W. KAISLING.

RINGING RELAY.

APPLICATION FILED DEC. 26, 1912.

1,232,044. Patented July 3, 1917.

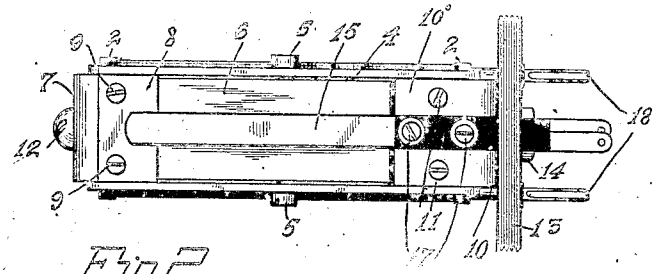

Fig. 2.

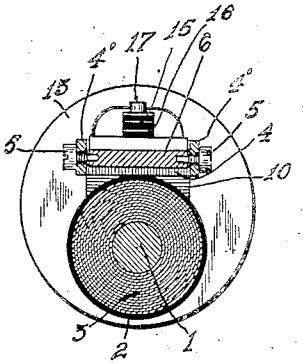

Fig. 4.

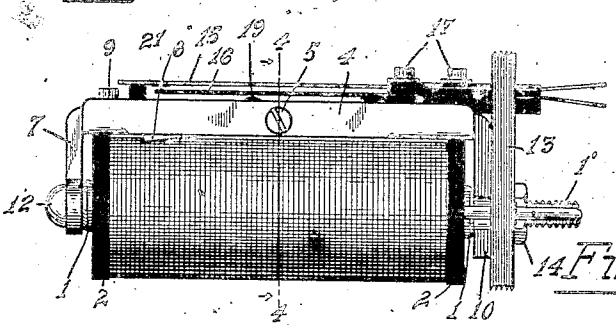

Fig. 1.

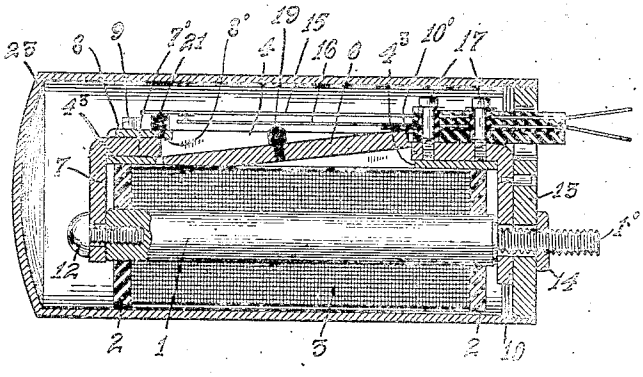

Fig. 3.

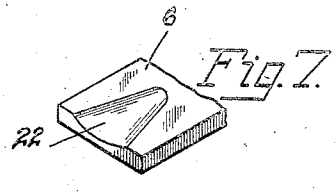

Fig. 7.

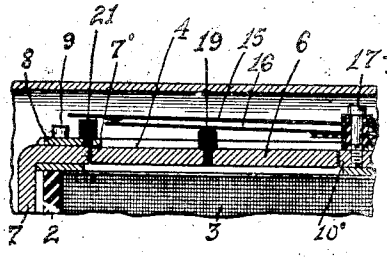

Fig. 5.

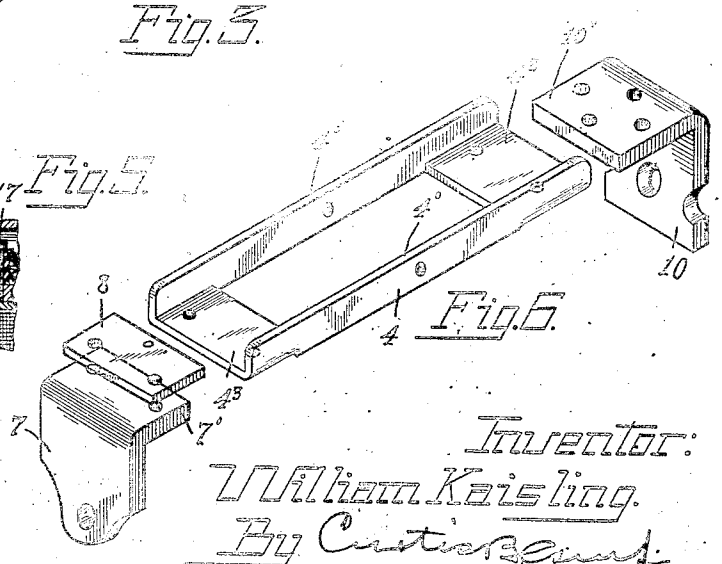

Fig. 6.

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UNITED STATES PATENT OFFICE.

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

RINGING-RELAY.

1,232,044. Specification of Letters Patent. Patented July 3, 1917.

Application filed December 26, 1912. Serial No. 738,572.

To all whom it may concern:

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

My invention relates in general to relays and is directed more particularly to relays which are adapted to be operated by alternating currents and to have their armature maintained steadily attracted by such currents, but of course my invention is not limited to use with alternating currents. In the ordinary direct current type of relay such as is used in telephone systems, when an alternating current is passed through the winding thereof the armature will frequently chatter. My invention is directed more particularly to the alternating current type of relay above referred to, an object being to provide a device of this character which is more efficient and positive in operation, compact, simple of construction and cheap to manufacture.

