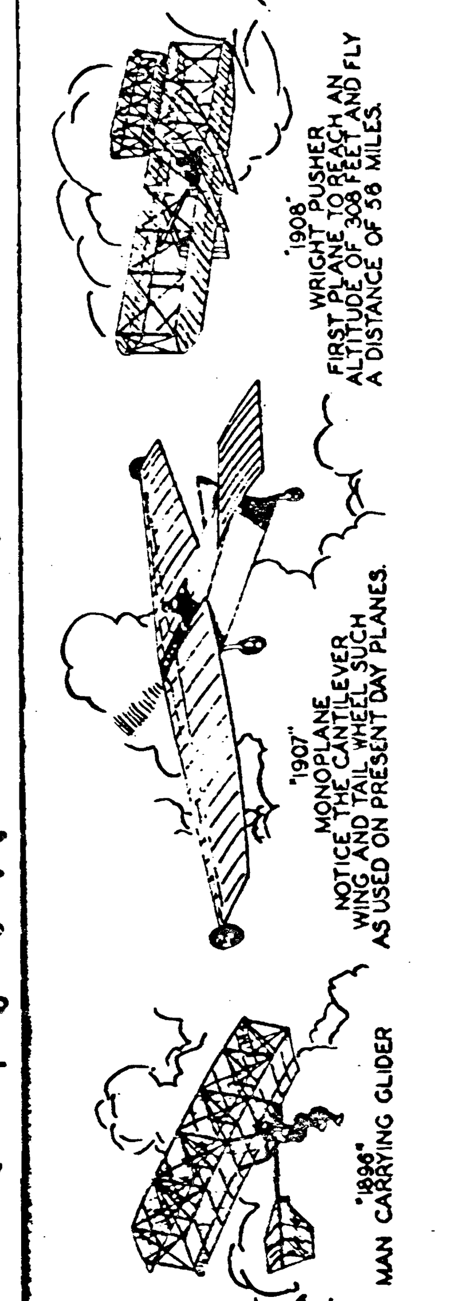

TEMPLATE "H" 2 REQUIRED
TEMPLATE "G" 2 REQUIRED
FLAP FOR PASTING
TEMPLATE "B" 2 REQUIRED PASTE FLAPS TOGETHER
TEMPLATE "D" & "C"
TEMPLATE "F"
TEMPLATE "E"
LEADING EDGE 3/32"X3/16"
CUT WING LETTERS FROM SAV-A-PLAN STRIP PASTE TO BOTTOM SIDE OF WING PANELS.
LANDING GEAR STRUT BRACE 3/32"X3/16"
AMERICAN WING INSIGNIA
BLUE
WHITE
RED
WING TIP BRACE
3/32 SQ.
3/32"X1/4"
WING SPAR 3/32"X1/4"
CONTROL OUTLINES CUT FROM SAV-A-PLAN STRIP. PASTE TO TOP AND BOTTOM OF WING PANELS.
3/64" THICK
RIB
TRAILING EDGE 3/32"X1/8"
FLAP OUTLINE IS PASTED TO BOTTOM OF WING ONLY.
FLAP OUTLINE
DIHEDRAL
AILERON CONTROL OUTLINE
TRAILING EDGE
TEMPLATE "A"
LONGERON
MACHINE GUNS
CROSSBRACE
TRIM
GUNSIGHT
AERIAL
LEAD IN WIRE
TEMPLATE "D"
TOP VIEW
RUDDER
AERIAL MAST
GUN SIGHT
OIL COOLER
MACHINE GUNS
COWL
WING WALK
WING WALKS CUT FROM REAR OF PLAN
EXHAUST
SCALE PROPELLER ARC
AIR SCOOP
OLEO STRUT
TWO PIECES 3/32"X1/4"
SANDPAPER ROUND
USE PIN FOR AXLE
SCALE WHEEL
FRONT VIEW
