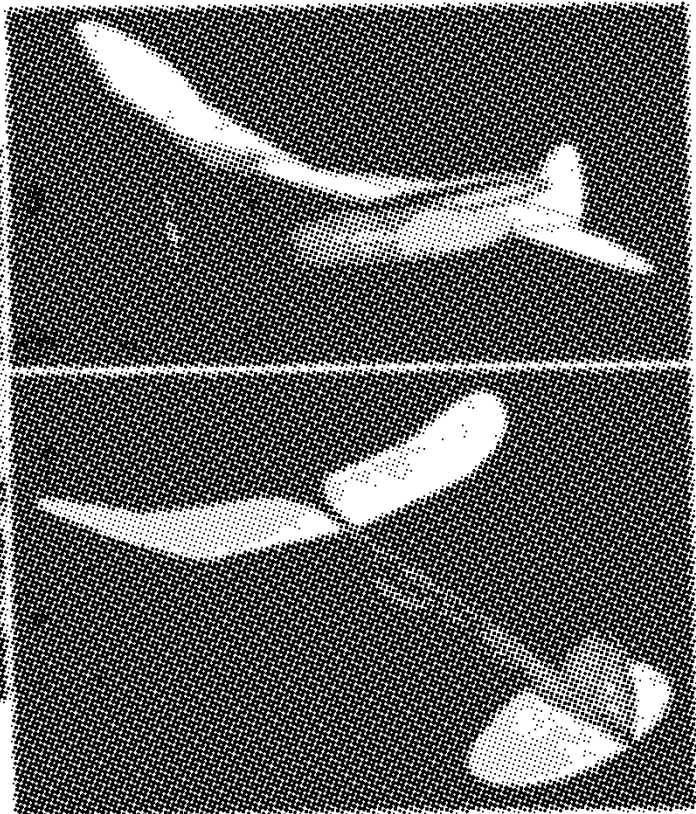




Though of simple construction it is a fine performer because of clean lines and excellent design



THE NATIONALS WINNING PACER

**A consistent class C winning
gas model that is easy to build**

by **SAL TAIBI**

THE Pacer placed first in the open class "C" event at the 1941 Nationals. On its first flight, with a 7 second motor run, it flew for 1 minute and 22 seconds. The duration of the second flight was 13 minutes and 55 seconds, and the third and final flight was 10 minutes and 5 seconds.

There are many factors that make up a championship flight, and although luck is an element, the model itself must get up there quickly and then glide well enough to take advantage of lurking thermals. The ship must be consistent, stable, and a dependable flier that performs well under all conditions. The Pacer has these necessary "virtues."

Class "C" ships usually outsoar the smaller class "A" and class "B" models,

but their drawback is comparatively poor climb. The class "C" Pacer compromises between the fast climb and poor glide of smaller ships, and the exceptional glide and poor climb of larger ships. The result is a fast climbing class "C" model that gets up to the thermals, and then has the ability to take advantage of them. The Pacer is powered by a motor having a displacement of .35 cubic inches. Because it has a wing area of 562 square inches, the model has to weigh 31.4 ounces; it is simple, rugged in construction and flies easily.

Fuselage

The first step in building the fuselage is to draw the top view full size. An elaborate

drawing is unnecessary; a center line with the width markings suffices. The formers and bulkheads are drawn full size on the plans and can be traced directly to balsa with carbon paper, or can, like the formers, be built on the plan.

1/4" x 1/2" gumwood is spliced to the two longerons before starting to build the "crutch." Former 1 is built of 3/16" x 1/2" balsa; 2, 3, 4 & 5, of 1/8" x 1/2" balsa; 6 & 7 of 1/8" x 3/8" balsa; 8 & 9 of 1/8" x 1/4" balsa; and 10 & 11 are cut from 1/8" sheet balsa. The bottom bulkheads are cut from 3/32" sheet balsa. While the crutch is drying, cut out the fire wall and bulkheads, and build the formers. After these have been cemented to the crutch, the 1/4" square top longeron is added. The 1/8" x 1/4" bottom stringers are then inserted in the bulkhead notches. Mark the formers where the 1/8" square stringers cross them, and cement the stringers in place. The fuselage wing rest (WR) is now traced off the plan, cut out, and cemented in place. 1/8" sheet is filled in beneath the top longeron and between the formers, to prevent the top longeron from sagging. The landing gear is bent to shape and glued to the firewall with pieces of 5/16" x 1/2" grooved basswood as shown on the plan.

3/32" O.D. aluminum tubing is securely cemented behind former 10. The tubing passes through the top longeron and through a 1/4" square brace that is cemented between the crutch longerons. This tubing is the pivot about which the rudder turns. A piece of 0.16 aluminum 7/16" x

1-5/8" is cemented to the fuselage at the extreme rear (see rudder detail). Another piece of aluminum 1/2" x 1-7/8" is formed as shown on the plan and cemented in place. Drill a 1/16" hole through both pieces of aluminum and trim one end of a piece of 1/8" dowel to 1/16" round. This peg is inserted into the holes in the aluminum and into the crutch. To remove the rudder, the peg is taken out and the rudder slips out of the tubing and off. The turn adjustment is controlled by bending the aluminum either way.

