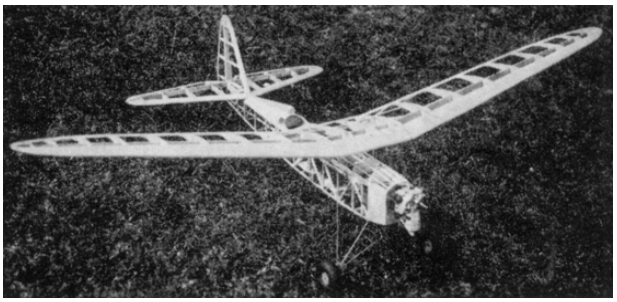
A FOUR FOOT WESTERNER

Here's a Little Gas Model that Has Every Desirable Quality - Small Span - Small Engine - Unusual Stability and a Big Performance

By ELBERT J. WEATHERS

It has the appearance of a full scale ship



It has a sturdy structure and can "take it"

It gains altitude quickly with a steep climb

DUE TO the present trend towards the smaller type gas engine, and the many inquiries as to plans received by the writer in the last couple of years as a result of photos in "Gas Lines" columns, we take pleasure in presenting the data for constructing the small parasol type gas model, "Miss San Diego," which was one of the very first small gas models to be built in the United States and powered with an engine of less than 5/8" bore. The parasoled wing makes the little plane very stable and assures for dependable, performance.

The ship performs beautifully with an inverted engine installation. Almost any of the popular small type engines can be easily adapted to this gas job, by merely altering the design of the metal mounting plates, which are located on the wooden beams. Whatever the engine make might be it should be inverted for maximum flight performance.

On several occasions it has flown over fifteen minutes on a forty-second motor run, and has a slow, lazy circling glide after the motor cut. Its flight abilities are most agreeable for contest flying.

Specifications

Wing Span	4 ft.
Wing Area	252 sq. in.
Wing Loading	64 lb./sq. ft.
Max. Wing Chord	6-3/4 in.
Overall Length	31-1/4 in.
Stabilizer Span	19-1/2 in.
Overall Height	10-3/4 in.
Tread	8-1/2 in.

Weight, Ready to Fly (With Engine) ..... 1 lb. 2 oz.

Enlarge the drawings to full working size as the first step, making use of the dimensions as given on the assembly drawing. All the balsa used is to be of firm medium-hard variety, unless noted otherwise.

Fuselage

Begin the construction with this unit. Build two side frames of 1/8" square balsa, using wood which is very firm, especially for the longerons. Fillers of 1/16" sheet are put in each frame at the front. Build the frames together in the usual way, pinning each up-side-down on the work table. When all 1/8" square cross bracing is cemented in place, cut a piece of balsa size 3/8" x 9/16" x 1-7/16", which is the tailpost and which is installed next. All fuselage formers are of 1/16" sheet balsa except No. 1 and No. 9, which are 1/8" thick. Locate the positions for fuselage formers No. 8 to No. 12 inclusive, and cement each in place.

The top, forward, removable section of the fuselage is assembled next. Lay the two 1/8" square longerons down, followed by formers No. 1 to No. 7 inclusive. Place the top center 1/16" square stringer first, followed by the remaining four. Cut and cement in place the 1/8" sheet balsa pieces upon which the No. 00 dress snaps are mounted on the removable section. The balsa strips for the fuselage frame, to receive the other half of the dress snaps, may be installed at the same time. Using metallic cement, secure the light halves of the four snaps in place on both the fuselage and removable section, making sure that all are in perfect alignment.

Now cut two strips 5-7/8" long and 1/8" wide from 1/32" sheet aluminum and cement them on the top fuselage longerons, where stepped down and where wing support slides. The main switch, of the small button type, and the booster plugs should be installed on the right side of the fuselage at this point. Next cut the rear motor beam anchorage bulkhead from 1/8" sheet balsa, as shown. Place it on with ample cement. The 1/32" balsa sheet can now be applied from formers No. 8 to No. 12.