NOTE: TRACE ALL TEMPLATES FROM PLAN ONTO STIFF PAPER. CUT OUT TRACED FORMS. BEND TO REQUIRED SHAPE AND CEMENT INTO THEIR PROPER POSITIONS. USE CARBON PAPER TO TRACE TEMPLATES FROM PLAN ONTO STIFF PAPER.
HINGE
TRIM
0451
F2A-1
FIN
TRIM TAB
ELEVATOR
COMPRESSION BRACE
PAPER HINGE
STABILIZER
TEMPLATE "I"
HEADREST
TEMPLATE "E"
COCKPIT ENCLOSURE MADE FROM STIFF PAPER
LIFE RAFT
TEMPLATE "F"
TEMPLATE "B"
AERIAL MAST
OIL COOLER
SPINNER CAP
PROPELLER SHAFT
NOSEPLUG
2 WASHERS
EXHAUST
INSPECTION DOOR
HANDGRIP
TEMPLATE C
TRIM STRIPE
BODY STRIPES
DIAGONAL BRACE
POSITION OF WING
STEP
NAVY INSIGNIA
BAGGAGE HATCH
3/32" SQ. LONGERONS
WINDOW
REAR MOTOR HOOK
STIFF PAPER
TEMPLATE "H"
LEAVE SPACE UNCOVERED AT REAR OF BODY TO ALLOW RUBBER MOTORS TO BE EASILY ATTACHED OR REPLACED.
TAIL WHEEL
COWL BLOCK
COWL COVER
WHEEL POCKET
TEMPLATE "A"
TEMPLATE "G"
LANDING GEAR STRUT
BACK OF SCALE PROPELLER IS DULL BLACK
SIDE VIEW
SCALE WHEEL
RIGHT LANDING GEAR STRUT
BUILD UP LANDING GEAR STRUT AND COVER WITH STIFF PAPER. ATTACH TO WING PANELS AFTER WINGS HAVE BEEN COVERED WITH TISSUE.
LEFT LANDING GEAR STRUT
TEMPLATE "A"
ACE WHITMAN

