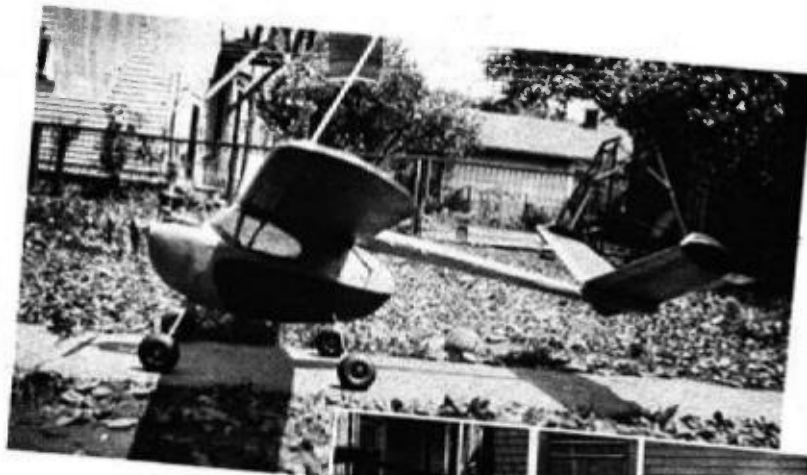


AERO CAR

by **EDMOND HAMMITT**
Member A.M.A.

A CLASS C THERMAL HUNTER WITH A TOUCH OF REALISM



● Four-wheel landing gear, vee tail make this model different.

HERE is a most unusual design—a true version of the future airplane to come. The Aero Car was designed purely for sport and experimental purpose. I must say the Aero Car has lived up to all my expectations. The climb is extremely steep, the glide fast and flat. She has proved to be a good, stable airplane. The Aero Car is assembled and disassembled in four sections: the fuselage, wings, boom, and tail surfaces.

It was designed primarily for the Ohlson "60." It has a wing span of 72 in., an aspect ratio of seven to one, and a Clark "Y" rib section. The original design was directionally unstable. The only change needed was to attach the rudders to the stab.

Theory: The theory upon which the Aero Car is based has been proved in my past designs. It isn't a simple matter of placing the wings as high as possible above the center of gravity. The fact is that the most efficient model in terms of its lift and drag ratio, disregarding stability, is the ship with its center of gravity, lift, and resistance as close together as possible.

The center of gravity lies slightly below the thrust line. The center of lateral area lies behind and above the center of gravity along the thrust line; the center of lift forward of the center of gravity, with the center of resistance between the center of lift and center of gravity.

This force arrangement has a tendency to make gentle turns because center of lateral area is only slightly above center of gravity, the displacement axis having a slight negative inclination. This causes the ship to respond to the rudder readily. It holds its bank without spiral diving because the neutral axis lies below the center of gravity, which gives a righting tendency.

The nose moment is 10% of wing span and the tail moment is 42%. The chord of the wing is 14% and the stabilizer is 45% of the overall.

A tapered wing was used to keep the center of lift forward of the center of gravity and yet have pleasing lines. The construction of the wings and stabilizer were so designed to prevent warps, if proper woods are used. If any builder comes across faults or better points, I would appreciate any suggestions given.

