

Build "Miss Philly IV"

"The gas bug'll bite you if you don't watch out! You'll build a chug-chug plane and then you'll sing and shout!" We hope you will forgive this musical parodizing—but that's just the way we felt when we first saw Max Bassett's top-notch sky-scooter, "Miss Philadelphia IV." With the super-sweet original model, young Bassett won many a meet. "Miss Philly" herself is now enshrined for posterity in the Franklin Institute Museum—but here's your chance to build her exact counterpart.

By Maxwell Bassett

UNDoubtedly, many of you model builders have been looking for plans for a gas model which can easily be built, and which will fly consistently and well. Here is just what you want—*Miss Philadelphia IV*—and the skeptical builder who needs proof of her ability must merely consider the performances of the original ship, and the records that it established.

In May 1933, *Miss Philadelphia IV* was launched from Camden Airport, N. J., and made a continuous flight lasting two-and-a-half hours (unofficial) over a total distance estimated at 180 miles—almost the distance from New York to Baltimore! She crossed three states—New Jersey, Pennsylvania and Delaware, and missed Maryland only by four miles. At times she reached an altitude of 8000 feet. For this flight, the ship of course carried an abundance of fuel in an oversize gas tank. Moreover, *Miss Philadelphia IV* also won many contests including the 1934 Texaco Gas Model event at Akron.

The original model is now retired, being "preserved for posterity" in a display room in Philadelphia's Franklin Institute Museum.

THE MODEL

OUR *Miss Philadelphia IV* flies at a medium rate of speed, climbs at an unusually steep angle, and has good gliding qualities. But most important of all to the gas model fan, it is an easy model to build. An experienced rubber-powered model maker should have very

little trouble if the usual care is taken. The wing, incidentally, is removable, hence the plane can be carried very conveniently.

The cost of your model should not exceed seven dollars. And if you are careful in buying your supplies, you may be able to build it for five!

Before starting construction, study the drawings and read the article two or three times, *thoroughly*.

The wing, tail and fuselage plans must be enlarged to full size. This can be done with a pair of dividers, or by taking measurements direct from the drawing and multiplying by the scale of the particular part.

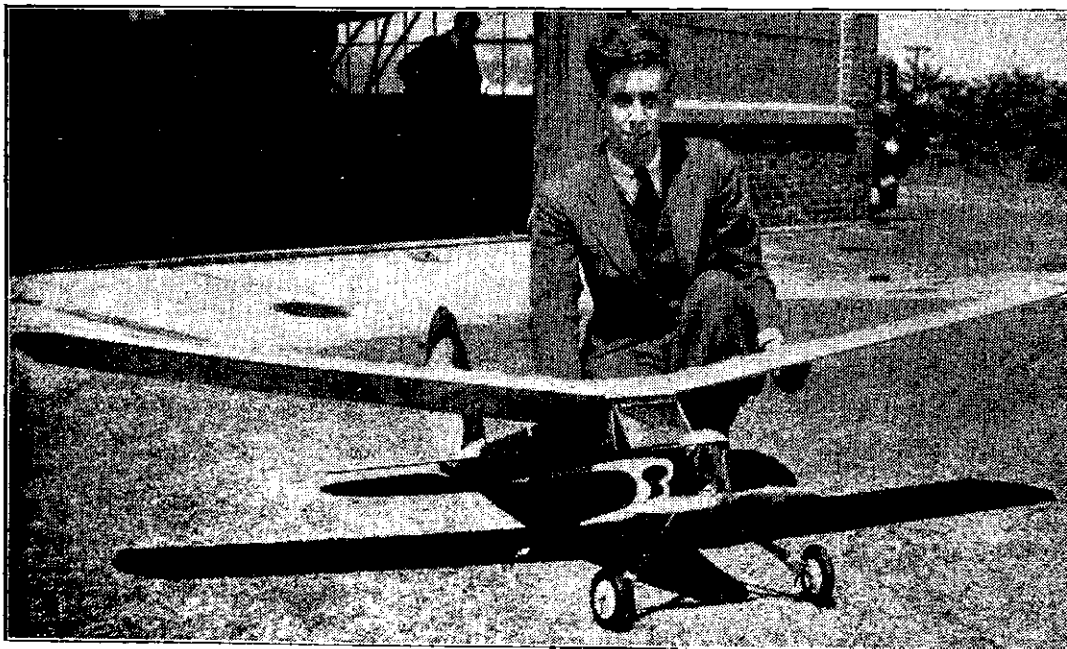
The model has a wing spread of $84\frac{3}{4}$ " and an overall length of 51". Ready to fly, with motor, batteries, and fuel, it should not weigh any more than 5 pounds.