SCALE: 3/4"=1'-0"
A TRUE VALUE KIT

BREWSTER F2A-1

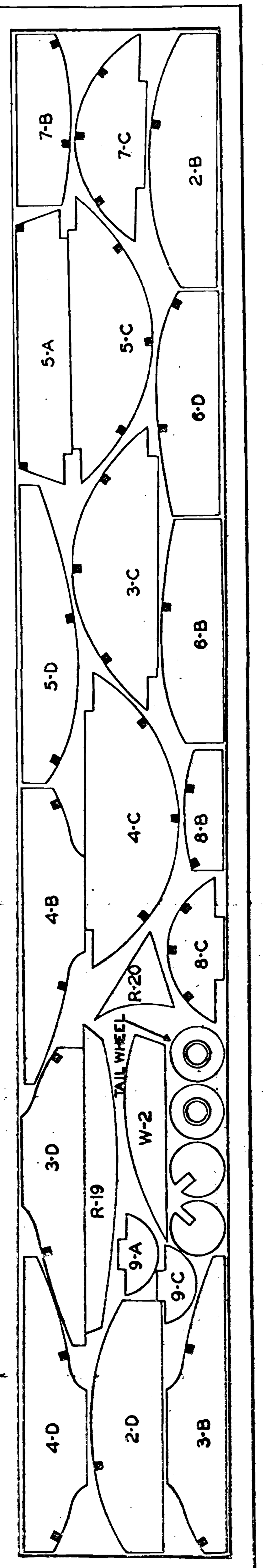
EXACT SCALE FLYING MODEL

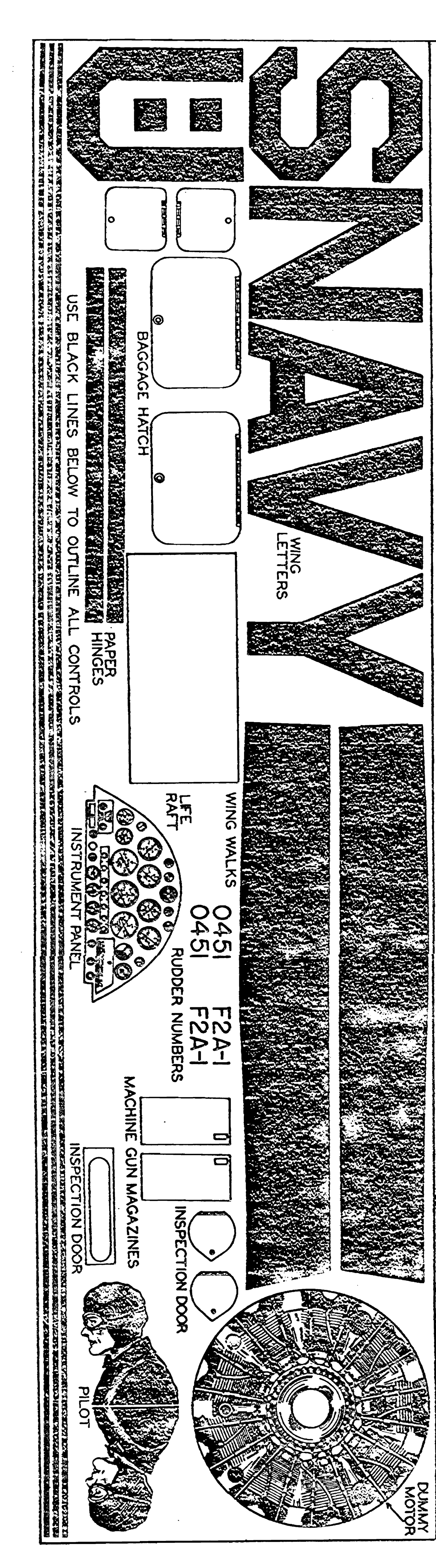
NO. 2967 WHITMAN PUBLISHING COMPANY
RACINE, WISCONSIN U.S.A.



