W. KAISLING.

SPRING ARMATURE RELAY.

APPLICATION FILED MAR. 28, 1910.

1,016,567.

Patented Feb. 6, 1912.

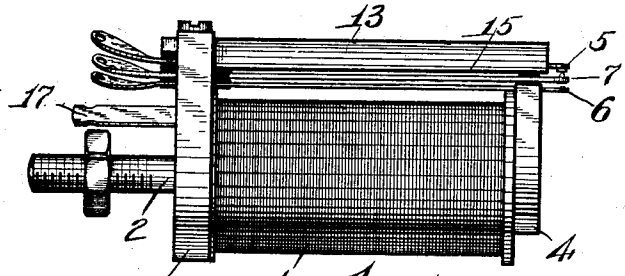

Fig. 1

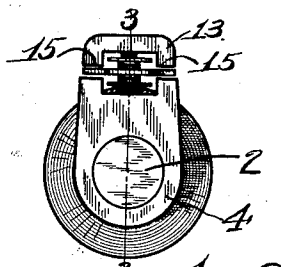

Fig. 2

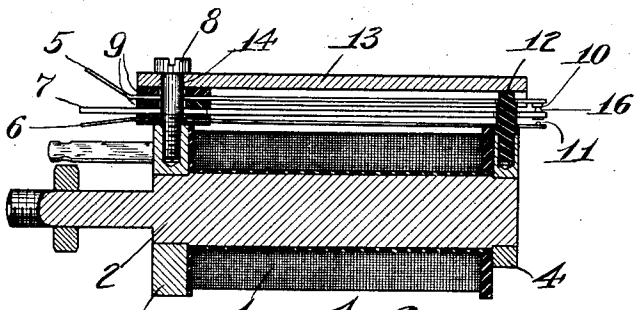

Fig. 3

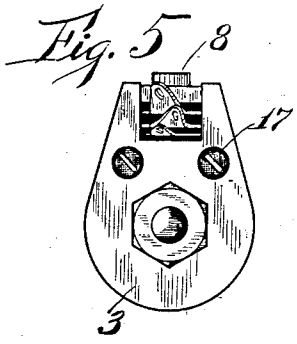

Fig. 5

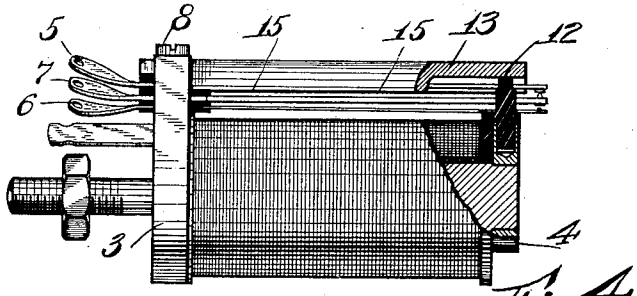

Fig. 4

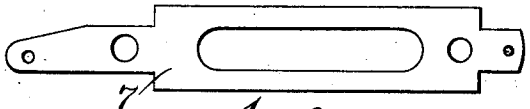

Fig. 6

Witnesses

George E. Mueller

Marjorie E. Grier

Inventor

William Kaisling

By Curtis Bleamp

Attorney

UNITED STATES PATENT OFFICE.

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

SPRING-ARMATURE RELAY.

1,016,567. Specification of Letters Patent. Patented Feb. 6, 1912.

Application filed March 28, 1910. Serial No. 551,958.

To all whom it may concern:

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

My invention relates to relays, and more particularly to that type of relay used in connection with telephone systems, the object being to produce a relay which is simple and of an improved construction, and although of relatively small construction, very efficient.

Referring to the accompanying drawing, Figure 1 is a side elevation; Fig. 2 is an end elevation of the structure shown in Fig. 1; Fig. 3 is a longitudinal section through the line 3—3 of Fig. 2; Fig. 4 is a side elevation partially broken away at the front end of the relay; Fig. 5 is an end elevation of the structure shown in Fig. 4; Fig. 6 is a plan view of the armature of the relay.

In Fig. 1 is shown the energizing winding 1, about the core 2, which is preferably made of a soft grade of iron and secured to the ends of the core are the pole pieces 3 and 4 which are made of soft iron. The terminal 17 may be secured to the spool head in any suitable manner, one of the terminals of the winding being fastened thereto. The pole pieces 3 and 4 are driven on to the core 2 as shown in Fig. 3, and the contact springs 5 and 6 and the flexible spring armature 7 are fastened to the pole pieces 3 by the screw 8, being insulated from the pole piece by the insulating blocks 9. The contact springs 5 and 6 are made of some non-magnetic material and carry at their free ends the respective contacts 10 and 11. The free ends of the springs carrying contacts rest under tension on the shoulders of the separating insulation stud 12 and are thereby held in their relative positions. The heel iron 13 for connecting the pole pieces 3 and 4 in a magnetic circuit is secured at one end to the pole piece 3 by the screw 8, the said heel iron being in direct contact with the pole piece 3, as shown in Fig. 5, and also being connected to the pole piece 3 by the iron screw 8. The said heel iron extends in a plane parallel to the axis of the core and has its free end overlapping and adjacent to the pole piece 4. Thus, it is seen when the relay is energized the magnetic circuit including the heel iron 13, pole piece 3, core 2 and the pole piece 4, is only open between the free end of the heel iron and its adjacent pole piece 4. The flexible spring armature 7 which is preferably made of steel is secured at the pole piece 3, being clamped in position between the insulating blocks 9 by the screw 8 and carries the contact 16 which registers with the contacts 10 and 11 at its free end, the said contact resting under tension against the upper contact 10 of the spring 5, and normally out of engagement with the contact 11. It will be noted that this spring armature is insulated from the screw 8 by the bushing 14 and from the contact springs 5 and 6 by the insulating blocks 9, and therefore is not normally in direct contact with any part of the magnetic circuit of the relay.

