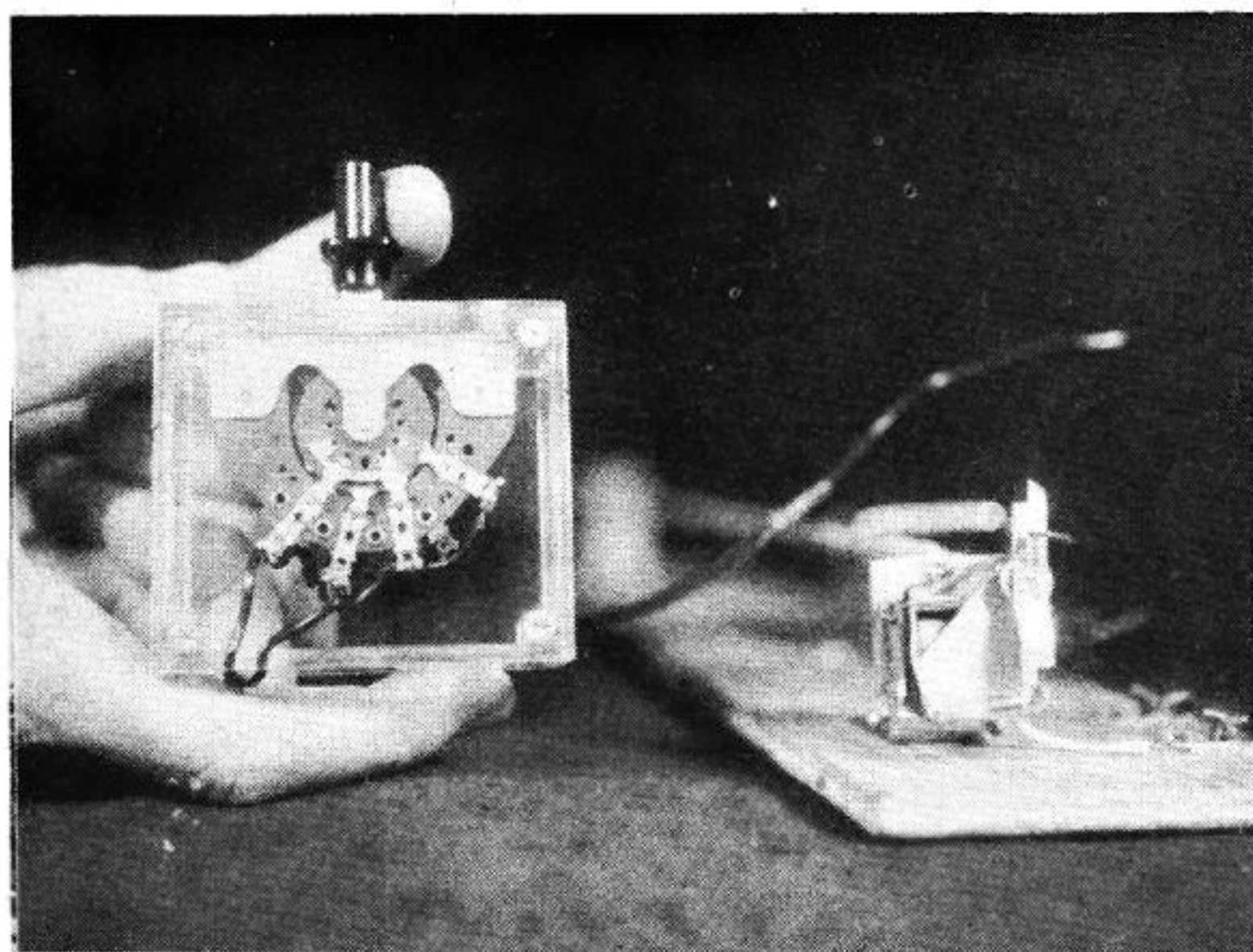


A 73-cent switch, modified escapement, are combined to give either left or right rudder on a single channel. No sequence!

By DON GROUT



Close-up of the converted switch and the escapement. Right—Two rudder-only radio models.

Exit the Beep Box

► The toughest part of building and flying a radio control model lies in the flying, much to the beginner's surprise when he first wonders whether he has right or left rudder, or just neutral, as the ship pivots in the distance. Whether or not he really knows can make the difference between an out-of-control flight or one that comes back to land nearby.