For a more complete understanding of my invention reference is to be had to the accompanying drawing in which like reference characters denote like parts and in which:

Figure 1 is a side elevation of the relay with the shell removed;

Fig. 2 is a plan view of the relay;

Fig. 3 is a longitudinal cross section of the relay with the shell in place on the relay;

Fig. 4 is a transverse cross section on the line 4, 4 of Fig. 1 looking in the direction of the arrows;

Fig. 5 is a partial section of the relay to show the armature in its actuated position;

Fig. 6 is a perspective view of the armature supporting frame, and the two pole pieces; and

Fig. 7 is a perspective view of the armature showing the recess on its bottom surface for clearing the electromagnet coil.

Referring now more in detail to my invention as illustrated, it comprises an electromagnet having a core 1, spool heads 2 at each end, and an energizing winding 3 surrounding the core 1. Terminals 18 are provided for the electromagnet.

Extensions of the core 1 are provided in the form of pole pieces 7 and 10, pole piece 7 being attached to the free end of core 1 by means of a screw 12 while pole piece 10 is secured to the other end of core 1 by means of a threaded extension 1^1, nut 14 and shell support 13. An armature support 4 is also provided having attaching ends 4^3 connected by side pieces 4^1. The support 4 is preferably attached to the extensions 7^1 and 10^1 of the pole pieces 7 and 10 respectively by means of screws, screw 9 passing through the plate 8 and extension 7^1 into the adjacent fastening end 4^3, while screws 11 pass through the extension 10^1 into the adjacent end 4^3. This armature support 4 is preferably of non-magnetic material so as not to shunt any of the lines of force passing between the pole pieces 7 and 10. Non-magnetic stops 8^1 are carried by plate 8.

A flat armature 6 is pivotally attached to the frame 4 by means of pivot screws 5 which pass through the frame sides 4^1 and into the armature 6 as most clearly shown in Fig. 4. Armature 6 is preferably pivoted in such a manner that one end over-balances the other, and I preferably secure this result by placing the pivot holes in the armature 6 slightly off center so that the armature normally assumes the position shown in Fig. 3. The extent of over-balance may of course be varied according to the degree of sensitiveness required.

In order to bring the extensions 7^1 and 10^1 of the pole pieces close to the electromagnet, I have cut a recess 22 in the armature 6 to conform to the winding of the electromagnet, thereby also permitting a greater movement of the armature.

A set of contact springs 15 and 16 are insulatingly mounted upon the rear pole piece 10, being attached by means of screws 17. The contact spring 15 rests at its free end upon an insulating stud 21, which stud is secured to the plate 8. A buffer 19, preferably of insulating material, is carried by the armature 6 and is adapted, when the armature is attracted, to engage the contact spring 16 and move it into engagement with contact spring 15 as shown in Fig. 5.

A shell 23 is provided, being threaded on to rear support 13, and adapted to exclude dust, etc., from the relay parts.

When alternating current is passed through the winding of the electromagnet, the lines of force set up naturally tend to

follow the path of least resistance between pole pieces 7 and 10, and therefore the armature 6 being in the path of this flow is moved into its attracted position as shown in Fig. 5, the buffer 19 carried thereby acting upon the contact springs 15, 16. The initial attraction of armature 6 is also assisted by lines of force through the plate 8 which also acts as a stop when the armature is moved into its attracted position. The armature now lies directly in the path of magnetic flux extending between the pole pieces 7 and 10, the magnetic flux holding the armature in its attracted position without side or end strain upon the pivot points. Thus, the body of the armature connecting the pole pieces by a straight line and therefore the shortest possible path, it carries a greater number of magnetic lines of force than in the type of relay used previous to my invention. I have therefore found it to be sensitive to alternating currents of comparatively low frequency and very efficient in maintaining its armature steadily attracted responsive to such currents.

While I have illustrated my invention in a preferred form which has been worked out for a commercial device, I am aware that many changes and modifications thereof will readily suggest themselves, and therefore I do not desire to be limited to the exact structure as disclosed but aim to cover all that which comes within the spirit and scope of the appended claims.

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

1. An alternating current relay comprising an electromagnet, angular pole pieces attached to the ends of the core of the electromagnet having their free ends lying in a plane parallel to the core of said electromagnet, a bridge piece provided with parallel side pieces supported by said pole pieces, an armature pivotally supported between the side pieces of said bridge piece, said armature being slightly less in length than the distance between said pole pieces, and means for operating said armature whereby said armature is moved into the plane of said pole pieces to magnetically connect said pole pieces by the shortest path.

2. A relay structure including an electromagnet having a pole piece extending from each end of the core of said electromagnet and adapted to assume opposite polarities upon energization of said electromagnet, a bridge piece provided with parallel side pieces supported by said pole pieces, an armature pivotally supported at substantially its central point between the side pieces of said bridge piece in operative relation but clear of said pole pieces, means for operating said armature whereby said armature is moved into the plane of said pole pieces to magnetically connect said pole pieces by the shortest path, contact springs mounted upon one of said pole pieces, and an operating member carried by said armature for controlling said springs.

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.