April 12, 1927. 1,624,476

G. C. CUMMINGS

CONTACT DEVICE

Filed April 8, 1922

Fig. 1.

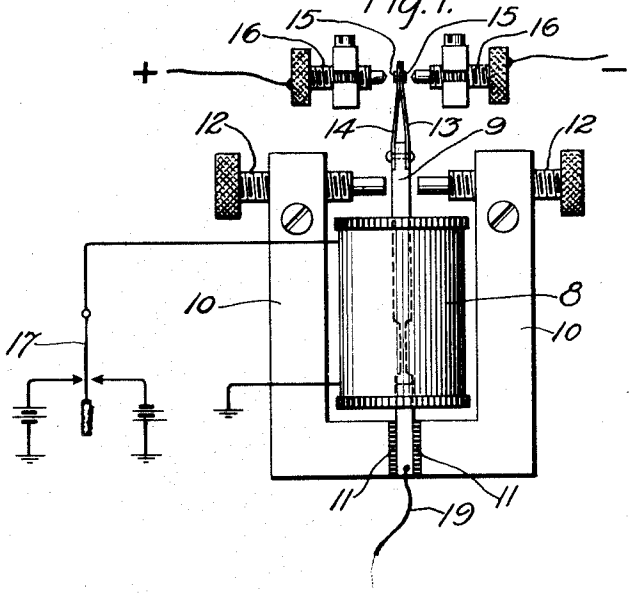


Fig. 2.

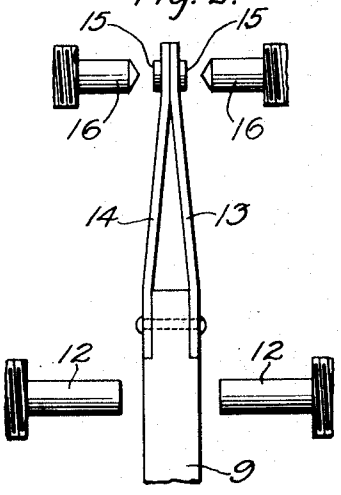
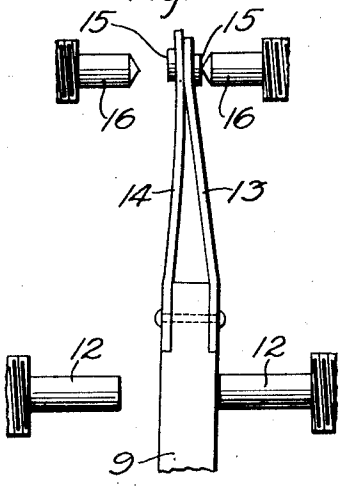


Fig. 3.



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UNITED STATES PATENT OFFICE.

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CONTACT DEVICE.

Application filed April 8, 1922. Serial No. 550,708.

This invention relates to contact devices for relays and the like.

An object of the invention is to provide a contact device in which the mechanical rebounding or chattering of the armature is eliminated without sacrificing the sensitiveness of the associated electromagnetic structure.

The invention provides an armature of an electromagnet equipped with two extension feather springs tensioned so that the free ends thereof are in frictional engagement, thus preventing the springs from vibrating at their natural periodicity.

Referring to the drawings:

Fig. 1 is a plan view of an electromagnetic structure showing a contact device embodying the invention;

Fig. 2 is an enlarged view of a portion of the armature and the contact members when in their normal position;

Fig. 3 illustrates the position of the contact device when the armature is attracted to the right.

In the drawings there is shown an electromagnet comprising an energizing coil 8 through which an armature 9 extends, the armature 9 being clamped between the magnetic members 10, 10, but separated therefrom by non-magnetic members 11, 11. To complete the magnetic circuit of the magnetic members 10, 10, adjustable pole pieces 12, 12 (Fig. 1) are provided. The armature 9 has secured to its free end feather springs 13 and 14, which are secured by means of rivets or other similar connecting means. Each of the contact springs 13 and 14 has secured at a point near its free end a contact button 15. Contact buttons 15, 15 are positioned with respect to the springs 13 and 14 so as to be in alignment with adjustable contact points 16, 16, through which an electrical circuit is completed in accordance with the operation of the electromagnetic device. The energizing circuit of the operating coil 8 may be completed upon the operation of a key 17 which connects the terminals of the coil 8 with a source of current. With this arrangement the movable contacts may be made to engage the opposing contacts 16 for impressing on the conductor 18 an impulse, the polarity of which is dependent upon the position of the key 17.

In Fig. 2 the springs 13 and 14, which are shown enlarged, are tensioned so that the free ends thereof are in frictional engagement with each other. With such an arrangement, when the armature is moved, as in Fig. 3, so that pressure is applied to the free ends of the contact springs, one of the springs is tensioned against the other, whereby one spring tends to move along a surface of the other spring. Should the springs tend to vibrate, following the engagement thereof with either of the contact points 16, 16, this tendency to vibrate is eliminated due to the frictional engagement of one spring with another. When rebounding occurs, such rebounding is absorbed by the conjoint action of the springs, and the springs are, by the frictional engagement of their free ends, substantially prevented from vibrating. Thus by eliminating chattering of the contacts, the life of the contacts themselves is increased, the operation of the apparatus is materially benefitted, and the speed of operation thereof is also increased.

The contact device which forms the basis of the present invention has been shown in connection with a particular type of electromagnetic structure, and it is, of course, obvious that various departures from the present showing could be made without departing from the spirit and scope of the present invention.

The invention claimed is:

1. In an electromagnetic mechanism, a contact device comprising a movable element, and a pair of spring members secured to said element and having their free ends in frictional engagement with each other to prevent their vibration at their natural periodicity upon the operation of said movable element.

2. In combination, a pair of relatively stationary contacts, a pair of movable contacts arranged to cooperate with the stationary contacts, a movable element, and resilient members secured to said element and carrying the movable contacts, the free ends of the resilient members being tensioned so as to be in frictional engagement with each other at all times.

3. In combination, a pair of relatively stationary contacts, a pair of movable contacts arranged to cooperate with the stationary contacts, a movable element, and resilient members secured to said element and carrying the movable contacts, the free ends of said resilient members touching so as to

produce a rubbing friction whereby such members when operated are prevented from vibrating at their natural periodicity.

4. In combination, a pair of relatively stationary contacts, a pair of movable contacts arranged to cooperate with the stationary contacts, a movable element, resilient members secured to said movable element and carrying the movable contacts, and operating means for moving said element whereby a rubbing friction is produced between the free ends of said resilient members for preventing said members from vibrating at their natural periodicity.

5. A contact device comprising a pair of spring members rigidly secured at one end and having only a portion of their other ends at all times in frictional engagement with each other to prevent their vibration at their natural periodicity, and means for moving said members.

6. A relay comprising stationary contacts, movable contacts arranged to cooperate with said stationary contacts, a pair of spring members substantially parallel and having their free ends movable, and in frictional engagement one with the other and carrying the movable contacts, and an operating coil for producing a magnetic effect sufficient to cause the engagement of the movable contacts with one or the other of the stationary contacts.

7. A high speed relay which is substantially chatterless comprising opposing contacts, two extension springs, rigidly secured at one end and tensioned against each other at their free ends to prevent their vibrations at their natural periodicity, and an operating coil operative to cause said extension springs to engage one or the other of the opposing contacts.

8. A high speed relay comprising an operating coil, an element responsive to the action of current through said operating coil, and two springs secured to said element and tensioned against each other at their free ends to provide a substantially non-chattering relay.

In witness whereof, I hereunto subscribe my name this 3rd day of April A. D., 1922.

GEORGE C. CUMMINGS.