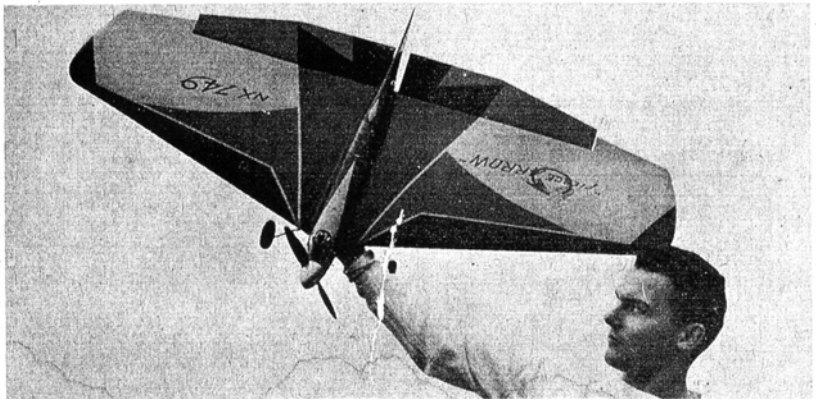
Either the helpers are littler or ships bigger! With 810 sq. in., super wing does a 60-65 mph with a gross weight of three pounds. More sweep in outboard panel avoids unequal length panels.

For that new 1957 pattern, why not build and fly a real airplane. This .35-powered big wing won two firsts in its first two meets.

Exciting, eh! Thicker tip sections, equivalent to washout, eliminate roll-in tendencies. Nose tends to drop, instead, on any careless stalls. FA comes in slowly, runs one foot on concrete.



the FIERCE Arrow

by W. F. Netzeband, JR.

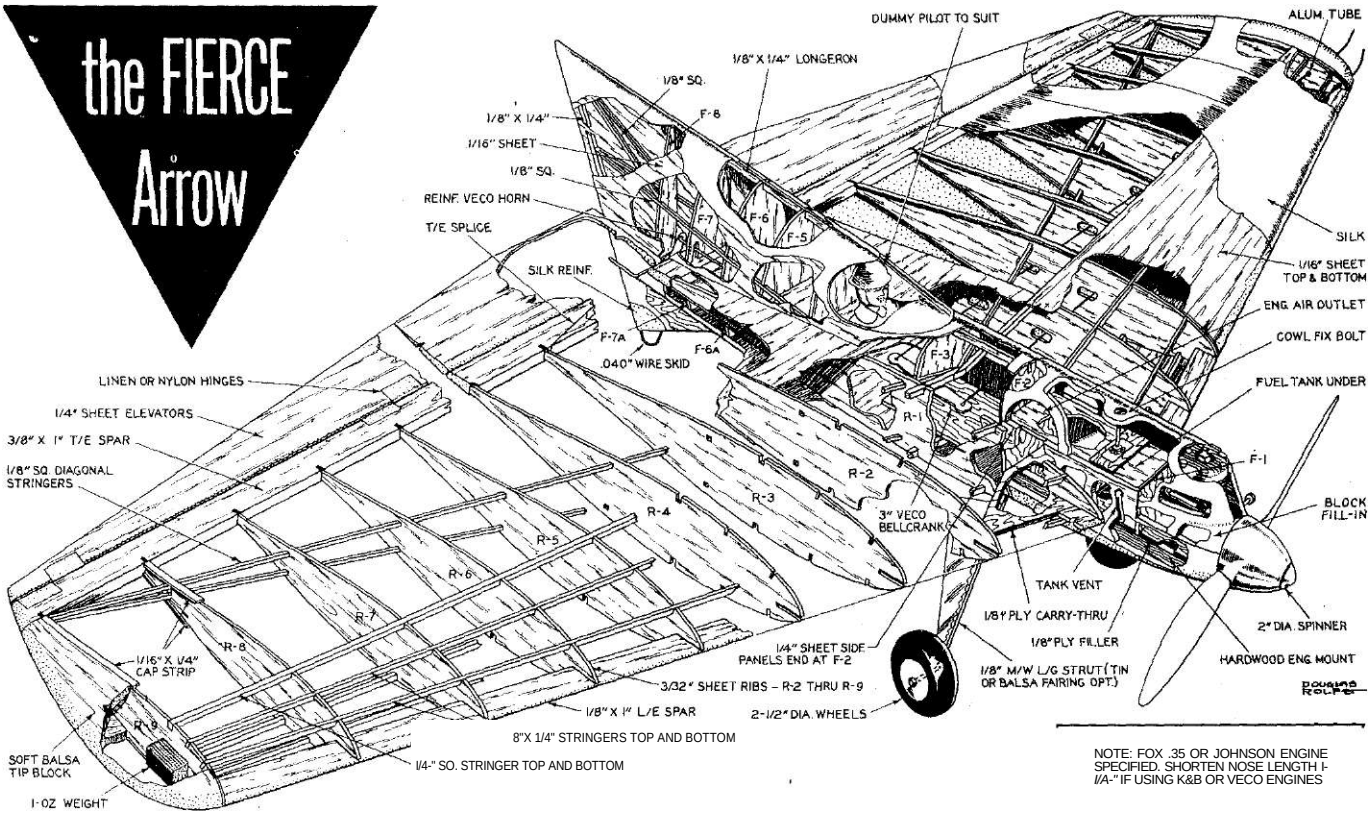
(Some numbers have been revised based on facts. WfN 4/2006.)

