

RC Bicentennial banner-towing flying saucer can be made up in many themes—a flying carpet, space ship from Mars, etc. An exciting air show model, it also makes a unique sport ship.

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HAPPY BIRTHDAY

THIS AMA SHOW TEAM model was built for this particular year, of course. At least the trim design of the flag was thought to be unique so a rectangular saucer was planned. Or was it vice versa?

A subminiature rectangular version has been flying for several years. This one has a six-in. span and is 11 in. long and weighs 3½ oz. with pulse-rudder equipment. With a Cox .010 at a tremendous down-thrust angle, it showed remarkable stability. However, due to the extremely small size, it glides like a re-entry space vehicle. Based on the experience gained from this one, the larger model seemed feasible with rudder, elevator and motor control giving much better control. Also, a tow sign was planned to be dropped in flight from a compartment, and towed for the show work. This sign "Happy Birthday America" could be dropped to the ground in front of the pilot before landing.

Rather than complicate things with a retractable landing gear, a skid arrangement was tried to make the under-carriage less noticeable in the air. For test flights and off of poor surfaces, wheels can be attached to the skids with Goldberg axles.

The span of the "F.F." is three ft. and the length is four ft. five in. giving it an area of 1908 sq. in. or 13¼ sq. ft. The dry weight, without fuel or sign, is eight lbs. The sign (14" X 18") weighs 12 oz. A .60 engine with muffler pulls it nicely. A Fox .78 pulled it quite spectacularly, although I am now using a K&B .61 Pumper. Any make radio system will fit since there's plenty of room for older, larger servos.

Due to the plane's size and the price of balsa wood, foam board was tried for the ribs, sign compartment, and even a full-depth spar. Found at an art store, a sheet .200 thick, 30 X 40", cost \$2.00. This length meant the ribs had to be spliced, which was done at the rear end. The splice angle was reversed at every rib. With the cap strips, the joint was very strong. A total of 2½ sheets was used. Wilhold Aliphatic Resin glue and epoxy was used throughout.

A Liberty Bell fin and rudder went along with the general idea and worked out very well. At the same time it was made removable to ease transportation. The

FLYING



Fran McElwee

skids also can be removed for the same reason or for repairs. Since the trailing edge is full span, the two outer sections were utilized for permanent trim, while the center portion is the normal elevator. This also worked out well and the outside dive tendency is lessened to a much greater degree. While speaking of the elevator, the servo set-up is from a wheel, taking off on a 45° angle to get far more up than down.

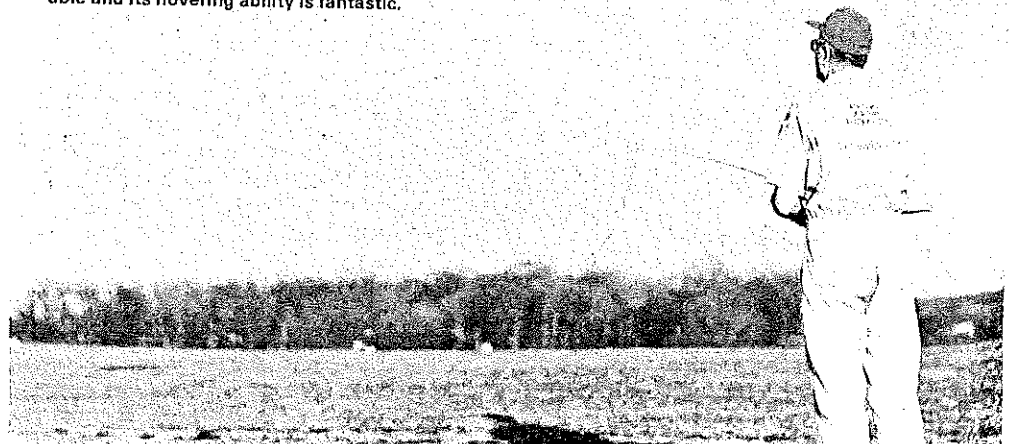
The plane handles easily, much like a trainer, especially on the landings. It can be hovered in very slowly. It has smooth turning capability, even at almost zero forward flight. At this high angle in low speed flight it really skids around the turns without excessive bank. The turning radius is around 30 ft. or so in this slow speed flight. It will inside and outside loop and fly inverted. Roll attempts are really weird, so have plenty of altitude when trying them. The "F.F." does rock in a moderate wind at lower speeds.

