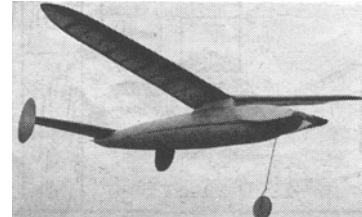
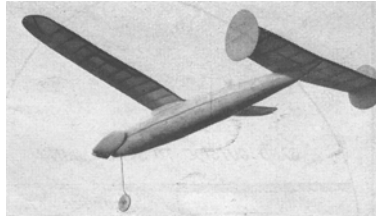
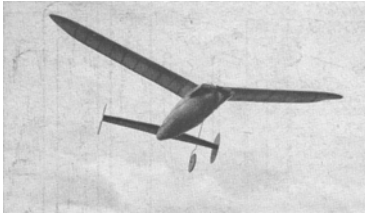


# THE STREAMLINER!

A super Class D fuselage model

by CHRISTIAN D. BERGER



THE two most important characteristics of a contest model are its climb, and gliding ability. For, after all, you have to get up high to catch thermals, but what good is a thermal to a model which sinks through one like a hot knife through butter? Of course, there is always stability, but as far as stability is concerned one need say only this -- no model can long endure without it.

It was with these thoughts in mind that this streamlined ship was designed. As you can see, every conceivable thing has been done to "clean up" the model and reduce drag. Round monocoque fuselage, one wheel landing gear, folding propeller, taper wing, streamlined wing mount, lifting tail and twin rudders all help to give a high lift to drag ratio. A fault common to most streamline models, excess weight, has been carefully avoided and no frivolous, impractical streamlining, such as using wheel pants or propeller spinner, has been done.

After the original ship was built, it performed even better than expected. Although it was never entered in any large contests such as the Nationals, it has won many local contests, one of which was the Cabin event of a New York University Model Airplane Championships.

Unlike most streamline ships, this model is a remarkably consistent performer and will fly in almost any kind of weather. To give it an extremely high, powerful climb, a long heavy motor strung all the way to the tail of the model is used. The motor (16 strands of 1/4" x 1/30" brown rubber, 30" long) weighs 2.1 oz. and constitutes 40% of the model's weight. It is an established fact that, other things being equal, the greater the percentage of weight contained in the rubber the greater will be the model's climb. Though 40% is an extremely high weight ratio,

compared to other fuselage models, this combined with its low drag qualities, accounts for its spectacular climb.

In case you find it difficult to build the ship as light as specified, you're still safe because at 6 oz. you will have 35% rubber (which is still quite high), and even at 7 oz. the ship will have 30% rubber, just normal for fuselage models. However, it is quite easy to build the ship light as long as you use light quarter-grained balsa; such wood is stronger than other cuts of heavier balsa.

Now that we are on the subject of wood, let's start the ----

**CONSTRUCTION:** Although this is not considered a beginner's model, plans and instructions are so explicit that even the tyro should have little difficulty in building this ship.

Study the plans carefully before you start to build anything. The entire model (except spars and blocks) is constructed of quarter-grained balsa.

**FUSELAGE:** Using the full size templates, cut the bulkheads from 1/16" sheet balsa. For bulkheads over 3" wide cement an extra strip of wood to 3" sheet. Mark each bulkhead, in ink, with markings that appear on the corresponding template. Don't worry about using wood that is too light, for even if the bulkheads break out after completion, it won't noticeably weaken the fuselage.

Planks are 1/16" x 3/8" wide. Here again use very light wood. Mark two master planks directly from the plans. Cement the bulkheads (starting with No. 7, 8 and 9) to these master planks where marks for the corresponding bulkheads appear, and set each bulkhead in so

that the planks cover the spaces made by marks on the bulkheads. Carelessness here will result in a bumpy fuselage. Pin the ends of the master planks together temporarily and check the alignment continually as work progresses. After all bulkheads are attached to the master planks cement two more planks about midway between the master planks. Then start to add more planks by cementing them to the edges (and to the bulkheads too, of course) of these first four planks.

Each of these additional planks must be beveled along one edge, otherwise cracks will show between the planks. Before cementing a plank in place, run a sandpaper block, at an angle, along that edge which you are about to cement to the preceding plank, so as to bevel it. Work slowly and cement only part of a plank at a time. Use plenty of cement but wipe off any excess.

