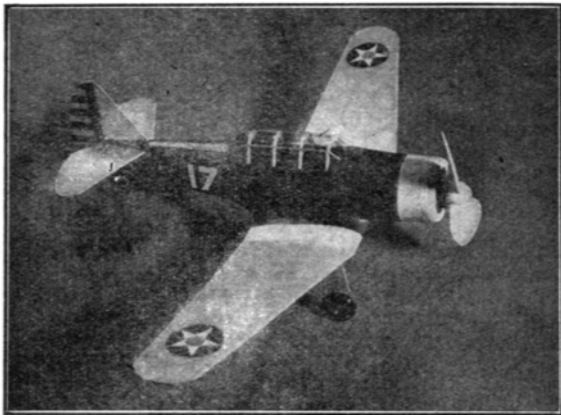


## ARMY BC-1

**Follow these plans and instructions for building one of the most realistic scale models ever designed to fly.**

**By Milton Kahn**

DEVOTEES of flying scale jobs haven't a very wide selection these days since most of our planes are either mid-wingers or low-wingers. On top of that, the majority are military types.



A perfect example of craftsmanship. It flies as well as it looks.

Some sort of a bugaboo still exists, however, that low-wing flying scales are not so hot, and as a result are more or less treated like a stepchild. Nonsense! That's all this author has been building and flying for the last three years, and he can report nothing but excellent flights with swell flying characteristics to boot-including this month's job.

The North American trainer in Air Corps circles is known as the BC-1 basic combat. The manufacturer's designation is NA-16-3. This two-place ship is widely used in preparing Flying Cadets to eventually handle swift, single-seat fighters. This "prep school" ship is a tricky job, and has to be flown every minute. The BC-1 is powered with a 550-h.p. Pratt & Whitney Wasp engine and cruises at 195 m.p.h. It has a maximum speed of 210 and a rate of climb of 1500 feet per minute. Landing speed with flaps is 67 m.p.h. and cruising range is 900 miles. Structure is all-metal throughout and tail surfaces are stressed-skin covered while moving parts are fabric faced.

## FUSELAGE CONSTRUCTION

EASIEST WAY to start things right is to remove Plates 1 and 2 from the magazine and pin down to a flat surface. Over these pages, spread a convenient sized sheet of wax paper. The necessity of this will be obvious. Your first step is to cut to correct size the four longerons and pin them into position on the side view. The longerons are identified by the dotted longitudinal lines.

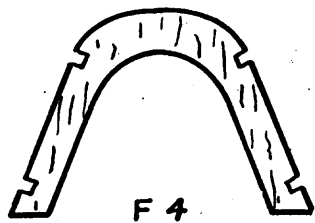
Cement the uprights (also called compression members) in position. After one frame is completed, lay down the second side and in due time remove so that both sides can be attached by cross braces. The cross members are cemented at right angles to each upright. An illustration is best given on Plate 1 showing a front view of the frame with formers around it.

Crack the frame slightly at the point where former F-3 is to be mounted. Taper the nose so that F-1 can be cemented as shown in the top view. The remaining three formers (also parts of F-1) required to round off the nose is shown in full size front view on Plate 1. The side formers are notched for a single side stringer, top and bottom formers, for three stringers.

Formers, F-4 to -7 inclusive, are cemented as shown, while on the bottom, formers F-8 and 9 (formers and wing spars combined) to F-13 are cemented in position. Later, F-2 formers are attached on each side of the body. After this is secured, fit in the 1116" by 3132" stringer as shown and taper as noted on Plate 2. Up front, this stringer is cracked slightly and cemented at the angle shown between the nose bulkhead and F-2.

Wing fillet parts WF-1, of which two are required, are cut to shape and attached after the leading edges of the stub wing are cemented into position. Rear wing fillet WF-2 is likewise attached when ready.