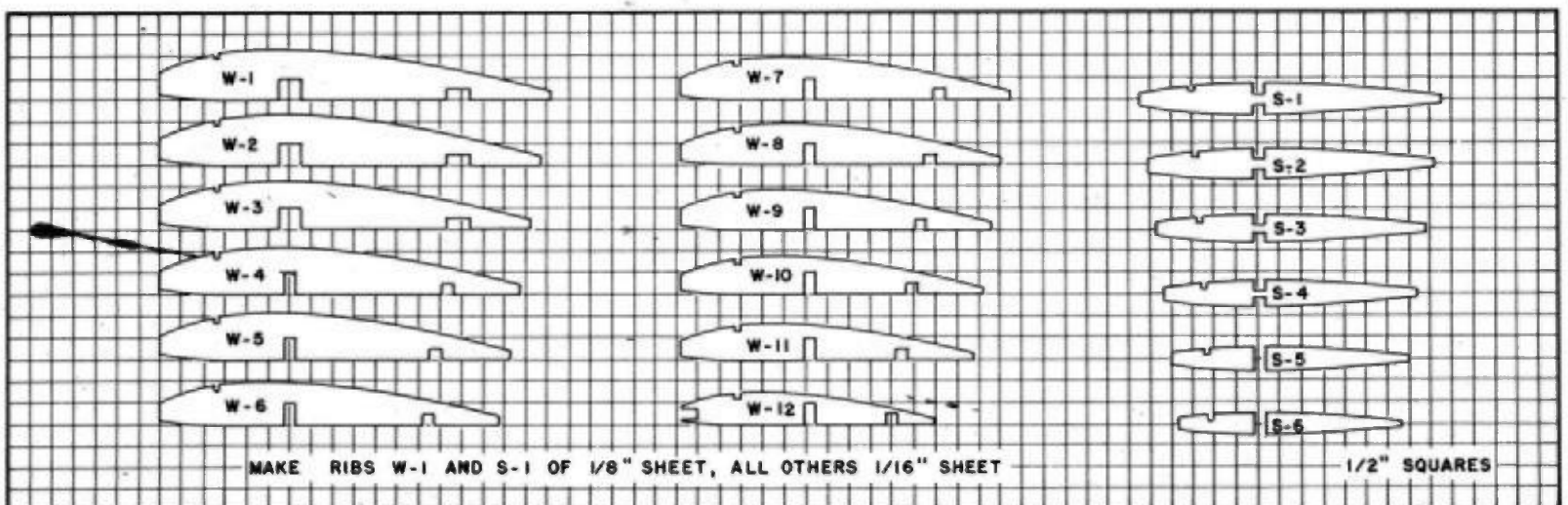
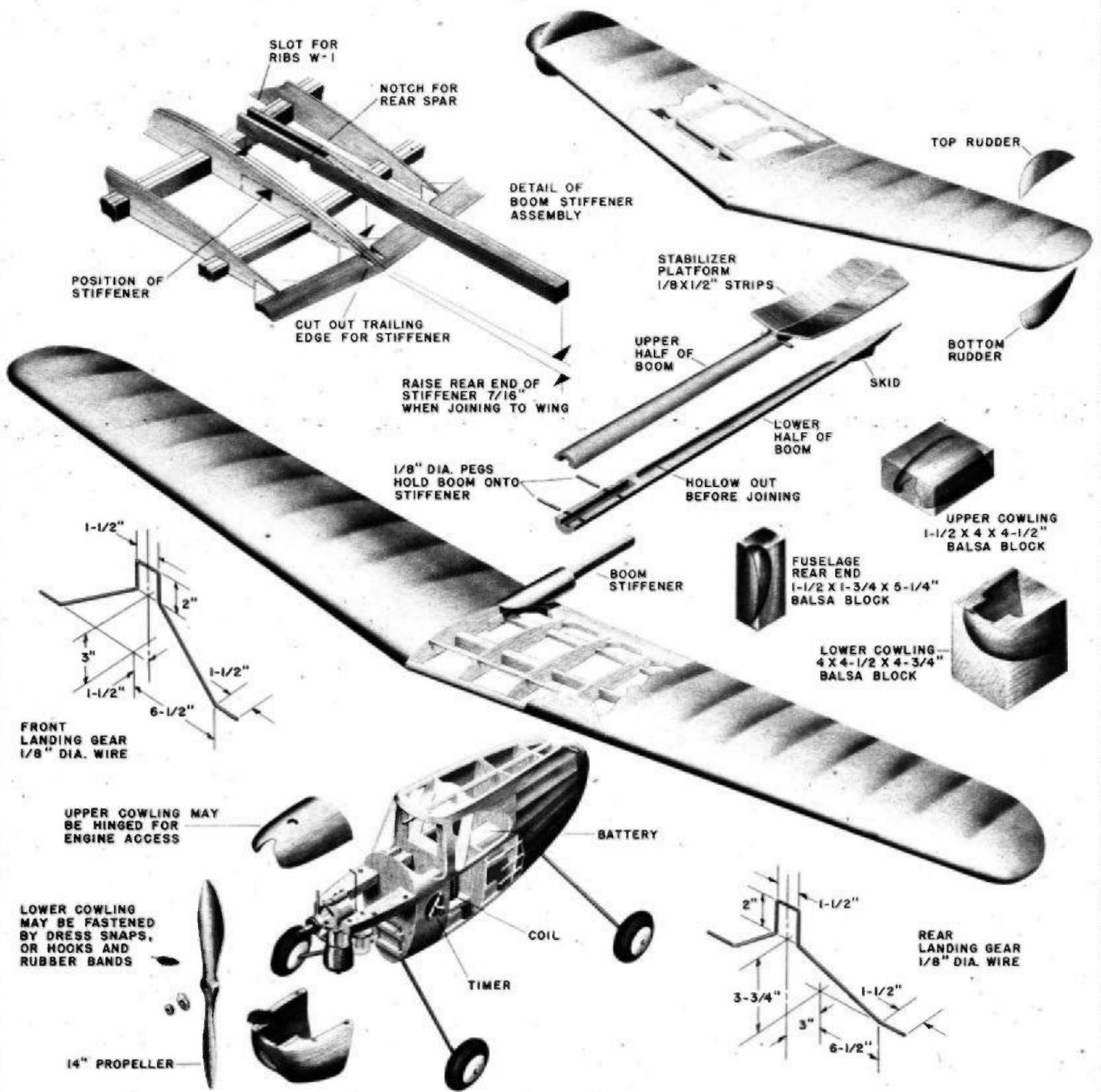
Fuselage Construction: The fuselage construction is not as complicated as it looks. The first step is getting a hard piece of $\frac{1}{4}$ " sheet balsa for the keel. This keel establishes the correct angular relation of the wings to stabilizer, as well as the relation to the thrust line, so reproduce it accurately. The formers are of $\frac{1}{8}$ " sheet balsa made in two halves. After formers are cut out and cemented together, cement a $\frac{1}{8}$ " x $\frac{1}{4}$ " strip of balsa on all

