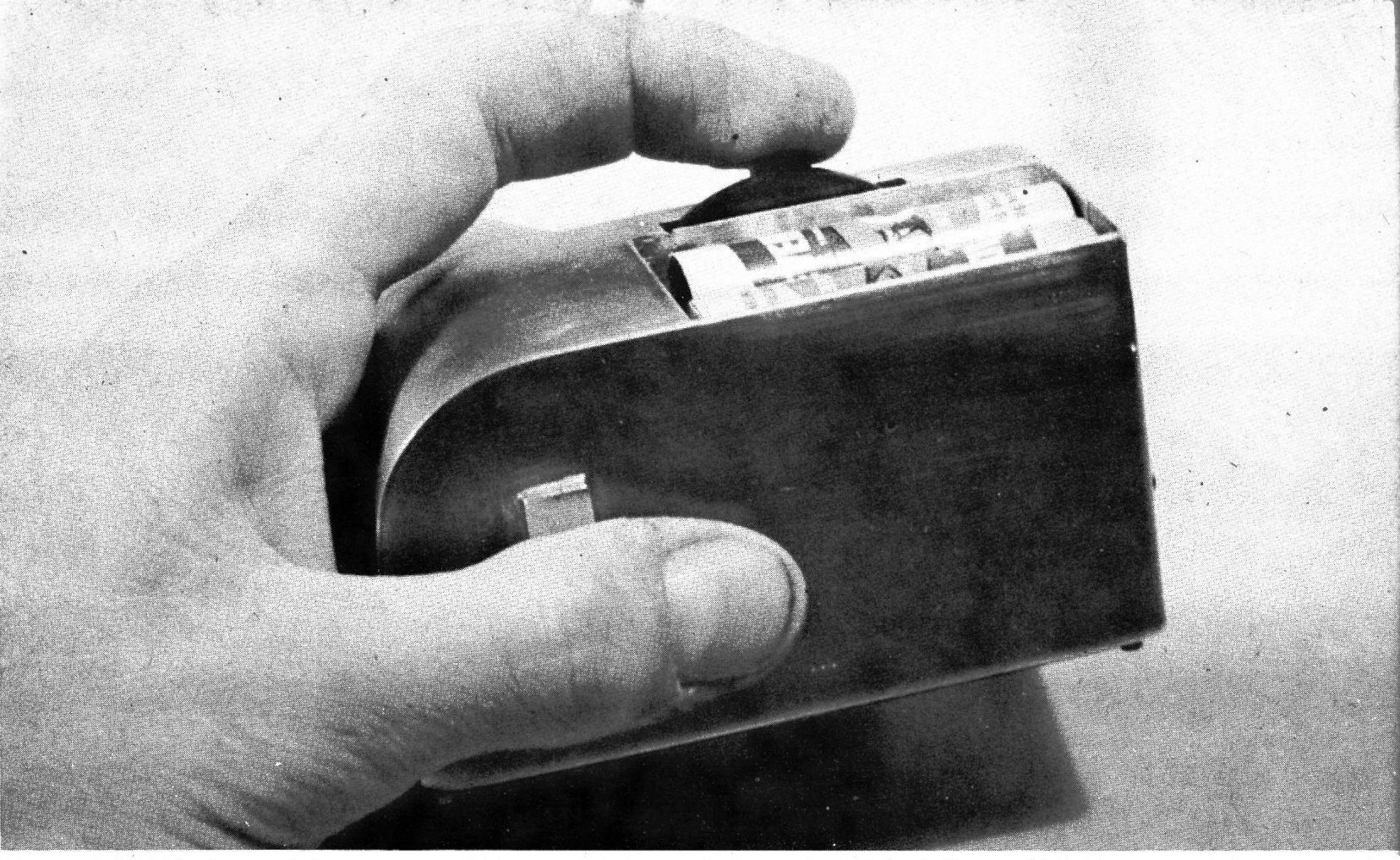


Control box is automatic key set to operate 2-4 times a second. A cam varies the signal-on and signal-off. Powered by miniature motor, worm gears.