The cockpit hatch is strengthened by cementing in the stringers where required. The curved rear part of the stringers are cut to the necessary shape from 1116" sheet. Stringers required for the top and bottom formers are attached next. Omit the center stringer for the bottom formers until the entire wing has been built and cemented in position. Study your plans so that this is made entirely clear to you before covering the model.



F 4

REMOVABLE PLUG

F3

F4

F1

F2

$\frac{1}{16}$ " SQ.

WF-2

F8

F9

F10

WING  
RIB

WF-1

$\frac{1}{16}$ "  
SHEET  
BALSA

WIRE  
AXLE.

SIDE VIEW

TOP

F 1

WING FILLET  
WF-1

POSITION OF LANDING GEAR STRUT

WING FILLET  
WF-2

LANDING GEAR  
FRONT VIEW

R2

R1

$\frac{1}{16}$ "  $\times$   $\frac{1}{8}$ "

F2

F8

F9

F1

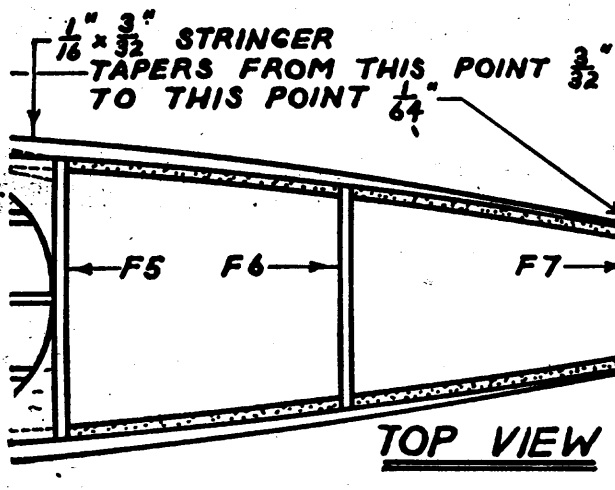
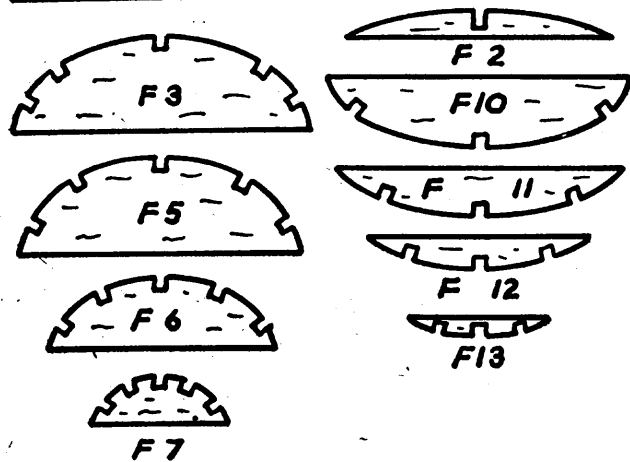
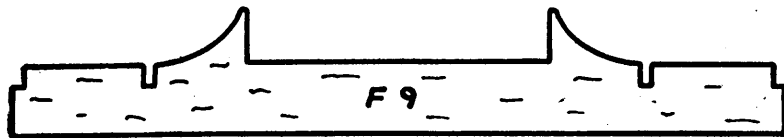
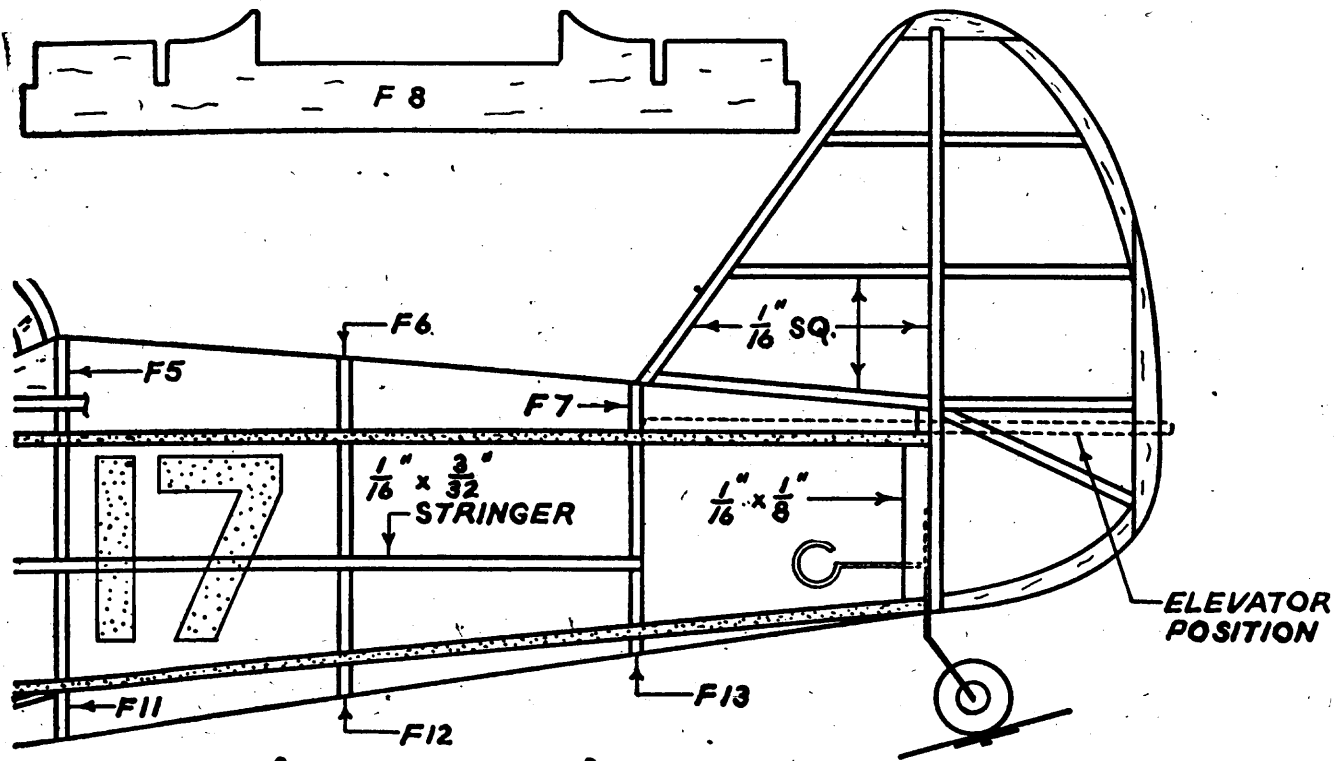
F3