The outline of the cockpit is penciled on a sheet size 3-1/8" x 3-5/8" x 3-3/8" long, which is applied between formers No. 8 and No. 9. The cockpit is cut out after the sheet is cemented and dry. Proceed to finish by cutting a piece 1-1/4" x 3-1/8" x 7-1/8" long from the 1/32" stock size, applying it in the same manner, between formers No. 9 and No. 12. Cut lengthwise through one wall of a length of 1/8" O.D. diameter rubber tubing and lay it, using cement, around the cockpit edge to form the combing. The head-rest is carved from soft balsa and should be hollowed out. The block is 3/4" square at the cockpit, 1/8" x 1/4" at the rear end, and is 7-1/2" in overall length. Cement it in position.

Using the template provided in the plans, cut the windshield from the celluloid specified, but do not install it until after the model is covered and painted.

The landing gear is formed from 1/16" piano wire. First make the front side frame, followed by the rear side frame and the center shock strut. Cement two cross braces on the fuselage bottom, each size 1/8" x 1/2" hard balsa, to receive the landing gear. Use ample cement to bind each landing gear frame to these and also be sure that both balsa mounting strips are well braced with gussets and cement at the lower fuselage longerons. Heavy thread and metallic cement render a satisfactory and permanent job of securing the landing gear to the fuselage. To finish it, bind all three frames together at the axle with fine copper wire and solder well. The tail skid is formed from a length of the same wire used for the landing gear. It is installed where shown.

Make the firewall from 1/8" plywood of good quality. It is 2-1/4" x 2-5/16" in size. Cut the motor beam and wiring holes and then install it against the end of the fuselage frame, using a common butt joint and plenty of cement. Follow with the motor beams, which are 1/8" x 3/4" x 4-1/4" in size. They should be cut from black walnut, maple, or some similar hardwood having the necessary shock-absorbing qualities. Make the two engine-mounting plates from 27-gauge galvanized sheet metal and install each on the wooden beams as shown, using 6-32 steel or brass machine screws and nuts. The wooden beams can now be shoved through the firewall and rear anchorage bulkhead and securely cemented in

position, making sure that each are parallel to the top longerons of the fuselage.

Install the coil, condenser and battery holder where shown. The battery holder is of simple sheet brass construction. See drawings for this detail. Complete the fuselage by wiring everything with fine, stranded-and tinned-insulated wire, using the diagram provided.

The wing strut unit, or cradle, which supports the wing, should be constructed next. It is formed from the same wire as used for the landing gear. Begin by forming two end frames, as shown. It will be noticed that each are to be bent with a narrower spread at the tip ends than that of the fittings on the wing center section, as the cradle thereby needs to be only sprung apart to drop the wing between it, to secure it for flying. The two diagonal side braces are formed and soldered to the end frames, the joints first being bound with fine copper wire. Be certain that the frame is in perfect alignment, before soldering. To complete it, apply 1/16" x 1/4" balsa strips to each side of the struts, routing out channels for the wire and soldered joints and cementing the two halves together over the wire. Sand the balsa struts (now 1/8" thick) to streamlined cross section and cover them with tissue later on, when the model is covered, to insure for a good finish.

Wing

The ribs are all of 1/16" sheet balsa, except ribs W-2, which are of 1/8" sheet balsa. Both the leading and trailing edges are cut from 1/16" sheet balsa, and are of 3/8" width. Each consists of three parts, as the center section of the wing is constructed first, although the wing is a one-piece unit when completed. The wing spar is built up from three pieces, as shown in the plans, and is cemented together as one piece before being laid down in building the center section. Each wing tip is 1/16" sheet balsa. The balsa veneer leading edge covering is prepared after basic construction is completed.