The slot used in my other published saucers was eliminated. The smaller versions had none and stall recovery was normal and quick. Omission of the slot saves hours of work and construction is much easier.

Being square and having no tips, the frame goes together quickly and easily. A large carpenter square is helpful. I found the foam board cut easily with a new, sharp X-Acto blade around a rib template, using a metal straight edge for straight cuts. Cut the 12 ribs, splicing the rear end.



Top: During an air-show demonstration in the nation's capital the Flying Flag flies by the Washington Monument trailing a banner reading "Happy Birthday America." The system for banner towing is described in the article. Here: Fran flies the saucer overhead for the benefit of the photographer. It is surprisingly maneuverable and its hovering ability is fantastic.



The two center ribs have 1/16 in. plywood contact cemented on the inside surfaces back to the second spars. Make sure you have a left and right panel. To make things easier, cut all the openings you'll need in these ribs before assembly. I cut lightening holes in all the ribs but the tip ones, but saved only 5 1/2 oz. so think it was hardly worth the effort. I pinned the ribs together with spar material in the slots and sanded them to be uniform.

The ribs are glued and assembled on the full-depth spar first, then the 1/4 in. sq. spruce spars are glued in place. The leading edge is a single piece across the span and cut out later at the engine area. The 1/4 in. plywood firewall and foam bulkhead can be glued in, bracing the firewall well with balsa triangular pieces. I normally use a mounting plate of 1/4 in. aluminum attached to the back of the engine. Commercial mounts can be used. The slanted cooling area is a piece of foam board.

The rudder box can be built of foam board and 1/4 in. sheet balsa around a 1/4 in. sheet. The rudder can be glued in later, after covering, or the removable version can be used (follow the plan). The fin, rudder and elevator are all made of 1/4 in. sheet with no taper in section, elevator square, and merely rounding off the edges of the fin and rudder.

Mount all the equipment before sheeting and cap stripping. Sullivan Golden-N-Rods (blue) were used in the original, bracing every six in. or so, to eliminate flexing. Three hatches are used. The fuel and equipment hatches are easily removed with the rotating latch lock shown on the plans. The in-between hatch is 3/32 in. plywood held in place with four self-tapping screws. The switch and charging plug are mounted on this.

The leading edge sheeting and the cap strips can be glued now. The tip cap strips are wider to stiffen the tip against bowing in. Vertical pieces of 1 1/2 in. foam board are glued to the tip ribs between the spars, after gluing in a 1/3-in. wide foam board piece on edge, down the center line of the tip ribs. Foam triangular pieces (3/4 x 3/4") are glued every 4 in. or so as tip support and also are used around the wide cap strips around the equipment hatch. The 1/2 x 3/4" leading edge has a fibreglass arrow shaft embedded in it after gluing it in place. A false spar is installed on top and bottom at the end of the blue area to attach the Monokote, in order to save double covering this area.

Homemade horns of 1/16 in. fibreglass were made and epoxied, as per the drawing, to the two trim elevator sections. A threaded rod was epoxied to the side of the rib and a quick-link made adjustment possible. Commercial horns could be used but mount them solidly so flex is kept to a minimum.