for the R.C. fan

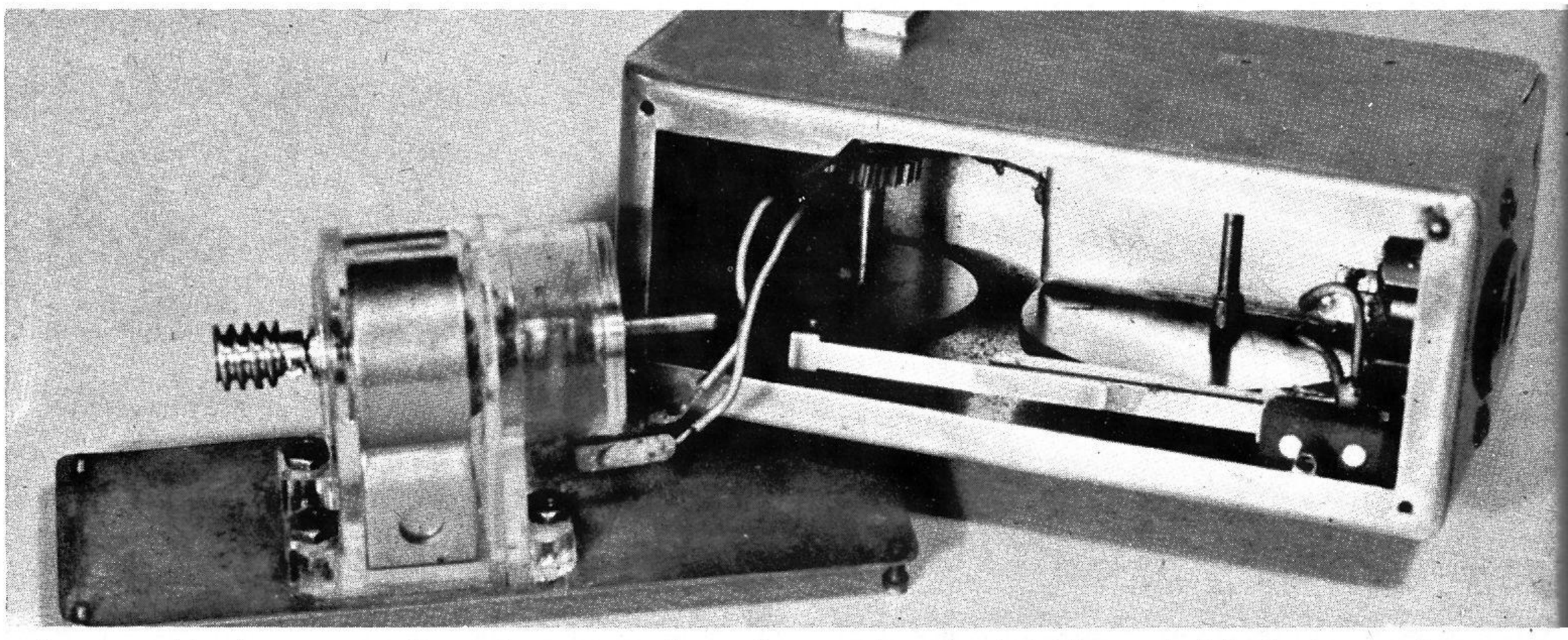
Flip-Flap Control

by NORMAN S. BRISKMAN

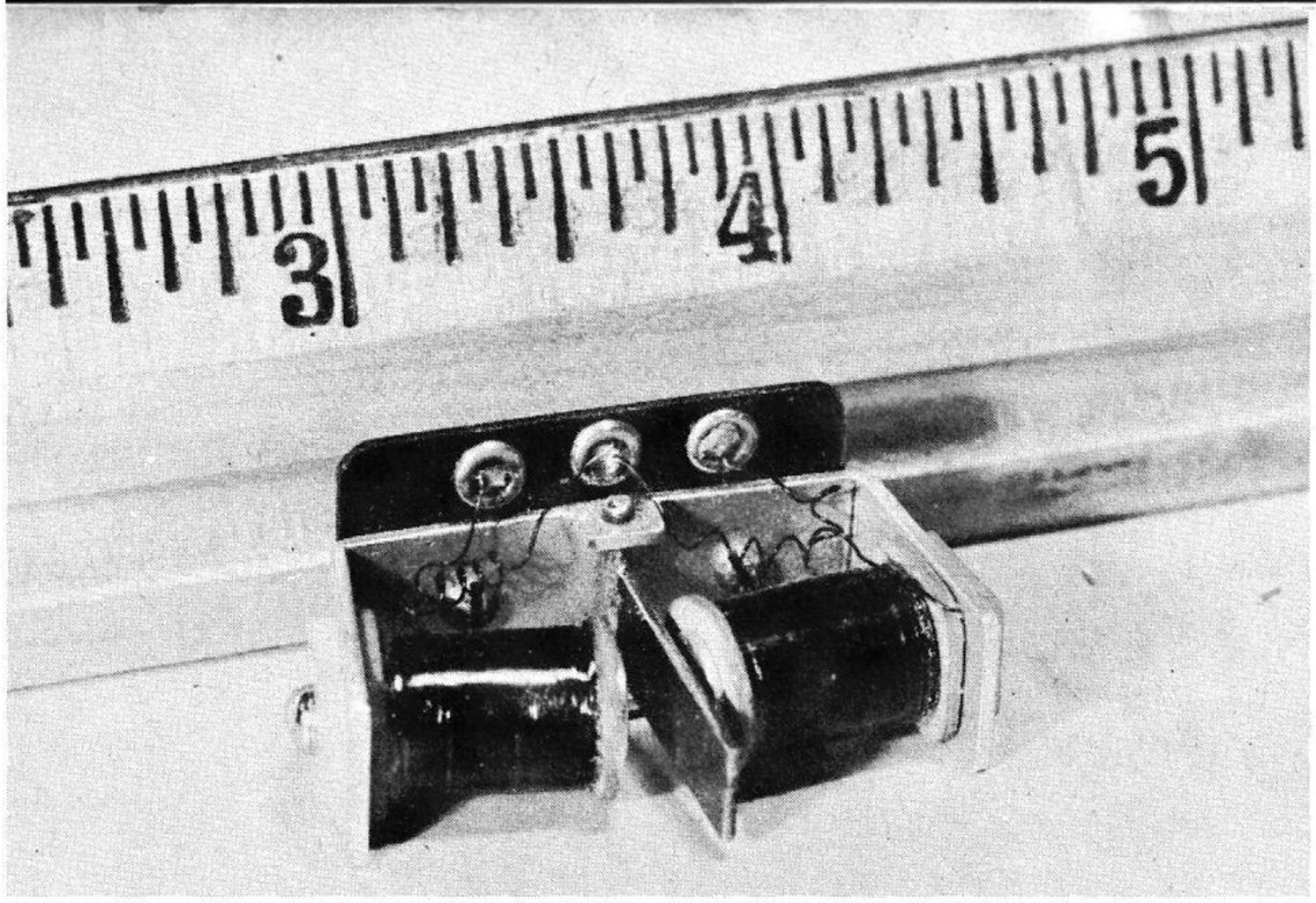
If you can fly radio, you could fly with proportionate control—so simple is this gimmick!

To those of you who are familiar with proportional control, this new actuator should be an addition. For the many who have not yet experienced this phase of control, this will be a simple and direct introduction. Proportional control was first introduced in the July 1947 M.A.N. More recently (Nov. and Dec. 1950), George E. Trammell again presented proportional control with many refinements and good detail. And it works! My *Super Brigadier* equipped with Trammell's control actuator performs well.