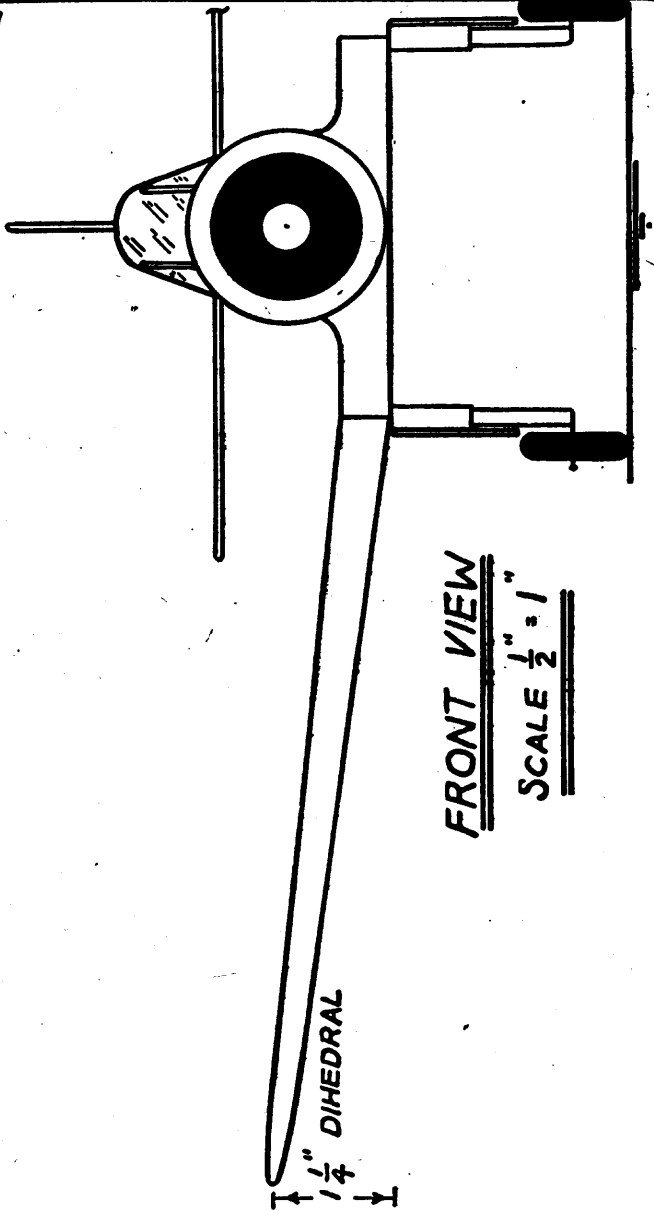
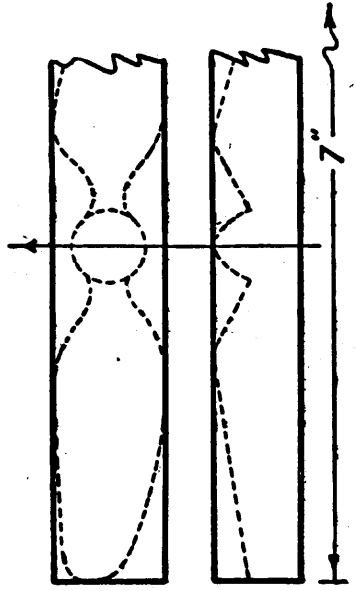