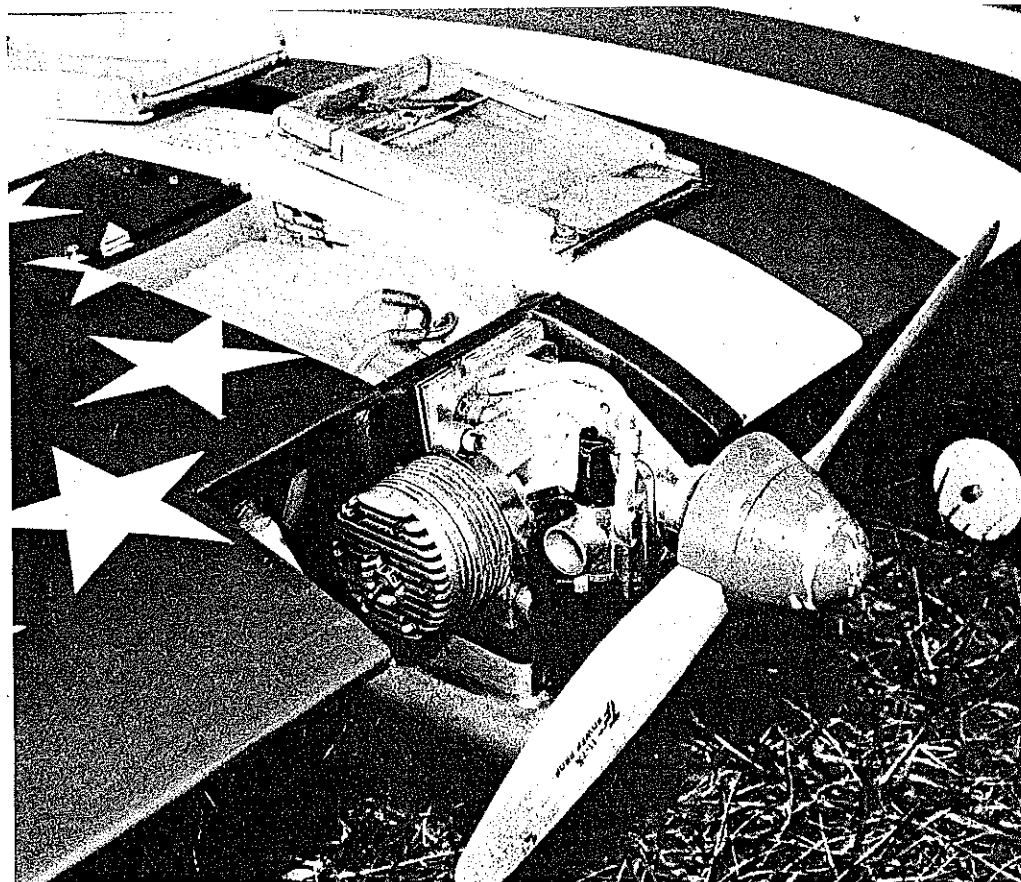
The skids, or landing gear, are bent from 5/32 in. wire. The mounting is in the usual grooved hardwood. Mine was 3/8 x 3/4". Taper the front as shown and glue in



Almost 25 years of development lie behind the Flying Flag—Fran had several saucers published through the years. Here he shows off an .010 version alongside the ship in the article.

Recommended power is a .60—or up. Shown here is a Fox Eagle. (Plans show K&B Pumper which is now being flown.) Note hatches removed to show tank and radio compartments.

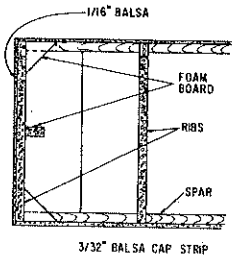
the plywood side supports. Straps and self-tapping screws will hold them in after covering. The gear is long to give a good ground angle to shorten the take-off run, also the prop misses by a mile! No taxiing



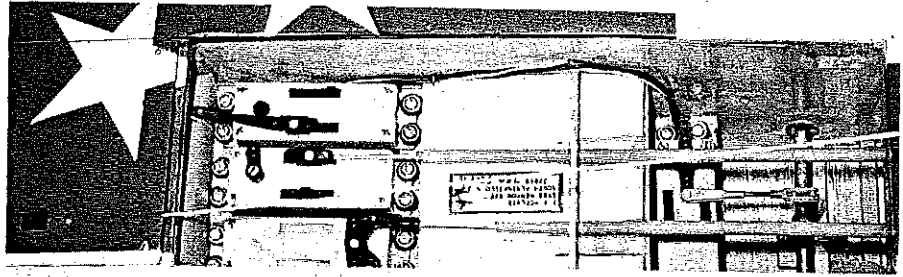
Flying Flag

was intended so just a replaceable tail skid is employed. The outside of the tip ribs was covered with 1/16 in. balsa for better adhering of the SuperMonokote. The leading edge is shaped, and overall sanding done.

