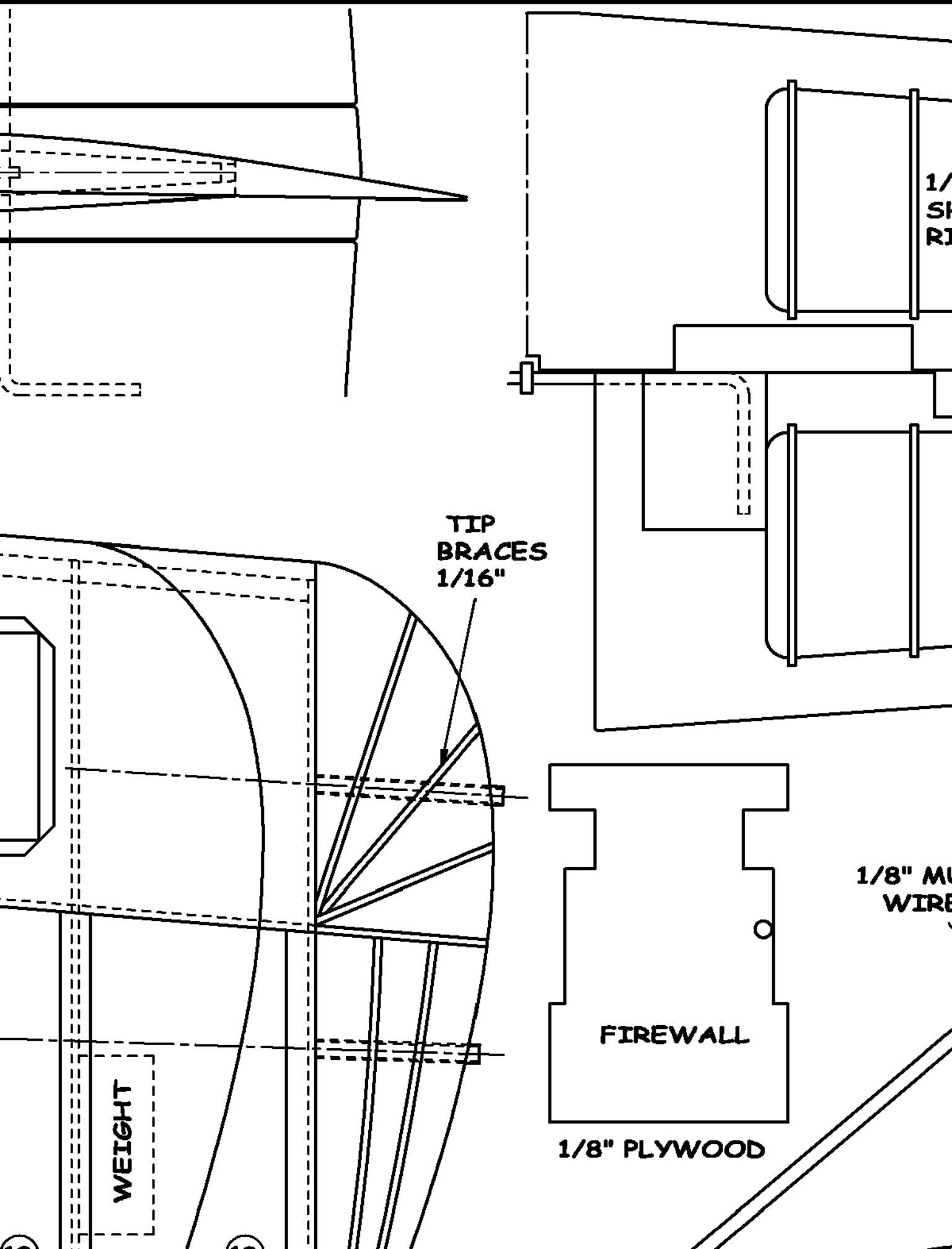
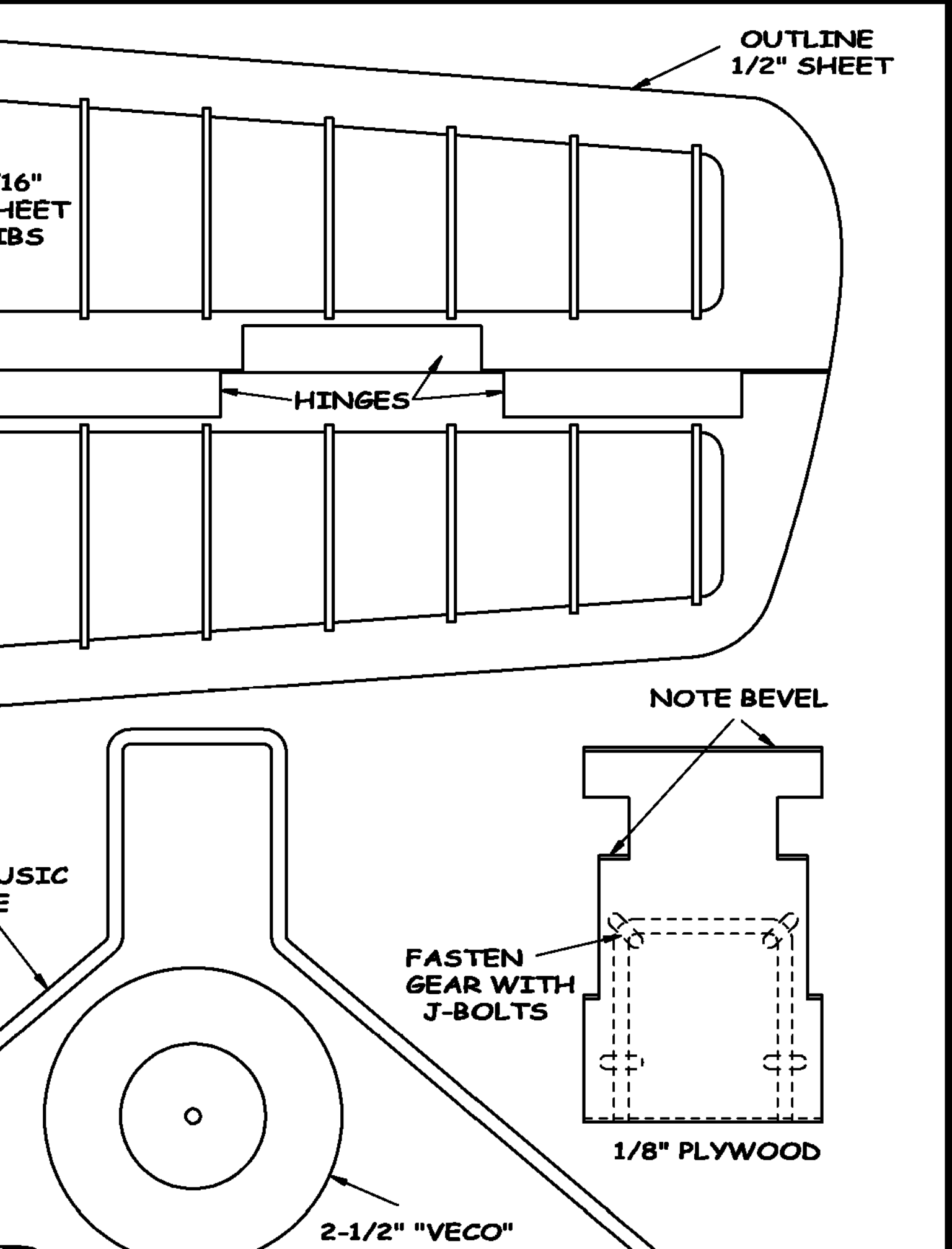