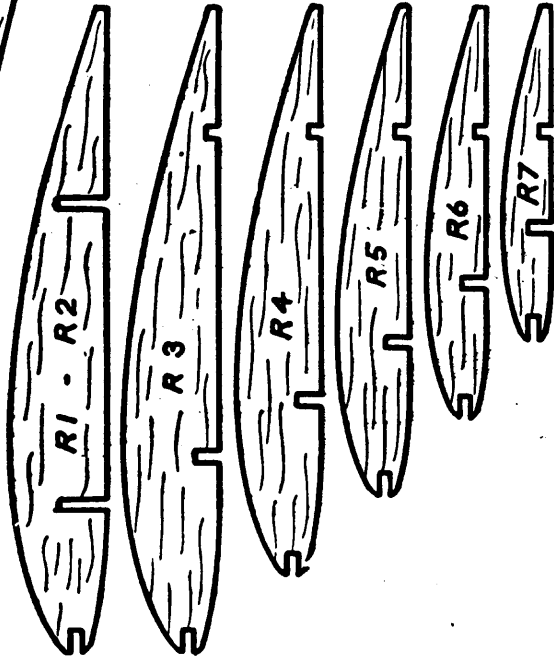
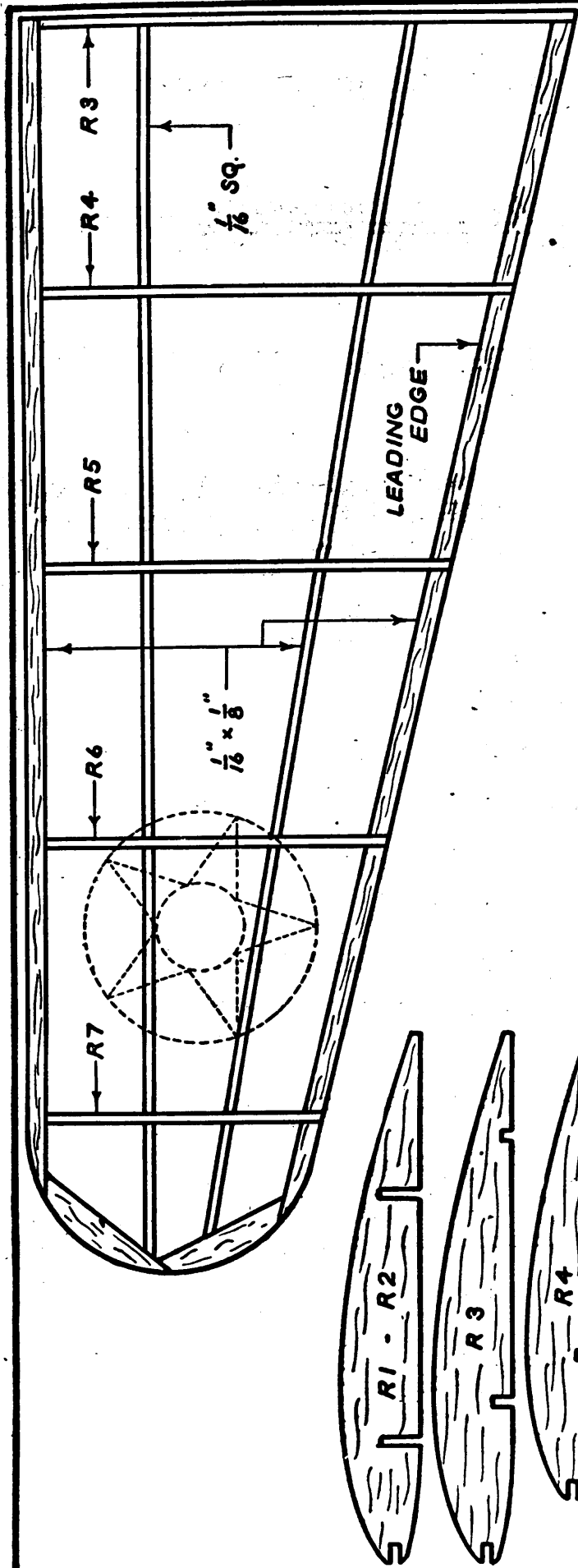
F2