In the original ship, I used a Brown Junior Motor, but, with a slight change in the motor mount, any similar motor of about the same size and weight will fly her just as well.

In building, *take your time*. Be sure every piece is perfect before going on to the next. Be especially careful that the tail and wing surfaces are absolutely true and are not warped during construction. Use plenty of cement—go over every joint at least once or twice, until you are sure each is perfect. Again, do not spare any cement, for strong joints make the strong ship!

Balsa is used throughout—except where otherwise noted—and should be of a medium or hard grade. Use only high grade materials. Poor or cheap stuff never has, and never will, make a championship model.

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So neat, trim, and "lifelike" is *Miss Philadelphia IV* in this picture, that were it not for the size-comparison afforded by the presence of her young builder, Maxwell Bassett, it would be easy to mistake her for a full-sized modern ship. And it took a real plane four hours to trail and recover her on an epic two-and-a-half hour continuous hop from Camden Airport in 1933!

BUILD the fuselage first. Probably the easiest way is to start by forming the two sides or halves, and then putting them together by gluing in the cross pieces to make the complete fuselage.

Each builder has his own pet way of laying out a fuselage, but here is a way that I have found very satisfactory. Lay your upper and lower longerons on the drawings, and shape them to fit. There are no places where the wood must be curved in making the halves, but you must be sure that the joint in the lower longeron is well made, and strongly glued and bound.

All the vertical members of the half are placed and glued next. These are of $\frac{3}{8}$ " square balsa, while the angle braces are of $\frac{1}{4}$ " square stock. They are placed as designated in the drawing. Before removing the half from the drawing, go over each joint again with cement, to be sure they are all strong.

The other side of the fuselage is made in the same way, and then both halves are placed together, and bound and glued at the rear. From this point on, the upper and lower cross pieces are put in place. These are of $\frac{3}{8}$ " square balsa. Be sure to glue these firmly, particularly on the inside of the lower longeron.

The tail-skid is made from bamboo—or wire if you prefer it—and is glued securely into place. The celluloid windows should then be cemented in position. The windshield is made of one piece of celluloid, placed outside of the $\frac{1}{8}$ " by $\frac{1}{8}$ " ash supports. Finally, to give the fuselage a finished appearance, the edges of the longerons should be rounded off.

WINGS

THE wing is constructed entirely of balsa, except for the bamboo tips. Cut the ribs first. The wing section is approximately a Clark Y airfoil. It is $11\frac{3}{8}$ " long (not including leading and trailing edges) by $1\frac{1}{2}$ " deep. The spar is set in from the bottom, so it is only necessary to cut one slot in each rib. It is a good idea to place the ribs side by side, then sand them all together to form a set of perfectly matched ribs.

The main spar is made next. It consists of two halves, glued together in the center. The joint should be reinforced by two sheets of $\frac{1}{8}$ " flat balsa on the front and back of the spar, glued and bound thoroughly. The wing should have $7\frac{1}{2}$ " dihedral under each tip.

This completed, the next step is to cut out the leading and trailing edges. The leading edge is of $\frac{5}{8}$ " by $\frac{3}{8}$ " balsa, and is planed and sanded to fit the curve of the rib section. The same is done to the trailing edge, of $\frac{1}{4}$ " by $\frac{5}{8}$ " balsa.

