No. 775,230. PATENTED NOV. 15, 1904.

H. G. WEBSTER.

CIRCUIT CHANGING APPARATUS.

APPLICATION FILED DEC. 7, 1903.

NO MODEL.

Fig. 3.

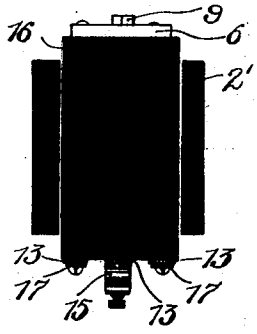


Fig. 1.

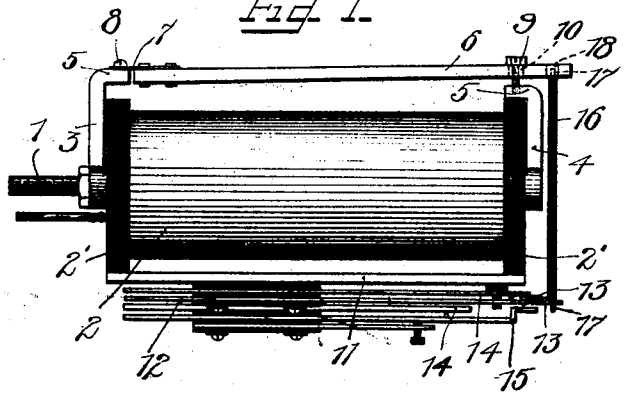


Fig. 4.

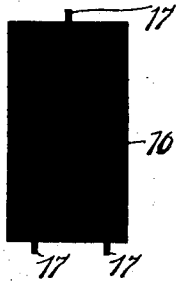
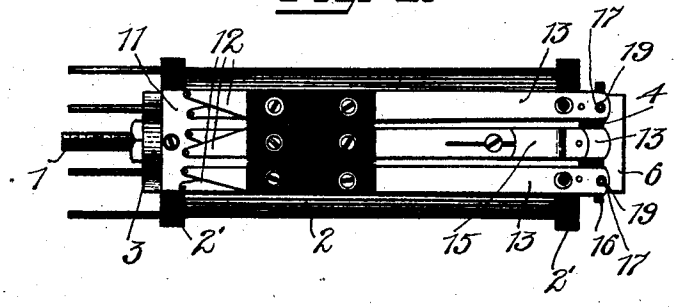


Fig. 2.



Witnesses:

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No. 775,230. Patented November 15, 1904.

UNITED STATES PATENT OFFICE.

HARRY G. WEBSTER, OF CHICAGO, ILLINOIS, ASSIGNOR TO STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

CIRCUIT-CHANGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 775,230, dated November 15, 1904.

Application filed December 7, 1903. Serial No. 184,073. (No model.)

To all whom it may concern:

Be it known that I, HARRY G. WEBSTER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Circuit-Changing Apparatus, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to circuit-changing apparatus, particularly to that class known as "relays," in which a plurality of actuating-springs are moved between other contact-springs upon attraction of an armature which is mechanically associated with the actuating-springs; and my invention has for its object improved means for rendering said springs more readily accessible to inspection when the relay is in a fixed position—for instance, on a telephone-switchboard.

The relay of my construction consists of a core about which is disposed an energizing-coil and from which members of magnetic material extend perpendicularly and are spanned by an armature, which armature I preferably spring-hinge to one of said members and the forward end of which extends over the other member. This spring-hinge serves to normally prevent the armature from closing the magnetic circuit; but upon energization of the coil the armature is drawn toward its associated member to close the magnetic circuit through the core, the perpendicular members, and the armature. By this construction a very limited air-gap may be obtained, thus producing great power and efficiency with a minimum of energizing-current. Below the armature and parallel thereto may be disposed switching-springs of any number and arrangement, actuating-springs of which are mechanically connected with the swinging end of the armature, the retractile force of said actuating-springs serving also to maintain the armature away from its associate pole member when the coil is not energized, and the actuating-spring may then engage other contact-springs to establish desired circuits. Upon attraction of the armature the actuating-springs may engage alternate contact-springs and break connection with the other contact-springs.

As a means for associating the armature with the springs I provide a distance-piece interposed between the swinging end of the armature and the actuating-springs, and to render the switch spring-contacts accessible from the end of the relay I construct this distance-piece to be readily removable, it being held in place merely by the pressure against the ends thereof of the spring-hinged armature and the actuating-springs. Pins extend from the ends of said distance-piece into apertures in the armature end and the actuating-springs to prevent self-removal of the distance-piece, and when it is desired to remove the distance-piece a pressure thereof against the actuating-springs will withdraw the other end from the armature-aperture, and the piece can then be readily removed to lay bare the ends of the actuating-springs.

By reference to the drawings my invention will be more clearly understood.

Figure 1 represents a side elevation view of the relay. Fig. 2 is a bottom view thereof; Fig. 3, an end view thereof, and Fig. 4 is an isolated view of the distance-piece.