F8

F4

F10



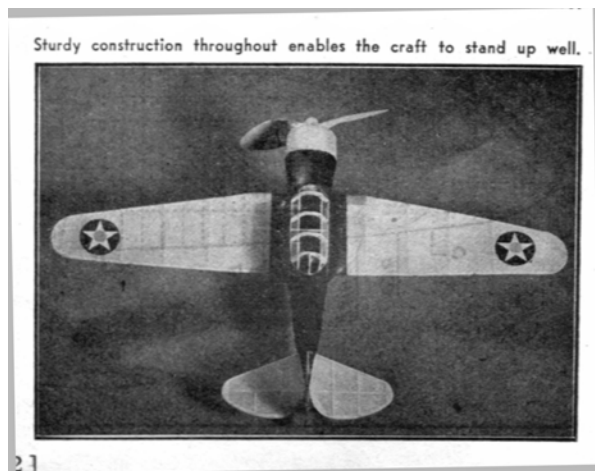


FRONT VIEW  
SCALE  $\frac{1}{2}$ " = 1"

## WING AND TAIL

BEFORE MAKING right and left wing panels, the center section, or stub wing, must be built into the fuselage. Since formers F-8 and -9 are already cemented in place, attach wing ribs R-1 and 2 into the notches provided for them. Next fit into their leading edge slots, the leading spar. The trailing edge spar is tapered as required and also glued. Curved sections forming fillets WF-1 and -2 are next to be cemented.

Wing construction is conventional and simple. Shape the designated ribs and cut the notches out carefully. Pin down the wing spars directly over the wax paper covered plans and cement each rib as noted. Add the leading edge spar, followed by the trailing spar which should be tapered to conform correctly. The tips are added on last. Cement all joints well and later sand down the rough spots. The second half of the wing may be made by reversing the plan. Before-hand, however, go over the outlines with a pencil so that the impression shows clearly through the reverse side.