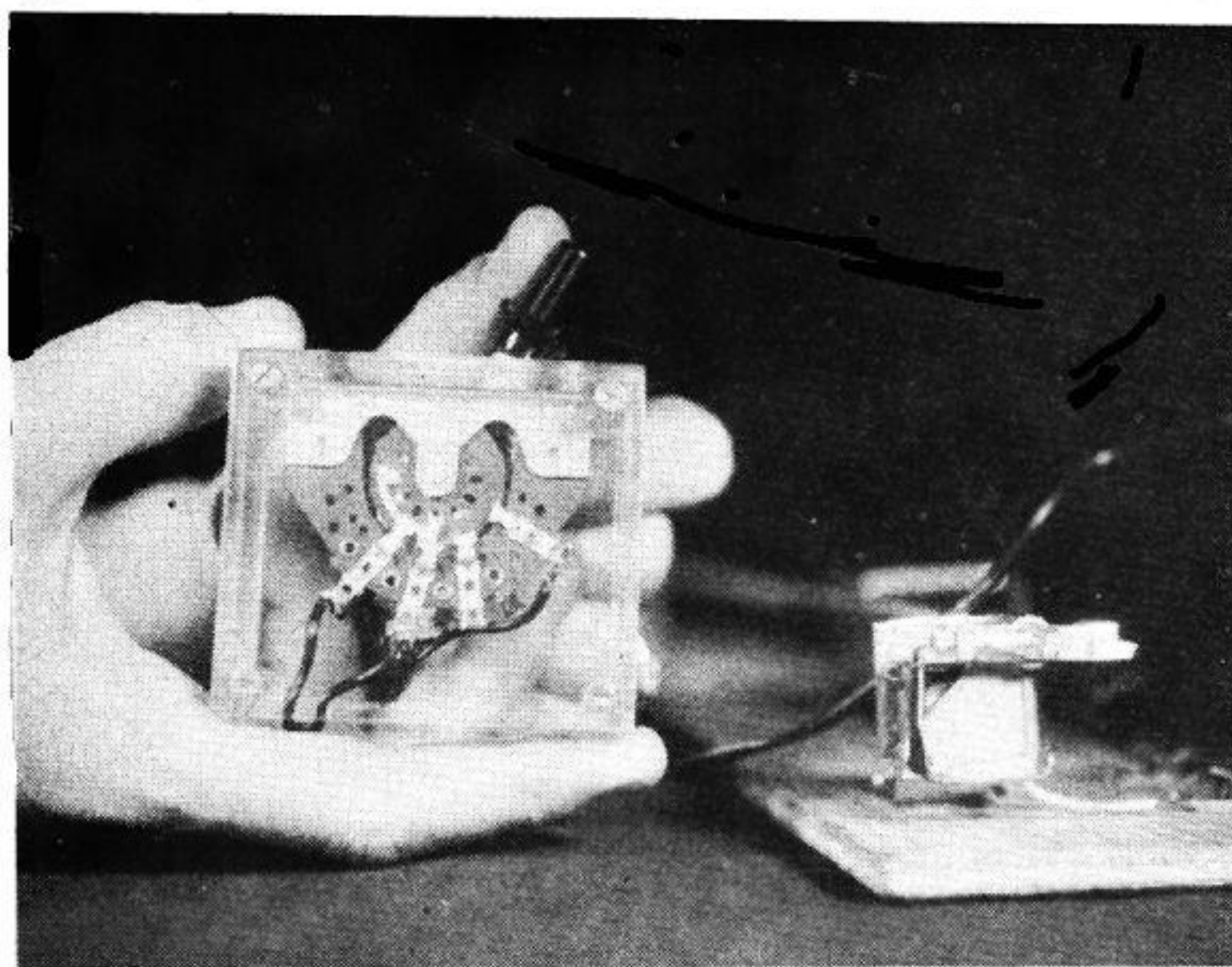
Even the fairly experienced pilot sometimes makes the mistake of thinking he made a mistake. That does it. For instance, your ship is gliding cross wind and you wish to turn into the wind for the landing. You give right rudder, let's say, and nothing happens. You wait. One second, two, three, then say, "heck it must be in neutral, so I'll give it right." You've had it! The delayed control reaction due to the wind fooled you; now the ship pivots and races away down wind while your mouth hangs open. If for any reason the ship is out of adjustment, making unequal diameter turns, as during early test flights, you have got to know what rudder position is coming up—but positively, or in a wind, you'll get fouled up and may lose the airplane.