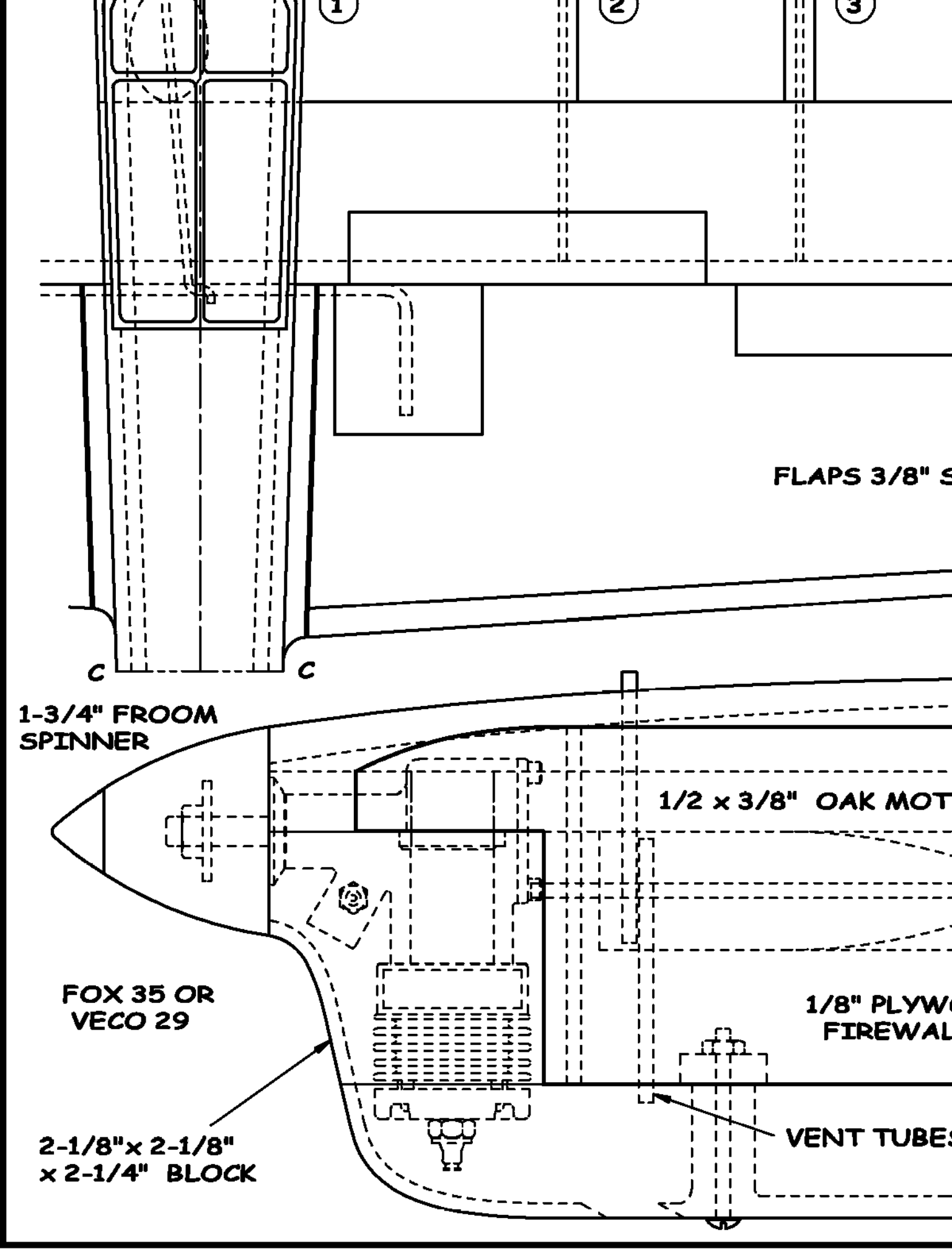
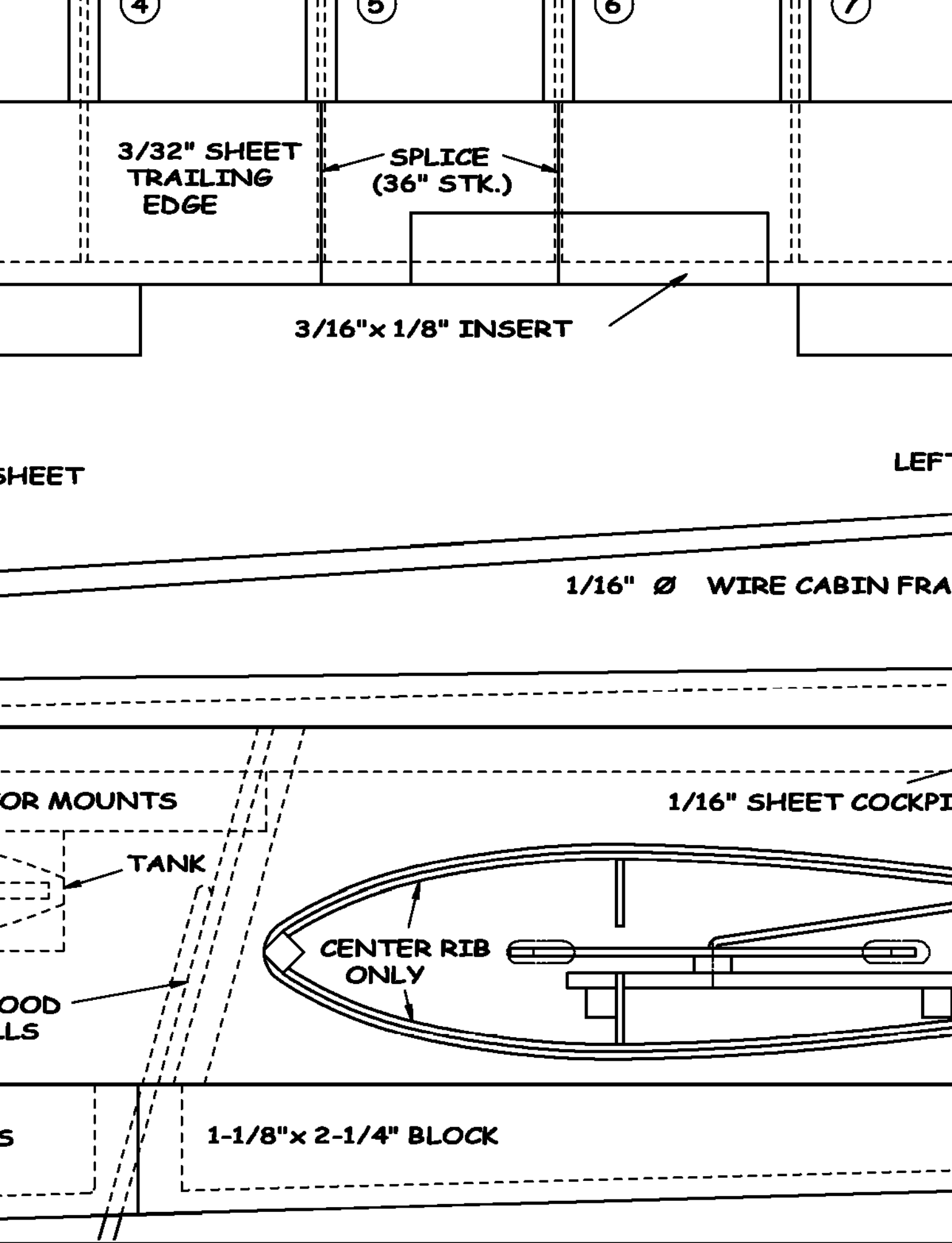
