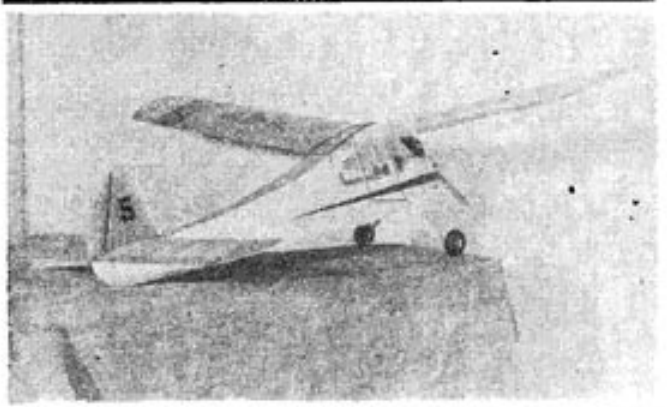
STAR FLIGHT



by HARRY A. WILLIAMSON

IF you get the impression, when looking at the illustrations on this page, that you've seen the *Starflight* before, you are probably right. You can see the *Starflight* any time you visit your neighborhood airport and practically every time you glance nonchalantly aloft on a sunny afternoon, to check that putt-putt overhead.

Starflight has been the cause of several minor disagreements. Some people say it resembles a Piper *Cub*, others, an Aeronca *Champion*. Truthfully, it was designed with both airplanes in mind, and an attempt was made to incorporate some of the lines of both ships, in conjunction with the elements of design necessary in a good free flight model.

After many sketches, the model as presented here was evolved, and it has proved to be as successful as we had hoped. We recommend the *Starflight* for beginners in gas modeling and for those modelers who are making the transition from controline to free flight. We feel that a little skill and an understanding of the drawings will result in a model as smooth flying as the original. If you are in the market for realism in flight and appearance, and simplicity of construction, we think *Starflight* is for you, so clean the debris from your work bench and let's go to work.

Fuselage. Enlarge the drawings to three times the size shown by use of the scale ruler and grid lines. Make two sides as shown by the heavy outline. From the full size pattern sheet, make one each of all the formers shown. Add 3/32" square stiffeners to both sides as shown in addition to formers F-6. Cement formers F-4 and 5 to one side only, square them up and allow to dry. After drying, cement the other side to these formers and put the assembly aside. Bend the landing gear from 1/16" diameter wire and cut the formers GF-1 and GF-2 from 1/16" hard balsa. Now, add the gear and these two balsa pieces to F-5 and cement liberally. Join the sides at the rear and make certain the curvature of each side is the same. The holes shown on F-1, F-2, F-3 are for the Anderson *Baby Spitfire*. Drill holes to suit whatever engine you wish to use, making certain the thrust line remains as shown on the plans. Cement these formers in place and add the 3/32" square crosspieces, along with F-7 and F-8. Cover the nose with 1/16" soft sheet and add the top and bottom of the fuselage. Be sure to insert it *between* the sides as shown on the plans; we have found that the extra 5 mins. of work needed for this is worth the effort when the "crush-test boys" give your ship the business. Sand the assembly well, add the stabilizer platform and dowels and cover with the same material as used on the wing, preferably lightweight *Silkspan* or tissue, dyed in your favorite color. Finish with two coats of thinned dope and another light sanding. Add .010" thick celluloid windows and windshield—and the fuselage is complete.

Cowl. Make the cowl as shown in the details on the drawing, spot cement to the fuselage after bolting the engine in place, and sand and carve to size. This assures a smooth-flowing blend of lines from fuselage to cowl. Again, cover with strips, using the same material as used on the fuselage. The cowl may be held in place with dress snaps or rubber bands.

Wing and Tail Group. It is not necessary to enlarge the drawings to make these units. Cut the required number of pieces using the full size patterns and (*Turn to page 49*)

on crankcase pressure, very effective. However, a speck of dirt, or oil hardening in the valve makes them inoperable with a vengeance. Further difficulty was foreseen due to the great powers of fuel meniscus in these small sizes. *Fuel meniscus?* That did ... So we used a disc rotor and made it ...-floating. Five minutes after assembly ...ve knew we had it. Only two smooth faces are needed, and one of them is already inside the crankcase. Best of all the intake hole can be spotted easily, and if missed, it can be tried again with a new rotor. In addition to all these advantages, the thickness of the rotor is not critical and this gives the amateur machinist another place to pick up and correct accumulated error.

