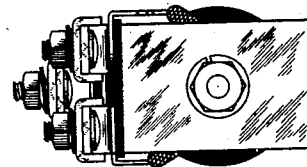
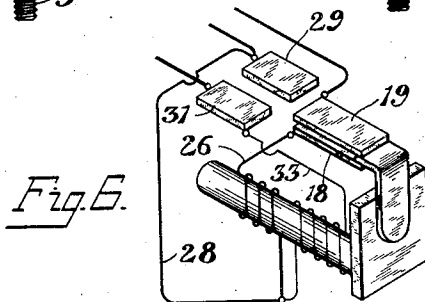
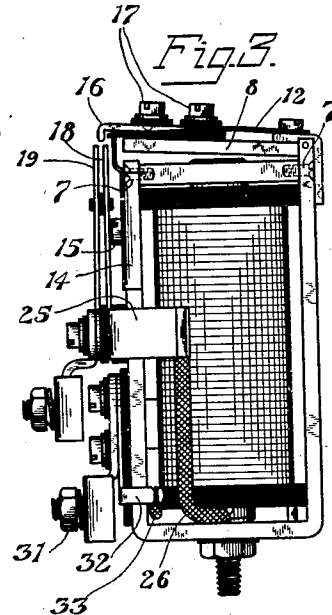
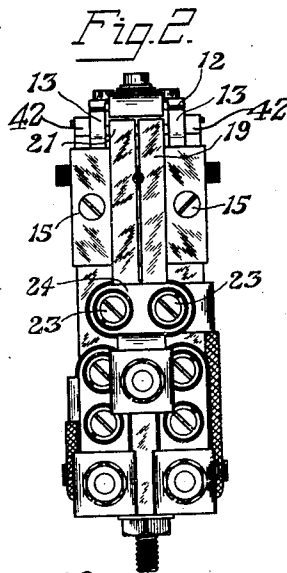
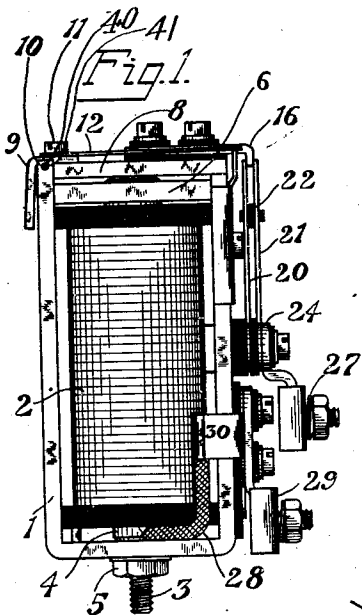
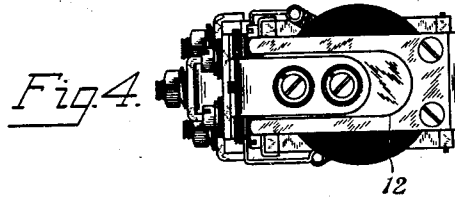


W. KAISLING.
KNIFE SWITCH RELAY.
APPLICATION FILED JULY 1, 1913.

1,228,778.

Patented June 5, 1917.



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UNITED STATES PATENT OFFICE.

WILLIAM KAISLING, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD & SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

KNIFE-SWITCH RELAY.

1,228,778.

Specification of Letters Patent.

Patented June 5, 1917.

Application filed July 1, 1913. Serial No. 776,802.

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Knife-Switch Relays, of which the following is a specification.

My invention relates to relays and more particularly to what I call knife switch relays, and has for its object the provision of a relay of this type in which an armature actuated switch blade is adapted to control circuit conditions in connection with a plurality of stationary switch blades. I am thus enabled to get a very positive contact and without the use of platinum.

My improved relay is of particular utility in connection with automobile service, although of course, it is not so limited in its use.

I will explain one embodiment of my invention more in detail by referring to the accompanying drawing illustrating said specific embodiment, in which—

Figure 1 is a side view of a relay constructed in accordance with my invention;

Fig. 2 is a top view thereof;

Fig. 3 is a side view of the relay looking at the opposite side to that of Fig. 1, the parts being in alternative position;

Fig. 4 is an end view of the relay;

Fig. 5 is an end view looking at the opposite end of that of Fig. 4, and

Fig. 6 is a diagrammatic view illustrating circuit conditions.

My improved relay has a framework consisting of the U-shaped keeper 1 to which the winding spool 2 is secured by having a portion of restricted diameter 3 of its core 4 project through the lower portion of this U-shaped element, being held in place by the customary nut 5. The core at the opposite extremity of the winding spool projects through a non-magnetic bridge 6 which is secured by means of screws 7, 7 to the opposite legs of the U shaped element. An armature 8 is secured to a non-magnetic angle piece 9 and is pivotally mounted at 10 upon one leg of the element 1. The screws 11 which hold the elements 8 and 9 together also hold in position a bifurcated spring 12 shown more clearly in Fig. 4, which presses against outwardly projecting arms 13, 13 carried by a non-magnetic plate 14 fixedly

mounted by means of screws 15 to the U-shaped element 1.