The cowl is drawn to scale making it necessary to enlarge the drawing before proceeding with the construction. Mark off on a piece of paper, one half inch squares equal in number to the smaller squares of the cowl drawing. Now reproduce the drawing in the large squares as it is in the small squares. Select a medium piece of balsa 5" x 5 1/2" x 3" for the cowl. Fit the block into the fuselage and cement lightly. After several hours of drying the cowl is ready to carve. After shaping and sanding the outside to shape remove the cowl and cut out the inside. Carve the cowl to approximately 5/16" thickness all around. The bottom block is made similarly except that it is cemented permanently in place.

Motor mounts are made of basswood and are bolted to the gumwood longerons. Mount the motor on the basswood mounts as shown. The coil is enclosed in a 1/8" sheet box and cemented in the bottom of the cowl. Let the high tension wire clip protrude from the box in order to attach the high tension wire. The condenser is mounted on a clip bolted to the firewall. The outside battery box facilitates battery change. It is made of 1/8" sheet with .034 wire springs attached to the top where the wiring is attached. After the motor has been mounted the exhaust hole can be cut out and a hole to fill the gas tank while the cowl is on. Don't forget the reinforcement piece across the top of the cowl. 1/8" dowel is cemented to the bottom front of the wing rest. It should protrude about 1/2" because the rubber that holds the wing is looped over it. After the timer has been mounted the wiring can be completed. Use multi stranded wire as it is less liable to break from the vibrations. If in doubt follow the wiring diagram on the plan. The

batteries and cowl are held in place by stretching a rubber band between hooks; one on the cowl to the fuselage on one side, and a hook on the cowl and one on the fuselage rear of the batteries on the other.

Stabilizer and Rudder

A full size drawing of the rudder is necessary before it can be built. The rudder has an ordinary flat cross section and is simple to build. Force a piece of 1/16" wire into the rudder and cement it firmly as it is the front pivot.

After drawing the stabilizer plan by the previously described method start building. Be careful when drawing full size parts to use correct size squares. Lay down in order, spar, leading edge, and trailing edge. Cement 1/8" x 1/2" ribs in place and allow the entire unit to dry thoroughly. After removal from the workboard shape the ribs with a knife or any other suitable instrument. Temporarily attach the stabilizer to the fuselage with pins. Cement B9A to the stabilizer and insert the stringers. The underslung rudder, cut from 1/4" sheet, is cemented on *after* the stabilizer is covered.

Wing

Again make a drawing of the wing before starting construction. If the wing is drawn on thin paper or tracing paper, only one half the wing need be drawn. The paper can be reversed and the other half of the wing can be built. Elevate the bottom spar 1/8" from the plan because of the undercamber. Ribs are then fitted into position, and the leading and trailing edges attached. Then the top spar is added and the wing is dried for several hours. After the other half of the wing has been built, the halves are cemented together at the proper angles. Joints are reinforced with 1/8" sheet gussets and the ribs with 1/8" sheet triangles. Attach the sheet wing mount and cover the leading edge of the wing up to the top spar with 1/16" sheet balsa. Cap strips are now added on top of the ribs and over the trailing edge. Sand away the strip at the trailing edge as shown on the full size drawing of the wing rib. A small piece of light aluminum is attached to the wing center

as reinforcement against chaffing by the rubber wing tie.

Covering

Cover the fuselage with silk if possible, although Silkspan or bamboo paper is almost as good. Double tissue, bamboo paper, and Silkspan each have merits as a wing covering. However if double tissue is used, be sure to cross the grain of the two layers. Give the surfaces about four coats of dope and the fuselage about six. Use a half dope—half cement mixture for applying the covering.

Flying

A few days after completion check the model surfaces for warps. The Pacer wings and tail are constructed solidly enough to resist warping, but if warps do occur take them out. Enough Pacers have been built to prove airworthiness, and by carefully making flight adjustments championship performance will result. The wing is set at zero degrees, and stabilizer with reverse camber, at 1/2" positive incidence. Set the rudder 1/4" to the *left*. Two degrees left thrust and two degrees down thrust are the requirements for motor setting. Glide the ship several times putting more or less incidence into the stabilizer. Remember! Careful slow adjustments save much time and effort.

Set the timer between 10 and 20 seconds for the first flight and use very low power. Launch the Pacer and watch the flight very carefully. Under power the Pacer should climb in approximately fifty foot circles to the *right*. When the motor cuts, it should gradually turn to the *right* and glide in about two hundred foot circles. Each model may have individual flight characteristics but all Pacers, without exception, climb to the *right* under power, and glide to the *left*. If the ship reacts favorably on first flight, fly it again with the same power and motor run. The ship should be flown about ten times, gradually increasing the power to maximum.

If you have followed instructions, and were guided by common sense, you now have a perfectly flying ship that will afford you many hours of satisfaction, and what's more, an excellent chance to win.