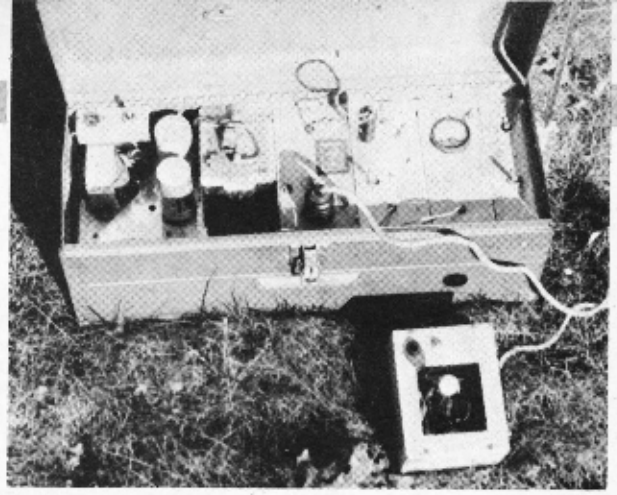
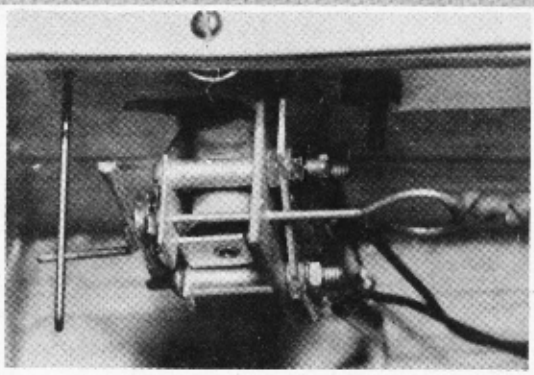




RADIO CONTROL

How Weaver gets the Gallop out of his Ghost

■ Many who see Harry Weaver fly his Mambo are impressed by the way he gets top results from a very simple Galloping Ghost control system. Harry has been able to get most of the "gallop" out of the Ghost—especially in straight flight and moderate turns. In addition he performs practically all of the Multi plane stunts. Perhaps not so smoothly, but he does 'em, and with the simplest possible form of "proportional multi control". G/G is an ideal training system, for those who wish to later try more complex forms of proportional. We wish every reader could see Weaver's Mambo in the air!

The plane, pretty much stock, does have a few changes. Harry added 1/16" thick pine strips on top and bottom to strengthen the kit's wing spars . . . this was after the standard wing folded in flight (G/G builds up some pretty heavy "G loads"). The motor mounts were spread apart some. The engine is held on a phenolic mounting plate (in a crash the plate usually breaks, saving engine and fuselage structure). Landing gear is double-wire; wheel, moved rearward, is 1" in front of CG—to cure earlier ground-looping tendency. Two dowels run through fuselage bottom for rubber bands to fasten LG; a Celastic sheet was put on the fuselage underside. Harry pressed the gear cross wires against the still wet Celastic, to form grooves that hold the landing gear in perfect alignment.

Weaver's transmitter is a WAG-TTPW 50-mc RF section, with a 3A5 multivibrator for modulator; power supply is 2-volt vibrator type; transmitter mounts on rails in a long toolbox.

Receiver with one 1AG4 and two transisitors, was originated by Warren Plohr (see page 44, Aug. '59 issue) and has been found reliable. Harry sez it works well with a Sigma 4F relay, not as well with a Gem. He prefers the larger relay, so this is no problem. Receiver will work down to 17 volts B supply and 1.1 volts on the 1AG4, it pulses nicely, even close to his transmitter. As far as receiver adjustment goes, it's important to set relay so it gives neutral at all pulse rates. Although Harry found that some receivers will not allow this, the Plohr job does fine; it also gives the same neutral regardless of how far the plane is from the transmitter—again, certain receivers do not.

Linkage setup for rudder and elevator is sketched. Servo is usual Mighty Midget motor, with large gear mounted on extension shaft that runs back to tail. Quite weak centering is used; rubber band runs from crank wire attached to torque rod to fuselage pin. Torque rod runs over top of stabilizer, emerges from fuselage rear 9/16" from top. Rudder area has been enlarged since '61 Nats—spins were not too reliable there. Also added is a pulser "roll button".