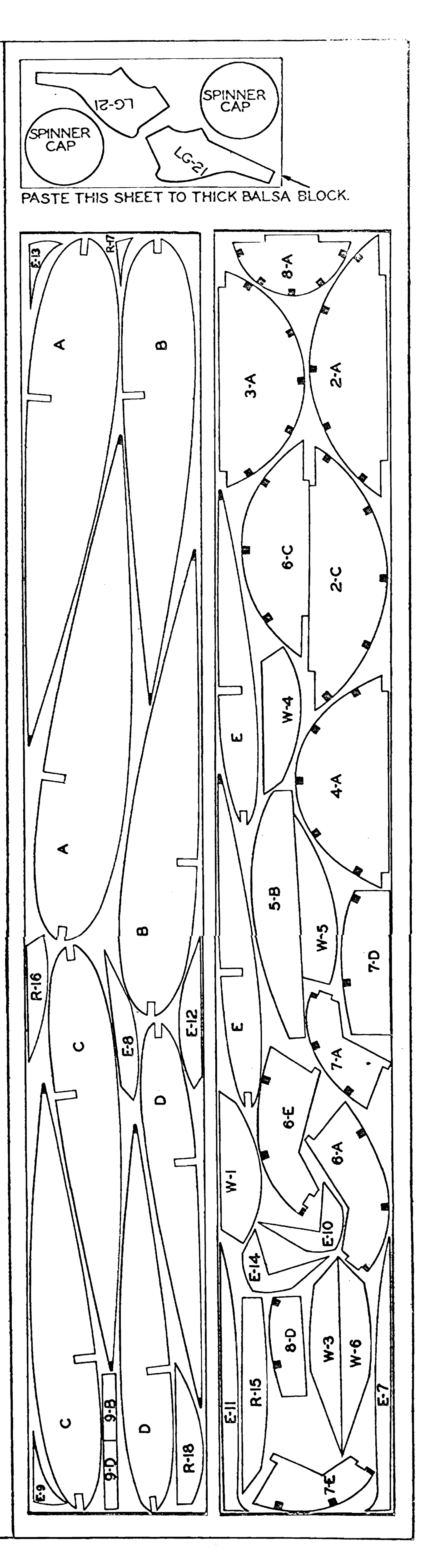
CONDENSED INSTRUCTIONS

- Place drawing board or flat smooth board on bench or table. Lay plan, blue side up, on board and cover it with transparent waxed paper. Smooth out both plan and its waxed paper cover and fasten to board at corners with pins or thumb tacks. During the early building stages, balsa parts are cut from various sheets and bundles of sticks to exact size and are pinned to board right through waxed paper and plan with many ordinary thin pins. As the waxed paper is transparent, all drawings and sketches show through plainly. All balsa parts are held in exact positions while cement is drying and thus, when removed, should maintain correct shapes. As cement does not stick to waxed paper, said paper can be used several times.
- Place longerons in proper positions.
- Cut uprights to correct sizes, cement into position and allow to dry thoroughly.
- Put in diagonal braces.
- Build a second body side in same manner.
- While second body side is drying cut out all body formers carefully from rib sheets.
- ~~Remove the second body side~~ from plan and put in all body formers and cross braces. When cement is thoroughly dry check body for alignment.
- Be sure all corners are square.
- Cut out all pieces required to build the wings.
- Place spars and trailing edges in positions and insert ribs. Complete by attaching leading edges and wing tips.
- Remove wings from plan and sandpaper leading and trailing edges round to conform with airfoil sections.
- Cut out pieces required to build tail and rudder. Work over plan.
- Cut cross members and cross braces to size. Apply cement to ends of pieces and pin down into position. When dry, remove assembled parts from plan.
- Construct landing gear as shown in various views and sketches.
- As COMPLETE detailed instructions are given on back of blueprint, plan can be removed from board so that perspective sketches and other details for finishing model are available.






TEMPLATE "A"
MOTOR COWL BLOCK
NOSE PLUG
BREWSTER F2A-1
W-4
W-5
W-6
3/32" SQ.
RIB "E"
3/32"X3/16"
3/32"X1/4"
RIB "D"
WINGSPAR
RIB "C"
PROPELLER
TRAILING EDGE
RIB "B"
LEADING EDGE
3/32"X1/8"
3/32"X1/4"
RIB "A"
WASHERS
SHAFT
NOSE PLUG
STABILIZER
HINGE
ELEVATOR
BRACE
3/32"X1/8"
E-7
E-8
E-9
E-10
E-11
E-12
E-13
E-14
R-15
R-16
R-17
R-18
R-19
FIN
RUDDER
TRIPOD
LONGERON
UPRIGHT
BODY UPRIGHT
DIAGONAL BRACE
LANDING GEAR STRUT
HOW BANDS ARE JOINED
WING RIB SECTIONS
BODY CROSS SECTIONS
DOTTED LINES DESIGNATE DIAMETER OF COWL BLOCK.
NO.1
NO.2
NO.3
NO.4
NO.5
NO.6
NO.7
NO.8
ACE WHITMAN PRODUCTS



DETAILED INSTRUCTIONS

Study plans, perspective sketches and instructions carefully and thoroughly before attempting model construction. Time and patience are required to make this exact scale model. Always bear this in mind. The following few additional tools and materials, other than those supplied, are necessary to build this airplane model: A razor blade (preferably one with a heavy rounded back); a small drawing board upon which to work and cement parts; about fifty small thin pins; a pair of pliers for bending shaft; some small pieces of sandpaper; and a piece of waxed paper 12x36 inches.

