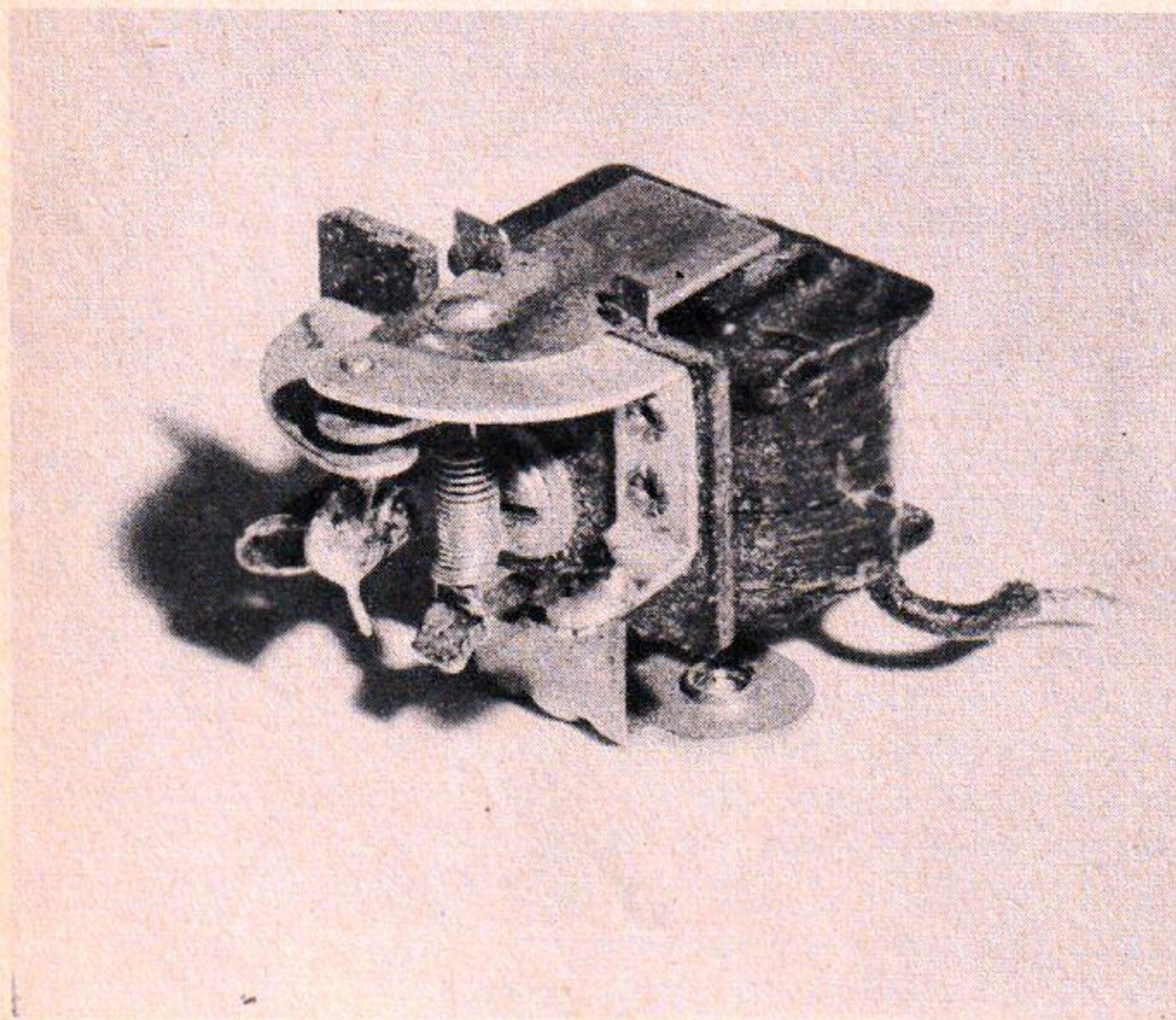
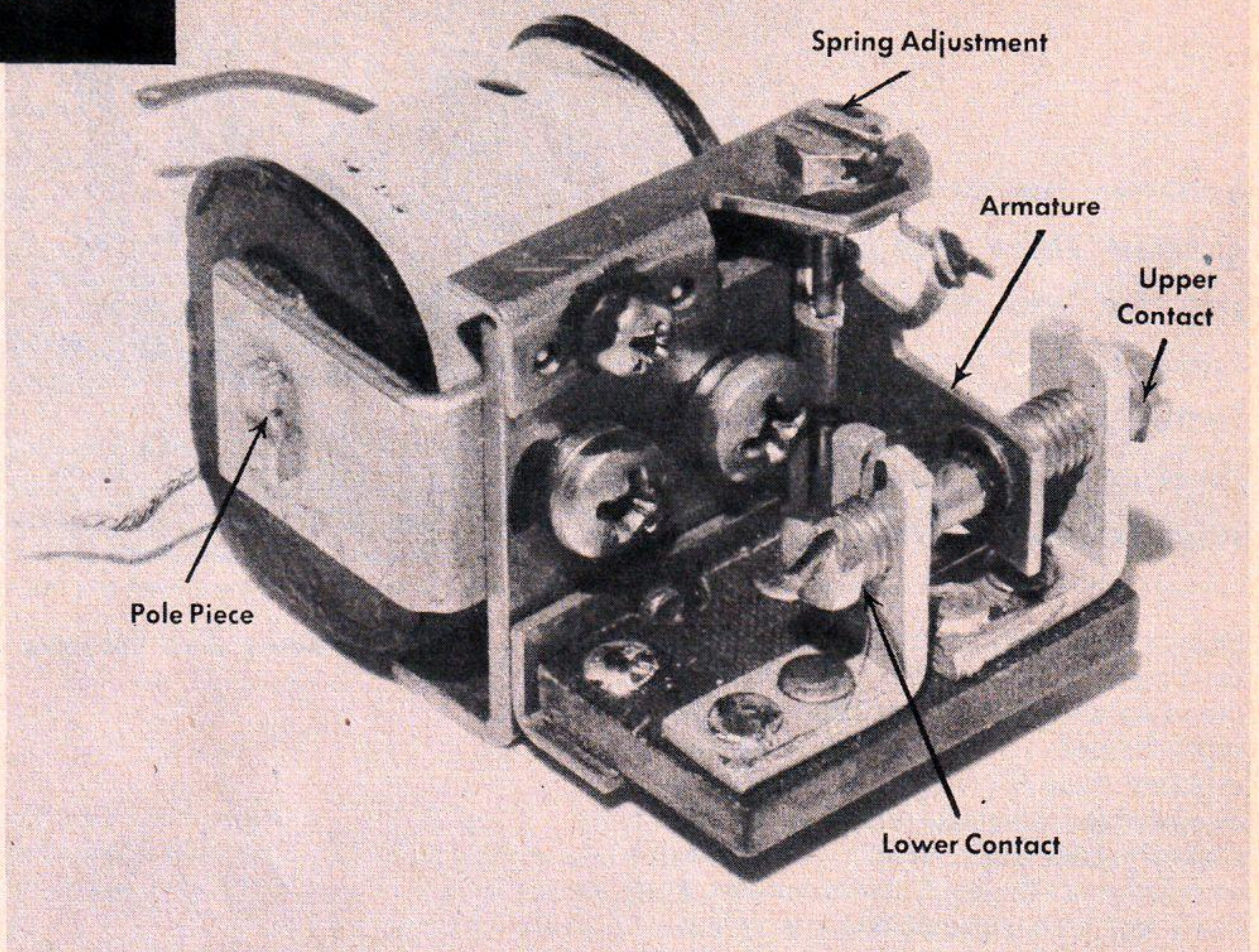