Reasons like this led to the "beep box," the original box being the motor driven drum and control stick gimmick that was shown with Walt Good's *Rudderbug* plans in this magazine. Since then it has been realized that it is pos-

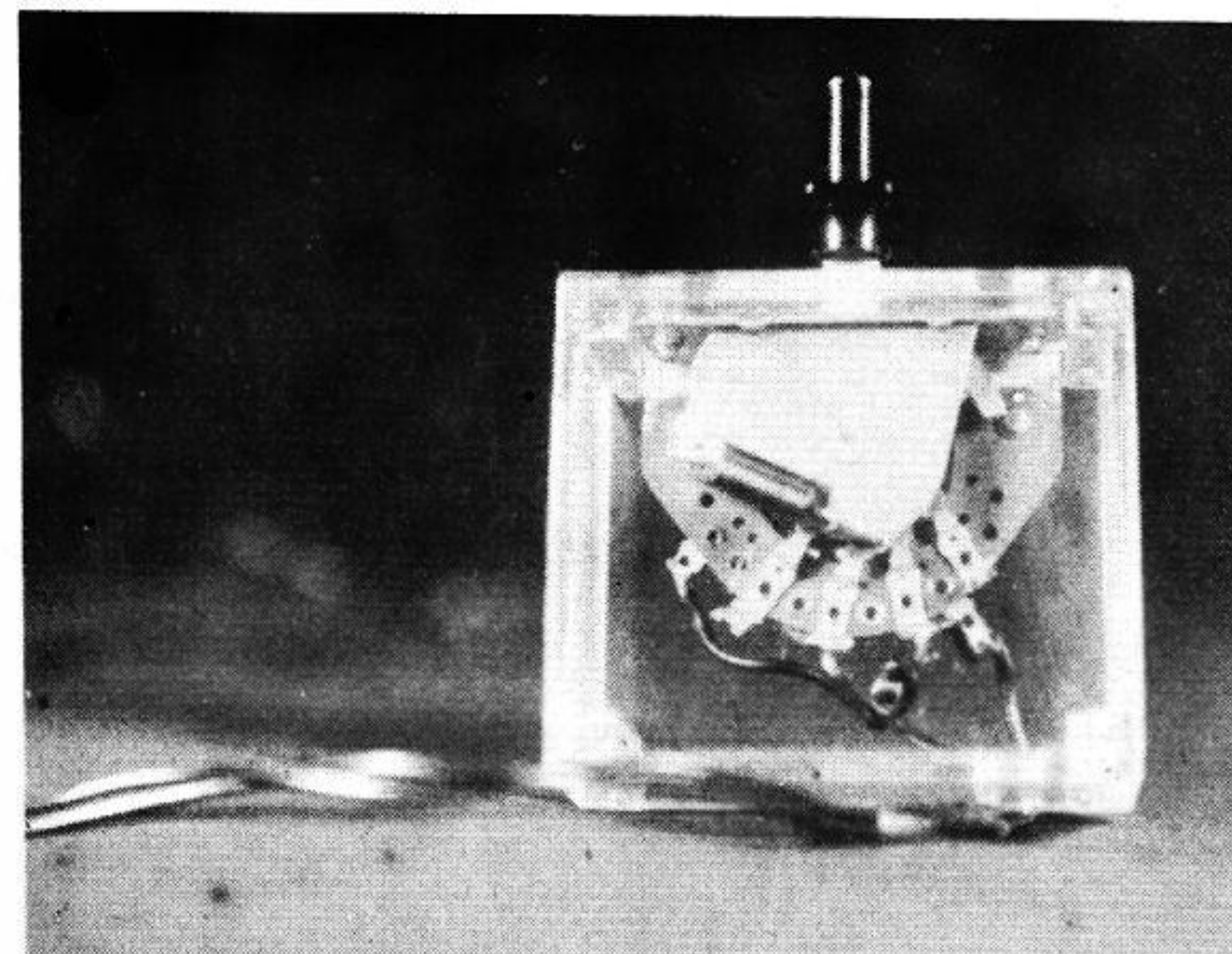
sible to use excess rudder with a "beep box," because the ground control stick permits fast and repeated applications of rudder on the same side. Leave it on and you spiral, but apply it several times briefly and you can get the degree of turn you want. In effect, you also have left or right rudder on command without having to think at all of what rudder position is next.

Recently becoming interested in radio control, the writer purchased a set in kit form which contains a standard switch for control, and immediately could see the advantage of a control box, as has been written in a number of articles. But since the cost of the radio unit was approximately \$20, it didn't seem plausible to spend almost the same amount to make a good motor-powered "beep box". Also it was found that the geared motors were rather hard to find.