While plane adjustments are fairly standard, CG is farther aft than on kit plans—3½" back from L.E. of wing. The 50-oz plane is powered by an OS 15 engine turning an 8-6 prop; a clank tank is utilized.

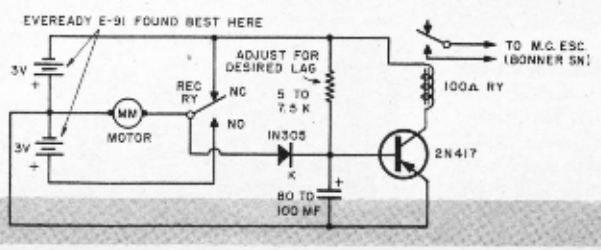
Most of the system refinements are in the pulser and plane circuits—latter consist of the receiver and motor control circuit shown. When MC button is pushed, plane gives a distinct lurch, since MM motor is not wired through back contact of motor control relay . . . as is normal practice in most proportional systems.

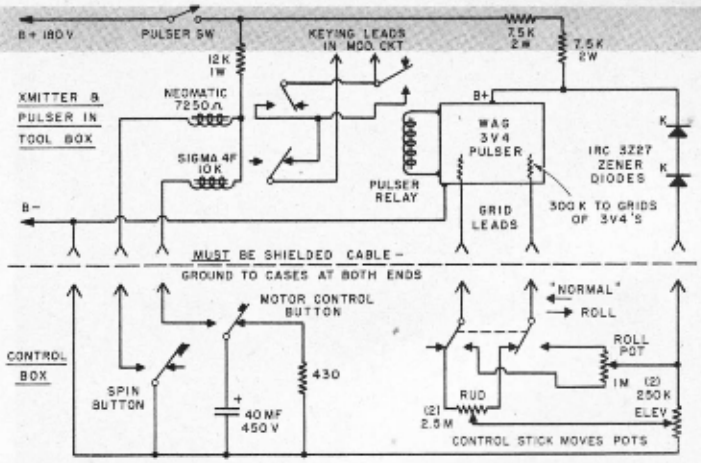
The pulser basically is a Good type using a pair of 3V4 tubes (circuit in *Air Trails Hobbies*, Jan. '55, p. 16). It is powered from transmitter high voltage, latter being dropped by resistor and regulated at 54 volts by a pair of Zener diodes which aids pulse stability. Control pots are mounted in an arrangement from this mag's Nov. '56 issue. Rather than using standard linear pots Harry adapted log taper pots for the rudder; he finds that by hooking these as shown you get a broadened neutral, yet the necessary extremes of rudder deflection when the stick is pushed all the way to either side. This setup slows pulse rate more than desireable for some systems at extremes of rudder position, but it doesn't make too much difference with G/G (it would cause unwanted up-elevator with Kickin' Duck). Pulse rate range is 3 to 13 cycles.

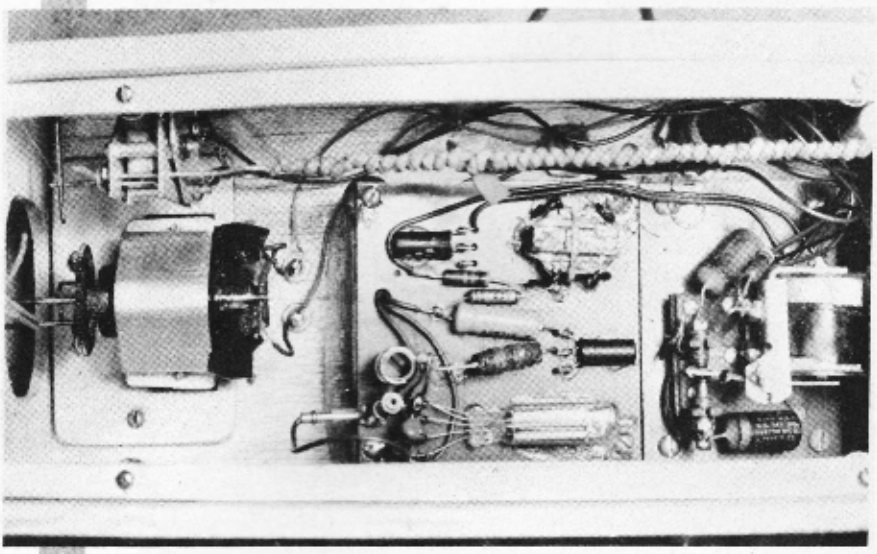
A push button for solid on-signal gives full up elevator and left rudder—this is the "spin button". Another button gives a momentary off-signal to operate motor control. Circuit for this is shown; no matter how long button is held down, signal is off only a second and relay interrupts tone to transmitter for this period. So it is not necessary to listen for engine speed to change—just punch the button, hold for awhile and all is taken care.