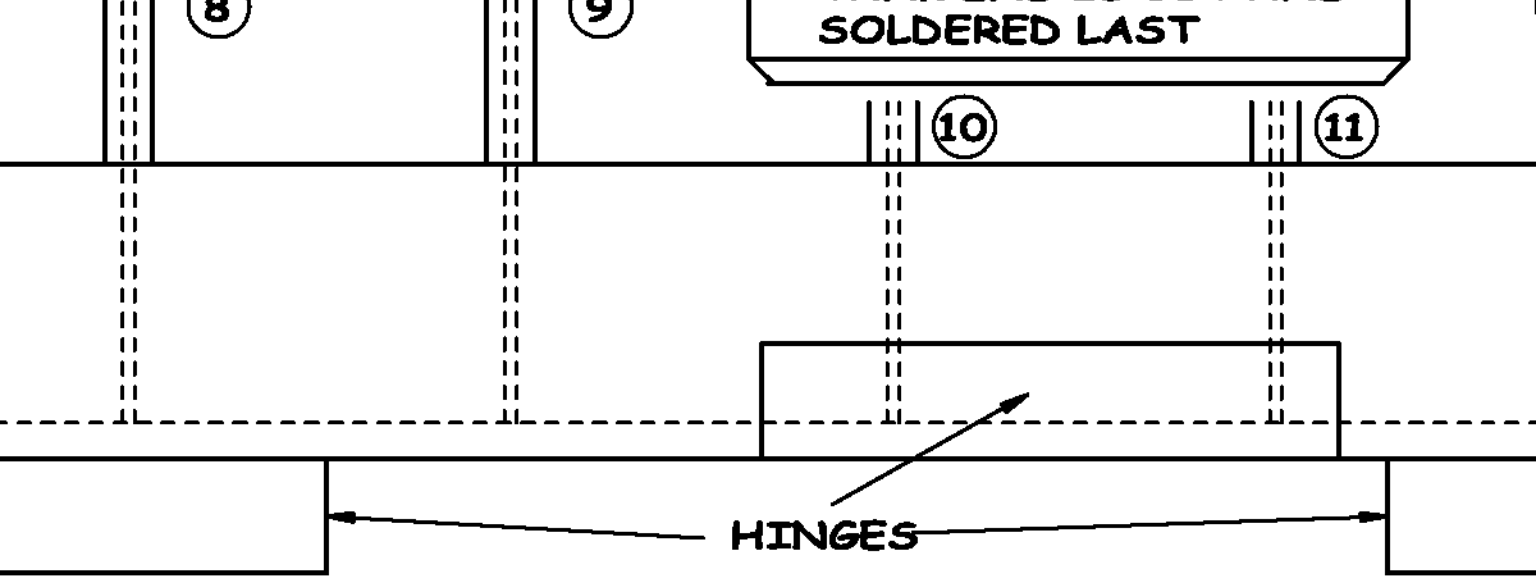
SHIM STOCK
TANK END IS CUT AND