Chuck up the 5/8" aluminum rod and turn down the rotor shaft to fit the hole in the rear of the engine block. This should not be a tight fit, but smooth running and a bit loose if anything. Bring the O.D. of the rotor down to size and face it with a gentle cut, making certain there is no shoulder next to the shaft as this will prevent seating. Cutting loose from the stock should be halted about halfway through and all sharp edges broken, then complete the severance. Locate and drill the drive hole. This should be a bit oversize, but *do not* drill all the way through the disc, just enough for good clearance. Mark the outline of the port and file away the indicated area. The rotor may be held between two thin bits of wood or fibre in a vise for this operation. Break any edges that develop. Now, take up the block and put the rotor shaft into the hole from the outside rear of the case and scratch the outline of the round portion as shown on the plan. Split the difference between this line and the edge of the shaft hole and drill a 1/8" hole along the diagonal. The intake tube is a length of 5/32" thin wall brass tube. Taper one end slightly (this taper is emphasized on the drawings) and press the tube firmly into the case. The needle valve assembly may be from a *Baby Spitfire* or other small engine.

The crankcase front section must now be ...drilled; set it in the engine block and spot the holes for drilling. These holes are drilled and tapped 2-56. The original engine used 3-48 screws throughout, but the larger size is not needed. However, it may be comforting to know that if you ruin the No. 2 hole you can always retap it for 3-48. Tapping is easier if the holes are first filled with kerosene and the tap backed off at frequent intervals. Tap in the mounting studs next.

At this point, clean up all the parts and make a trial assembly to be sure everything fits smoothly and turns freely. If the rotor valve shows a tendency to creep forward on the pin, don't worry about it—it won't when the engine is running. The important thing is that it seats well and does not bind at any point.

(Next month we'll bring you the concluding part of the *Little Dragon* construction article, giving instructions for con rod, cylinder head, and the amazingly simple sleeve and piston arrangement which eliminates the need of conventional milled or cast-in by-pass. Details of fuel, starting and running will also be covered.)

BILL OF MATERIALS (for entire engine)

- 8" of 3/4" sq. hard aluminum alloy rod
- 2" of 5/8" round hard aluminum alloy rod
- 3" of 1/2" round 17ST rod
- 3" of 9/16" seamless steel tubing
- 3" of 9/16" drill rod
- 1" of 1/8" O.D. heavy wall brass tube
- 1" of 5/32" O.D. thin wall brass tube
- Scrap of 1/8" thick dural sheet (hard) for con rod
- 2—3-48 studs 5/8" long
- 8—2-56 or 3-48 screws, fil. head, 3/8" long
- 2—No. 4 hole washers
- 2—3-48 nuts
- 1"-sq. thin gasket material
- 1 *Baby Spitfire* needle valve assembly
- 1 *McCoy Hot Point* Plug

Starflight

(*Continued from page 25*)

make outline drawings on a piece of wrapping paper, marking the rib locations. After assembly, sand well and cover. Take care to remove all warps when doping. The rudder is fitted between the two center ribs on the stabilizer and cemented in place.

Finishing. The original model was covered with yellow *Silkspan*, and given three coats of thin, plasticized dope. We suggest that use of colored dope be minimized, to save weight. On the original ship, we used blue *Trim-Film* for all striping and black *Trim-Film* for control outlines and cabin door outlines. It's easy to apply and makes a clean job. One coat of hot fuelproofer on the fuselage and center section of the wing completes the job.

The drawings show no fuel tank because every model builder has his own pet theories along this line, and the model's construction is such that almost any type may be used. You may, if you are using the *Baby Spitfire*, fuel from the tank which is supplied with the engine, in conjunction with Mel Anderson's *Baby Timer* (a marvelous little gadget, by the way) or, you may choose a simple coiled-tube type of tank, held on the side of the fuselage with rubber bands. Whichever type you use however, never fly the model with an engine run greater than 20 secs.

Adjustment and Flying. The original model proved very easy to adjust, and if you have been fairly careful with the construction, your version should give no trouble. Before hand-gliding, check the wing and stabilizer for warps. If any are present, remove them by steaming or moistening the covering with dope thinner and pinning the surface flat on a board. The model should balance on or very near the wing spar when supported on your finger tips, and any major unbalance should be corrected by addition of modeling clay to the nose or tail as required. Check lateral balance also, by suspending the model by the fingertip method from the prop shaft and rear stabilizer dowel. Again correct any unbalance by the addition of clay to the high wingtip. Now we are ready for the glide tests. Hand glide in tall grass, if you can find any. Adjust the rudder tab for a glide circle of approximately 150' diameter and work on the glide until it is smooth and flat. If the model has any stalling tendencies, remove them by shimming up the leading edge of the stabilizer. Diving tendencies should be corrected by shimming up the stabilizer trailing edge.

The first power flights should be attempted with caution. We added two 1/32" thick brass washers behind the right side of the engine to give left-thrust. Set the timer for approximately 10-sec. engine run and launch gently into the wind, noting any unusual turning tendencies or stalling characteristics. If the model climbs steadily with a smooth left power turn and no hint of a stall, your adjustments are correct. Any unusual tendencies must be corrected by adjusting the thrust line for smooth-power flight. When satisfied with the initial 10-sec. power flights, set the timer to 20 secs. and enjoy yourself.