There was a good ground controller idea in *Model Airplane News*, May 1951 issue, by E. J. Brown which had no motor and was very simplified. However, it seemed possible to make one that would have a lever action with a right and left rudder on each side and return to a neutral in the center. After considerable figuring, it was evident why it had not been done before as the control handle had to move in a circle. Would it be possible to change the escape- (Continued on page 52)

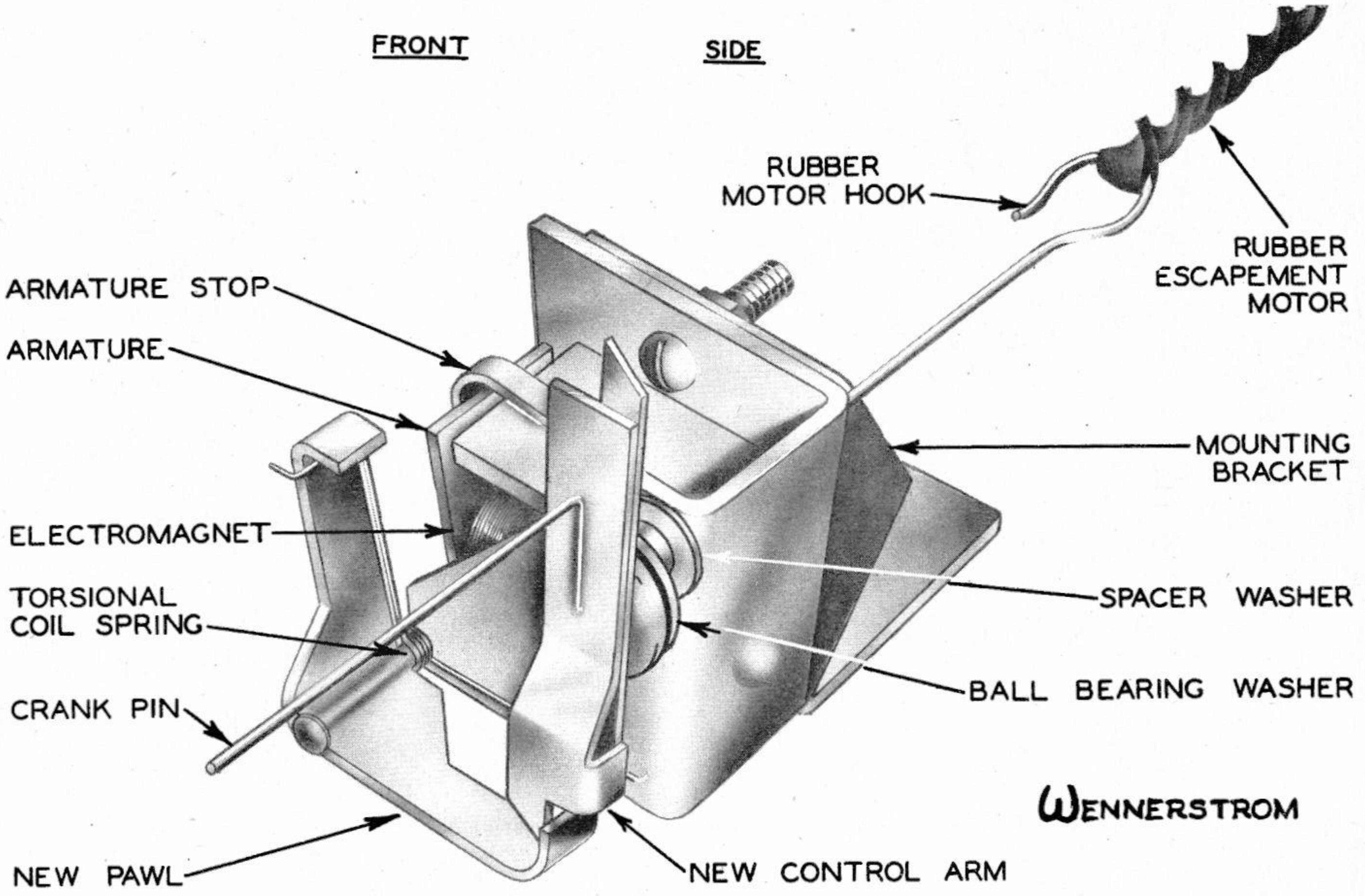
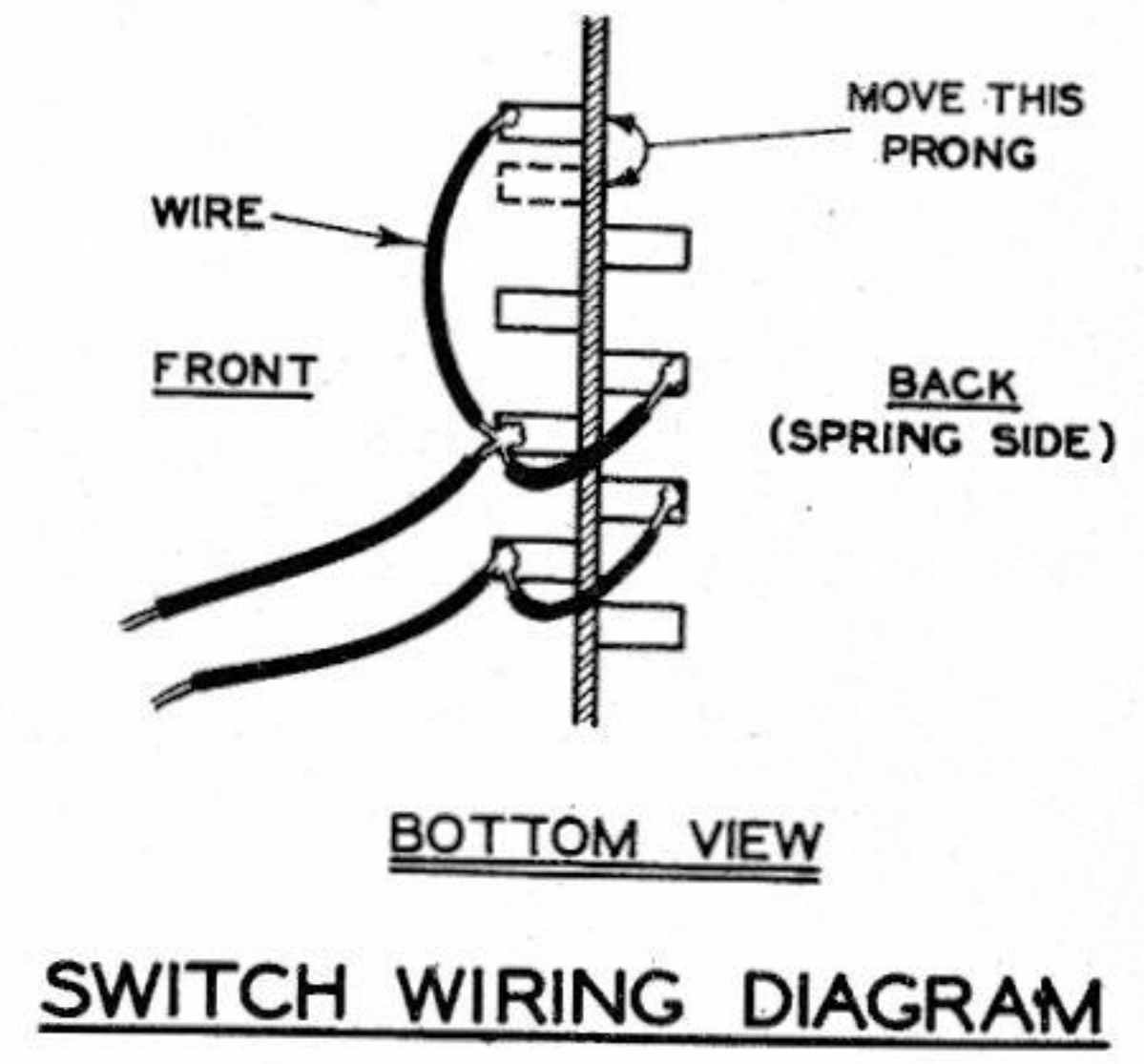
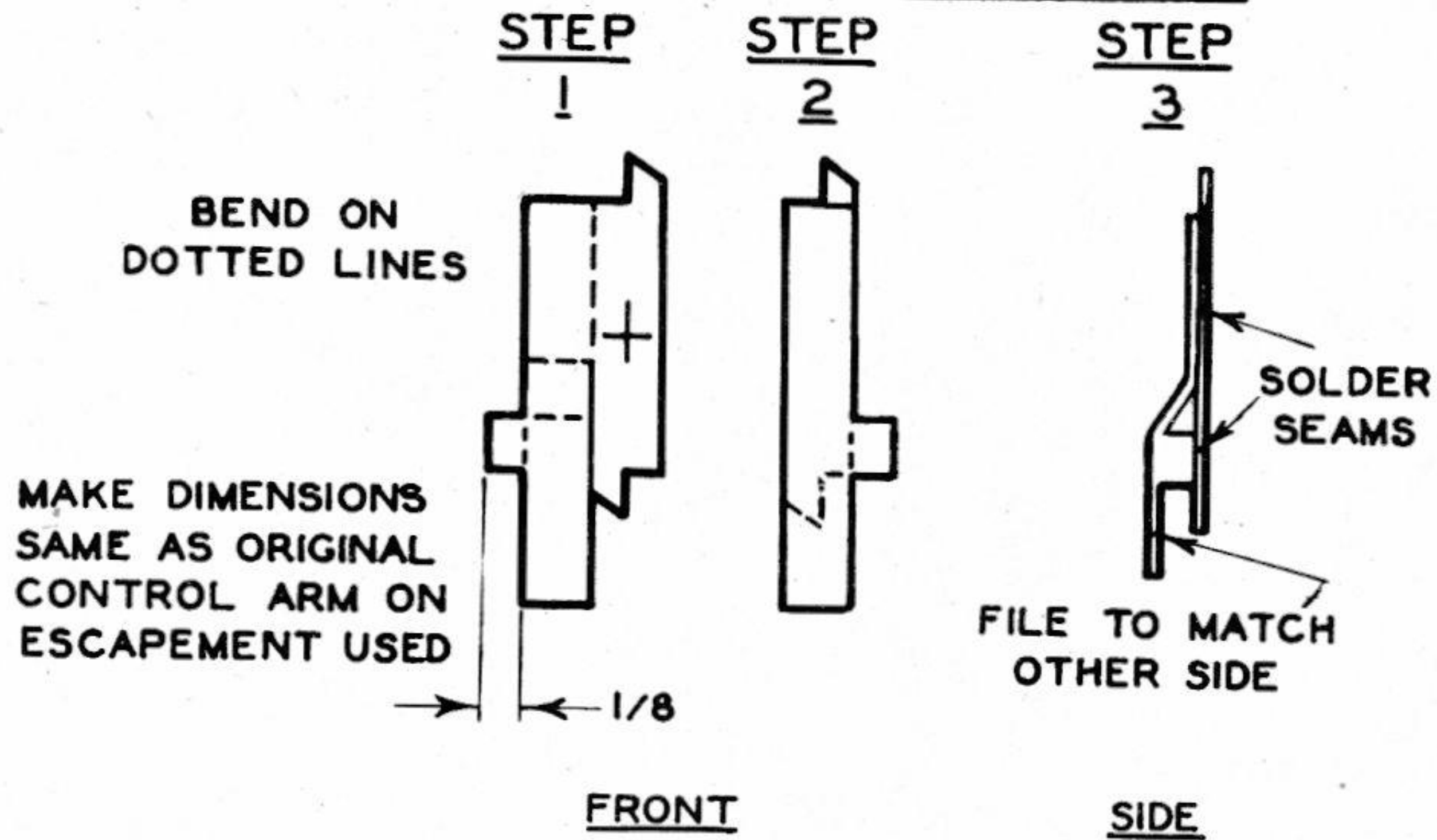