When about ten planks have been added cement the landing gear and wing mount fittings in place, where the marks appear on the bulkheads. Use three coats of cement and then cover the glue joints with a patch of silk, using more cement. Put these fittings in "to stay."

Now continue the planking. When angles form near the nose and tail cut a straight taper on the plank and jam it in to fit. After planking is finished, let it dry thoroughly and then sand lightly all over with fine sandpaper. Take off as much balsa as possible but don't rub in any "windows." Apply two or three coats of dope, sanding in between, or cover with tissue for super strength. Now trim the plank ends, build in tail plug and nose plug holes, cut out the space for the stabilizer and cover this with a piece of 1/16" sheet. Addition of the wing mount block and wheel complete the fuselage.

**WING:** Cut ribs No. 1, 10 and 11 from 1/32" balsa, using the templates. Now stack up 9 pieces of 1/32" sheet balsa between ribs No. 1 and No. 10, like a set of books between bookends, and pin them together. Carve and sand this "block" so it tapers from rib No. 1 to rib No. 10 thus giving a perfect set of ribs for a taper wing. This method is very fast and accurate. Make two sets of such ribs.

Draw full size wing plans and rub some wax (a candle will do) over the lines so that the construction won't get stuck. Pin down the bottom spar and trailing edge. Don't pin the T.E.

down flat, but jack up the front side with some pieces of 1/32" sheet slipped under about half-way. Cement all ribs in place, making the No. 1 ribs lean over about 5/32" for dihedral, then the leading edge and top spar. Bend 1/16" square bamboo around a candle flame for the wing tips and cement these in place. Remove the frames from your drawing when dry and sand the L.E. and T.E. to shape. Cover the L.E. top and bottom with very light 1/32" quarter-grained balsa, always starting to cement to the spars first and then toward the L.E. Again sand the L.E. to shape and join the wing halves, cementing the dihedral brace in place with a patch of silk.

Cover the undercamber with tissue first, tacking the tissue to each rib with dope and then cover the top and spray with water to shrink the tissue. Finish with two or three coats of dope.

**TAIL ASSEMBLY:** Cut out two tails, with the rudder templates, from 1/16" medium, quarter-grained sheet balsa. Sand the outer side of each to give a streamline section, tapering near the top, but thick at the bottom. Cover each with tissue and dope two or three times. Add a cement skin as shown, for tail skid purposes.

Stabilizer construction is similar to that of the wing. Remove the tissue from the rudders where they are to be cemented to the stab. and cement them on. Remove the tissue from the balsa parts on the bottom of the stabilizer where it is cemented to the fuselage and cement it to the balsa platform of the fuselage. Be sure you don't put any turn in the rudders when doing this.

**PROPELLER AND FITTINGS:** Obtain a block of medium balsa, 15" x 2" x 1-1/2", which has the grain running parallel to the 2" side. This will make grain of both blades the same. Drill a 1/16" hole through the center and saw the block to shape shown on the plans. Carve the prop in the usual manner, leaving the hub thick. Have about 1/8" undercamber in the blades and give the tips an elliptical shape. Give the prop its final shape by sanding with rough, then finer and finer sandpaper, ending with 10 nought or 400 Wet or Dry carborundum paper. The prop should now be about 3/8" wide at the hub, 3/16" to 1/8" thick at the blades and 3/32" at the tips. Finish with two coats of thin cement and three coats of dope, sanding after each coat with 400 Wet or Dry paper. Cement on two bent large-face bushings and cut off both blades cleanly with a thin razor blade. Drill 1/16" holes in the hub at

the angles shown. Make sure these angles are correct or the prop will not fold right.

Bend all the wire and brass fittings shown on the plans. Push the brass hinge bearings into the balsa over the holes in the hub, cementing them in place. Cover the bearings and surrounding wood with a small patch of crinoline or silk.

Now pin the hinges to the blades and attach to the hub temporarily. Test for proper folding and make any necessary adjustments. It may be, necessary to round the rear corners of the hub. When everything works smoothly glue the hinges in place, also clamping small wire U's into the wood over the hinges. Here again, use a patch of crinoline or silk for reenforcement.

From medium balsa carve the nose block to fit the fuselage contour. Make it fit the fuselage snugly. Cement large-face bushings to the plug for the prop shaft bearings. Slip the prop shaft through the plug, two 1/4" flat washers, the tensioner spring, two more washers and the prop. Bend the shaft over the hub and cement it in place using a wire U and a patch of crinoline.

