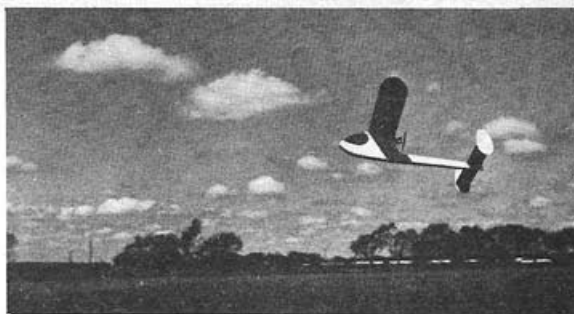




Designed for a slow steady climb, using a full tank of fuel to reach same height as a regular contest free flyer—Doc shows how to launch.



Right or left flight pattern is fine with Pushover—this photo taken immediately after launch at left, shows gentle right turn and climb.

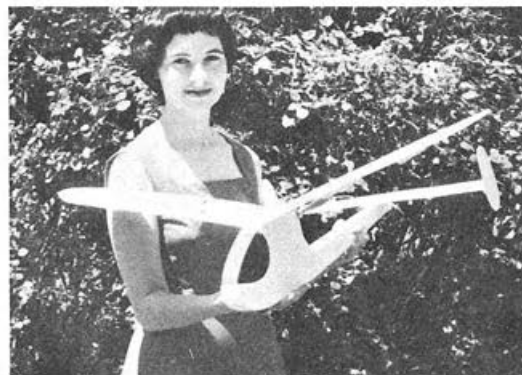


Next step of flight photo sequence shows Pushover reaching a reasonably high altitude, glide is just good enough to eliminate need of D.T.'ing.

# THE PUSHOVER

By DR. BILL BAKER . . . READY FOR SOMETHING NEW? THEN TRY THIS PUSHER. MAYBE IT'S JUST A SPORT FLYER BUT IT WILL GIVE YOU HOURS OF GENUINE FUN.

► Ever since I first flew with a reed-valve engine, I have wanted to build a pusher. The Pushover is not a contest model, but a stable, rugged, and attractive ship. My wife was surprised that it flew at all and it surprised me because it flew off the board without needing any adjustments. The Pushover climbs slowly, using a full tank of fuel to reach



Doc's team manager, who as all good wives, favors her husband's participation in our hobby, poses with his well-designed free flyer.

the height a contest model attains in ten seconds, so no engine timer is used. The glide is just good enough to make good landings, so no dethermalizer is used either. Any pattern is safe with this ship as the torque is very small and the model is entirely out of the spiral propwash. I enjoy its remarkable ability to fly equal circles to either the right or left, depending on how the rudder is set.

An .020 or .024 reed-valve engine is recommended, although a tired .049 could be used. As a reed-valve engine will run backward, use a standard propeller with it, but if you have a rotary-valve engine, pusher props are readily available.

The model is constructed entirely of medium-weight 3/32" sheet, (6 sheets), plus one strip of 1/4" square, and some scraps of 1/16" plywood.

**Fuselage:** I started by making two right sides. Suggest you make one right and one left, as it saves time. The unbroken line on the plan is for the side pattern; the broken line indicates the final dimensions after the top and bottom are covered with 3/32 sheet. Cut out the sides, marking the positions of the 1/4 square uprights carefully, and join the upper and lower halves of the sides by cementing the 1/4 square uprights in place across them. When dry, cement F2, F3, and the plywood, F4, to the uprights to join the fuselage sides. Use a square to be sure the sides and F4 are at right angles. Join the tail end together with a short piece of 1/4 square. The (Continued on page 59)

## The Pushover

(Continued from page 17)

rest of the bulkheads are now added. The nose, forward at F1, is filled in solid by laminating scrap sheet to the proper thickness. This can later be drilled to receive the ballast (one ounce of lead in the original). If you wish to use a wheel, glue some scraps of plywood, about 1 x 2 x 1/16 inches to the interior sides, and drill for the dowel axle. The top and bottom are now covered with 3/32 sheet. The grain should run lengthwise, except over the areas of high curvature. Do not cover the wing-mount area. Cement the 3/32 doubler's inside the wing-mount area and also the wing supports. The 1/4 square uprights at the rear will have to be notched a bit for the engine mounting nuts, and the tops of all the uprights will also have to be beveled to allow the wing to sit properly. Except for the stab platform and the dowels for the hold-down rubbers, that's it. (I assume you've heard of sandpaper and will use it.)

*Wing and tail:* The wing is very simple to make. Cut a 1/2 inch strip from a 3 inch sheet of 3/32, and butt glue the resulting 2 1/2 inch piece to a sheet 3 inches wide, to make a 5 1/2 inch chord (34 inch span at this point). When dry enough to handle, dampen the upper surface and put the wing ribs in place, using rubber bands, pins, and Elmer's glue. A rib goes at the center, and every 5/8 inches away from the center. If there are no warps, put aside to dry twenty-four hours. If warps are present, the slow-drying Elmer's gives you plenty of time to repin and get them out. When dry, cut the wing in half at the center and cut away the center rib. Join the two wing halves, hand-launch glider fashion, by sanding the ends with the tips raised to the dihedral angle of 4 1/2 inches at each tip. Use several coats of Elmer's glue here. When dry, cut the tips to shape, sand, and trim the ribs as shown on the plan. By the way, the shape of the tip is rather important, because with the airfoil used, the tipshape makes a certain amount of washout automatic. The big

boys think this is somehow beneficial.

The stabilizer is a 3 x 18 x 3/32 inch sheet. The top is dampened with water, and the ribs are placed at the tips, every three inches, except for the center. Cement the 3/32 sheet rudders to the tip ribs.

Mount the engine with nuts and bolts, rather than woodscrews. Assemble the plane with rubber bands and check the center of gravity. Drill the nose block and add enough weight to bring the CG to the point indicated on the plan. Do not attempt to fly the model if this is further aft than shown.

Dope as desired. I used two coats each of filler, clear, and white, and painted the cockpit red for contrast. Flying weight of my Pushover is nine ounces.

I did not key the wing and stab, because the wing mount is quite stable and the model is so uncritical that visual alignment before each flight is accurate enough. After the engine is started I adjust the stab for either a right or left turn by having about 1/32 inch of the stab platform protrude from one side of the leading edge.

The original model required no adjustments. Yours however, may and I think you should add nose weight for a stall and shim up the stab trailing edge for a dive. Leave the wing incidence alone and do not move the center of gravity rearward. Unless you have warps or poor alignment, I can foresee nothing but lots of fun and carefree flying for you.

I would be very interested in hearing from anyone trying to adapt the model for radio control. If I had radio equipment, I would put an escapement at F3, mount the receiver under the wing, make a removable upper nose and place the battery there.