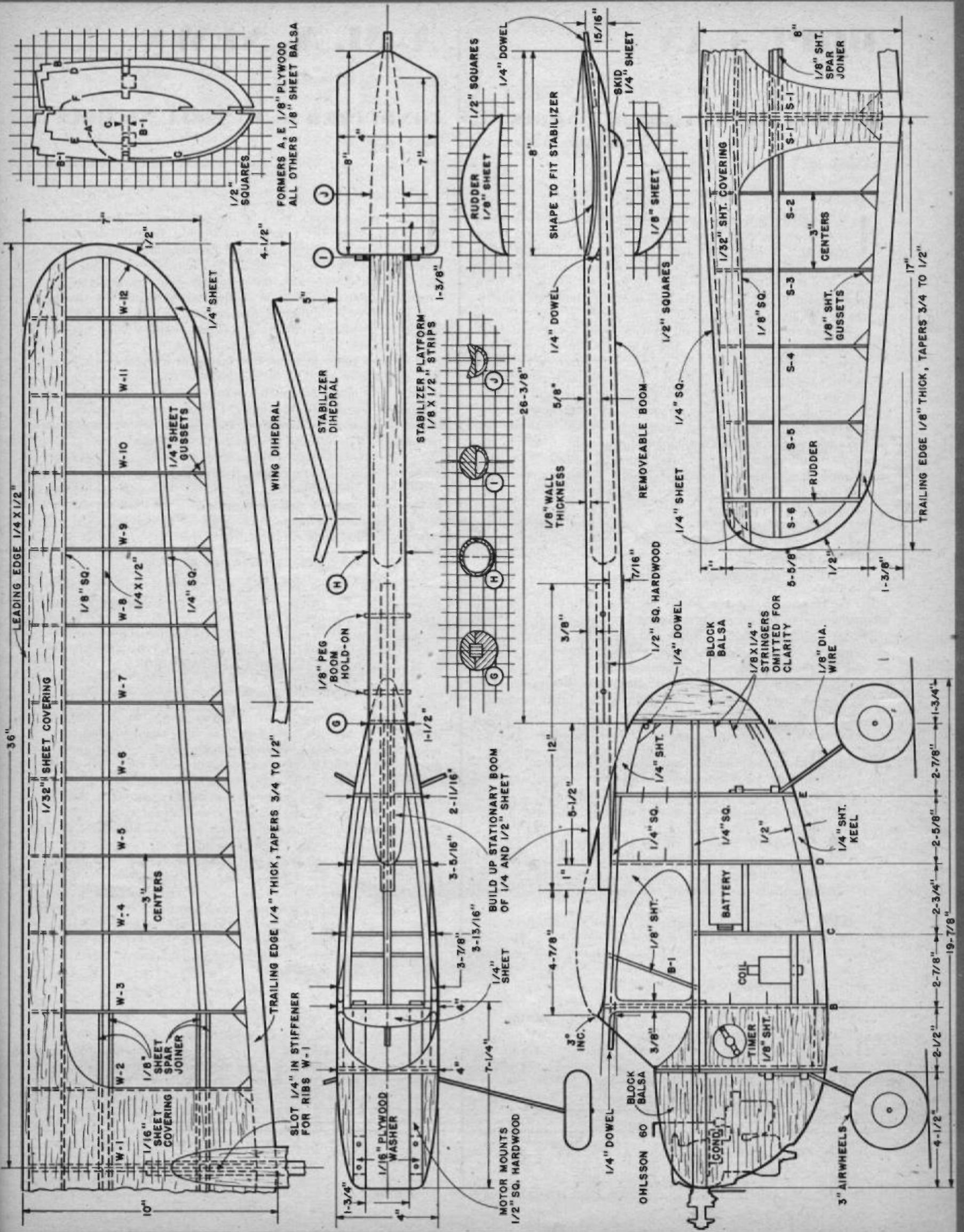
formers with the exception of firewall and former E, which are plywood to prevent folding and insure strength. Balsa formers A, B, C, D, and F are cemented to keel in proper place. (Make sure all formers are aligned according to plans.) Cut out firewall and former E. Before assembling any formers, cut notches, holes, and motor mount slots where called for. Place landing gears onto firewall and former E before assembling the fuselage. When all formers are dry, place $\frac{1}{4}$ " sq. longerons along the sides and top of fuselage. Then cement formers B-1 and E in place, leaving firewall A until last. All stringers $\frac{1}{8}$ " x $\frac{1}{4}$ " are placed, omitting some, so accessories and wiring can be accomplished. Make wire leads as short as possible and tape all bare wires. Timer is mounted on plywood $\frac{1}{16}$ " thick, between formers A and B. Coil is mounted likewise between formers B and C. Battery between C and D. A plug-in battery was used. The rest of the stringers are cemented in place leaving the shell completed. Motor mounts are inserted and aligned. Do not spare the cement. Gussets are cemented where shown. Celluloid is then attached to windows and pegs cemented in place.