Turn the switch to the right, as you would a light switch, and the escapement moves to right.

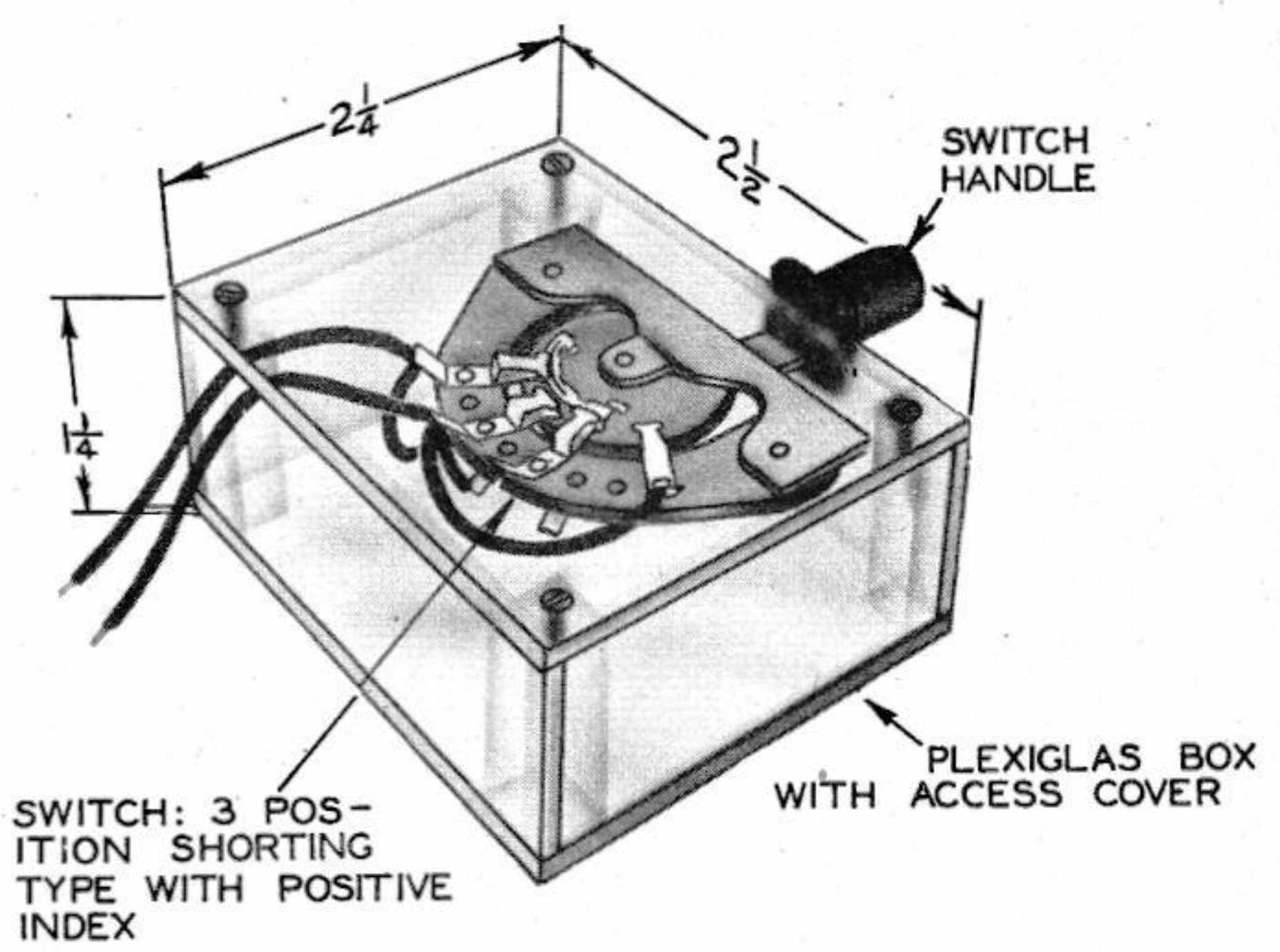
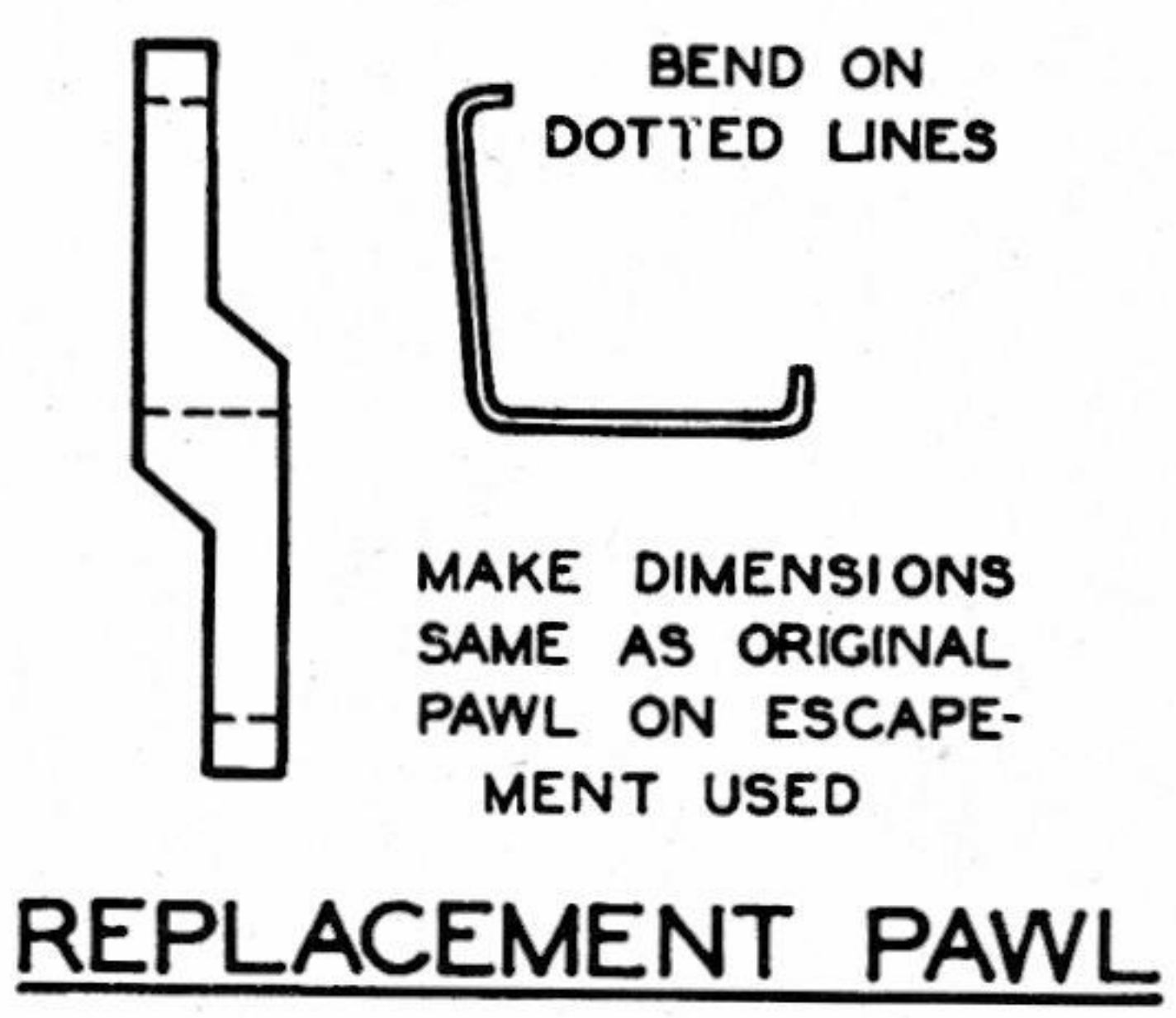


