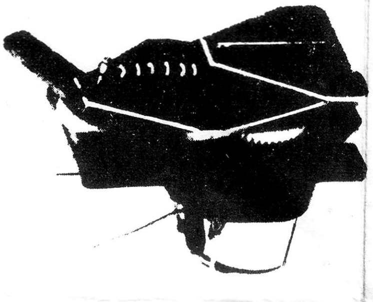
RAND GG HINTS

GL Has Received Queries on the Rand Units We Fielded the Questions to an Expert

By HERB ABRAMS



Thanks for giving me the opportunity to answer questions about the set up of the pulser for the RAND LR-3 on Galloping Ghost. I've received letters from modeler asking about this subject and welcome the chance to help them.

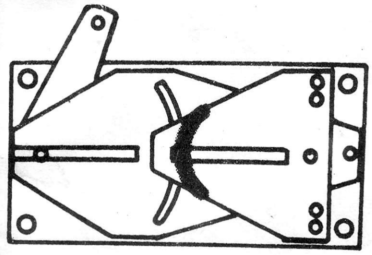
This spring while attending the DCRC Symposium, I was approached by a modeler with the problem that he "gets up elevator when signalling rudder and no down elevator at all. Would I look at his equipment and see if I could help him?" This was a familiar situation, but I had not seen it so extreme. The neutral pulse rate was set approximately at the pulse rate required for full down. That is, the crank was moving only 2° or 3° each side of neutral. By the crank, I mean, the crank that drives the elevator and rudder plates, on the LR-3. We looked in the transmitter and found that the rate pot could be adjusted in relation to the stick by loosening the hex head screw (the screw that attaches the pot shaft to the quadrant). With the transmitter turned on and the receiver and actuator in operation, we adjusted the pot until the crank described an arc about 45° each side of neutral. This pulse rate should be approximately 5½ to 6 pps. Incidentally, if he had been using a switcher and 3.6 volts we could have set the pulse rate a little higher for the same movement. We would have elected to use the same pulse rate obtaining an arc of 70° to 90° each side of neutral, which would further reduce the interaction between rudder and elevator.

I pointed out to the modeler that a galloping ghost system requires compromises. That is why there is no one optimum position! There are so many variables in the system, including the airplane, that the modeler has the challenge of determining for himself the best adjustments for the most satisfying flying. I showed him that in selecting the pulse rate and width change, that he was trying to match the motion of the stick on the transmitter with the action of the actuator on a linear relationship. That is, if we moved the stick halfway, the actuator would deflect the controls effectively half way. When the stick was moved to its limit, the actuator would also approach its limit. A 70-30 width change is all that is required with the LR-3 and his transmitter provided 80-20, causing unwanted motor control when the stick moved to the extremes. I explained that since he could not change the electronic pulser to provide 70-30, he could accomplish the same thing by attaching a plywood mask to the stick assembly to limit the stick motion. I have had to do this on my Min-X transmitter when using 3.6 V on the actuator.

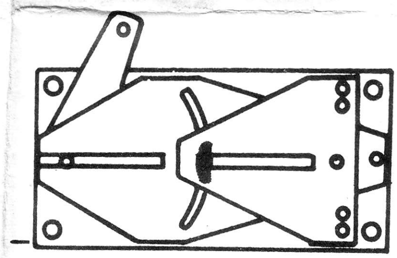
After making the appropriate adjustments to the transmitter, the elevator pushrod was readjusted so that on neutral pulse rate, the elevator moved an equal amount above and below neutral. About this time my attention was diverted to my own airplane being flown by Jack Lemon. So the modeler, on his own, buttoned up his equipment and proceeded to become all excited about the flying he now was able to do.

During the past summer I received letters from modelers with similar questions and, in addition, letters asking for my recommendation about using switchers with the actuator. I have flown extensively with switchers with two cells and three cells. Using three cells I find that higher voltage does not alter flying characteristics very much but does give faster motor control. However, it does increase the number of problems. I suggest that 3.6 V be used by modelers only after they become familiar with the system. Higher voltage causes higher battery drain. It also causes unwanted motor control unless stick motion is limited with a mask. Two cells have not given satisfactory motor control, because use of the voltage drop inherent in the use of transistor switches. The resulting two volts are not sufficient for reliable motor control. The simplest and most universal flying has been with center-tapped, four cells providing 2.4 V to the actuator.

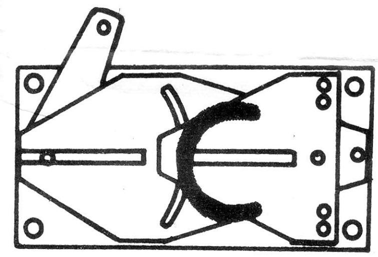
This series of drawings show the arc segments of the crank that drives the rudder and elevator plates. To get this same effect, do not focus too closely on the LR3 crank, but simply let the pin motion blur—focus your eyes generally so the blur effect looks like a scope trace.



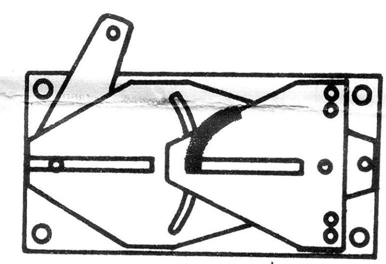
Here is the arc at neutral pulse width and rate for straight flight.



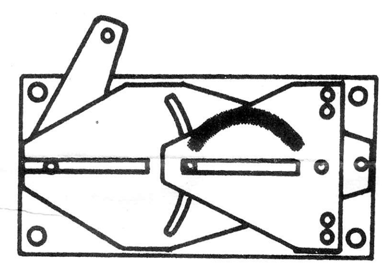
Full down is shown on this arc trace, no turn is had in this trace.



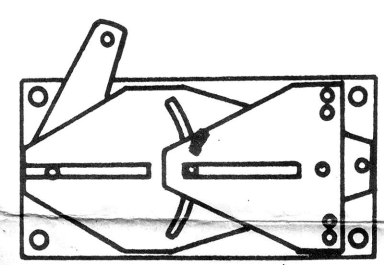
This is the view of the arc giving you full up. Again no side motion.



Here is a full turn arc. For opposite turn arc is on opposite side.



This arc depicts full up and a full turn. Opposite turn opposite side.



This is the view of the arc giving you a full down and turn.