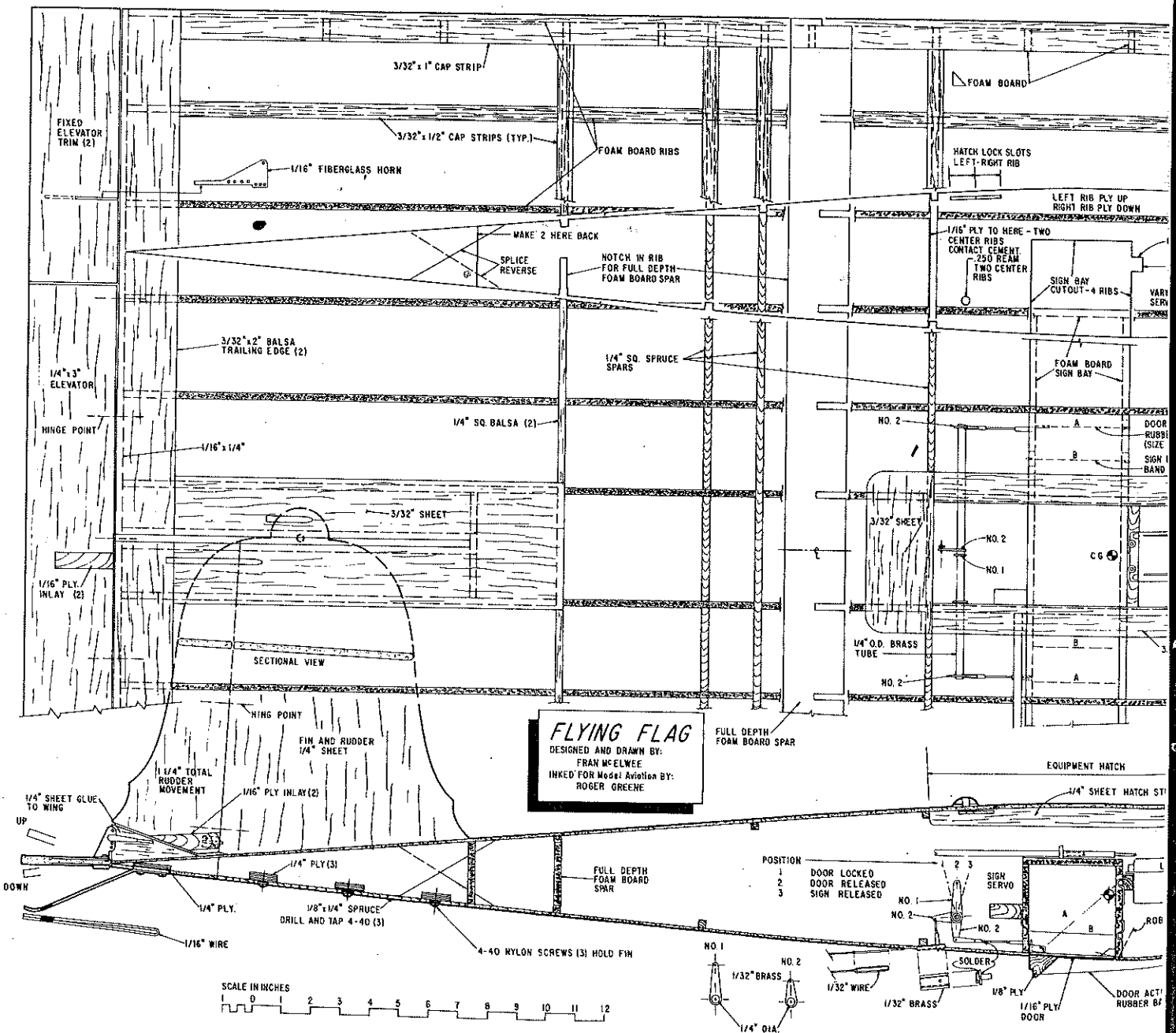
The original is covered with white Super Monokote except for the blue area which is metallic-blue Super Monokote. The red stripes are 2-49/64 in. wide, of Super Monokote, cut along a long metal straight edge with a sharp knife. The lines are laid



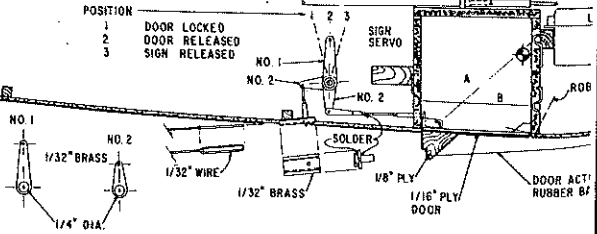
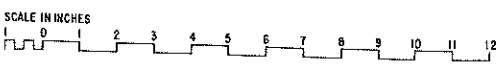
FRONT VIEW TYPICAL TIP SECTION