By referring to Fig. 2 of the drawing, it will be seen that the heel iron 13 is bent around the contact spring 10 in the shape of a U having the surfaces 15 close to the armature 7 in its entire length, as shown in Figs. 1, 3 and 4. The free end of the heel iron 13 rests against the top of the insulating stud 12, thus retaining its position relative to the pole piece 4. By the use of this heel iron 13, it is possible to insulate the armature 7 from the frame of the relay and still secure a very efficient relay.

In the operation of the relay, when an energizing circuit is closed through the winding 1 of the relay, a magnetic circuit is produced, including the heel iron 13, the pole piece 3, the core 2 and the pole piece 4, but this magnetic circuit is open at a point between the free end of the heel iron 13 and the adjacent pole piece 4, and the flexible spring armature 7 being between the heel iron 13 and the pole piece 4, lines of force from the magnetic circuit are conducted to the said spring armature 7 along the full length of the surfaces 15 of the heel iron 13 and the armature 7 is therefore attracted at its free end to the pole piece 4 and the upper contact 10, 16 is broken and thereafter the contact 16, 11 is closed. Thus, it will be seen that although the spring armature 7 is normally not in direct contact with any part of the magnetic circuit, a very efficient operation of the armature is secured due to the heel iron 13 having its surfaces 15 extending along the upper surface of the flexible spring 7.

What I claim as new and desire to secure by Letters Patent is:

1. A relay comprising a core, an energizing winding about said core, a pole piece secured to one end of said core, and extending at right angles therefrom, an integral flexible spring armature secured at one end to said pole piece, a contact carried at the free end of said spring armature, a second pole piece secured to the other end of said core and extending at right angles therefrom, a second contact registering with the contact on said armature, the said second pole piece being adapted when the relay is energized to attract the free end of the said armature, whereby there is a coöperation between said contacts, substantially as described.

2. A relay comprising a core, an energizing winding about said core, a pole piece secured to one end of said core, an integral flexible spring armature secured at one end to said pole piece and lying in a plane parallel to the axis of said core, a contact carried at the free end of said spring, a second pole piece secured to the other end of said core, a second contact registering with the contact on said armature, the said second pole piece being adapted when the relay is energized to attract the free end of the said armature whereby there is a coöperation between said contacts, substantially as described.

3. A relay comprising a core, an energizing winding about said core, a pole piece secured to one end of said core, a second pole piece secured to the other end of said core, a heel iron secured at one end to the first mentioned pole piece and having a free end terminating at a point adjacent to said second pole piece, an integral flexible spring armature secured at one end to said first mentioned pole piece and having a free end extending between the free end of said heel iron and the pole piece adjacent thereto, the said second pole piece being adapted when the relay is energized to attract the free end of the said armature, substantially as described,

4. A relay comprising a core, an energizing winding about said core, a pole piece secured to one end of said core, a second pole piece secured to the other end of said core, a heel iron secured at one end to the first mentioned pole piece and having a free end terminating at a point adjacent to said second pole piece, an integral flexible spring armature secured at one end to said first mentioned pole piece and having a free end extending between the free end of said heel iron and the pole piece adjacent thereto, a contact carried at the free end of said spring armature, a second contact registering with the contact on said armature, the said second pole piece being adapted when the relay is energized to attract the free end of the said armature, whereby there is a coöperation between said contacts, substantially as described.

5. A relay comprising a core, an energizing winding about said core, a pole piece secured to one end of said core, a second pole piece secured to the other end of said core, said pole pieces extending at right angles to the axis of said core, a heel iron secured at one end to the first mentioned pole piece and having a free end terminating at a point adjacent to said second pole piece, an integral flexible spring armature secured at one end to said first mentioned pole piece and having a free end extending between the free end of said heel iron and the pole piece adjacent thereto, said heel piece being included in a magnetic circuit when said relay is energized and adapted to conduct lines of force from said magnetic circuit to said spring armature, whereby said armature is attracted to said second pole piece, substantially as described.

6. A relay comprising a core, a winding on said core, pole pieces secured to each end of said core and extending at right angles therefrom, a heel iron secured at one end to one of said pole pieces and having a free end terminating at a point adjacent to said second pole piece, said heel iron being parallel to the axis of said core, an integral flexible spring armature secured at one end to the first mentioned pole piece and having its free end extending between the free end of said heel iron and the adjacent pole piece, said armature lying parallel to and between said heel iron and the core, said heel piece being adapted when the relay is energized to conduct lines of force from the magnetic circuit of the pole piece to said spring armature, whereby said armature is attracted at its free end to the adjacent pole piece.

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

WILLIAM KAISLING.

Witnesses:
GEORGE E. MUELLER,
MARJORIE E. GRIER.