Next, the distance between the ribs is laid out on the leading and trailing edges, and $\frac{1}{8}$ " deep grooves are cut into them to form a strong joint between the ribs and edges.

The wing is assembled by making a half at a time—one left, and one right panel. The halves are made by placing the ribs on the spar and gluing them into place, along with the leading and trailing edges. Then the two halves are joined, and the wing is now complete except for the tips.

The tips are made of bamboo $\frac{1}{8}$ " by $\frac{3}{16}$ ". They are bent over steam or other heat, and should be lashed as well as cemented into place. Finally, go over every joint *again* with glue, to make sure that all are well-cemented and tight.

TAIL

THE tail assembly is built right on the fuselage—a different procedure than is usually used. This is to eliminate any chance of changing angles in flight, or any incorrect adjustments that might cause a crash. Also, the tail can be built lighter this way.

Start by gluing and binding the main spar of the tail to the top longeron of the fuselage. Bend the bamboo to the correct shape, and fasten to the fuselage and ends of the spar. The ribs are inserted next. They are of $\frac{1}{8}$ " by $\frac{3}{16}$ " ash strips, which pass one on top and one underneath the main spar. They are held to the bamboo by drilling a $\frac{3}{16}$ " hole through the ash strips and binding together with thread. The ash strips are bound and glued to the main spar also.

The rudder is built in a similar manner except for the ribs, which are built of $\frac{1}{8}$ " flat balsa instead of the two-piece ash ones used in the stabilizer. Rudder adjustment is obtained by use of a small solid balsa flap, located as shown on the drawing. It is fastened to the rudder proper with soft copper wire.

The rudder is set at 0-degrees with reference to the thrust line, and all adjustments are taken care of by the flap. The elevator on the original model had a negative angle of incidence of 2 degrees, which eliminated any chance of the ship not pulling out of a dive, and yet was not too great an angle to cause a stall.

Be sure the tail surfaces are neither warped nor out of line.

THE LANDING GEAR

AN extra tough landing gear is most essential in a gas model, for it must be able to take all the extra stress of a bad landing or crash. The landing gear on *Miss Philadelphia IV* is of wood, which makes a rigid gear—and if yours is properly mounted, wood would be very good on your model, too. Spruce struts, $\frac{1}{4}$ " by $\frac{3}{4}$ ", are used, planed to a stream-line section.

The fuselage fittings are brass strips $\frac{5}{8}$ " x $\frac{1}{32}$ " x 3", bent in the center. Two are used on each strut, one in front and one in back, as shown in the drawing, right center. A hole is drilled $\frac{3}{16}$ " from the top of the strip and a $\frac{3}{32}$ " bolt is passed through. This bolt is carried right through the lower longeron and motor mount, and holds the strut in place. Front and rear struts are held in the same manner.



This is how Miss Philadelphia IV appears when fitted with a special upturned-wingtip airfoil. Though not the original ship, this job differs only in wing design, hence you'll be perfectly safe in matching your model with this picture as you assemble the various parts.

The landing gear itself is of the split type. A piece of 1/16" piano wire is run from the bottom end of the front strut, to the center of the underside of the fuselage, where it is held with rubber bands. The wire is in one piece, and at the end of each strut it is lashed on, then turned outward to form axles for the wheels.

The junction of the rear and front struts is where the shock-absorbing quality of the landing gear is obtained. It is very simple, yet very efficient, and is made merely by binding the two struts together with heavy rubber bands. This allows the rear strut to "give" through the rubber, when a hard landing is made. (Bands shown in black on plan.)

Either hardwood or airwheels may be used, although the latter are to be preferred. The wheels selected should be about 4" in diameter.

MOTOR MOUNT

SHOULD the model have a poor motor mount, its flights cannot help but be poor, also. The mounting in *Miss Philadelphia IV* is of the fixed type, which not only allows greater strength, but is much lighter than any other type.

