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D. D. MILLER

2,096,054

ELECTROMAGNETIC SWITCHING DEVICE

Filed Sept. 11, 1936

FIG. 1

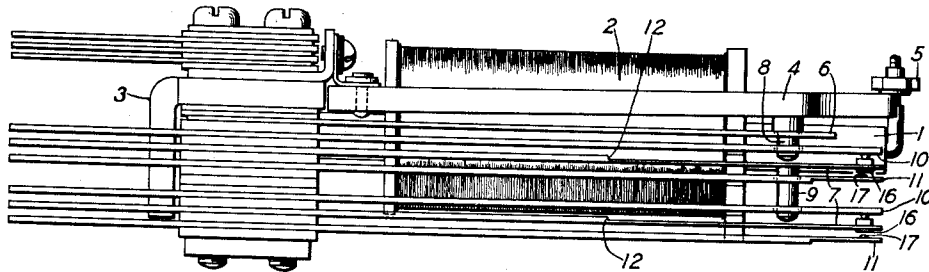


FIG. 2

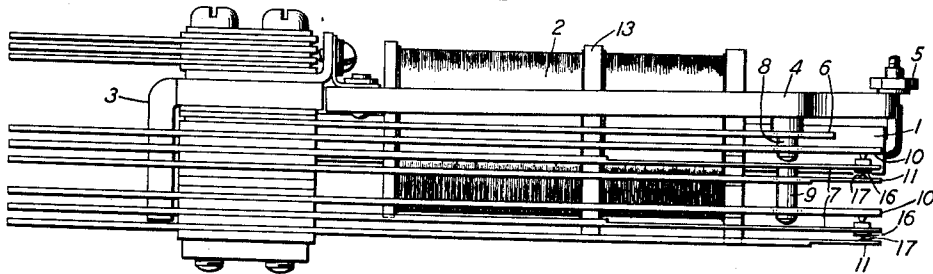


FIG. 3

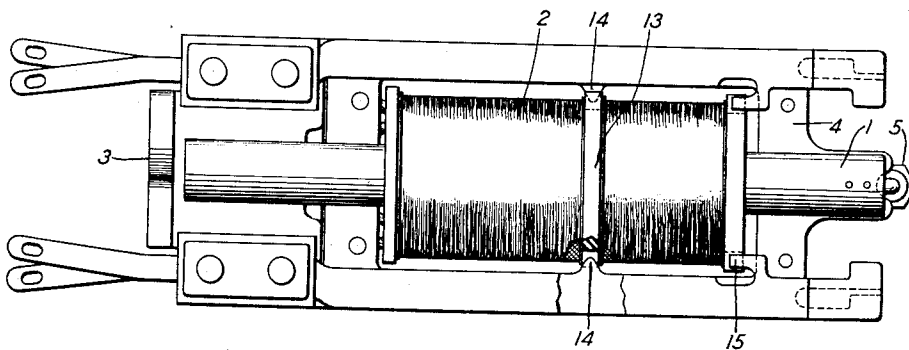


FIG. 4

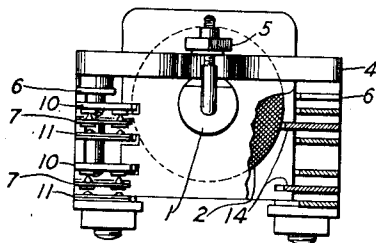
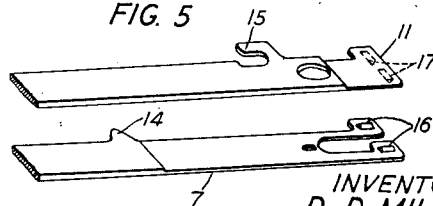


FIG. 5



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ELECTROMAGNETIC SWITCHING DEVICE

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3 Claims. (Cl. 200-104)

This invention relates to electromagnetic switching devices and has for its object to improve the operating characteristics thereof.

A persistent difficulty in the use of relays is a tendency of the contacts to "chatter", that is, to make a series of short closures before coming to rest. This action delays the response to the relay operation, is injurious to the contacts themselves, and may result in the faulty operation of apparatus controlled over the relay contacts.

