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The Old Rocketeer

by G. Harry Stine

A Nostalgic Look At Tally's Swan

Back in 1965, boost-gliders were still new -- relatively speaking -- and Larry Renger's "Sky Slash" design was cleaning up at all B/G contests. B/G design was still wild, wooly, free-wheeling, and empirical. In other words, it was fun. A.W. "Pinky" Guill was, at that time, one of the best senior model rocketeers in the world. He was an old aero-modeller who somehow found time to build and fly model rockets between trips abroad as a senior engineer for Union Carbide International. (Today, Pinky is manager of Union Carbide's plastic division in New York City.) He was a Trustee of the NAR and senior advisor of the NAR Fairchester Section in Connecticut.

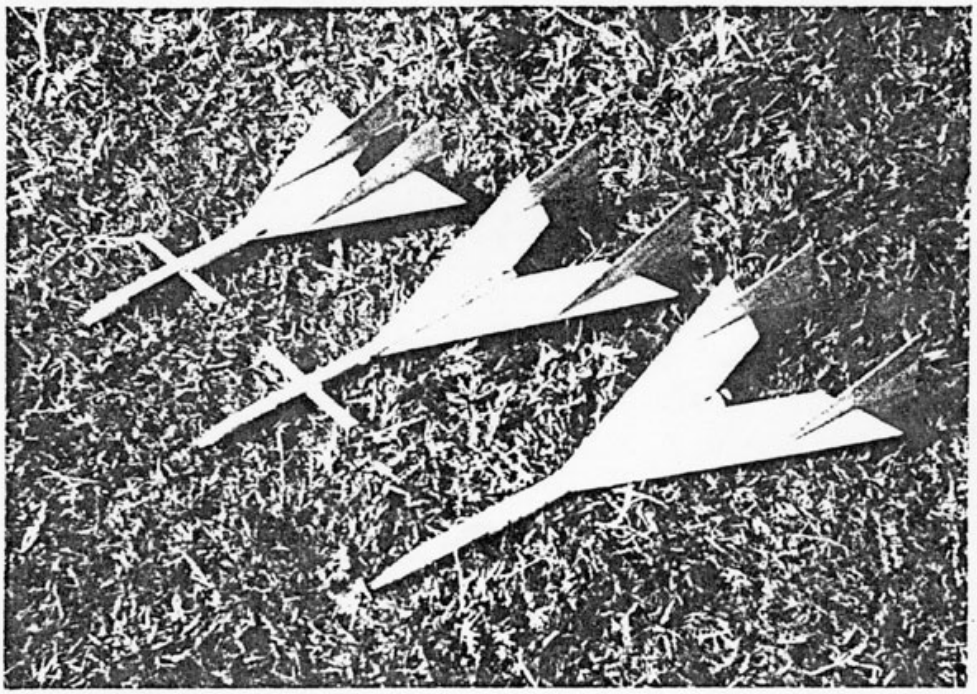
Pinky began working on a unique boost-glider design in 1962. By the time 1965 rolled around, he had it perfected. He was interested in rear-engined canard-type configurations where the front surface is small and set at an angle of incidence while the aft surface is large and forms the primary lifting surface. This is just backwards from a conventional configuration.

The 1964 Edition of the Pink Book came out with Rule 5.1.5 that prohibited, for the first time, the ejection of an empty, used, expended engine casing from a model in flight unless it had an attached streamer or was enclosed in an unstable airframe. Pinky's B/G's were engine-poppers, so it was back to the drawing board. Instead of separating a pod like everyone else was doing, Pinky decided to keep the engine casing in the B/G.

Today, this isn't a B/G, but a rocket glider, R/G. So Pinky Guill can perhaps be credited with developing the first successful R/G model.

Retaining the engine casing increased the glide weight by 0.42 ounces. To compensate for this, Pinky went to a higher lift-to-drag elliptical wing. Early test flights indicated some serious panel flutter, so he added external stiffening ribs that serve double-duty as flow fences... not that he really needed them on an unswept wing, but it did improve the slow flight characteristics.

The result was "Pinky's Swan", and it took third place in Senior Division Swift B/G at NARAM-7 (Aberdeen Proving Ground).



Here are three of A. W. "Pinky" Guill's early experimental variable-geometry Swans before he went to the elliptical wing. This design flew well, but the elliptical - winged Swan would perform better if it stayed together during boost. The Swan closest to the camera has the canard folded back into the body tube. [Photo from the GHS hysterical collection].