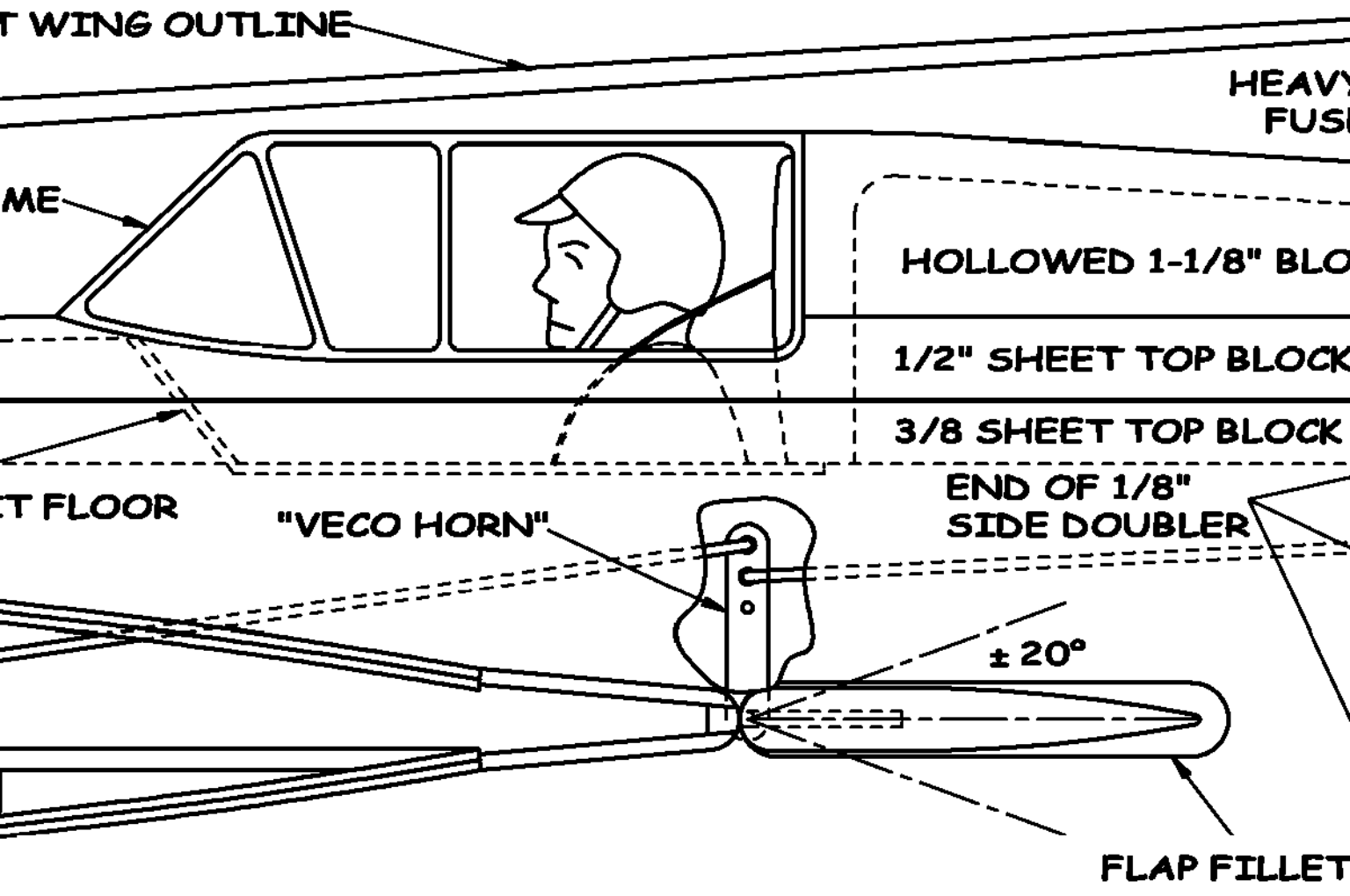

TIP
BRACES
1/16"
FIREWALL
1/8" PLYWOOD
WEIGHT


OUTLINE
1/2" SHEET
16"
HEET
IBS
HINGES
NOTE BEVEL
USIC
E
FASTEN
GEAR WITH
J-BOLTS
1/8" PLYWOOD
2-1/2" "VECO"