FRAN McELWEE
1400 KENYON AVE.
80. PLAINFIELD, N.J.
07060
601-754-9507

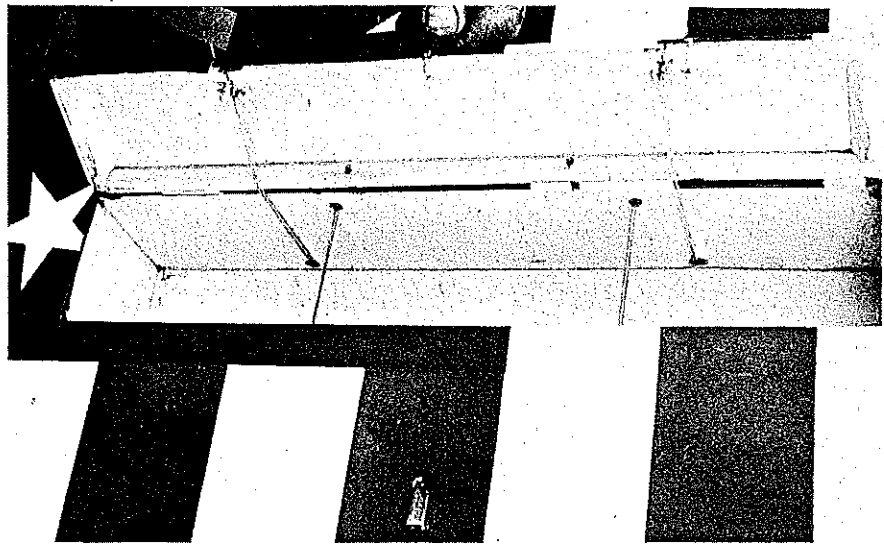


FLYING FLAG
DESIGNED AND DRAWN BY:
FRAN McELWEE
INKED FOR Model Aviation BY:
ROGER GREENE



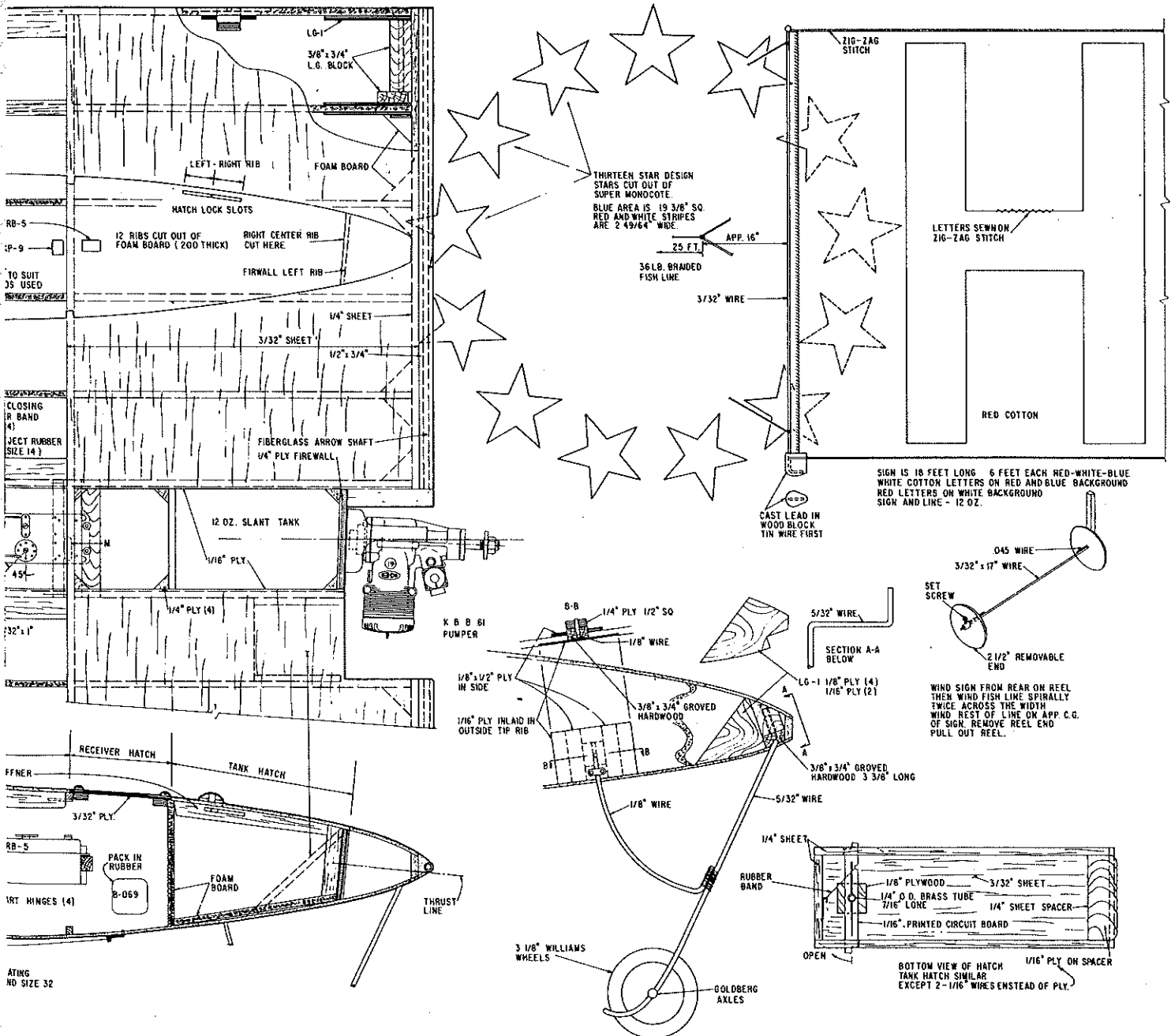
out on the white with a felt pen, and the open area to be double covered is pierced with a pin all over to allow the air to escape. The red stripes are applied; the left tip is all red, and the right tip is blue forward and red to the rear. The fin and rudder are covered with the Monokote trim sheets of gold for the bell. Two lines of