The tensioner stop is a collared hook screw with the hook clipped off. Screw it into the nose block in such position as to make the prop stop in a horizontal position.

The tail plug is made of very light balsa. Push the tail hook through, bend it to leave loop for winding and cement it well. Cover both prop and tail hooks with cambric tubing.

**ASSEMBLY:** Make a 30" motor of 16

strands of 1/4" flat rubber (40 feet of rubber). Lubricate it well with a mixture of green soap and glycerine. Tie rubber bands around the ends to prevent tangling. Attach the tail plug, slip through the body and put on the prop. "Lock" the prop hook by tying the hook end to the prop shaft with a rubber band. This also forms the arm for stopping the prop.

The nose plug is held in place by a rubber band strung from the landing gear over the fuselage.

The wing is held on with several rubber bands.

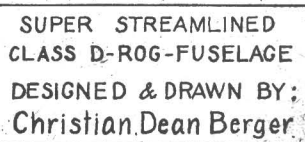
**FLYING:** The model should balance near the wing trailing edge and should climb and glide to the right. Give the rudders about 1/8" right turn but warp *washout* into the *port* wing and stabilizer half. Glide the model and adjust with incidence and turn till it glides perfectly. Use about 1/16" right and downthrust and try a few winds. Adjust with the thrust line only until it climbs smoothly. Increase the power as long as everything is O.K. and try to adjust mostly with the thrust line.

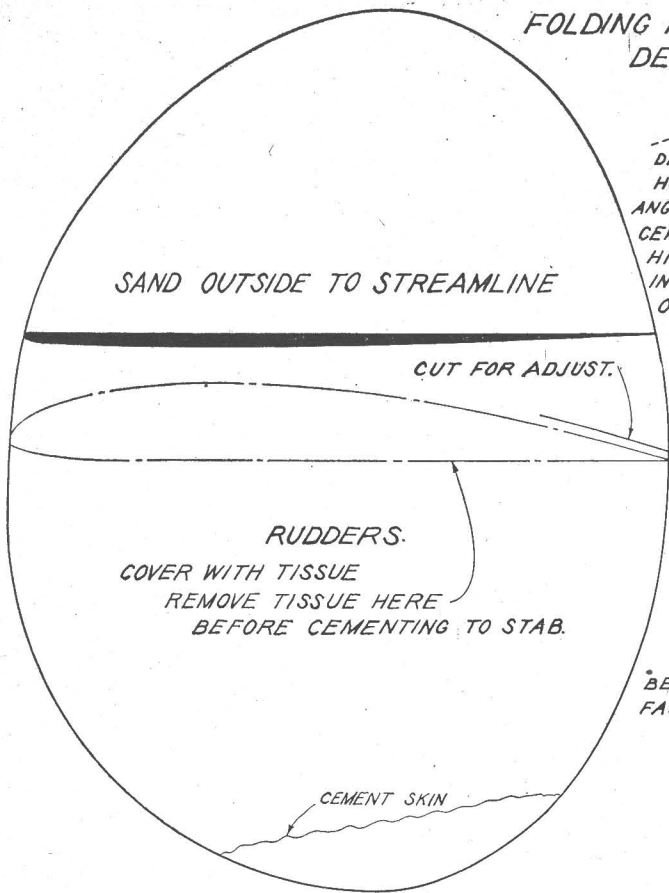
About 700 turns is the maximum one can get. The best procedure in winding is to take the tail plug and nose plug out and let the model hang on the rubber, "hold" the motor just put two fingers around the prop hub and hang on while the rubber is stretched and wound by a winder hooked to the tail plug.

Here's hoping you don't lose the ship on its first flight!

## VICTORY

*Scanned From November, 1943*  
*Model Airplane News*





# FOLDING PROP. DETAILS

DRILL  $\frac{1}{16}$  DIA.  
HOLE AT  
ANGLES SHOWN  
CEMENT  
HINGE BEAR-  
INGS OVER  
OPENINGS.