This is the reverse side of switch, showing altered wiring. Motor control also can be installed.

REPLACEMENT CONTROL ARM



WENNERSTROM



Exit the Beep Box

(Continued on page 30)

ment in some way to apply to suit a lever action control box?

A standard Control Research escapement kit was used but there is no reason why the idea cannot be applied to other escapements. A new control arm was made as in Figure I so that it would have the standard two positions, right and left, but only one neutral, and a new pawl as in Figure II that was offset so that the pawl tip that engages the neutral position is only in line with the neutral of the control arm, and the two tips of the control arm (right and left rudder) are in line only with the other pawl tip that engages when the escapement is closed. Thus, as the escapement is activated, it requires a closed contact, and hold, to get one rudder movement and, when released, the escapement returns to neutral. To get the other rudder movement, it requires a closed contact, and a very short release followed by a second closed contact and hold. Upon release of that position, it also returns to the same neutral. For example; to get left rudder it would be one held impulse—and to get right rudder, it would be two impulses, the second being held.

Now to return to the switch box. The problem has been simplified as the escapement will always return to neutral when released. By having neutral in an upright position and contacts on both left and right throws, we make it a single contact one way and a long contact, a short break, and a hold contact the other way. I found it necessary to keep the speed and action, particularly on the double contact, at the same speed each time so used a two-pole, three-position lever-action shorting type switch with a positive index and adjusted it for about the same speed as the normal electric wall switch. When it is operated you do not hold the lever, but simply snap it as you would turn on a light. This switch was obtained from Allied Radio, 833 West Jackson Blvd., Chicago, Illinois, stock #34-021, type 1452, for 73c plus postage.

Slight modifications of the switch are necessary. Looking at it from the side, that does

(Continued on page 54)

not have the spring, I filed off the rivet that held the permanent contact at the far right and moved that contact to the next holes to the right and reriveted it into position. A short piece of 1/16" brass tubing works well as a rivet. About half of the moving contact was filed away so that, when it engaged the permanent contact just moved, there was just enough left to make a good connection. This was necessary to give the spacing between the two "impulses".

The other change was on the opposite poles of the switch, the side with the spring. With a pair of long-nose pliers, bend the permanent contact, second from the left, toward the other middle contact until it is almost touching the moving contact when the switch is in upright position. It is also necessary to file off a little of the right end of the moving contact. It is a good idea not to file too much away from both moving contacts until you have wired the switch for by the filing you can govern the speed of the action corresponding to the speed with which you find it most convenient to operate the switch (see diagram for wiring).

When you have the switch operating correctly you can make a small box to protect it, approximately 2-1/2" long, 2-1/4" high and 1-1/4" deep. Mine was made of plexiglas. One side was screwed on so it would be accessible. This works very well. There is no reason why, with the escapement operating in this manner (one neutral), it would not be possible to add a third prong on the control arm at right angles to neutral position and, with possibly a four-position switch, incorporate motor control or engine shut-off. One rudder position would be operated by one impulse, the other rudder position by three impulses and engine control or cut off by two. Engine control would operate at only a neutral rudder position and engine shut-off would require some type of delay as it would pass through that position with each operation.