To build the wing, first construct the center portion by pinning into position the leading and trailing edges, and the spar. Raise the leading edge 5/16" from the work table. Wing ribs W-1 and W-2 are now cemented in position. (If an engine having a suction feed and therefore close-coupled tank is to be used, the brass gas tank, and its installation in the wing center section can be disregarded.) The fuel tank and wing strut fittings are installed later.

When dry, remove the wing center section construction from the work table and lay down the spar on either side to proceed with the right or left wing panel. Pin the leading and trailing edges in position and after raising the leading edge 5/16" at the inner end and 3/32" at the tip, proceed to install and cement wing ribs W-4 to W-11 in place. The trailing edge gussets are 1/4" x 3/8" in size and are made from 1/16" sheet balsa. After installing them follow with the wing tip which is cemented in position, with 1/16" sheet balsa bracing on the top and bottom. When the wing structure is completed, proceed to cover the front portion with 1/64" sheet balsa, as indicated. A piece 2-3/4" x 6" is required for the center section while two pieces, each size 2" x 2-3/4" x 18-3/4" will be needed for the left and right wing panels, between ribs W-3 and W-10. The portion remaining from rib W-10 to the tip is covered with two small pieces. In laying the balsa veneer on, start by making a line of pencil marks across the tops of the ribs which will show the position of the rear edge of the veneer, on the top side. Apply cement to these rib portions and lay on the sheet, using pins to hold until dry. When set, moisten the sheet balsa with water where it is to be pulled over the leading edge proper, or the sharpest bend to be made with it. Proceed to bend it on over and pin it underneath along the whole panel, as you did on the top. Cement is next applied between the veneer and the rib sides at every rib. Be certain that the veneer follows the rib contours, by stretching it tightly. From 1/32" thick sheet aluminum, cut and install the four wing strut plates on wing ribs W-2 as shown. A hole a trifle larger than the wing strut wire is drilled in each. Use plenty of metallic cement in securing them in place. The wing unit is now completed, ready for covering.

Tail Surfaces

The empennage is of simple construction. Begin by forming all of the parts, ready to assemble. The fin, stabilizer, leading and trailing edges are 1/16" x 1/4" balsa and all ribs are of 1/16" sheet balsa except fin rib F-4, which is 1/8" sheet. The stabilizer and fin tips are also of 1/16" sheet balsa, and the main spars for each surface are cut from 1/8" sheet balsa. Both the stabilizer and fin are of the same type construction. To build the stabilizer, lay the spar down first, followed by the leading and trailing edges. At stabilizer rib S-5, block the spar up 1/8" and raise the leading and trailing edges 7/32" from the work table. Install the ribs and cement in position. Cut two pieces of 1/8" sheet balsa and cement well between ribs S-1 as shown. The dress snaps which hold the tail surfaces in place are mounted on one of these two sheet balsa fillers. Use an ample quantity of metallic cement to install the other three halves of the No. 0 size dress snaps.

When the basic construction of the fin is completed connect the tab with the fin by means of small copper or iron wire hinges. The tail surfaces are completed by covering both the stabilizer and fin

leading edges with 1/64" sheet balsa, done in the same way as that on .the wing.

Covering

The original model was covered with Mino Tissue, which is the cream-colored "natural" paper sold for rubber powered model aircraft. It has watermarked parallel lines running through the sheet about an inch apart, and with that description anyone building this ship can easily procure it if it isn't sold under the name of "Mino." It is ideal for the covering material for this small light gas job. Cover the wing, tail surfaces and fuselage in the conventional manner and water-shrink the covering. When dry, cement the fin to the stabilizer very securely, making sure both are at right angles. Remove the paper over the center of the stabilizer, in cementing the fin, to insure for a strong joint. Dope the entire model with two coats of clear dope and follow with two coats of pigmented dope (sprayed if possible) in a color or colors of your own choice. The original was first painted a vivid orange and later a bright yellow with black trim, both equally effective.

