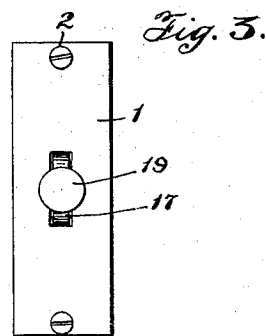
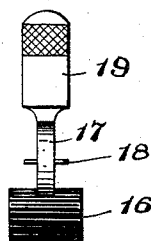
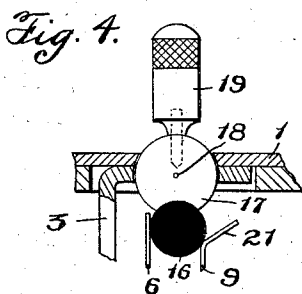
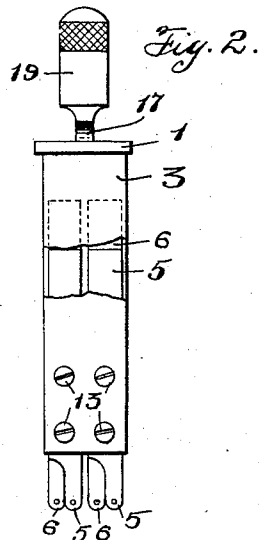
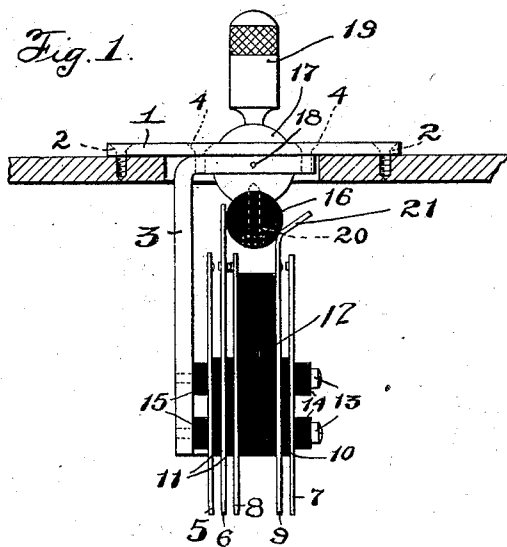


No. 748,397.

PATENTED DEC. 29, 1903.

W. MEYER.
CIRCUIT CHANGING APPARATUS.
APPLICATION FILED OCT. 10, 1901.

NO MODEL.



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UNITED STATES PATENT OFFICE.

WILLIAM MEYER, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, 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. 748,397, dated December 29, 1903.

Application filed October 10, 1901. Serial No. 78,187. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MEYER, 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, and more particularly to that class of circuit-changing apparatus used in telephone systems, and has for its object the provision of improved means for effecting the operative interconnection between the various circuits of a telephone-line.

My invention is of particular utility when used in connection with the cord-circuits of telephone systems whereby the operator may operatively associate a telephone-line with her operator's listening set or with a calling apparatus, such as a ringing-generator.

My invention is designed to produce a circuit-changing device of this kind which may be of the simplest construction, which does not get out of adjustment, which is readily removable from the other appliances on a switchboard, and which may be easily repaired if in any way damaged. As is well known, circuit-changing keys when used in this connection must be so designed that they are self-locking in the listening position, while in the ringing position they automatically return to their normal position when released.

To this end my invention consists in the novel and improved construction of circuit-changing apparatus to be particularly described hereinafter in connection with the accompanying drawings, illustrating one embodiment thereof, in which—

Figure 1 is a view in elevation of my improved key. Fig. 2 is an end view thereof. Fig. 3 is a top view of my improved key. Fig. 4 is a detail view illustrating the manner of mounting the operating-lever. Fig. 5 is an end view of the lever mechanism.

Like characters of reference indicate like parts throughout the figures.