► The Fierce Arrow was conceived mainly to be different. Design analysis indicated possibilities of superior performance, in that high Reynolds Number (740,000) allowed a CL max of 1.3 or almost as good as flaps. Wing loading is actually less than the Half Fast or 7.63 oz. a square foot. Drag was the only thing that had us worried, but it has proved to be no more than a conventional 500 sq. in. job.

We see no reason for the flying wing to be maligned the way it is, except that its detractors have not achieved the proper touchy balance. Also, the Half Fast and Arrow have a thicker tip than root (15% to 10%) giving the same stable stall characteristics as washout on conventional wings. Hence, no roll-in from stalled conditions, and a nose dropping affect to pull out of said stall. Area is 917 sq. inches while speed hovers between 60 and 65 MPH, weight under 3 lbs. Tug is generous, particularly overhead. The proof of the pudding is the way it eats up the pattern. By the way, the panels are SYMMETRICAL, same sweepback. (my undereducated boo-boo back then).

Out of two meets it has won two firsts, one of them at the King Orange meet on its 6th flight. Six of them have been built and more are in progress. By the way, that's a "35" in there!!

We calculated the minimum turn radius at 10.2 feet, and the large area lets it go around square turns clean with no tendency to bobble and there's always a margin of safety on

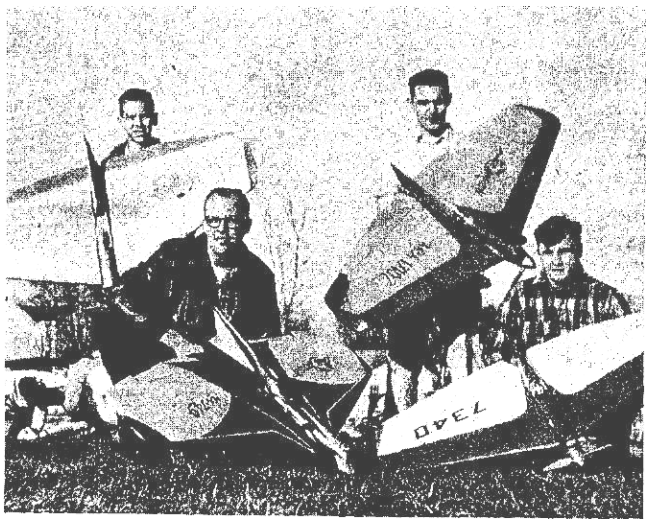


eights. Overheads, where it's up to the ship, are easy. Also, landing and take-off are automatically maximum points if you do not fight the ship. It flies slow enough that landing run is about one foot on concrete. Interested yet?

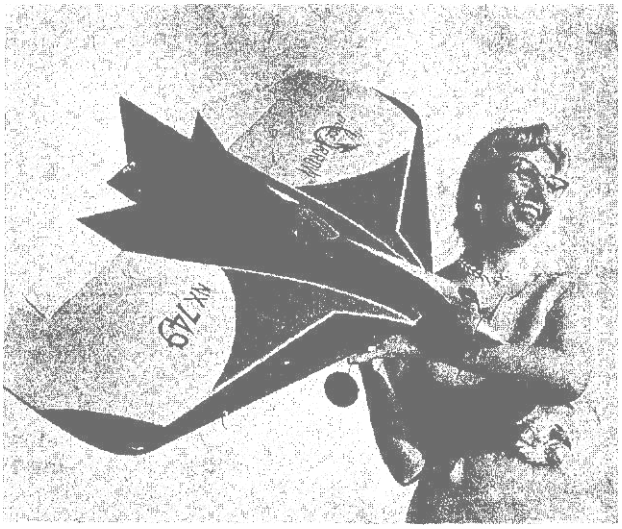
I have been fairly dissatisfied with ordinary stunt ships but I have been unable to find much wrong with the "Arrow," and I've tried, believe me! In any wind up to 25 mph, at least. At 30 she will do a pattern, but not too prettily.