Assembly and Flying

First install the motor on the motor mounting plates. Then remove the top section of the fuselage and lay the wing cradle across the main longerons. Secure it with 1/8" flat rubber making it just tight enough so that it may be adjusted on the ground but can't shift in flight. Install the battery in its holder just ahead of the cockpit. Connect the rubber gas line to the carburetor (if using gravity feed) and lead it through the top section of the fuselage, followed by the snapping of this removable unit into place. Connect the other end of the gas line to the wing tank, after springing the wing into position in the support for it. The tail surfaces are snapped on and it is ready to balance. Supporting the ship by the fingertips about 40% back from the wing center section chord, adjust the wing back or forth until the plane balances with the nose slightly down. Before test-hopping under power, it can be safely hand glided to insure for maximum gliding performance on the first powered flight, if desired.

Although the original ship was flown on limited motor runs of about 30-40 seconds by clipping the gas line shut behind the carburetor, some builders may desire to install a mechanical timer such as the Autoknips, etc., the installation of which the writer leaves to their own ingenuity. (Timers, as used today, were hardly known or thought of at the time this model was designed.)

In test flying, throttle the engine down to about half speed and allow it to take off under its own power, flying in no wind if possible. Set the timer or gas shut-off for about 20-25 seconds. After initial hops, if all is satisfactory the engine may be revved up to its maximum r.p.m. (with the prop being used) and the plane is liable to be "gone with the wind" if any.

Any further questions regarding it may be addressed to the author, enclosing a self addressed stamped envelope for prompt reply. Photographs of models of "Miss San Diego" would be welcomed by MODEL AIRPLANE NEWS, together with a note on its performance.

WIRE FRAME CEMENTED IN UNIT FOR FUEL LINE PASSAGE

BOTTOM VIEW OF UPPER REMOVABLE SECTION OF FUSELAGE

#00 DRESS SNAPS

12" DIA~6½" PITCH PROP RECOMMENDED FOR ELF ENGINE

1/16" SQ.

1/8" SQ.

WIRING DIAGRAM

SWITCH

BATT.

TO GROUND

TO BREAKER

CON.

COIL

TO PLUG

GAS TANK

C.L.

7⅜"

1" O.D. RUBBER TUBING

SOFT BALSA

1/32" SHT. BALSA

STABILIZER POSITION

1/16" SHT.

STAND. FLASH LIGHT CELL

1/8" SQ.

BLOCK ON STAB.

1/16" SHT. FILLER

MB

COND.

1/16" SHT.

ELF COIL

1/8" FILLER BLOCK

1/16" PIANO WIRE

TAIL SKID INSTALLATION

1/16" SHEET TIP

3"

F-1

1/64" SHT. BALSA

6"

F-2

1/16" X 1/4"

FIN SPAR

1/16" X 1/4" CUT FROM SHEET

F-3

1/8" SQUARE

1/16" SHT.

R-1

R-2

R-3

F-4

F-5

1/16" X 1/4"

6"

2 13/16"

S-5

S-4

S-3

S-2

S-1

1/64" SHEET BALSA

1/16" SHEET (BOTTOM)

1/16" SHT. FILLER PCS. MAKE 4 10" X 3/32" X 1⅛"

STABILIZER SPAR

2⅛"

2"

1⅛"

LANDING GEAR ~FRONT VIEW~

1/16" PIANO WIRE

M & M

FUS.

8"

6¾"

CEMENTED

3"

ALUMINUM STRIP

#0 DRESS SNAPS

1/8" SHT. BALSA FILLER (BOTTOM)

COIL

1/16" SHEET FLOOR

(-)

1/16" SHEET FILLER

3/8" X 9/16" X 7/16"

2¼"

4"

TOP VIEW OF FUSELAGE SHOWN WITH UPPER PART REMOVED

26 3/8"

2½"

BEND AT RIGHT ANGLE

FRONT WING MOUNT PLATE (MAKE 2)

~ FULL SIZE ~ .032" ALUM.