STEP 1 • RE-ENFORCED PRINTED SHEETS
Printed balsa rib sheets are supplied. But, when stronger models are required, plain sheets of white writing paper can be pasted to backs of rib sheets. Apply library paste to paper and attach to back of each rib sheet. Paper re-enforcements eliminate possibility of cracking balsa along the grain. While drying, place pasted parts between two flat surfaces and apply weights to them (some old magazines or books) to prevent warping. Do not remove paper re-enforcements from various pieces after they have been cut from rib sheet.

STEP 2 • SANDPAPERING
Material: Wood Block and Sandpaper (not furnished)
For sandpapering obtain a small block of wood and fold sandpaper tightly around it. Rub sandpaper covered block with an outward motion LIGHTLY and SQUARELY on all balsa strips. Avoid rounding edges of square longitudinal pieces.

STEP 3 • SPARS, ETC. Material: Sanded Balsa Strips
From the sanded strips select the correct sizes as required on the plan for leading edge, spar and trailing edge. Do this before any notches are cut in ribs so that fit will be very close or tight. A good close or tight fit requires less cement. Consequently, less weight will be added to the finished model.

STEP 4 • WING—RIBS—WING TIPS Material: Printed Balsa Rib Sheets
With a razor blade cut out illustrated ribs and wing tips from rib sheets as they are needed in the process of building the wing. This will prevent pieces from being lost. Begin assembly by working over the wing in the top view. It is advisable to place a piece of waxed paper over plan to prevent wood parts from adhering to and tearing or soiling plan when they are removed.

While working over plan hold down balsa parts with small thin pins.

The wings are assembled in two units, namely, right and left panels. Place spars and trailing edges in position and insert ribs beginning with A, B, C, etc. After all ribs are in place, fit leading edges in position and complete wings by inserting wing tips. Cement all joints carefully and when they are thoroughly dry remove wings from plan.

STEP 5 • ELEVATORS AND STABILIZER
Material: Balsa 1/32" sq., 1/32"x1/8" and Printed Rib Sheets
The tail is assembled in two units, namely, stabilizer and elevator. Sandpaper all strips as explained in Step 2, before cutting to required lengths. Use waxed paper and pins in assembly. Cut cross members and cross braces to required sizes and cut curved tips from rib sheet. First, place cross members and then front and rear edges in position. Pin down firmly. Apply small amount of cement to cross braces and curved pieces before inserting and pinning down into position. When all pieces are in their proper places, allow cement to dry thoroughly before removing from plan. Two black strips are printed on rear of plan. These are to be used for paper hinges. Cut off hinges to required sizes and slit balsa cross members at positions indicated and insert hinges. Apply cement only to outer edges of hinges.

STEP 6 • FIN AND RUDDER Material: Balsa 1/32" sq., and Printed Rib Sheet
Cut required parts from rib sheet. Assemble rudder in two units, namely, first the fin and then the rudder. Work over side view. Rudder is assembled in the same manner as stabilizer. Allow cement to dry thoroughly before removing from plan. Paper control hinges can now be inserted.

STEP 7 • BODY-SIDES Material: 3/32" sq. Balsa
Cover side view of plan with waxed paper.
Assemble body sides over side view. First pin down longerons. Next put in upright members. Start at front and work toward rear. Cut uprights to size and apply cement to ends before dropping into their correct positions. Now put in diagonal braces. When thoroughly dry, remove body side from plan. As two such sides are required, replace waxed paper over plan and make another similar body side.

STEP 8 • BODY-FORMERS Material: Printed Rib Sheet
The second body construction step is the assembly of the two sides into the completed frame. Work over top view. Cut body formers from rib sheet. Stand both body sides up side down on plan and pin into position. Place bottom body formers into position and cement into place, one station at a time. Start at rear and work toward front. Crack or bend longitudinals where necessary. When cement is thoroughly dry, remove from plan. The top body formers can now be cemented into position. Put in body side formers. Check trueness of body by holding frame so that it can be viewed from front to rear along center line. Check corners to be sure they are at right angles and perfectly aligned.

When cutting out stringer notches make them a trifle smaller than the printed outlines to assure a tight fit for the stringers.