In accordance with the present invention, the travel of the armature is reduced and the contact closure made firmer and given a slightly wiping characteristic by limiting the motion of the moving spring at an intermediate point. More specifically, the restriction on the movement of the spring at an intermediate point causes the contact bearing end to move through a larger angle than the corresponding passive spring. It, therefore, approaches the resting contact at an angle thrusting it away until the contact is firmly closed.

The practical embodiments of the invention will be better understood from a consideration of the following description of the accompanying drawing, in which

Fig. 1 shows a side view of a relay employing one form of the invention;

Fig. 2 shows a second form of the invention;

Fig. 3 shows a bottom view of the relay of Fig. 2;

Fig. 4 shows an end view partly in cross-section of the relay of Fig. 2; and

Fig. 5 shows a fragmentary perspective view of the contact springs utilized in the relay of this invention.

The inventive idea has been applied to a relay of the type disclosed in the application of F. A. Zupa, Serial No. 747,125, filed October 6, 1934, to which reference is made for a detailed description of the relay as a whole.

In general, the relay comprises a core 1 on which is mounted a coil 2. A bracket 3 is welded to the rear end of the core 1 and serves to support the mounting for the armature 4 and the spring pile-ups which are located on either side of the relay coil. The armature normally is held against back-stop 5 by means of springs 6, and acts on the movable springs 7 by studs 8 and 9, which pass through apertures in the passive springs 10 and 11.

In the embodiment of the invention shown in Fig. 1, the movable contacts 7 are stiffened by being thickened for approximately the inner half of their length. Due to this difference in thickness the free ends of contact springs 7 move about the point 12 as a center describing arcs having ap-

proximately half the radius of those described by the passive springs 10 and 11.

The embodiment shown in Figs. 2 to 5, inclusive, which is the preferred form, differs from that of Fig. 1 chiefly in that a central spoolhead 13 is provided having slots at either side into which fit lugs 14 on the movable springs 7. These lugs make a snug fit with the slots as distinguished from the loose fit of the lugs 15 on the passive springs 10 and 11 in the slots formed by the projections on the front spoolhead. This arrangement insures the desired action of the movable springs. As the stud 8 carried by the armature presses on the movable spring 7, the spring rotates about the fixed point established by the lug 14 and the spoolhead 13. The contacts 16 on spring 7, being located at a greater distance from the lug 14 than stud 8, may move through the necessary contact closing distance at the expense of a lesser movement by the armature. As indicated above, due to the pivoting of the movable spring 7 at the intermediate point, the movable contact points 16 approach the passive contact points 17 at an angle, making the contact a wiping thrust which absorbs the tendency of the contacts to chatter.

What is claimed is:

1. An electromagnetic switching device comprising a core having a rearward extension, a coil supported on said core, an armature controlled by said coil, a plurality of contact springs, said armature and said contact springs being mounted on said rearward extension and extending parallel to said coil, means controlled by said armature to move certain of said contact springs with respect to others of said springs, and means comprising a central spoolhead to limit the movement of said moving springs intermediate said mounting and said armature controlled means.

2. An electromagnetic switching device comprising a core having a rearward extension, a coil supported on said core, an armature controlled by said coil, a plurality of contact springs, said armature and said contact springs being mounted on said rearward extension and extending parallel to said coil, means controlled by said armature to move certain of said contact springs with respect to others of said springs, and means to limit the movement of said moving springs intermediate said mounting and said armature controlled means, said movement limiting means comprising a central spoolhead having slots in which lugs on said moving springs engage.

3. An electromagnetic switching device comprising a core having a rearward extension, a coil supported on said core, an armature controlled by

said coil, a plurality of contact springs, said armature and said contact springs being mounted on said rearward extension and extending parallel to said coil, means controlled by said armature to
5 move certain of said contact springs with respect to others of said springs, and means to limit the

movement of said moving springs intermediate said mounting and said armature controlled means, said movement limiting means comprising a central spoolhead having slots in which lugs on said moving springs fit snugly.

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