REAR WING MOUNT PLATE (MAKE 2)

1/16" X 3/8"

1/64" SHEET BALSA

6"

GAS TANK

WING MOUNTING PLATES

W-10 W-9 W-8 W-7 W-6 W-5 W-4 W-3 W-2 W-1

SPAR CUT FROM 1/8" SHEET

1/16" SHT. TIP

1/4" X 3/8"

1/16" X 3/8"

1⅛"

1⅜"

E.J.W.

2" 2¼" 2½" 2¾" 3" 3" 3" 2" 1"

1/4" SQUARES

TOP EDGE

½ SIZE WINDSHIELD TEMPLATE .010" CELLULOID

COIL MOUNT FULL SIZE MAKE 2

1/8" SHEET BALSA

1/16" SHEET TIP

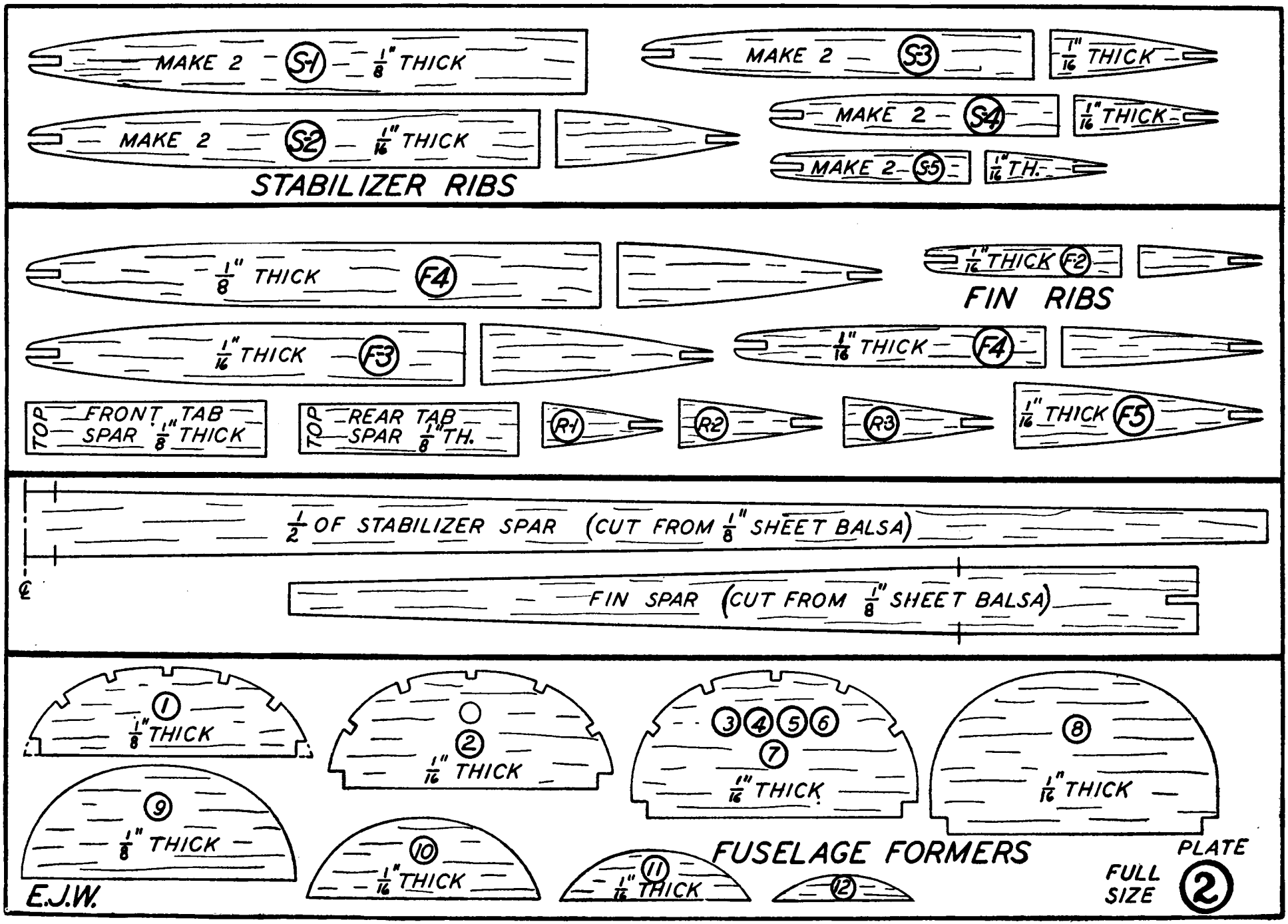
"MISS SAN DIEGO"

