WINCH GUILLOTINE

designed and described

by Robert Blaine

There is no substitute for *safety* in gliding launching. Periodically we should check our methods and our equipment. Winch launching has always presented a problem in safety, i.e., certain, quick release at the winch by cutting the line should trouble develop aloft. Unfortunately there are a number of winches operating without provision for such a safety feature.

Sketches and ideas established pretty well the basic design for the Chicagoland winch about a year ago. From the safety angle, however, there were these questions:

Rope, wire or cable for our line? Any two? or all three? The favorite for most winches had settled pretty solidly down to a combination of the first two. Some told us to use a length of rope and 14 gauge semi-hard wire—some said 16 gauge semi-soft—some said vice versa. We chose a combination of all three for our line. Several hundred feet of 1/8" steel aircraft cable were to be next to the drum (first to be wound on). Then a couple of thousand feet of wire joined a thousand feet of 5/16" rope. The rope carried the release rings for the glider release.

Our problem now concerned cutting the line at the winch. If our guillotine had enough power to cut cable and wire, it should have no difficult in cutting the rope, we reasoned.

We were puzzled some about the various conditions under which the line might have to be cut. Our guillotine must cut whether the line were under tension, completely slack, being pulled at sharp angles, or was travelling fast or slow in either direction through the guide. A powerful "wallop," positive and quick, must chop across the entire area through which the line moves. This area was small in our case since the guide rollers, one inch apart, limited it to one square inch.

Some designs we had heard of had used weights, depending on gravity to pull one blade down beside another, or a cutting edge down on an anvil surface. This method was eliminated in our plans because heavy weights would be a nuisance to carry about and to handle. More than that, their action could conceivably be delayed by a number of factors and their own inertia might allow small forces to keep them from falling. Some designs have successfully used a manual pull to get cutting action. This method might provide plenty of power through the use of levers, but the delivery of that power might not always be lightning-quick. (Full power instantly is most desirable if the line should be travelling at a good speed).

We were of course not interested in the old "get-out-and-get-under" method which calls for three lengths of light chain on which hang one 2-lb. hammer, one anvil, and one cold chisel. We had seen this method and we shuddered at the thought.

The problem of where to locate the guillotine seemed best solved by finding the point where the line would remain nearest one single location under all conditions of tension, slack, or motion. This point in our case was immediately inside of the guide rollers. Here we could use the frame supporting the guide rollers as a mounting for the guillotine.

Here is the answer as we worked it out: Power we secured from a big pancake spring. A strip of one-inch wide carbon steel band was coiled in 3½ turns and oil-bath hardened. Its center was fastened and its outer end bent in a sharp hook to fit around a 3/8" steel pin. The cutting blades were designed as giant scissors, one to swing across the other using the power of the pancake spring. The movable blade was mounted so it could swing clear past the stationary blade. Nothing was to impede its free delivery of the blow. Hardened cutting edges for the blades were provided for by welding on about a quarter-inch of air-hardening surface metal and grinding a good edge before the ultimate hardness set in.

Reference to the illustrations of the guillotine both removed from the guide and mounted in position and cocked for a blow will show what a simple mechanism it turned out to be. It is set by cocking the blade and holding it with a trigger arm. Regular sashcord allows the winch operator to spring it from almost anywhere, although we tied the rope to the steering wheel of the winch car so it would always be available to the man at the throttle.