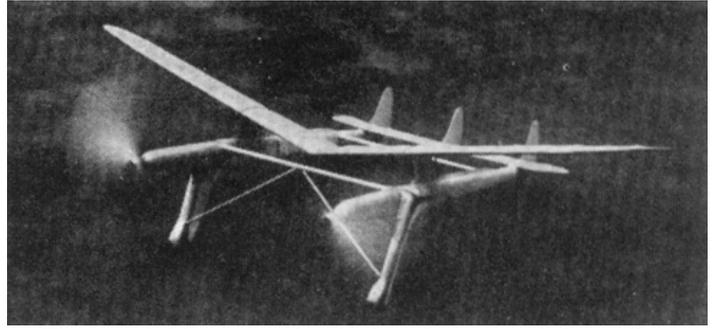


An Experimental Twin Tractor

**One of the Most Unique and
Finest Fliers Ever Presented. If
You Want Something Different,
Build and Fly This One
By FELIX GUTMANN**



The model boasts of twin fuselages and three fins

HERE is a model that is different; an unusual type of airplane that will please every kind of builder. It is ideally suited as an all weather outdoor model, may be easily adapted to a contest or speed model and provides an interesting project for the advanced builder because of its many new constructional features.

Of all model types it is the twin tractor which ranks second to the single tractor fuselage model in stability and flying qualities. Not only does this twin tractor live up to that

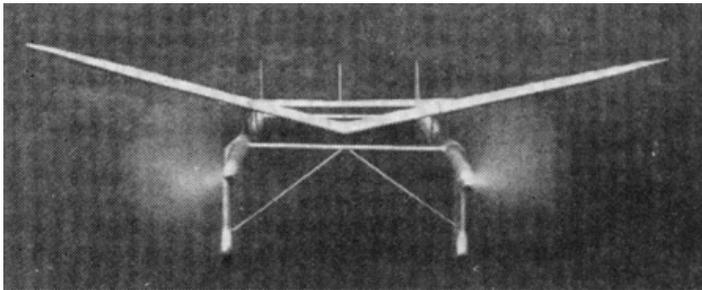
classification, but it could give an easy show-down to many a single fuselage model in both flying and appearance.

There can be no arguments as to the stability of this ship. The climb is very steep. It flies in a wide circle to the right. The glide is very flat though fast, due to the high wing loading which is slightly over 2 ounces per 50 square feet of wing area, enough for any contest, and yet the performance is outstanding considering this fact.

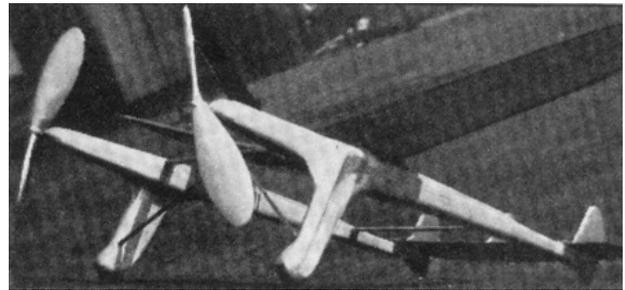
This model may justifiably be classed in the "super-streamline"

category, since every possible way of eliminating parasite drag has been incorporated. Among the new and novel features of this ship are the landing gear construction, the wing mounting method including the wing clips, and the method of attaching the removable tail unit.

This twin tractor may be used as a basic design for some builders who may wish to develop something new from it, which undertaking may be a very interesting and valuable one.



A wide tread and twin props insure good takeoffs



The motors are enclosed but are easily wound



The model in flight high over Central Park and some of New York's "Skyscrapers"

CONSTRUCTION

Wing

The area of the wing is 140 square inches. For those who wish to bring the model into the 150 square inch plus, or E class, it is suggested that the span be increased to 40 inches continuing the present taper to that span.

First cut all the ribs from 1/16" medium sheet balsa. It would be a good idea to scale tip the root rib shown in the plans to full size, and then cut a template. However, each model builder usually has his own pet method of executing this process so it will be left to his own ingenuity. The leading edge is 1/8" x 3/16" stock. The trailing edge is 3/32" x 1/4", and the spar is 1/8" x 1/4". All of them are of hard balsa. The tips are of 1/16" round bamboo. Before building the wing, scale up the plan to full scale. Cut a cardboard template as shown to be used as a guide in inclining the ribs 9 degrees from the vertical when gluing them in place. Be sure to have exactly 1/8" spacing between the two sets of ribs which are to accommodate the wing mounts. When the wing halves are dry, glue them together, putting 3" dihedral in each half. While this is drying make two wing mounts as shown on the plan, one left and one right. They are cut from 2" sheet balsa at an angle and are not glued in place till after the wing is covered. When covering the wing disregard the opening for the mounts. The slit of tissue is cut out after the wing is doped, only on bottom, the covering is left whole on the top. The mounts are then glued place. Be sure they are perpendicular. To be sure that the wing has 3 degrees incidence make a cardboard template 6 inches long by 3/4" at one end and 9/32" wider at the other end. Place the wing on a table so that it rests on the mount, and holding the template vertically slide it under the wing parallel to the chord at a point where it won't lift the wing off the table. Right here adjust the wing so that the spar and the trailing edge touch the template and the wing will be true. All this to be done of course before the cement between the mounts and the wing has hardened.