Ash wood is preferable, but any other hard wood such as hickory or oak, may be used. The two main members—which run along the inside of the lower longerons—are of 1/4" x 5/8" x 16" ash. They should be glued firmly to each longeron, then bound. These two pieces take all the landing stresses and motor vibration, and also support the ignition system—so be sure and have them well secured. The rest of the mount is of smaller pieces, making the right bed for the particular motor and ignition system used. Details of our motor mount are shown in the drawings. All structural members of the mount are 5/8" deep.

The original model had a half-degree offset down and to the right, to compensate for the thrust, and the tendency of the motor to pull the plane into a power stall.

Using either clips or soldered joints, put in your coil, external switch, external booster connections—if you plan to use boosters—and then wire your entire job. Wherever possible, mount these so they are supported by the main members of the motor mount. Keep the spark and high tension wires away from all metal parts. And if you plan to use one, you should install your automatic timer at this time.

COVERING AND COWLING

BEFORE starting to cover your ship, see that all surfaces are perfectly true and that they are not warped in any way. And see that all sharp edges are rounded off and the wooden parts sanded, for these factors are of importance in the final appearance of your plane.

Use a good grade of silk or heavy bamboo paper, and cut out the various pieces to cover your ship. Thinned-out cement, or heavy dope, make good adhesive for silk, while paste is very good for bamboo paper. Paste also has the quality of sinking into both the wood and the paper fibre thus making very

strong joints. Be sure to place the covering on evenly—an uneven piece will cause the surface to warp.

After the full covering has been applied, spray the entire ship with water to tighten it. Finally, apply your dope. This should be regular nitrate dope, similar to that used on real planes. Two coats of clear and three or more coats of colored are applied, depending on the finish desired. And a last, light coat of clear, quick-drying lacquer or varnish will put a dandy finish on the model.

The color scheme of our original *Miss Philadelphia IV* was yellow and blue. The wing, tail, and striping on the fuselage were yellow, and the remainder of the ship was blue. But of course, any color scheme desired can be used. It is best to have a dark body and a light wing, to furnish good contrast under varying conditions of light.

Since your motor should be of the air cooled type, the cowling is used for display and never for flying. It is made of aluminum, and fits over the top of the engine. No cowling is needed on the sides, as the fuselage fills in there. The top cowling can be held in place with either dress snaps or rubber bands.

ASSEMBLY AND TEST

PLACE the wing at such a point on the fuselage that the plane will balance when poised upon the fingertips, held beneath the wingtips, at about one-quarter of the distance from the leading to the trailing edge. The wing is tied in place with fresh rubber bands. Use plenty of rubber to do this, for if the wing should move while the model is in flight, the results would be disastrous.

Use a pine or a spruce propeller, with a diameter of 14" and a pitch of about 6".

After making sure that the model is all "in line," and that everything is balanced, test the model by gliding it. While doing this the prop should either be left off, or set in horizontal position.

For the "take-off," it is advisable to run with the plane, at the same time giving it an even thrust forward with the arm. Care must be taken to throw or release the model so that its nose is pointed level or slightly downward.

When the plane is adjusted so that it glides evenly and in a straight line, drop an eyedropper-full of gas into the tank—or, if you are using an automatic timer—adjust it for 5 to 10 seconds motor running time. Throttle the motor to its slowest running speed by retarding the spark and enriching the gas mixture.

Run the motor at the slowest speed that will fly the plane. If this advice is followed until you know just what to expect from your plane, you will avoid crack-ups and eliminate many of the headaches common to test flying. When flying any plane for the first time, always keep this rule in mind—as the power and speed of the plane is increased, so also are all of its bad flying qualities.

Never fly a gas model without having your name and address marked in a conspicuous place upon it, and never put more than a very few drops of gas in the tank unless you have a car at hand

a **FLYING ACES** reprint
for an interesting five or ten miles
cross country chase.

So here's wishing you many "Happy Landings," fellows, with your gas-powered *Miss Philadelphia IV*.