My improved key consists, in the embodiment thereof herein shown, of a capping-plate 1, adapted for mounting and insertion within the operating-table of a telephone-switchboard, the capping-plate being of sufficient size and strength to support all the circuit-changing mechanism and being provided with screw-holes 2 2, whereby the same may be secured to the said operating-table. The circuit-changing springs are mounted upon an inverted-L-shaped bar 3, secured to the capping-plate 1 by means of screws 4 4. In thus mounting the springs on one bar, vertically arranged in this instance, a key is produced which is simple and made of a small number of parts. The circuit-changing springs comprise, in this particular embodiment, the generator-springs 5 5, the two sets of line-springs 6 6 and 7 7, and the springs 8 8, normally in electrical connection with the springs 6 6, but disengaged therefrom when said springs 6 are actuated to bring them into operative relation with the springs 5, whereby the line-circuit is broken at the point where the ringing-generator is connected to the line, so that a signal will be transmitted over but one subcircuit, as is well understood in the art, and also the operator's listening - springs 9 9, placed adjacent to the springs 7, an insulating-strip 10 being interposed to prevent normal electrical contact between the same. Insulating-strips 11 11 are interposed, respectively, between the springs 5 and 6 and 6 and 8 for the purpose of preventing normal electric contact between the same except at the point where platinum contact-points may be inserted for this purpose. An insulating-strip 12 is placed between the said springs 8 and 9 both for the purpose of mounting and preventing electrical contact between the same. The whole structure, comprising the sets of springs 5, 6, 7, 8, and 9 and the sets of insulating-strips 11, 11, 10, and 12, is secured to the L-shaped bar 3 by means of bolts 13 13, suitable washers 14 14 and 15 15 being interposed for the

purposes of construction. The springs 9 and 7 are normally not electrically connected, the sets of springs 5 6 being likewise electrically discontinuous, whereas the sets of springs 6 and 8 are normally in electrical contact. A very compact and durable structure and secure mounting for the springs is thus secured, the danger of getting out of order or of displacement by wear and tear being materially decreased.

The operative actuation of the key—that is, either bringing the springs 5 and 6 into electrical engagement or bringing the springs 7 and 9 into electrical engagement—is effected by means of a cylindrical-shaped actuating-button 16, of insulating material, which is suitably secured to an operating-disk 17, provided for this purpose, the disk 17 fitting into a groove provided in the actuating-button 16, as is well shown in the drawings. The disk 17 is pivotally mounted in the L-shaped bar 3 by means of a pin or shaft 18, whereby I dispense with the necessity of a movable escutcheon or plate to close the aperture which is necessary in the capping-plate 1 in order to have the lever pass therethrough, as the disk 17 will at all times retain its relative position with regard to the hole provided in said capping-plate, through which said disk may project. A lever 19, which may be secured to the disk 17 by means of screws, is employed for the purpose of effecting an actuation of the disk 17, and thereby the actuating-button 16. The actuating-button 16 is held in place on the disk 17, preferably by means of a suitable screw 20. As mounted, the button 16 may be moved either to the right or left, as desired, to effect the operative actuation of the springs, which are mounted below. The springs 9 are provided at their upper extremity with an inclined portion 21, which is arranged at such distance from the pivotal mounting of the disk 17 that when the button 16 is moved into engagement with said spring and rests upon said inclined section it will remain there—that is, it will be locked in such position—thereby retaining the springs 9 in constant contact with the springs 7 unless the lever 19 is manually actuated in the reverse direction to remove the button 16 from engagement with the said spring 9. The button 16 has also operative engagement with the set of springs 6 6, which springs are longer than either the springs 5 and 8. The button 16, however, impinges against one side of the said springs 6, which are bent into engagement with the springs 5 when the lever 17, as shown in Fig. 1, is moved toward the right. The resiliency of the said spring, however, tends at all times to push the lever normally back into the vertical position, whereby the electrical engagement of said springs with the springs 8 is again secured.