Elevator

The elevator is very easy to build since there are only 2 types of ribs. There are nine main ribs and 2 tip ribs. (See bottom right of plate 1.) 3 of the main ribs are of 1/16" sheet while all the rest of the ribs are 1/32" sheet medium. The 1/16" sheet ribs are the ones to which the rudders are cemented. Note the 1/16" x 3/32" notch back of each of these ribs. The rudders fit into each of these notches. The leading edge of the elevator is of 1/8" sq. strip, the trailing edge of 1/8" x 3/16" and the spar of 1/8" x 3/16" all hard. The tip is of 1/16" round bamboo or reed. The rudders are not cemented to the elevator till the latter is covered.

Rudders

The rudders are cut from 1/16" x 4" stock. The grain must run vertically. If no 4" stock is available, cement two pieces of 1/16" x 2" sheet edge to edge. Cut cardboard templates of twice the size shown (3" x 4"). Make two and graph them with half inch squares. Draw lines through corresponding squares running through corresponding points on the plan. Make one template for the mid-rudder and one for the two end rudders, or make just one for the end rudders and trim it down to the shape of the center rudder as soon as the others have been drawn. Note the tab on the bottom of each rudder; the two are integral. Now streamline the rudders, round off the leading edges and bring the trailing edges to a point. Round off the edges of the tabs. The tabs fit into the slots at the end of the bodies, thus aligning the tail. The rudders are finished down with ten nought sandpaper, doped, sanded again, and covered with tissue, the grain of which runs at right angles to the grain of the rudders, i.e., horizontally. One piece of tissue is doped to each side of each rudder. This will strengthen and improve the appearance of the rudders.

Fuselages

There are two separate bodies to be constructed. The construction is very simple and interesting if the proper procedure is taken. If more attention is to be paid to contest flying, then it is suggested the landing gear be eliminated since its elimination will make the model fully one half ounce lighter, as well as eliminate extra drag.

Thus two identical fuselages may be made with no attention having to be paid to the left or right side. However, the instructions will describe the construction of the model with the landing gear.

Each fuselage is begun by cutting a center blank, 2 in all, from a sheet of 3/8" medium hard balsa wood. All the dimensions are shown on the plan at the bottom of plate 1. To make the sides, obtain two identical sheets of 1/8" x 2" x 36", identical in size and hardness, (medium hard). Lay out each piece as follows: From opposite ends and on opposite sides lay off 26" from the ends, two 5/8" lines at right angles to the edges of the wood, as shown. Connect the inside ends of the lines by a line running diagonally the length of the piece. We now have the divisions between the two sides and also their lengths laid out. The rest of the dimensioning may be taken off the plans. It shows the proportions of the front part of each side. Note that when the four sides are finished, there will be two pieces as shown on bottom and two as on top. Cut away the shaded portions which are scrap. The sides are now glued to the center blanks. Make one left body (with the broken piece on the left and the whole piece on the right) and one right fuselage with the broken piece on the right and the single piece on the left. Hold in place with pins till dry. Note the curve on top at the tail due to the taper. Also note that the tops of the center blanks and the tops of the sides are flush. At this point it is an excellent idea to build the landing gear which is integral with the fuselages. See the lower left of plate 2. Cut 2 main pieces "A." Note that the hollow for the wheel which is half as deep as the pieces are thick (1/16" deep) is on opposite sides on the two pieces. Cement piece "L" in place on the left body and piece "R" on the right body so that the hollows are facing outside. Now cut 4 pieces "C" with the opening running right through and make two sets of 2 each glued together. Glue each set of 2 to each piece "A" in the appropriate position so that they face the outside. Now cut two more pieces "C" only with the hollows running halfway through like on "A." Make one left and one right and glue to the corresponding landing gear, so that we now have a hollow 3/8" wide

on each wheel pant. To give the axles for the wheels a stronger support than just 1/16" on each side, we glue a piece "B" of 1/16" sheet on each side of each landing gear, 4 pieces in all, and the axles now will have 1/8" support on each side. All these pieces are cut from 2" wide balsa held at an angle. Now cut a 3/8" sq. medium hard strip so that it reaches from the top of pieces "C" on each pant flush with the leading edge of piece "A" and up to the top cutting it flush there. It is then glued in place against the side of piece "A" and on top of pieces "C". Running from the top rear edge of this strip to the back of piece "A" along piece "A" and flush with the top of the fuselage cement another 3/8" sq. piece as shown. Now glue the 1/8" sheet rib in place in the middle of the hollow panel back of the vertical strip. Glue a strip of 1/8" sq. in the corner formed between the 3/8" vertical strip and the front side. When all these pieces are dry, carve them down to the approximate streamline shape shown in the various perspectives. Now cut a groove 3/32" wide by 1/32" deep all around, the hollow panel to be covered with 1/32" sheet balsa. Cut a panel to shape and glue it in place covering hollow point. This construction keeps the weight of the landing gear down.