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The banner is stowed in this compartment. When half-servo movement pulls out release pins, the hatch is pulled open by an external rubberband. Bands shown, beneath banner, help toss it out after release. Band-loaded cover snaps back.

Left: Radio compartment is snug yet is readily accessible. Foamboard is used extensively, as for ribs and even full-depth spar. The span is 53 in., area 1908 sq. in. Weight, 8 lbs.



Langley's Model Aero Engine,
1903

by Robert Meyer, Curator
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Flying Flag/McElwee

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black trim are added to the base. The 26 stars are cut out of the white, using a metal template to cut around, again make sure the blade is sharp. The gold 76 decals were found in a paint store and are 5 in. high. Fuel-proof over them. I used Hobby epoxy clear.

The engine is mounted at about 2° right-thrust and about 7° down-thrust. The rudder is neutral. Start out with neutral elevator and go from there. Mine actually ended up with slight down elevator which is contrary to all my other saucers. Rudder movement is about 1½ in. total, the elevator 1 in. up and ¾ in. down.

My first test hop was conducted a bit differently from the normal. The first take-off was done with wheels on the skids, on an abundant area of hard-top, so a long low-speed run was made, only increasing engine power enough to achieve take-off. The ship probably never used half the power of a five-year-old 60, and it was airborne. A slow climb-out and straight flight until sufficient altitude was attained in order to try more power and to see how the ship handled in general. Full power showed more down-thrust could be added. Turns were smooth in both directions, no correction needed. Stall recovery was smooth and fast, no loss of stability was noted in the absence of the slot as thought possible.

The second flight was tried on the skids, after more down-thrust had been added. It took full power to get moving but it took off in about 100 feet—what a racket! Later tests off of a dirt area were unsuccessful because the skids dug in and not enough speed could be attained to lift off. This was with an old .60. Since installing a Fox .78 such take-offs haven't been tried again. But the .78, next installed, took it up much more steeply, so now perhaps it would take off on the skids from dirt.

Again, a caution on the down-elevator. This ship can go just so far toward flat-out flight and then it will tuck under. Try it out high enough so a recovery can be made

safely. Time hasn't permitted tests of different size and pitch props; all flights so far have used Top Flite 11-7½ or 11-8 Power Props.

Perhaps an explanation of the sign, drop and tow system may be of interest. Similar set-ups could be used in other ships as well. As mentioned earlier, the tow sign measures 14 in. high and is 18 ft. long, made of inexpensive cotton, consisting of 6 ft. each of red, white, and blue. The letters are 13½ in. high with 2-in. wide lines and are cut from the red-and-white cotton. Red letters are sewn on the white background, white letters on the red and blue background. A zig-zag stitch is used for the letters, and also to stitch the edges of the sign to prevent unraveling because the sign really whips.