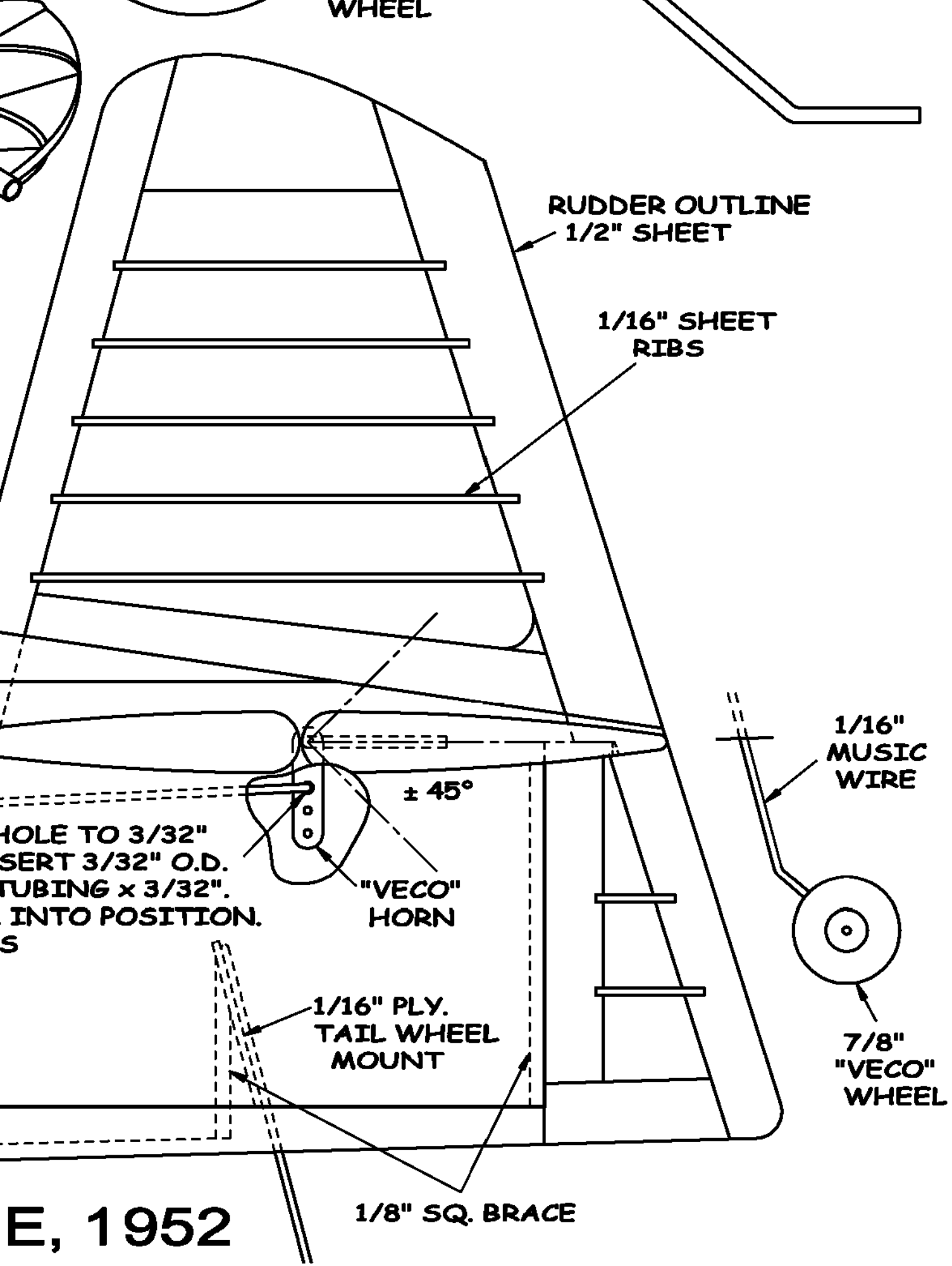

1
2
3
FLAPS 3/8" S
C
C
1-3/4" FROOM
SPINNER
1/2 x 3/8" OAK MOT
FOX 35 OR
VECO 29
1/8" PLYW
FIREWAL
2-1/8"x 2-1/8"
x 2-1/4" BLOCK
VENT TUBES