(2006 revisions) Kit construction differs from original in several respects. Besides the laser cut parts, you'll need a bunch of 6# 1/16" balsa to do the planking thing. The 1/8" x 1" leading edge slabs should be 8# balsa. Spars should be 8 – 10# balsa. The leading edge pieces are assembled onto the ply carrythru over the plans. The ribs have assembly tabs on alternate ribs, and the basic frame is assembled over the plans. You can proceed to the planking phase, including the trailing edge planking attached to the building board.

Assemble the engine bearers and spacers on a flat surface. Locate the engine bolt holes and drill mount holes, and install blind nuts. Then assemble the lower block and nose sides to the bearer assembly. This subassembly can now be glued into the wing frame, keyed by the building board for alignment. IF you elected to use the authentic wire landing gear, it gets bolted to the firewall, and glued into the main assembly now. From here on it will be in your way at every turn!*(Continued on page* 45)



Four of the six FA's built to date. Minimum turn radius is 10.2 feet. No bobbled square corners. Margin of safety on the eights.



The whole family's proud, we'll have you know! Seriously, the first Fierce Arrow would do good pattern in 25 mph wind—not bad at 30.

The Fierce Arrow

(Continued from page 11)

Top planking goes through fuselage only aft of cockpit bulkhead. It projects inside the root ribs ¼" to form basis for fuselage planking between the cockpit bulkhead and the firewall.. Bottom planking ends at rib edges, then goes thru fuselage to allow the ¼" bottom plate to be installed. Everyone needs a minor problem to solve. Here is yours.

Planking on the original Fierce Arrow was applied with the, then new, Goodyear Pliobond (contact cement) since there were large areas to work. It worked well, but now there are modern methods of securing planking to substructures. Basic planks are extra wide, and edge-glued per plan notes. Dry fit each glued-up plank to its final resting place. Glue and let dry along the leading edge cap. Then dampen outside of plank, and apply slow drying cement to the three spars, and root and tip rib. Using masking tape, clamps, etc, assure that the planking is true to the ribs. Take only the time needed to be sure the planking is STUCK down. After planking, you can add 1/16" x *1/4"* cap strips, including a cap on the tip ribs. Carve and assemble the tip blocks, add the one-ounce tip weight and leadout tubes.

Now the bellcrank plate gets epoxied in flush with the bottom of the rib slots. Bellcrank and leadouts should be installed next. Cable leadouts are sincerely recommended. Install the elevator horn to the trailing edge, noting slight offset to accommodate the ball joint clearance. The pushrod is next to be assembled and installed. You can set the horn arms and bellcrank to their neutral positions right now by adjusting the pushrod length. The final adjustments can be made at the handle.

Rear end fuselage is a slightly different procedure. Bulkheads are cemented to planking except #7, using a center line to line them up. No offset is necessary *but* be sure it isn't turned in. Add the top longeron and sand it to mate with the planking. Bottom is 1/4" sheet and should be parallel to the basic reference plane.

Back to the nose massaging.. The nose needs some blocks to fill in around front so we can get down to the 2" dia. spinner. The Top block is spot cemented to the fuselage and carved to shape. You can take the easy way and leave the engine uncowled if you like. Otherwise, hollow out and open outlets at rear for ventilation. The front inlet slot starts out 5/16" wide, and should be adjusted after flight tests. The hold-down system consisted of a blind nut on piece of 1/8" ply, and a carefully dimensioned screw through the cowl. With proper keys one screw is sufficient to hold the cowl in place. Carve all to rough shapes, and start sanding.

I covered the entire original Fierce Arrow with silk and finished with five coats of half-strength butyrate clear dope with elbow grease between coats. Color was four coats in three colors, but you're boss here. We (Mother Nature and I) will allow you no more than 45 ounces, gross dry weight. You should have enough experience to finish up details so we'll not waste your time.

I flew the ship on 65-foot lines, and this is a good place to start your fun tuning Originally the power of choice was a GOOD open exhaust Fox Stunt 35, Fox fuel, and a 10-5 Top Flite prop. What scares me now, with all this knowledge? I never tuned the Fierce Arrow! I guess I was nimble enough to fly around the idiosyncrasies. It didn't like to be hammered in squares, and until 1957 there were NO TRIANGULAR maneuvers. SO, be gentle on the modern stunts, and keep up the flight velocity. You and the Fierce Arrow can become really good friends. Honest. (Revisions by WildBill …….4/2006)