The landing gear may now be finished down as shown in the perspective in the upper left hand corner of plate 2. The rest of the fuselages is now finished down to the cross-section shown in plate 1, upper left. The final sanding is ten nought sandpaper. Note that the tops of the bodies near the tail are flat to accommodate the elevator. Note the small stop blocks which are glued into notches cut for them and then streamlined. The guide rails may now be glued in place and held with pins till dry. (Note cross-section in A-A.) Now cut 2 cross braces as shown in plate 2 upper left, of hard 3/16" x 5/8" balsa 11" long. Note the circles and cross hairs on the bodies showing where to cement them. Cut slits at these points.

Do a good job of gluing these braces in place and apply a heavy cement skin at the joints. True up with a triangle. Note the details of the nose and glue the 1/8" sq. strips in place.

Now cut two nose plugs as shown. The plug is 1/2" long while the front end is 1" long. Cut the plug out of the block first, then slip in place in the nose, then carve the front end right on the plane to give it a rounded appearance. Drill a hole for the prop shaft and insert a long bushing in front and one in back. Bend two tail hooks as shown on the side view, (.034 music wire,) protect with rubber tubing. Insert the center piece. Drill a few small vertical holes around the tail hooks in the centerpieces and then run a needle with thread down and around through the holes, passing around the back part of the hook binding it in place. Then apply a cement skin. Now cut 2 sub-rudders of 1/8" hard sheet balsa and cement in place as shown in middle right plate 1. Cut V grooves around the bottoms and cement some 1/16" round bamboo or reed in the grooves. When dry trim the fins, rounding the sides and smoothing them. Cement the 1/32" sides in place leaving 1/16" between them making the slots for the rudders.

When everything on the fuselages is shaped and smoothed, apply 2 to 3 coats of banana oil with intermediate sandings of ten nought sandpaper. The wheels may now be made as on the plans, and inserted. Use pins for axles. The wheels are given 2 coats of dope and 2 coats of colored dope.

The propellers are now carved from 2 blocks of 1" x 1-1/2" x 10" and carved according to the usual procedure. Make one left-handed and one right-handed propeller. Give them 3 coats of banana oil and one to 2 coats of silver dope. Use any proven free wheeling. The righthand prop is put on the right fuselage, the left-hand prop is put on the left fuselage. Use 8 to 10 strands of 1/8" flat brown rubber well-lubed.

Cover the wing and tail with Japanese tissue. Try to use some red tissue for visibility. Spray with water and apply 2 coats of banana oil when dry. Cut away some of the tissue from the 3 1/16" ribs on the elevator, and glue the rudders in place; see that they are perpendicular. Bend 2 wing clips as shown in plate 2, right, using .034 music wire. One is slipped inside each fuselage with just the prongs showing, and facing the center of the plane. They should fit snugly. They should be located about 7" back from the nose. Slip one 1/8" flat rubber band around each wing half and slip it around the corresponding wing clip. The wing will now be held securely. The tail is held in place with rubber bands. Note the notches on the fuselage side view. Bands fit around elevator passing over end rudders and into notches. Rudder tabs fit into slots in sub-rudder.

The prop shaft is of .034 music wire. The rubber hook is protected by rubber tubing. Note the wind up hooks in front of the propeller, eliminating "S" hooks. Use several large bronze washers or ball bearings for the prop bearings.

Flying

The model may circle in either direction. There is no torque. Have a helper hold the tail end of the fuselages. Use a powerful twin-winder. Remove both nose plugs and insert wind up hooks in winder and wind up 650 to 1000 turns in each motor. Stretch the rubber well. Use about 4" slack or more. If the tension of the rubber is too great for the required winds have two persons, each winding up one motor, the same number of winds of course. Launch by gripping bodies back of the landing gears and holding propellers against the knees till the right moment. The nose slightly up and thrust forward into the air. Start adjustments with the wing slightly back of where shown on the plan. The model should soar up gracefully into a high climb, "reaching for the cumulus clouds."

**Scanned From November 1939
Model Airplane News**

TOP VIEW, FUSELAGE SCALE: $\frac{1}{4}$ "=1"

PROPELLER LAYOUT SCALE: $\frac{1}{4}$ "=1"