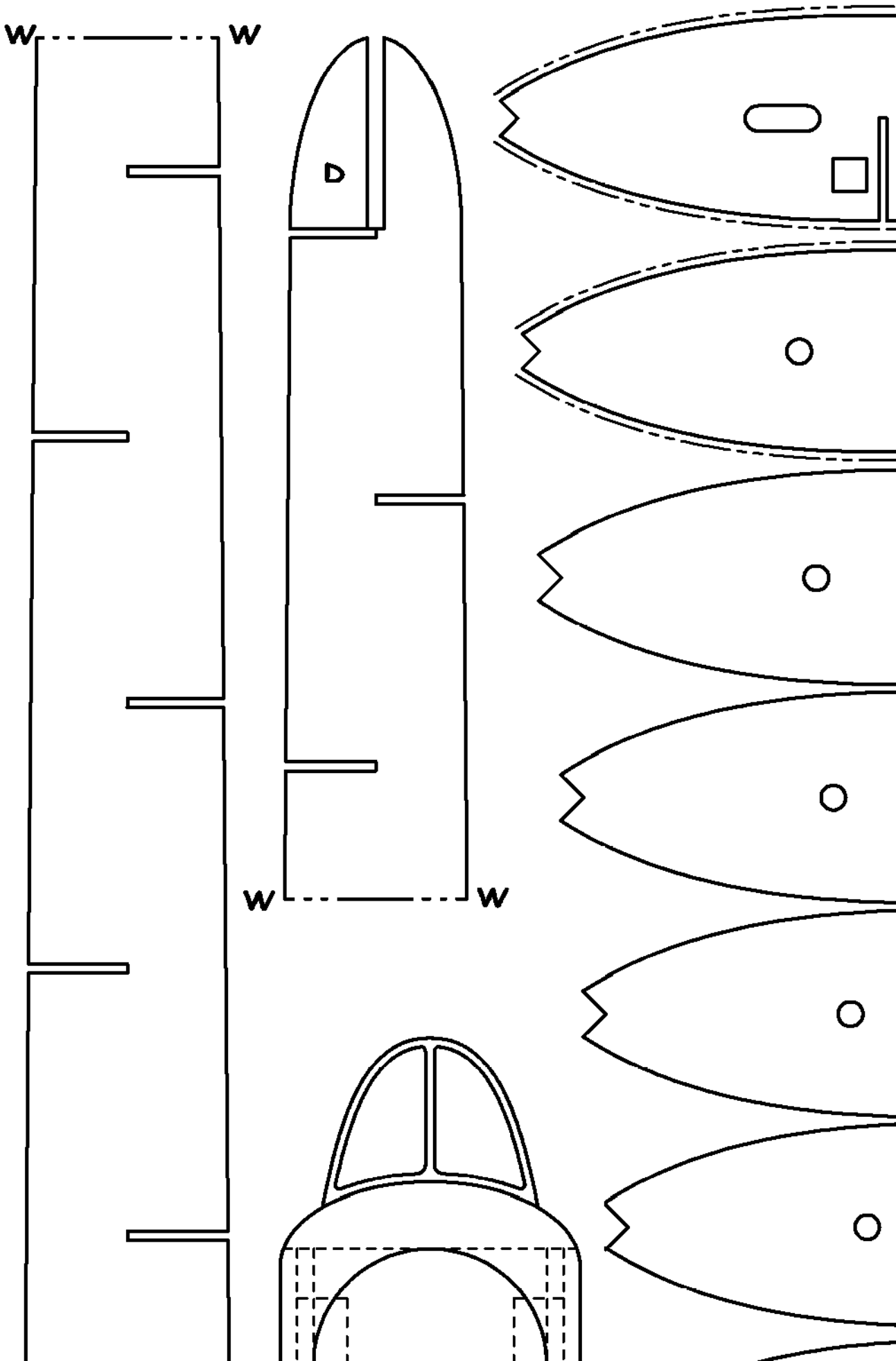

4
5
6
7
3/32" SHEET
TRAILING
EDGE
SPLICE
(36" STK.)
3/16"x 1/8" INSERT
SHEET
LEF
1/16" Ø WIRE CABIN FRA
OR MOUNTS
1/16" SHEET COCKPI
TANK
CENTER RIB
ONLY
OOD
LS
S
1-1/8"x 2-1/4" BLOCK