Ribs, spars, and leading edge of both the rudder and elevator are cut to correct lengths from 1/16" sq. hard balsa. The curved edges are trimmed to shape from 1/16" sheet. Apply cement liberally on all the connecting parts.

The rear hook is shaped from No.12 piano wire, inserted into the tail post as shown, and bent to shape and cemented. The tail wheel fork is made likewise and cemented securely. At this time, metal fittings for the landing gear and prop shaft may be shaped from wire of the same gauge.

## COWLING AND LANDING GEAR

THE FRONT edge of the cowl is sanded to shape from a disc of required proportions. Use

a compass to obtain the correct diameter and trim with a sharp razor. Make an opening in dead center for the removable nose plug. A slight recess is sanded in about 1/16" deep as indicated by the dotted lines in the side view of the cowl.

To attach the frontispiece of the cowl, first lay it flat on its face. Then cement four pieces of balsa each measuring 1/8" by 1/8" by 11/16" upright at quarterly intervals. After they have hardened in this position, take the whole unit, and cement it flush against the open-faced nose. When this dries, the cowl sides are covered with 1/32" sheet. However, first round off the 1/8" square mounts with sanding. Use model-making pins to aid in holding the sheet covering until the cement hardens sufficiently to warrant their removal.

The landing gear legs are made from hard balsa dowels a single length and then sanded and cut to shape. The front view plan of this unit is shown on Plate 1. After the leg is shaped, take a perfectly straight length of wire and carefully insert it through dead center of the strut all the way down until enough of it comes through the bottom to be bent outward for the axle. Apply a dab of cement on top and bottom ends.

The outer flaps are cut to the required pattern from 1/6" sheet. This is shown in full size on Plate 1. Flatten the outside of the upper part of the landing strut slightly so that when the flap is cemented it may adhere more easily.

When both landing gear legs are ready, attach them with a liberal amount of cement as indicated by the positions shown in top and side views;

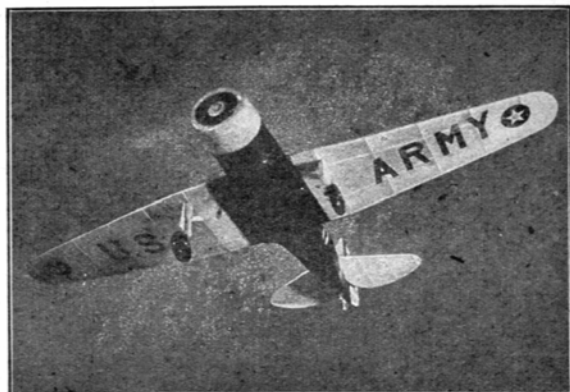
## PROPELLER AND COVERING

CARVE THE propeller from a hard balsa block measuring 1" by 1-1/2" by 7". By using slightly larger wheels the diameter may be increased. Enlarge the pattern shown on Plate 3 in order to obtain the full size blade. The spinner cap is carved integral with the prop. Cup the inner sides of the blades for greater efficiency. Insert the wire shaft as required, slip through the nose plug and bend to shape. Balance the blades perfectly. Covering the ship must be done in an expert manner in order to bring out the best looks for this craft.

Start with the tail parts. Use yellow Japanese tissue as in this case it is the standard color for a military plane. Apply the dope lightly along the leading edge of the elevator from one end to the other. Lay on the paper and smooth

out the wrinkles. When the liquid dries, apply the dope more generously to the ribs, center spar and trailing edge. Fold the paper over these parts and pull tightly.

The outer edges are then trimmed leaving a 1/8" margin. This is doped and folded in all around the edges. The uncovered side is treated likewise and trimmed. The rudder is covered with yellow tissue and after this is completed, both surfaces are sprayed lightly with water and set aside to dry. These surfaces must not be doped with banana liquid as they will warp completely out of shape.