"Pinky's Swan" is not a klungy antique that will not perform with today's birds. Try building it, and you'll see.

Construction is straightforward with the exception of the canard release mechanism which must be pre-assembled before inserting it into the body tube. Two balsa plugs are assembled to a 5-inch length of 1/8-inch diameter wood dowel. A piece of 1/32-inch music wire is bent as shown. Note: assemble the bulkheads to the dowel and insert the trip wire in the following order: Bend the forward loop in the trip-wire. Insert both unbent ends of the trip-wire through holes in the bulkhead and slide the bulkheads onto the dowel, pushing them toward the center of the dowel. Bend the ends of the trip wire as shown. Then slide the bulkheads to each end of the dowel, making sure the ends of the trip wire are positioned through holes in the bulkhead as shown. Glue the bulkheads to the dowel. Assemble the elastic thread as shown. The assembly is now ready to be inserted into the body tube.

The operation of the canard release mechanism is as follows. A loaded engine is inserted into the aft end of the body tube and left against the engine stop wire in the rearmost position. The canards are swung into the body in their boost position. The engine is then slid forward against the rear bulkhead. This pushes the trip-wire forward into the notch in the tip of the canard, holding the canard folded into the body. The bird is launched in the standard manner. When the ejection charge goes off, the engine casing moves 3/4-inch to the rear, the ejection charge gas being vented through fuselage holes as shown. The rearward movement of the engine casing allows the trip wire to move aft under tension of the elastic thread. This releases the canard surfaces so that it can swing out into the airstream.

Without the canards extended into flight position, the bird is ballistic; it flies