STEP 9 • BODY-STRINGERS Material: Balsa 3/32" sq.
The same kind of materials are used for both longerons and stringers. Smooth with sandpaper, cut to required lengths and cement into positions indicated BY NOTCHES IN FORMERS as stringers are purposely not shown on plan. They run lengthwise along outside of body to help round out body and support covering.

STEP 10 • TEMPLATES Printed on Plan
All stiff paper templates are shown in full size on plan. With carbon paper trace these templates onto stiff paper. Cut out traced forms to exact size, bend to required shape and cement into position during the process of assembly. Apply cement to proper edges and hold or pin into position until cement is thoroughly dry.

STEP 11 • MOTOR COWL AND COWL COVER
Material: Balsa 1/2"x4 1/8"x5 1/4" and Template "A"
Cut ready formed motor cowl from heavy balsa block. Sandpaper edge until smooth. Trace cowling cover template from plan onto stiff paper. Bend into a cylindrical form, overlap one edge until it reaches dotted line and then cement together. While this part is drying slip it over motor cowl block to check size and attain a snug fit to motor cowl. DO NOT cement cowling cover to front of ship until entire model has been completely covered with tissue.

STEP 12 • PROPELLER Material: Balsa
A machine cut propeller is supplied. However, it is not completely finished. Sandpaper corners and edges round. Propeller must be balanced. Do this by piercing propeller center with a very thin pin which in turn is stuck to the edge of a board, thus permitting propeller to revolve FREELY. When propeller is properly balanced it will remain stationary, on its shaft, in any position. Sandpaper heavier blade until balance is attained.

STEP 13 • BEARING, ETC. Material: Furnished
The bearing, shaft and washers are all furnished ready to use. Note that the shaft is placed first through the bearing then through the washers and next through the propeller. Bend shaft over into a "U," pull back into hub of propeller and cement securely. Be sure shaft is aligned properly with blades so they will revolve truly. As tension of rubber motor will hold nose bearing in position DO NOT cement it to motor cowl. This will permit propeller unit to be readily removable from front of ship. Now insert rear motor hook into position shown in side view. Cement securely.

STEP 14 • LANDING GEAR AND TAIL WHEEL
Material: 3/32" sq., 3/32"x1/4", Paper Templates
Balsa Block and Printed Rib Sheet
From the thick cowl block cut the pieces required to build the landing gear. The main strut of landing gear is 1/4" thick. This must be built up from the surplus wing spar stock. Cut to correct length and cement two pieces of 3/32"x1/4" together to obtain a piece 1/4" sq. Build landing gear strut over full size views on front of plan. Trace two templates "G" onto stiff paper and cement to landing gear struts. Attach the two LG-21 blocks to assembled struts and cement securely. Pin re-enforcements should be used between the main or shock strut and the two LG-21 pieces. By means of thin pins, the wheels can now be attached.

The tail wheel is made from four separate pieces. Cut them from the rib sheet. Cement the various pieces together and "crossgrain" every individual piece. This is done to attain extra strength and to avoid warping. The two middle pieces have slots or notches for inserting tail wheel strut. These notches or slots must be matched when building up tail wheel as tail wheel STRUT is inserted into them. After cement is thoroughly dry, round outer edges to a tire shape. Now insert tail wheel strut. The landing gear and tail wheel are not attached until the final assembly.

STEP 15 • COVERING, ETC.
All individual complete parts are to be covered all around or on all sides. First sandpaper all rough edges and make all corners slightly rounded. Fit the tissue paper first, a section at a time, then apply cement and finally attach tissue and allow it to dry. Cover all parts completely and apply as much tissue in one section as possible without undue wrinkling. Cover body sections, where stringers are used in narrow longitudinal strips applied between each stringer over entire length of body. This prevents undue wrinkling and produces a much smoother appearance when tissue is tightened by shrinking, as explained. With a very fine atomizer or insect gun, spray entire covering of framework very lightly with water. Allow parts to dry. The tissue shrinks as it dries. This gives the parts a smooth tightly stretched covering. When parts are completely covered and dry they are ready for final assembly.