Like characters of reference refer to like parts throughout the different figures.

A core 1 is provided with an energizing-coil 2, disposed between insulating ends 2′ 2′, and L-shaped pole members 3 and 4, of magnetic material, extend perpendicularly upward from said core at the ends of the coil 2, the base part 5 of the L-shaped members extending inwardly toward each other. An armature 6 is adapted to close a magnetic circuit through the core and the members 3 and 4 and at its rear end is provided with a spring-hinge 7, which may be riveted to the end of the armature and secured to the member 3 by means of a screw 8. The upward end of the armature extends over the end 5 of the pole-piece 4. An adjusting-screw 9 extends through an aperture 10 in the armature and engages the part 5, by means of which adjusting-screw

the air-gap between the armature and pole member 4 may be regulated, the spring-hinge serving to normally maintain the armature against the head of the screw. A mounting-piece 11 connects the insulating ends 2′ 2′ at the opposite side from the armature, and switching mechanism 12, supported by said mounting, may consist of actuating-springs 13 13, of normal contact-springs 14 14, and alternate contact-springs 15 15. A distance-piece in the shape of a plate 16, of insulating material, extends between the swinging end of the armature and the actuating-springs 13 13, and upon energization of the coil 2 the armature is attracted to push against the distance-piece 16, whereby the actuating-springs are moved from the engagement with the normal contact-springs into engagement with the alternate contact-springs, the retractile force of the actuating-springs helping upon deënergization of the coil to restore the armature to its normal position.

In order to render ready access to the contacts at the ends of the springs when the relay is rigidly mounted in a switchboard, for instance, I cause the distance-piece 16, which when in position hides these contacts, to be readily removable to lay bare these contacts for inspection, cleaning, and repair purposes. I therefore provide pins 17 17, extending from the upper and lower ends of the distance-piece, to engage an aperture 18 in the swinging end of the armature and apertures 19 through the ends of the actuating-springs, the apertures being large enough to allow free disposition of the pins therein. To remove the distance-piece, it is merely necessary to push it downwardly against the actuating-springs until the pin at the upper end leaves the aperture in the armature, when the piece may be readily removed and may again be replaced in the same manner.

I do not wish to be limited to the precise construction as described, as changes may readily be made in the structure without departing from the scope of the invention.

I claim as new and desire to secure by Letters Patent—

1. In a device of the class described, the combination with a core provided with pole-pieces, of an energizing-coil for said core, an armature hinged to one of said pole-pieces and extending over the other pole-piece, switching mechanism disposed below said armature, a distance-plate disposed between the swinging end of said armature and actuating-springs of said switching mechanism, apertures through the swinging end of said armature and said actuating-springs, and pins extending from said distance-plate for loosely engaging said aperture, whereby said distance-plate is readily removable.

2. In a device of the class described, the combination with a core provided with pole-pieces, of an energizing-coil for said core, an armature disposed above said coil and substantially parallel to said core, a spring-hinge securing one end of said armature to one of said pole-pieces, the swinging end of said armature extending over the other pole-piece, switch mechanism disposed below said armature, a distance-plate of insulating material disposed between the swinging end of said armature and actuating-springs of said switch mechanism, apertures in the swinging end of said armature and said actuating-springs, and pins extending from the edges of said plate for loosely engaging said apertures, whereby said plate may be readily removed.

3. In a device of the class described, the combination with a core provided with L-shaped pole-pieces extending perpendicularly therefrom and toward each other, of an energizing-coil for said core, an armature disposed above said coil and core and substantially parallel thereto, a spring-hinge securing the rear end of said armature to one of said pole-pieces, the swinging end of said armature extending over the other pole-piece, switch mechanism disposed below said coil, a distance-plate of insulating material disposed between the swinging end of said armature and actuating-springs of said switch mechanism, apertures in the swinging end of said armature and actuating-springs, and pins extending from the engaging edges of said distance-plate for loosely engaging said apertures, whereby said plate may be readily removable.

4. In a device of the class described, the combination with a core provided with L-shaped pole-pieces extending perpendicularly therefrom and toward each other, of an energizing-coil for said core, an armature disposed at one side of said coil and substantially parallel to the core, a spring-hinge securing the rear end of said armature to one of said pole-pieces, the swinging end of said armature extending over the other pole-piece, said spring-hinge serving normally to maintain the swinging end of the armature away from the associated pole-piece, an adjusting-screw for engaging the air-gap between the swinging end of said armature and the associated pole-piece, switching mechanism disposed at the opposite side of said coil, a distance-plate of insulating material disposed between the swinging end of the armature and actuating-springs of said switching mechanism, apertures in the swinging end of said armature and actuating-springs, and pins extending from the edges of said plate for loosely engaging said apertures, whereby said plate may be readily removable.

In witness whereof I hereunto subscribe my name this 5th day of December, A. D. 1903.

HARRY G. WEBSTER.

Witnesses:

CHARLES J. SCHMIDT,

LEONARD W. NOVANDER.