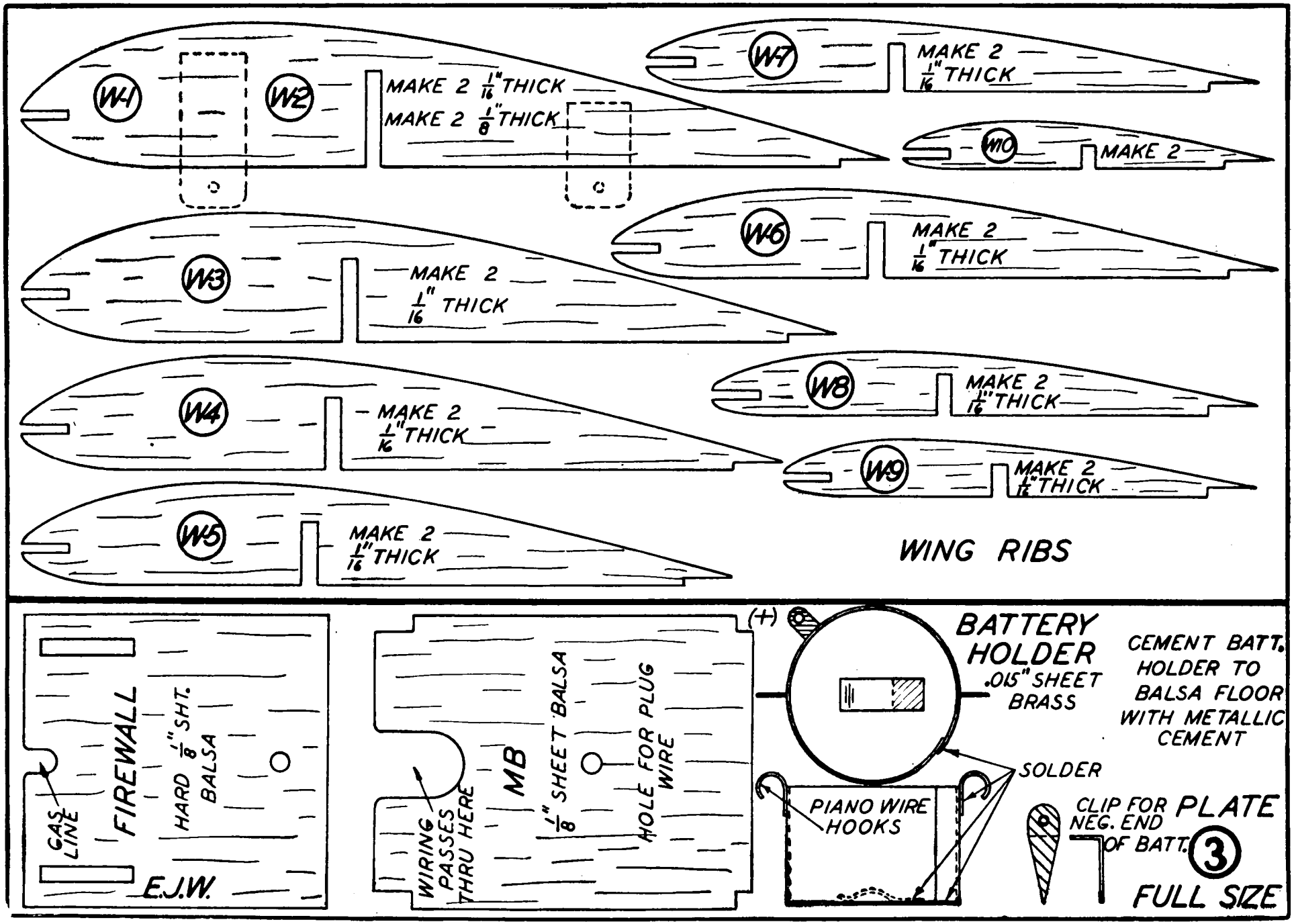
DESIGNED BY
ELBERT J. WEATHERS
2720 POINSETTIA DR.
SAN DIEGO CALIFORNIA
U.S.A.