A 3/32 in. diameter wire has about 3 oz. of lead cast on the bottom end; drill out a piece of hard wood for the mold. Tin the wire first, pour the lead, split the mold to remove. This wire is securely tightened to the front edge of the sign by folding the material over it and sewing well. The tow line is 36-lb. squidding nylon fish line, about 25 ft. long with a 1/32 in. wire clip tied at the front. Glue all knots because they have a tendency to untie. (A sailor I'm not;

there's probably a correct knot to fit the situation.) Due to the length of the sign, I found that the rear end twisted while being towed, so another 3/32 in. wire has been added to the trailing edge with about 1 oz. of solder wrapped around the lower end and a 9½" chute was added to the top rear to keep it more taut. At this writing only two flights have been put in with this arrangement. Results are excellent.

The drop system works like this. A 1/16 in. plywood door is rubberband-loaded to close. An external stronger rubberband, plus the weight of the sign (12 oz.), plus two eject rubberbands, will really throw the sign out when two wire pins are pulled from the door's edge. This is on a half servo movement. It's surprising how much pressure the airstream can exert. Forget that external band and the sign hangs up. It takes a loop to throw it out! The door slams shut by the internal bands, the sign meanwhile dropping like a yo-yo. This drop is made at a low-speed flight to the right of the pilot as the tow pass is made from right to left. As the sign is seen descending, increase power to normal flight while the sign unrolls to the rear. There's a big difference in drag with the sign in tow, but with a good .60 or larger, a climb-out can be made with no difficulty.

The sign is dropped in front of the pilot to the ground on a low pass at a low speed. This is accomplished by the other half servo movement pulling the release pin in the brass channel, releasing the wire clip on the end of the line. The same set-up is being used in three of my show ships and all work quite well.

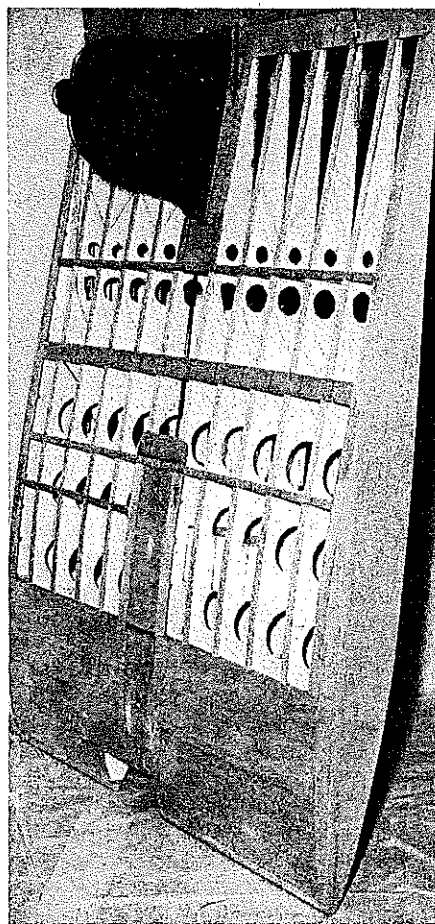
To load the ship, you reverse the way the banner comes out. Attach the tow clip first, insert the sign in the bay, then lock the door and don't forget the last external rubberband!

The F.F. has been flown with the larger KP-9 type servo's and individual receiver, but at this writing I am installing a Logitrol LRB-5 receiver-servo combination. This system is all but lost in the ship. It's a beautiful unit and the servos are much faster than my old big ones. I made a last minute revision on the plans to show the installation.

Also in the near future, hope to try other engines in the nose, such as the new K&B 61 Pumper (Editor's note: Now installed and shown on plan). While power such as this, and the Fox .78, isn't really needed for flight, the outstanding climb available should make the Flag more impressive going up. Actually, a .40 would probably fly the ship but I imagine it would be quite docile and with no reserve power when hovering.

If the flag isn't your thing, just the rectangular ship has spectator appeal. You can dress it up as a flying carpet, a ship from Mars, etc. Let your imagination run wild. Try something different.

If you have any questions or comments, please write me in care of this magazine, I'd like to hear from you.



One glance and the framework is obvious. You may want to substitute another fin and rudder. Present one highlighted bicentennial theme. Construction goes quickly but there sure are a lot of lightening holes to cut out!