HUB

BLADE UNDER-  
SIDE HINGE  
 $\frac{1}{16}$  WIRE  
MAKE 2

BENT LARGE  
FACE BUSHING

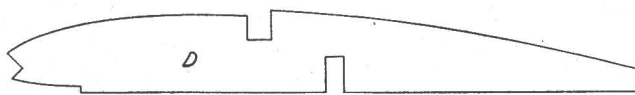
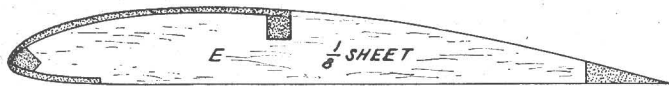
BLANK  
BEND TO

.016 BRASS  
HINGE BEARING  
MAKE 4

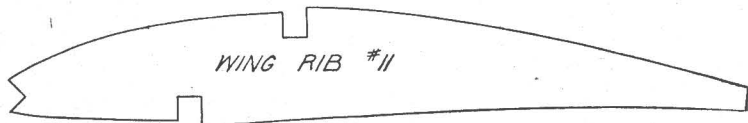
.016 WIRE  
MAKE 9  
FORCE INTO WOOD  
OVER HINGES.

PIVOT

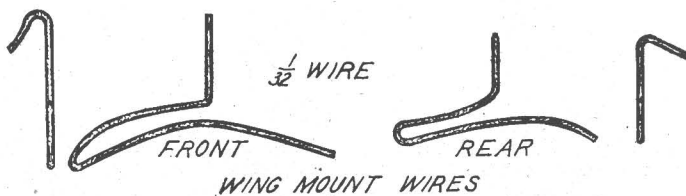
BLADE FACE  
HINGE  $\frac{1}{16}$  WIRE  
MAKE 2  
BEND HINGES AS SHOWN, FIT  
TO PROP AND ADJUST FOR  
PERFECT FIT & FOLDING.



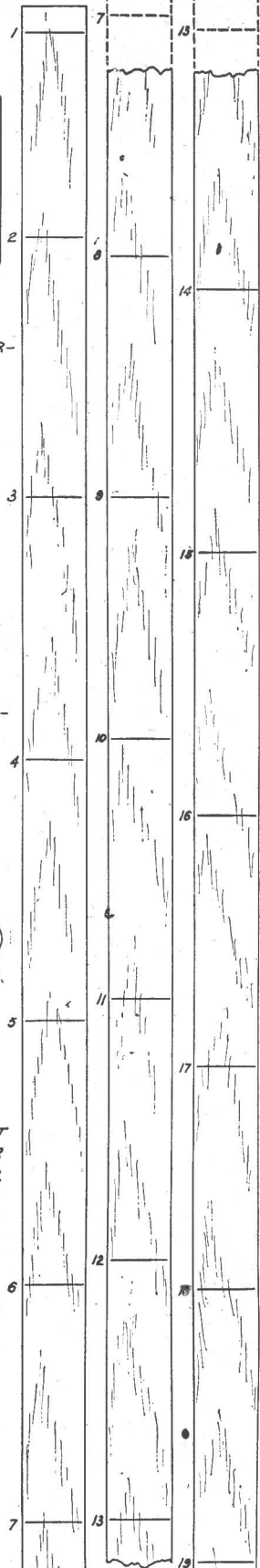
STABILIZER RIBS  $\frac{1}{32}$  SHEET



SCALE:  
FULL SIZE



MARK 2 MASTER  
PLANKS AS SHOWN



BULKHEADS

NOS. 1, 2, 6, 10, 18 & 19 MEDIUM BALSA,  
OTHERS VERY LIGHTEST BALSA.  
MARK EACH AS  
SHOWN, WITH  
INK.

MARK FOR FRONT  
WING MOUNT WIRE

CENTER HOLE

6

7, 8 & 9

3

4

5

MARK FOR  
REAR WING  
MOUNT WIRE

CENTER HOLE

11

10

14

13

12

MARK FOR  
LANDING GEAR

CENTER HOLE

16

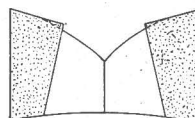
15

CENTER HOLE

17

2

WING MOUNT  
VERY LIGHTEST BALSA



HARD WOOD  
WHEEL 2" DIA.

SCALE FULL SIZE

PROP HUB

PROP SHAFT  $\frac{1}{16}$  WIRE

LANDING  
GEAR

$\frac{1}{16}$  WIRE

$\frac{1}{4}$  WASHERS