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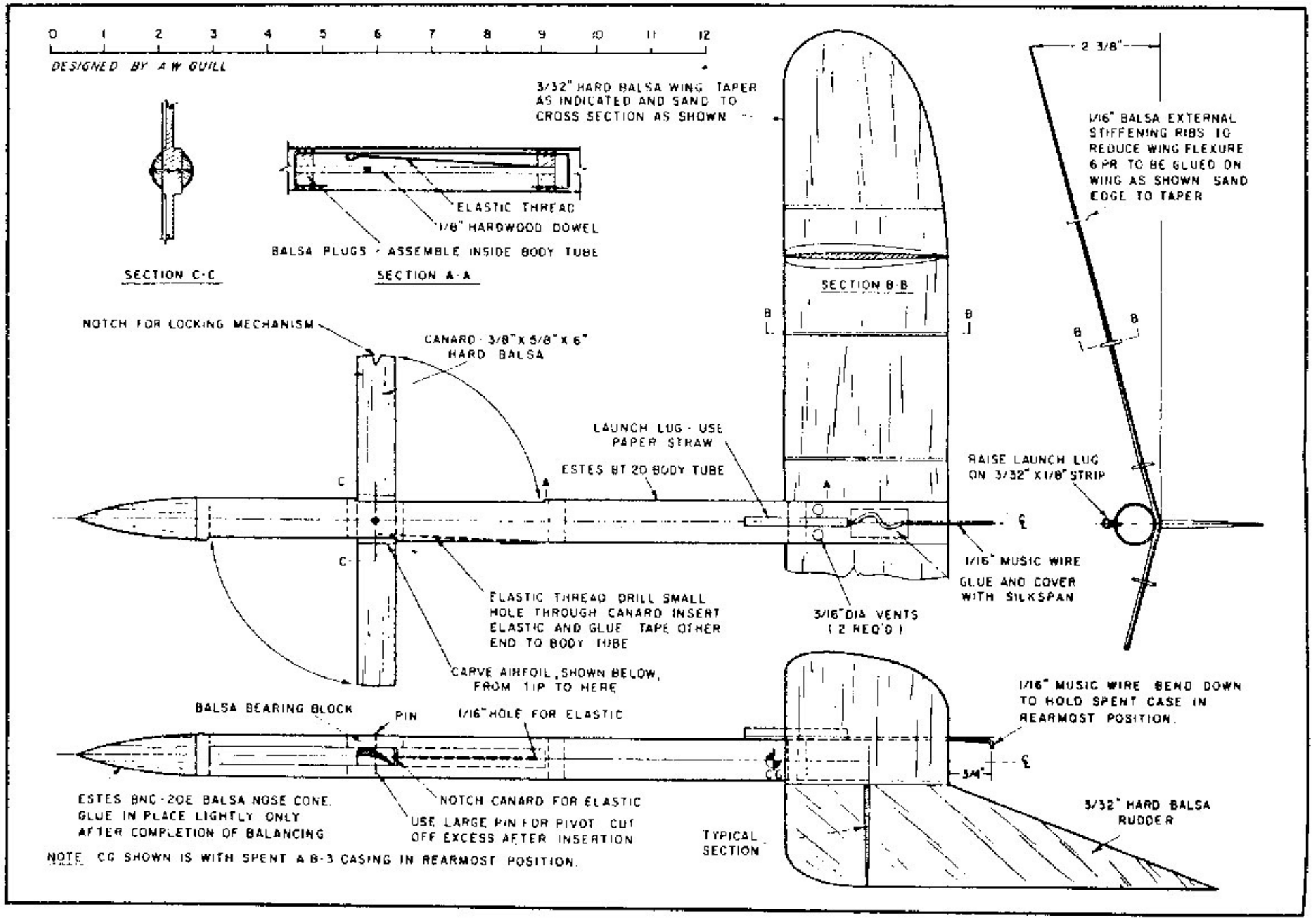
0 1 2 3 4 5 6 7 8 9 10 11 12
DESIGNED BY A W GUILL
3/32" HARD BALSA WING TAPER AS INDICATED AND SAND TO CROSS SECTION AS SHOWN
2 3/8"
1/16" BALSA EXTERNAL STIFFENING RIBS TO REDUCE WING FLEXURE 6 PR TO BE GLUED ON WING AS SHOWN SAND EDGE TO TAPER
ELASTIC THREAD
1/8" HARDWOOD DOWEL
BALSA PLUGS - ASSEMBLE INSIDE BODY TUBE
SECTION C-C
SECTION A-A
SECTION B-B
NOTCH FOR LOCKING MECHANISM
CANARD - 3/8" X 5/8" X 6" HARD BALSA
LAUNCH LUG - USE PAPER STRAW
ESTES BT 20 BODY TUBE
RAISE LAUNCH LUG ON 3/32" X 1/8" STRIP
1/16" MUSIC WIRE GLUE AND COVER WITH SILKSPAN
3/16" DIA VENTS (2 REQ'D)
ELASTIC THREAD DRILL SMALL HOLE THROUGH CANARD INSERT ELASTIC AND GLUE TAPE OTHER END TO BODY TUBE
CARVE AIRFOIL, SHOWN BELOW, FROM TIP TO HERE
BALSA BEARING BLOCK
PIN
1/16" HOLE FOR ELASTIC
1/16" MUSIC WIRE BEND DOWN TO HOLD SPENT CASE IN REARMOST POSITION.
3/4"
ESTES BNC-20E BALSA NOSE CONE. GLUE IN PLACE LIGHTLY ONLY AFTER COMPLETION OF BALANCING
NOTCH CANARD FOR ELASTIC
USE LARGE PIN FOR PIVOT CUT OFF EXCESS AFTER INSERTION
TYPICAL SECTION
3/32" HARD BALSA RUDDER
NOTE CG SHOWN IS WITH SPENT A 8-3 CASING IN REARMOST POSITION.

from p 7.

... straight up. When the canard deploys, its airfoil at an angle of incidence produces a nose-up positive pitching moment.

Glide trim is rather tricky. I've watched Pinky fly the Swan to trim it, which is the only positive way. If the swan gets a little tail heavy, it does not stall but simply mushes down to the ground in a deep stall attitude. I saw Pinky fly the bird several times in 10 mph winds with a ½A3-2 motor and it performed very well. When Pinky tried the Swan w/ a B engine; it would strip-tease since a B-engine boost would take the original design past the speed of balsa. Using '/8" balsa wings or built up wings, the Swan would probably take a B engine w/ today's construction techniques.

Pinky's Swan was a lot of fun to fly. It would make a nice, straight slow boost. There would be a PUFF when the ejection charge went off. The canards would snap out open. And the bird would just hang there.

Pinky's swan was not an easy bird to build for; it's time. It's easier today. To my knowledge, it was the first B/G to retain its engine during the entire flight. Thus, it was probably the very first rocket glider.