Neat trick is a "roll button", also used for Split-S. Positioning the stick for full-up and full-rudder gives rolls that "come back on themselves" and almost approach loops. It was difficult to position the stick precisely for just the right amount of rudder and elevator to give consistent rolls, so the Roll Button was added. This switches in a second rudder pot which may be preset. For this particular plane, it's adjusted to give about neutral elevator and ¾ to ⅞ right rudder . . . which produces very good rolls.

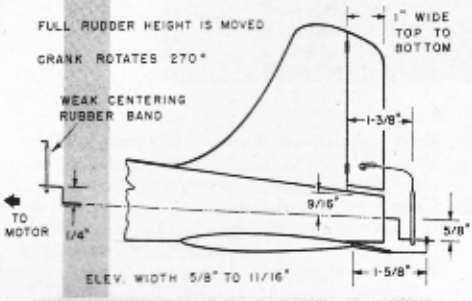
That's the story. Plane and equipment are fairly "standard", with a few little extra tricks in the pulser. It's these, plus plenty of practice, that enable Harry to do such a smooth flying job. It doesn't take an exotic plane and a bundle of cash to enjoy "multi control" proportional flying! Try it and see.

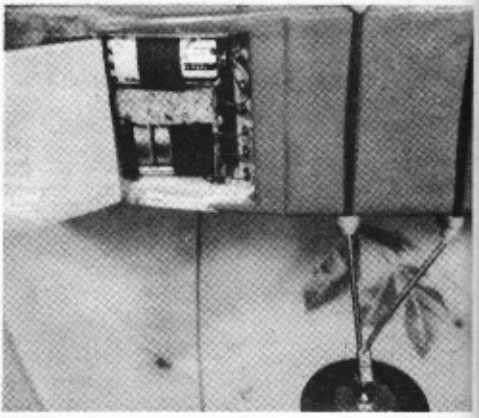


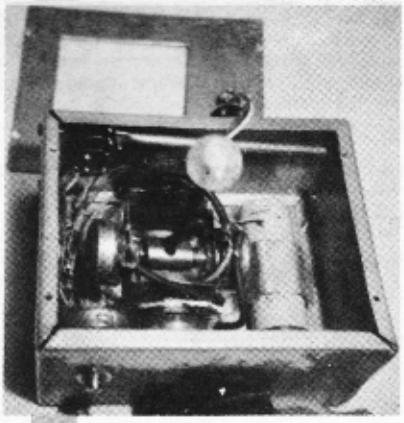


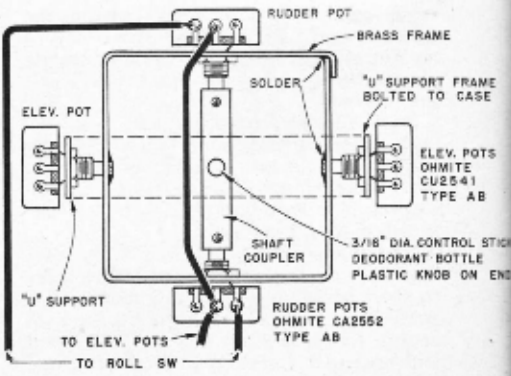


Harry, G. G., and Mambo (right)









NOTE: ELEV. POTS CONNECTED SAME AS THE TWO FOR RUDDER. THE PAIRS OF POTS GO TO ZERO RESISTANCE AT THEIR RESPECTIVE EXTREME STICK POSITIONS