The rear balsa block is shaped and sanded, then cemented in place. Nose cowling consists of two blocks hollowed to proper shape. The top cowling is made removable. It is hinged by pieces of cloth so it can be folded over to refill tank and other necessary adjustments. Pin hooks are attached to cowling and stopped with small rubber bands. Bottom cowling is held by dress snaps, pegs, or any other convenient method. Cut holes for cylinder head and exhaust.

Landing Gear: Landing gear is $\frac{1}{8}$ " in diameter steel wire. They are bent at proper angles and lengths. Blocks of hardwood $\frac{3}{8}$ " square are notched to fit landing gear. A tight fit must be accomplished. Holes are drilled through blocks, firewall, and former E. Holes are of $\frac{1}{8}$ " diameter; $\frac{1}{8}$ " pegs are inserted into holes and cut flush with surface, then cemented. I assure you this is a landing gear which will cause no trouble.

Boom: The boom is of block balsa made in two halves hollowed out. A piece of $\frac{1}{2}$ " x $\frac{1}{2}$ " hardwood runs through the boom which is secured to the wing. This stiffener allows assembling and disassembling. It is slotted 4" in length through the center leaving $\frac{1}{8}$ " of stock on either side. W-1 wing ribs are fitted into the slot and cemented. Then balsa block is shaped and cemented around the ribs and the stiffener. This process is done after wing is built and joined together. It shapes off the front of the boom and streamlines itself into the wing section. (Turn to page 116)





FORMERS A, E 1/8" PLYWOOD
ALL OTHERS 1/8" SHEET BALSA

1/2" SQUARES

RUDDER
1/8" SHEET
1/2" SQUARES
1/4" DOWEL

STABILIZER PLATFORM
1/8 X 1/2" STRIPS

SHAPE TO FIT STABILIZER

SKID
1/4" SHEET

REMOVEABLE BOOM

1/32" SHT. COVERING

1/8" SHT. SPAR JOINER

TRAILING EDGE 1/8" THICK, TAPERS 3/4 TO 1/2"

LEADING EDGE 1/4 X 1/2"

36"

10"

TRAILING EDGE 1/4" THICK, TAPERS 3/4 TO 1/2"

SLOT 1/4" IN STIFFENER FOR RIBS W-1

MOTOR MOUNTS
1/2" SQ. HARDWOOD

OHLSSON 60
BLOCK BALSA

BLOCK BALSA

1/8 X 1/4" STRINGERS OMITTED FOR CLARITY

1/8" DIA. WIRE

3" AIRWHEELS

1/4" SHT. KEEL

BATTERY

COIL

TIMER

1/8" SHT.