STEP 16 • WINDSHIELD AND ENCLOSED COCKPIT
Material: Transparent Stock
Make windshield and cabin windows from transparent stock supplied. Cut and fit material until proper size and shape are attained. Insert pilots and instrument panel into position before cementing windshield into place. Apply cement to outer edges of pieces and place into positions. Use pins in assembly until cement is thoroughly dry.

STEP 17 • ASSEMBLING
When all individual parts are completed they are ready for final assembly. Cement elevator and rudder into positions shown and allow cemented joints to dry thoroughly. Attach wing panels and block up wing tips until proper dihedral angle is attained. After these parts are completely dry attach landing gear and tail wheel. Line up the landing gear to correspond with drawing. Now cement tail wheel into position. Affix cowling to front of body. Apply cement to outer edge of cowl block and slip cowling cover into position. The model is now ready for decorations.

STEP 18 • DECORATIONS Material: Printed on Sav-A-Plan Strip and Emblem Sheet
Cut various decorations from Sav-A-Plan strip and Emblem Sheet. Apply a thin layer of cement to backs and place in positions. Cut "U. S. Navy" from strip and cement to bottom of wing. Cement dummy motor into front indentation of cowl block.

STEP 19 • RUBBER MOTOR Material: Rubber 1/32"x1/16"x7" (2 Bands)
Two large rubber bands are supplied. Tie them together to form a two strand rubber motor about 14" long. Sketch shows how bands are joined. Attach rubber motor between propeller shaft and rear motor hook. Rubber motor can be easily inserted by threading or pulling into position with a piece of string dropped through body if held in a vertical position. At front of ship nose plug is removable, but at rear of ship a small opening in the covering should be provided for inserting the rubber motor.

STEP 20 • SCALE PROPELLER Material: Balsa (not furnished)
A view of the scale propeller is shown on front of plan for those who do not wish to use the machine cut propeller supplied.

STEP 21 • FLYING
When model has been completely assembled it must be checked for center of gravity balance before a trial flight is attempted. Place the forefingers at the midpoint of the wing tips and lift model to see whether it balances. If tail has a tendency to drop it denotes tail heaviness which may be overcome by adding a little weight to nose of ship. If nose has a tendency to point downward, add a little weight to tail. Use this procedure until proper balance is attained. Tacks or pins can be inserted into front or rear of model to produce proper balance. When plane remains horizontal, while suspended on finger tips, it can be considered balanced. A few short trial glides should be made AFTER the model has been properly balanced (not before). When gliding, if ship has tendency to climb and if it does not make a gradual glide downward, it indicates that tail is still a little too heavy. This must be offset by additional weight at front of model. To be certain that ship is correctly balanced, hold it, unwound, in position for launching and if the glide after leaving the hand is steady and consistent and goes forward 10 or 15 feet, ship can be considered as making a normal glide. Model is now ready for its trial flight. When gliding the ship do not launch it upward. Launch it with the nose pointed slightly downward which permits gravity to take effect. Before trying a powered flight it is advisable to test motor by winding propeller with right forefinger. Permit rubber motor to unwind completely, two or three times. At this time check trueness of propeller rotation. While turning propeller and thus winding rubber motor, hold model firmly by its noseblock. The proper number of turns for rubber motor is attained when its coils or twists are fairly small and tight.

STEP 22 • SAVE YOUR PLAN AND COLORED PORTRAIT ON BOX
Although your model is finished your plan PROPER is still complete or intact. That is, no parts or templates should have been cut from it. Therefore, it can be looked over for small, possibly forgotten details.

For convenience of model builder all ribs, formers, etc., as shown on printed sheets are duplicated on this plan for use in final checking, repairing and for the building of additional models.

Sav-A-Plan can now be filed away for future reference.