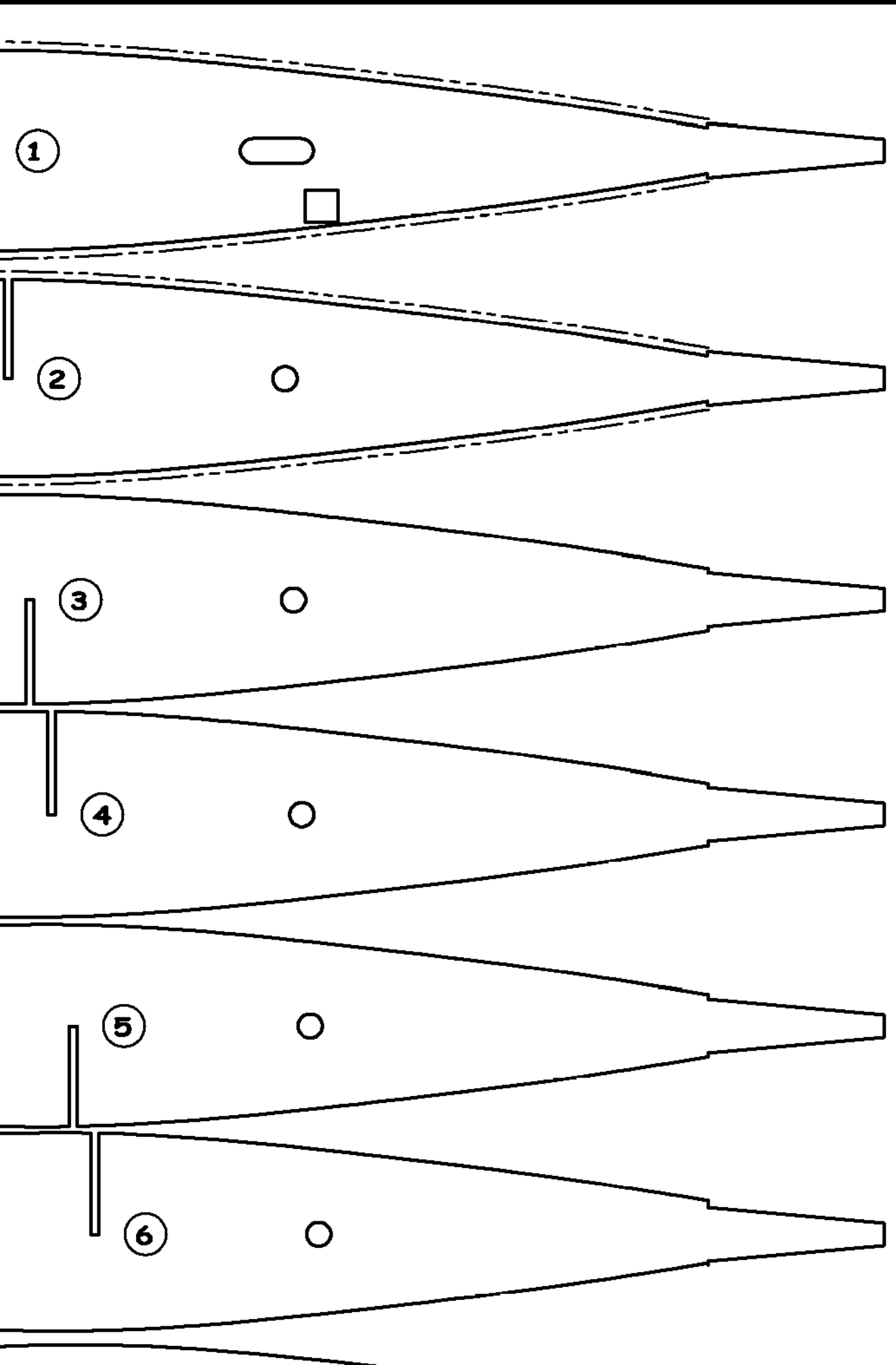

SOLDERED LAST
8
9
10
11
HINGES

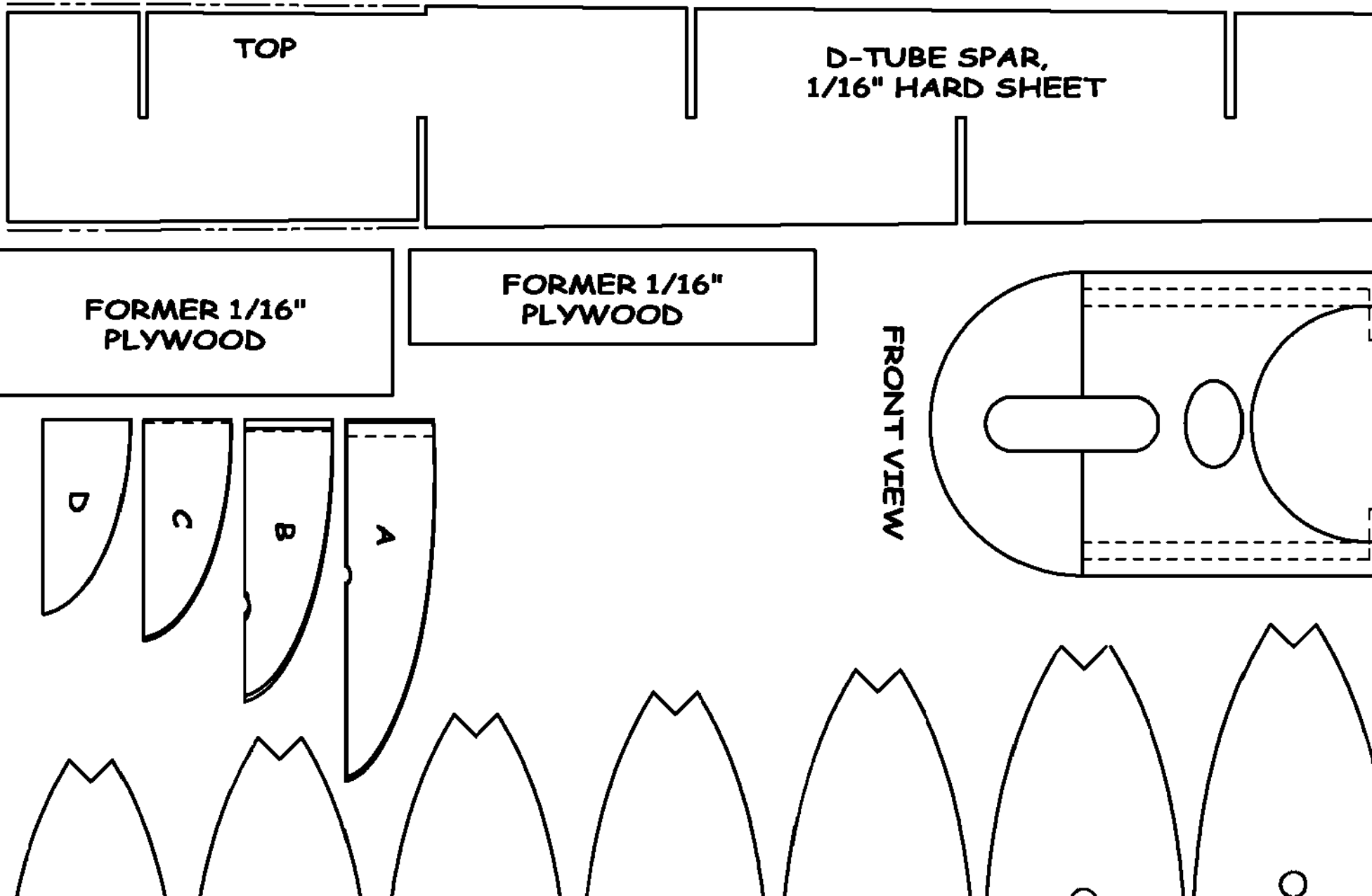

T WING OUTLINE
HEAVY
FUS
ME
HOLLOWED 1-1/8" BLO
1/2" SHEET TOP BLOCK
3/8 SHEET TOP BLOCK
T FLOOR
"VECO HORN"
END OF 1/8"
SIDE DOUBLER
± 20°
FLAP FILLET