1/4" SHT.

1/2"

1/4" SQ.

1/4" SQ.

1/4" SHT.

1/4" SHT.

1/2" SQ. HARDWOOD

1/4" DOWEL

7/16"

3/8"

5/8"

1/4" DOWEL

1/8" WALL THICKNESS

5/8"

1/4" DOWEL

8"

15/16"

1/8" SHEET

1/4" SQ.

1/4" SQ.

1/8" SQ.

1/8" SHT. GUSSETS

3" CENTERS

S-1

S-2

S-3

S-4

S-5

S-6

5-5/8"

1/2"

1-3/8"

17"

1-3/4"

2-7/8"

2-5/8"

2-3/4"

2-7/8"

19-7/8"

1-1/2"

3-7/8"

3-13/16"

BUILD UP STATIONARY BOOM OF 1/4 AND 1/2" SHEET

1/4" SHEET

1-1/2"

1/8" PEG BOOM HOLD-ON

G

H

I

J

WING DIHEDRAL

4-1/2"

1/4" SHEET

1/4" SHEET GUSSETS

W-12

W-11

W-10

W-9

W-8

1/4 X 1/2"

1/4" SQ.

W-7

W-6

W-5

W-4

3" CENTERS

W-3

W-2

1/8" SHEET SPAR JOINER

W-1

1/16" SHEET COVERING

1/16" SHEET COVERING

1/16" SHEET COVERING

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Aero Car

(Continued from page 55)

Holes are drilled through the detachable boom and $\frac{1}{2}$ " square stiffener. This allows pegs to be inserted through boom, securing for flight. The stabilizer platform is built up with $\frac{1}{8}$ " x $\frac{1}{4}$ " strips. It is important that the boom be made so there is no play where it is assembled; if there is any play existing, desirable flights will not be obtained.

Wings: The wing is built one panel at a time. First pin down trailing edges and spars. Cement ribs, gussets, and leading edge in place. Place $\frac{1}{8}$ " sq. where called for and let dry over night. Cement both wing panels together with spar joiners as shown.

Stab: The stabilizer is made in a similar manner: pin spars down first and the leading and trailing edges last.

The rudders are cut out of $\frac{1}{8}$ " balsa sheet, shaped, sanded, and cemented in place. $\frac{1}{16}$ " sheet balsa is cemented on leading edges of wings and stabilizer as indicated.

Before wing ribs W-1 are assembled, mark off exact position of the boom block. This must be accurate or empennage alignment will be difficult. Raise the rear end of the stiffener exactly $\frac{1}{16}$ " above level when the center rib is placed flat on a smooth surface.

Covering: With time and patience the fuselage can be covered so there is not even a wrinkle. The trick is covering small areas at a time. When fuselage is completely covered spray with water and let dry. In the meantime, other sections can be covered, such as wings, stab, etc. The wings and stab can be covered in four sections. The two top halves and the two bottom halves. When all surfaces are dry dope the surface three or four times with clear dope. Colored dope can be used; that is up to the individual. I like red ones.

Testing and Flying: When the model is completed check for warps and correct alignments. The ship should balance at $\frac{1}{3}$ of chord string from leading edge. No incidence in stabilizer was used, but if needed add it in small doses until proper amount is obtained. Hold the model between the two landing gears above your head; run until flying speed has been gained. Do not throw the ship; let it leave your hand gradually. This should be done and adjustments made until a good glide is achieved.

For power flights set the timer for about ten seconds. Do not lean the engine out. Gradually increase power on succeeding flights; make necessary adjustments until full power can be used. Open 'er up and start running—engine can be opened. If the builder gets as much enjoyment out of the Aero Car as the designer, he will be well rewarded.