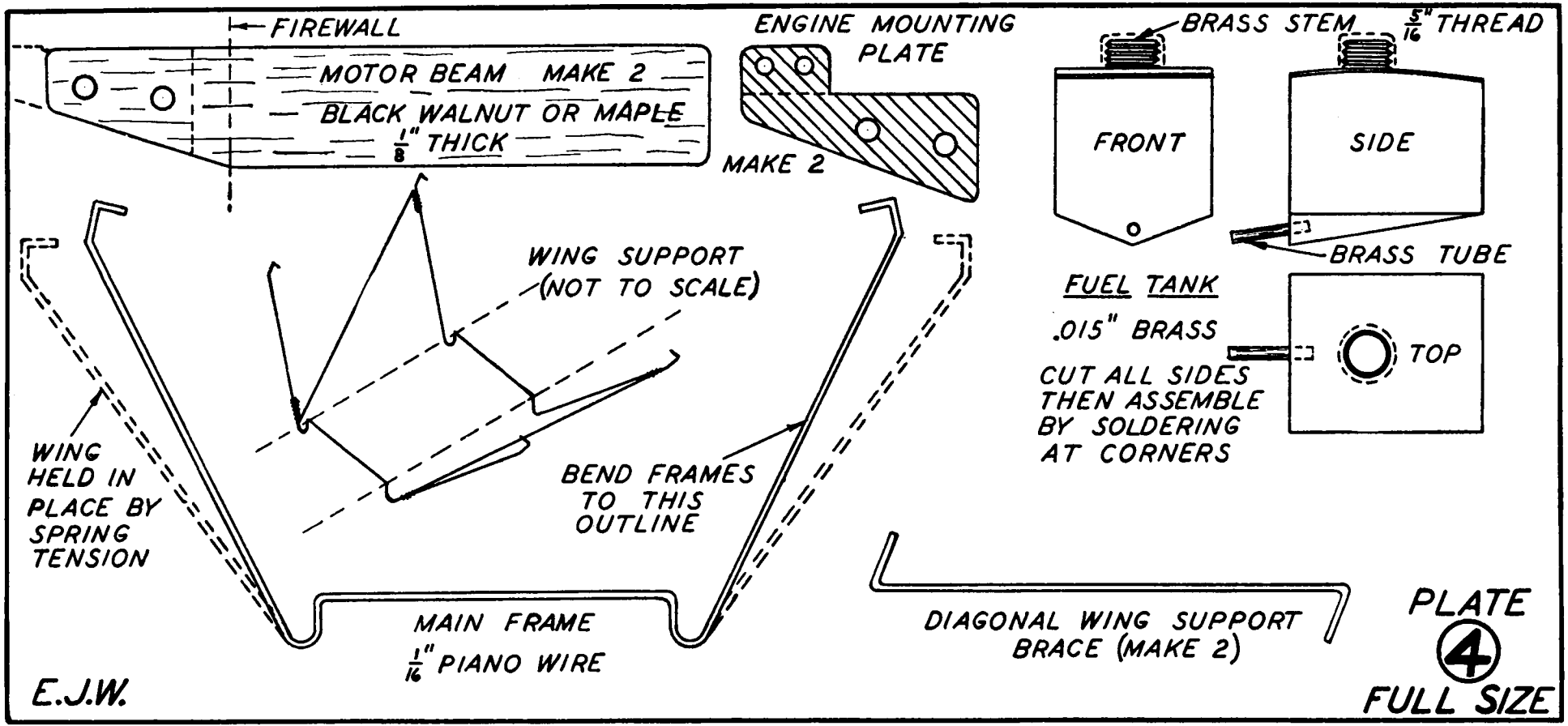
SCALE ~ 1/4" = 1"
EXCEPT UNITS NOTED

WING SPAN	4 FT.
WING AREA	252 SQ"
WING LOADING	.64 LB/SQ'
OVERALL LENGTH	31¼"
WEIGHT~READY TO FLY	1 LB~2 OZ.

ASSEMBLY DRAWING~PLATE 1


MAKE 2 S-1 1/8" THICK
MAKE 2 S-2 1/16" THICK
STABILIZER RIBS
MAKE 2 S-3 1/16" THICK
MAKE 2 S-4 1/16" THICK
MAKE 2 S-5 1/16" TH.
1/8" THICK F4
1/16" THICK F3
TOP FRONT SPAR TAB 1/8" THICK
TOP REAR TAB SPAR 1/8" TH.
R-1
R2
R3
1/16" THICK F2
FIN RIBS
1/16" THICK F4
1/16" THICK F5
1/2 OF STABILIZER SPAR (CUT FROM 1/8" SHEET BALSA)
FIN SPAR (CUT FROM 1/8" SHEET BALSA)
1 1/8" THICK
2 1/16" THICK
3 4 5 6 7 1/16" THICK
8 1/16" THICK
9 1/8" THICK
10 1/16" THICK
11 1/16" THICK
12
FUSELAGE FORMERS
E.J.W.
PLATE 2
FULL SIZE


W1
W2
MAKE 2 1/16" THICK
MAKE 2 1/8" THICK
W7
MAKE 2 1/16" THICK
W10
MAKE 2