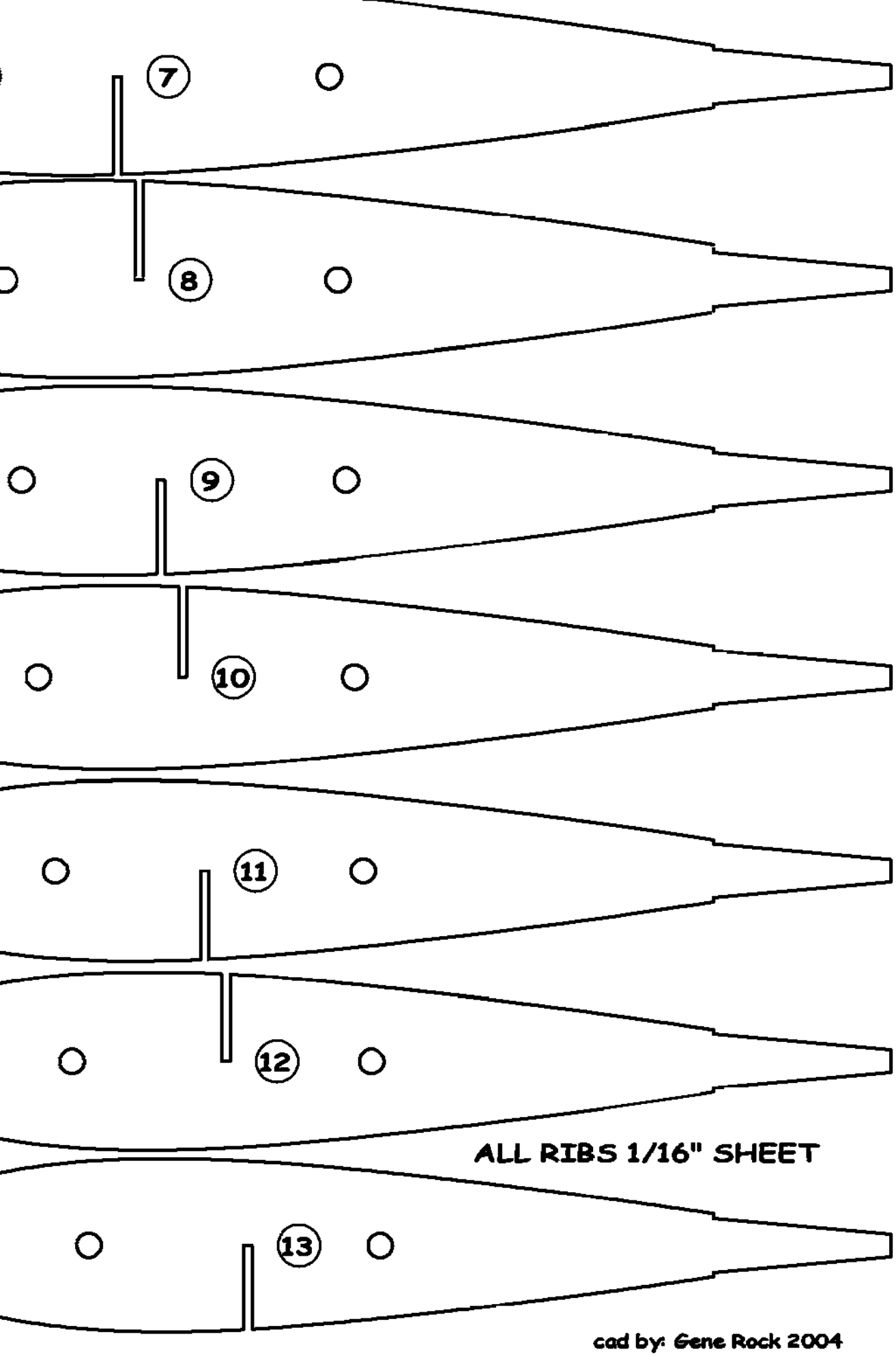
12
13
A
B
C
D
E
F
E
F
Y LINE INDICATES
ELAGE SIDES
OCK
DRILL H
DIA. IN
BRASS
SOLDER
4 PLACE
1/16" PLYWOOD
S


WHEEL
RUDDER OUTLINE
1/2" SHEET
1/16" SHEET
RIBS
1/16"
MUSIC
WIRE
± 45°
HOLE TO 3/32"
SERT 3/32" O.D.
TUBING x 3/32".
INTO POSITION.
S
"VECO"
HORN
1/16" PLY.
TAIL WHEEL
MOUNT
7/8"
"VECO"
WHEEL
1/8" SQ. BRACE
E, 1952


W
W
D
W
W


1
2
3
4
5
6


TOP
D-TUBE SPAR,
1/16" HARD SHEET
FORMER 1/16"
PLYWOOD
FORMER 1/16"
PLYWOOD
FRONT VIEW
D
C
B
A


7
8
9
10
11
12
13
ALL RIBS 1/16" SHEET
cad by: Gene Rock 2004