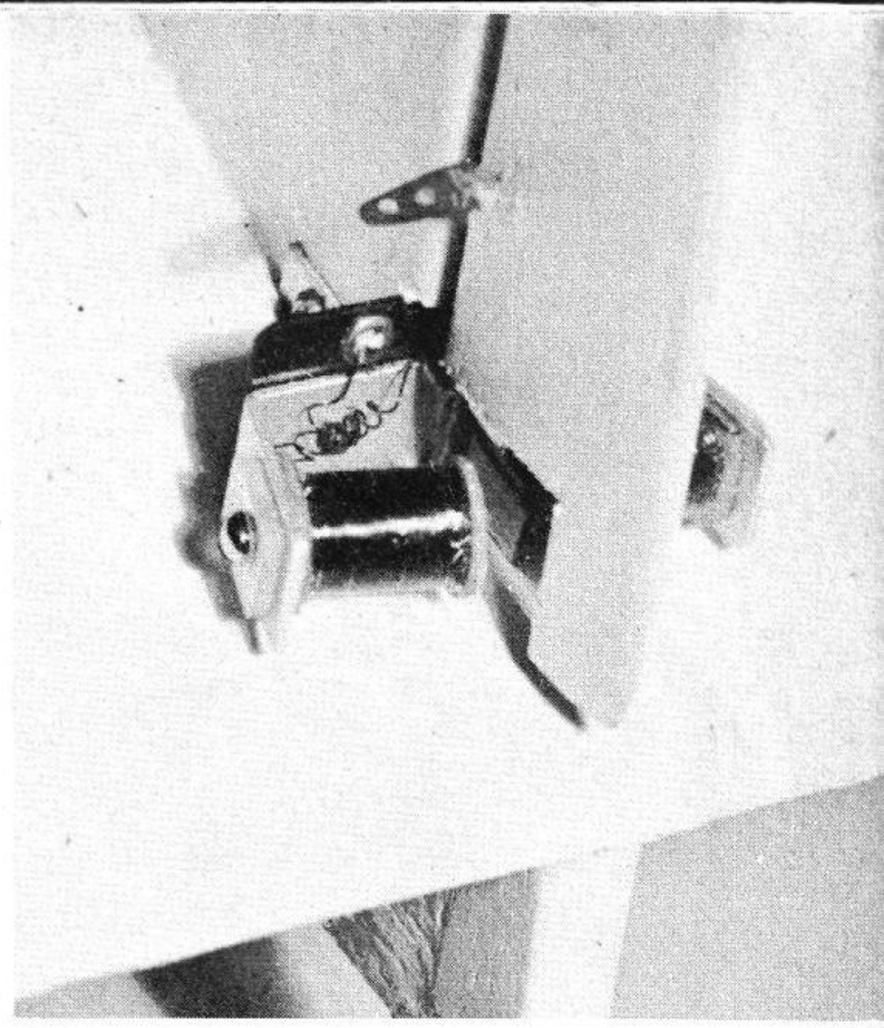
But now I would like to add one more of these actuators. This came about in trying to simplify gadgets, to reduce all possible chances of error, and still keep the ultimate goal. Through my own experience I have seen



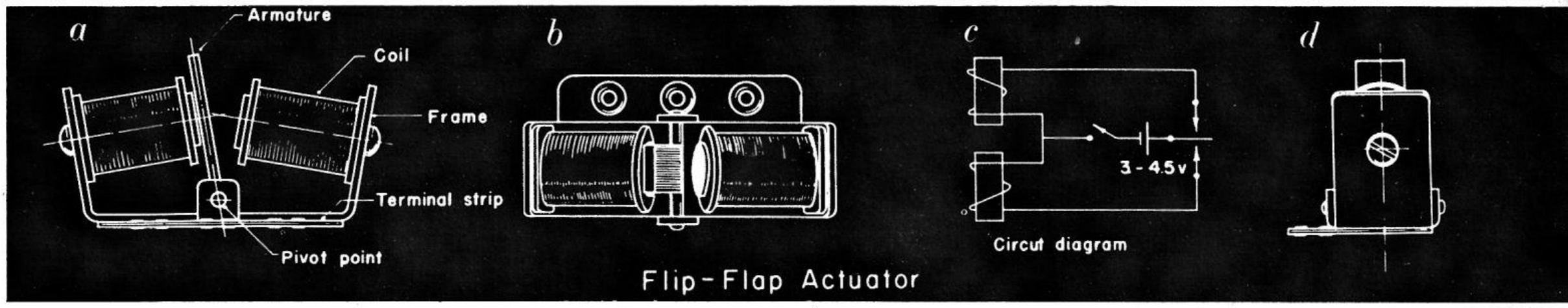
Opened control box shows parts: case 22 gauge bronze, contacts from surplus, cams micarta, though plexiglass, metal will do. Plugs into transmitter.