Graceful lines and beauty of flight are captured by this excellent take-off shot.

The wing panels are also covered with yellow tissue. First cut out a pattern of the outlines, leaving a quarter inch margin all around. Apply the dope over the front edges of the ribs and flatten the paper to them. As soon as the liquid dries, extend applications of dope down to the trailing edges and smooth the paper right over it. Then the leading and trailing edges are tacked down and the tips trimmed. The top part of the wing is covered in the same manner.

When both panels are completed, shrink the tissue by water spraying both sides of each wing. After that, apply at least two coats of dope. Regulation colored stars are attached to the top and bottom surfaces as shown in the wing plan view on Plate 3. The letters spelling out U. S. ARMY should be trimmed out of black paper and mounted in the correct manner. The flight photograph illustrates this best.

Before covering the fuselage, install the rubber power and hook on the washers and propeller.

The fuselage is covered in sections. First the sides, then the rounded top, and lastly the bottom. Blue paper is used throughout for the body, including the fillet section extending from

the side of the body out to the first rib of the stub wing. The space between that rib and the outer rib of the stub is covered with yellow paper. The cowling may be covered with blue paper if desired. It may, however, require more than one covering in order to darken the lighter colored sheet balsa.

The cockpit hatch is covered with either isinglass or thin sheet celluloid. Trim the rudder with regulation red, white, and blue stripes. A sheet of such tri-colors may be purchased at any model supply shop.

### ASSEMBLY AND FLYING

ATTACH THE wing panels to the stubs with plenty of cement. Place object at the extreme tips of the wings so that the dihedral angle measuring 1-1/4" will be obtained. Insert small model-making pins between the first wing rib and the stub wing rib to aid in holding this angle. Later remove the pins and fill up the holes with small dabs of cement.

The stabilizer is slipped into position and cemented fast. The rudder is mounted next. Be sure that these surfaces line up at right angles to one another.

As the ship stands, it is a bit tail heavy and therefore requires additional weight to the nose. This can be accomplished by add five or six coats of dope to the cowling, and after they are dry dab another several coats of blue dope. Paint the landing gear flaps blue. Coat the propeller several times, and if slightly more weight is needed use the inner trough of the cowling to accommodate small pieces of lead, solder, etc.

Trim the model by balancing it on your fingers. The balancing point should be right in front of the last.

The ship shown in the photographs is equipped with celluloid wheels. These are a bit hard and noisy. A pair of balloon tired wheels of the same diameter may be purchased at any model shop. It is suggested that this kind may be substituted for hard wheels as they make for easier landings. Glide the ship until the best is brought out. Then follow up with minor power flights. Study its behavior and make any adjustments that are required.

For *real* flights, use a geared winder and stretch out the strands at least twice their length. Try take-off flights. They're really very fascinating to watch.

## **BILL OF MATERIALS**

***(All wood medium balsa)***

Ten pieces 1/16" sq. for longerons, cross braces, stringers, etc.

Two pieces 1/16" by 1/8" by 8" for front wing spar

Two pieces 1/16" by 1/16" by 8" for rear wing spar

Two pieces 1/16" by 1/8" by 12" for the leading edge and wing tips

Two pieces 1/16" by 1/8" by 12" for the trailing edge

One piece 1/4" by 14" by 2" for the cowling nose piece

One piece 1/6" by 3" by 36" for ribs, bulkheads, tail parts, etc.

One piece 1/32" by 3" by 6" for motor cowling cover

One piece 1/4" by 1/4" by 6" for landing gear strut

One pair of rubber or celluloid wheels 1 1/8" diameter

One nose plug to fit

One piece of piano wire No. 12, eight inches long

One piece 1" by 1 1/2" by 7" for propeller ,

Paper - yellow for wings and tail, blue for fuselage, tail wheel, washers, cement, dope, isinglass or celluloid, sandpaper, razor, knife, and four feet of 1/8" flat rubber

THE END