W6
MAKE 2 1/16" THICK
W3
MAKE 2 1/16" THICK
W8
MAKE 2 1/16" THICK
W4
MAKE 2 1/16" THICK
W9
MAKE 2 1/16" THICK
W5
MAKE 2 1/16" THICK
WING RIBS
FIREWALL
HARD 1/8" SHT. BALSA
GAS LINE
E.J.W.
MB
1/8" SHEET BALSA
HOLE FOR PLUG WIRE
WIRING PASSES THRU HERE
(+)
BATTERY HOLDER
.015" SHEET BRASS
CEMENT BATT. HOLDER TO BALSA FLOOR WITH METALLIC CEMENT
SOLDER
PIANO WIRE HOOKS
CLIP FOR NEG. END OF BATT.
PLATE 3
FULL SIZE


FIREWALL
MOTOR BEAM MAKE 2
BLACK WALNUT OR MAPLE
1/8" THICK
ENGINE MOUNTING PLATE
MAKE 2
BRASS STEM
5/16" THREAD
FRONT
SIDE
BRASS TUBE
FUEL TANK
.015" BRASS
CUT ALL SIDES THEN ASSEMBLE BY SOLDERING AT CORNERS
TOP
WING SUPPORT (NOT TO SCALE)
WING HELD IN PLACE BY SPRING TENSION
BEND FRAMES TO THIS OUTLINE
MAIN FRAME
1/16" PIANO WIRE
DIAGONAL WING SUPPORT BRACE (MAKE 2)
E.J.W.
PLATE 4
FULL SIZE