The armature 8 carries a movable switch blade 16 which however is insulated from the armature as shown more clearly in Fig. 3; but which is secured to said armature by means of the screws 17. This movable switch blade is adapted to co-act with four stationary switch blades respectively 18, 19, 20 and 21 respectively. An insulating distance piece 22 is mounted between the four springs as shown clearly in Figs. 1, 2 and 3, and serves to hold them apart the proper distance. These springs are suitably secured in position by screws 23, 23 although insulated from said screws, the springs 19 and 21 having electrical contact with the plate 24 and the springs 18 and 20 having electrical contact with the conducting plate 25. The conducting plate 26 leads directly by means of a conductor 26 to a terminal of a part of the winding, and the plate 24 is offset so as to provide a connector 27. Another conductor 28 leading from the winding is connected to a connector 29 through the interposition of the conducting piece 30. All of the parts mentioned, of course, are insulated from the metal forming the magnetic circuit for the relay.

A third connecting terminal 31 is provided which through the agency of the conducting element 32 and conductor 33 leads to another portion of the winding of the relay.

One form of circuit arrangement of my improved relay is shown more clearly in Fig. 6. From what has been described it is thought the advantageous constructional features will be readily apparent. The relay has all of its parts heavily insulated, and is thus well adapted for the work it is called upon to perform.

A most advantageous feature of my improved relay is the novel manner of actuating the switching mechanism by means of which the circuit conditions are changed in accordance with the energization or deenergization of the relay. By referring particularly to Fig. 3, it will be seen that the relay is in a deenergized condition, there being no current in the windings. The springs 12 by pressing against the fingers 13 place the armature in its unattracted position as shown in Fig. 3. Now should the relay be supplied with sufficient current to cause the

attraction of its armature, then the armature is attracted against the action of the spring 12 and the movable switch blade 16 is forced between the spring blades 18 and 20 on the one side and 19 and 21 on the other. From what has been described, of course, it is clear that springs 18 and 20 are connected together and springs 19 and 21 are connected together.

By referring to Fig. 1, it will be seen that the movable switch blade 16 enters quite a distance between the springs with which it coöperates, and thus establishes a very efficient wiping contact similar to that obtained from knife switches, as the movable switch blade 16 enters between the springs to force them apart and likewise enters the distance of over a sixteenth of an inch, thus forming what might be called a highly efficient rubbing contact.

From what has been described, it is thought the novel features of my improved relay will be readily apparent to those skilled in the art. It will also be apparent that many modifications may be made from the structure and arrangement herein disclosed without departing from the spirit of my invention.

Having however thus described one form which my invention may take, what I claim as new and desire to secure by Letters Patent is:

1. A relay comprising a U-shaped heel iron, a spool electromagnet within said heel iron and having one end of its core secured thereto and its free end supported by a non-magnetic element at the open end of the heel iron, an armature pivotally secured to one prong of the heel iron, a spring secured to said armature, a stop secured to the other prong of said heel iron with which the said spring coöperates to retract the said armature, an angular member attached to the said armature for limiting the return movement of the said armature, and common means for securing said spring and angular member to said armature.

2. A relay comprising a U-shaped heel iron, a spool electromagnet within said heel iron having one end of its core secured thereto and its free end extending through a non-magnetic bridge piece mounted between the free ends of said heel iron, an armature pivoted to one prong of said heel iron, a bifurcated spring secured to said armature, a plate member secured to the other prong of said heel iron and provided with a plurality of stops for coöperating with said bifurcated spring to retract the said armature, an angular member attached to the said armature for limiting the return movement of the said armature, and a contact maker secured to said armature between the bifurcations of said spring.

3. A relay comprising a U-shaped heel iron, a spool electromagnet within said heel iron and having one end of its core secured thereto and its free end supported by a non-magnetic bridge element at the open end of the heel iron, a pair of insulatingly mounted contact springs lying in a plane parallel to the plane of the core of the electromagnet and secured to one prong of said heel iron, an insulating member for spacing said contact springs, an armature pivotally secured to the other prong of the heel iron and extending into operative relation with the electromagnet and other prong, a flat conducting element insulatingly secured to the armature and adapted to be thrust between the contact springs to effect their connection when the armature is attracted, and a spring secured to said armature coöperating with a plate secured to one prong of said heel iron to return said armature to its normal position when said electromagnet is deenergized.

Signed by me at Chicago, county of Cook and State of Illinois, in the presence of two witnesses.

WILLIAM KAISLING.

Witnesses:

G. E. MUELLER,
B. O'BRIEN.