The Sigma 4F, 8,000 ohm relay. The adjustable screw contacts and slotted head on the spring tension screw, make for reliable operation and easier adjusting. Relays must be set accurately — and no fooling about this!

Below—The Kurman 5,000 ohm relay. Lighter and cheaper, its adjustments are made by contact tabs, bending spring attachment tab. Always keep the live wire contact clean.



## RELAYS

► In a radio control receiver the first step out of the radio and into the mechanical is the relay. (The picture, top right, shows the various parts of a relay.)

A properly adjusted and cared for relay will maintain its adjustment and give excellent service. There are two current values to contend with in all relays. This is especially true on sensitive relays, since the current differential is very small. The initial current which flows through the relay, and in which we are first interested, is the pull-on current. This is the amount of current needed, usually about one milliampere, to produce a flux density sufficient to overcome the spring tension on the armature and attract it towards the pole piece. Once the armature is thus attracted, a few more tenths of a milliampere of

**The relay and its adjustment play a vital part in your operations. The way it is set determines how much radio range you really can obtain.**

current will reliably hold it against vibration and insure good contact pressure. When there is a decrease in the current flowing through the coil, the armature will release. This is known as the drop-out current and is less than the pull-on current because the flux density of the coil must fall below that needed to attract the armature. It also is due to a "closer" magnetic circuit's now being in force; that is, the distance between the armature and pole piece is less when the relay is picked up than before the armature is attracted.

The Aerotrol receiver and some of Control Research's use the Kurman 13C44 relay which is a sensitive and lightweight relay. It will operate on a pull-on current of 1.1ma and a drop-out of .6ma. The main objection to it is the method of adjustment, which must be done by the bending of small tabs. The principal assets are its weight of 1-1/4 ounce, and good sensitivity with moderate contact pressure.

The Sigma relay is one of the best relays on the market for radio control. The Sigma type 4F weighs 2-1/4 ounces and all adjustments are by screws, including a screw-adjusted hair-spring for tension on the armature. The Sigma type 5F relay, weighing 3-1/4 ounces, gives very reliable operation with a maximum current of 1ma and a drop-out current of .7ma, and is perhaps the best relay to be had. As with any relay, the correct adjustment is essential for proper operation. The clearances for reliable operation of a Sigma relay were illustrated in the first section of this review in the August issue. Sigma Instruments, Inc. has advised us that they are unable to handle individual orders for relays, due to the heavy pressure of defense orders. They also advise that orders will be filled by Terminal Radio Supplies, 85 Cortlandt Street, New York City.

A simple way of setting the relay is as follows: connect relay (Fig. 7, Tricks of the Trade), set rheostat to maximum resistance, which will drop the relay current for an 8,000 ohm Sigma relay to about .3ma. Adjust (Continued on page 43)

# Relays

*(Continued from page 24)*

the rheostat until the meter reads .8ma, then set the armature adjustment (spring tension) until the armature is attracted. Reduce the rheostat setting to .6ma and adjust the normally open point (at this time, the closed point) until the relay opens. A piece of cellophane between the armature and the pole piece will eliminate any residual magnetism and make adjustments and operation of the relay easier.

For those desiring lightweight midget relays, Control Research furnishes a type that is about one-half inch in diameter and one inch long. It weighs one-half ounce and is unaffected by vibration. The sensitivity is not as great as that of the Kurman or Sigma but it offers many possibilities for the future and in certain types of circuits.

The use of relays makes possible many variations in control circuits while still using a single receiver. While it is admitted that several relays will add a little weight to the receiver control system, their usage has the advantage of not being an electronic type of control and, once adjusted, will always hold that adjustment. And then there is only one receiver to tune.

**THE END.**