Actuator uses home wound coils, Control Research cores. Other size coils require other size frames. Current: 3 to 4½ volts. Good feature is that radio failure means return to neutral.



Actuator armature is built into the rudder. Usual linkages and rubber bands are eliminated.



Details of the actuator. With only one moving part there is little that can go wrong. Unit can be closed in with detachable cover for protection.

more over-controlling and excessive gadgets than need to be to fly a plane. Of course there is some worth in all these controlling elements, but knowing how to use each and to use only what is needed is a problem.

The flip-flap actuator is the product of my "sorting." The actual working of the unit is not new, but how it is utilized becomes its focal point. Its operation is simple inasmuch as there is only one moving part. Linkage is eliminated. The actuator can be set directly in position with surfaces to be actuated (rudder, flaps etc.). Weight and size are a bare minimum. Construction is light and simple.

Battery supply is kept to a single source of three to 4-1/2 volts. The battery drain is not actually continuous because of the slight pause between activating each coil. The single source has the advantage of giving equal strength in either extreme position. If however the battery should fail, then the activated surface would tend to neutralize. There would not be any pull either way from the coils, and air pressure on the surface would tend to neutralize it. Having the contact at the extreme movement of the armature also assures that air pressure will have little effect to reducing the movement of the surface.

Constructing this unit is quite simple. First get two coils of the type used in regular escapements. The coils shown are self-wound, Control Research cores with #34 wire to about 5 ohms. If you use the same coils it will not be necessary to change the details of drawing one. However, if you choose coils of another size, it is a simple set up to make the proper frame. First determine the extreme movement you wish of the armature. At the extreme position set a coil end perpendicular to the armature. Do the same with the other coil. This will give you the size and end angles for the frame. If you find it necessary to reduce the travel of the armature, either blocks can be set to keep it from its extremes, or set screws can be added to the frame which will act as stops for the armature. The frame is made of .040 aluminum. A scrap of 1/16" core iron will do well for an armature. Solder a piece of brass tubing to one short edge of the armature. This will be the pivot point.

Assembly is simple. The coils are secured to the frame ends, the armature is set between the pivot points and a pin will serve well to hold it. The terminal strip is micarta with three eyelets. There are three terminals, one is a common take off for each coil. This is hooked up to the armature of the receiver relay. The other two leads, one from each coil is taken—one to each contact of a single pole double throw relay. An on-off switch should be placed in the common lead.

The actuator should not require any adjustment other than changing the travel of the armature. The important part is to set the coil and armature perpendicular at the extreme. With only one moving part very little can go wrong with this type of actuator. The armature will either pivot or won't, and to insure this give the armature a free pivot.

To install the actuator we'll use rudder as an example; there is a clear picture of this. As you see the armature is actually part of the rudder. Mounted at the base of the rudder there is good support and is not to open to damage, in case of a crack-up. The unit can be housed in a fairing if clean lines are desired. But, for good practice, get the ship to fly well, then doll it up.

With the actuator you will need a control box. Actually it's a simple mechanism. It takes the place of the conventional micro-switch. (This too can be used as explained by Trammell.) The control box is nothing more than an automatic key set to key at two to four times a second. Add to this a cam that will vary the signal-on to the signal-off portion and that's it. Except for a miniature motor and a set of worm gears it's all home made. The case is made from 22 gauge sheet bronze, the contacts are from surplus, the cams micarta (plexiglass or metal will do) a few pieces of tubing, wire and a couple of springs. Of course variations of this can be made and should to accommodate the material on hand. The principle should remain the same. Size and weight need not enter into such a unit; it is only ground equipment.