By the use of my invention I thus avoid the

difficulty which has hitherto been apparent in keys of this nature—namely, the sticking of the actuating-button when actuated to operatively associate the ringing-keys so that a continued connection of the telephone-line with the ringing-generator is effected. It will be clear that by the construction which I employ this difficulty is overcome, as the contact-button 16 impinges against the side of the contact-spring, and thus has no possible chance of forming with it a position wherein said contact-button would be retained in any but its normal position.

It will thus be apparent that by means of my invention I materially decrease the space on the operator's table which is required for the ringing and listening keys, as the springs of the said keys can be mounted close together, thereby reducing the width, the springs also being arranged vertically, whereby the length of the space which will be occupied by the said key in the operator's table is reduced.

While I have herein shown and particularly described one embodiment of my invention, I do not wish to limit myself to the precise construction and arrangement as herein set forth; but,

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a circuit-changing device, the combination with a capping-plate, of an L-shaped supporting-bar having its short arm secured to the lower side of said capping-plate, the long arm thereof extending perpendicularly downward, an opening through said short arm and said capping-plate, a disk pivoted to rotate longitudinally in said opening, an actuating-handle normally extending upwardly from said disk, a cylindrical button of insulating material normally disposed below said disk and secured thereto, a mounting-block of insulating material extending directly below said button and parallel to and secured to the long arm of said supporting-bar, a straight contact-spring secured to said mounting-block at one end, the other end extending upwardly and disposed at one side of said actuating-button, another contact-spring secured to the opposite side of said mounting-block and extending straight upwardly, the end thereof being inclined outwardly and disposed at the other side of said insulating-button, actuation of said handle causing said button to impinge against and move said straight spring outwardly, to be returned to its normal position by said spring upon release of the handle, an actuation of the handle in the opposite direction causing said button to engage the top of said inclined end of the long spring, to be retained in said position by said inclined end, substantially as described.

2. In a circuit-changing device, the combi-

nation with a capping-plate, of an L-shaped
 supporting-bar having its short arm secured
 to the lower side of said capping-plate, the
 long arm thereof extending perpendicularly
 5 downward, an opening extending through
 said short arm and said capping-plate, a disk
 pivoted to rotate longitudinally in said open-
 ing, an actuating-handle normally extending
 upwardly from said disk, a cylindrical but-
 10 ton of insulating material normally disposed
 below said disk and secured thereto, a mount-
 ing-block of insulating material extending
 directly below said button and parallel to
 and secured to the long arm of said support-
 15 ing-bar, a pair of short, straight contact-
 springs secured at their lower end between
 said mounting-block and said supporting-bar
 and insulated from said bar and from each
 other, a long, straight contact-spring secured
 20 between but insulated from said short springs
 at its lower end, the other end of said long
 spring being normally in contact with the in-
 ner short spring and extending beyond the
 short springs and disposed at one side of said
 25 cylindrical button, another long spring se-
 cured at its lower end at the other side of said
 mounting-block and extending straight up-
 ward, the end thereof being inclined out-
 wardly and normally disposed at the other
 30 side of said cylindrical button, movement of
 the actuating-handle in one direction caus-
 ing the cylindrical button to impinge against
 the long straight spring on the inner side of
 the mounting-block, to be returned by said
 35 spring to its normal position upon release of

the handle, and movement of the handle in
 the opposite direction causing the button to
 engage the top of the inclined end of the
 other long spring to be locked in such posi-
 40 tion, substantially as described.

3. In a circuit-changing device, the combi-
 nation with a capping-plate, 1 of a supporting-
 bar 3, a disk 17, adapted to rotate longitudi-
 nally in an opening passing through said sup-
 45 porting-bar and said capping-plate, an ac-
 tuating-handle extending upwardly from said
 disk, a button 16 of insulating material, se-
 cured to and below said disk, a mounting-
 block of insulating material 12, a straight
 spring 6 disposed through one side of said 50
 mounting-block, the end thereof being dis-
 posed at one side of the button 16, a spring
 9 disposed at the other side of the mounting-
 block and having an inclined end 21 disposed
 55 at the other side of the button 16, actuation
 of the handle in one direction causing the
 button 16 to move spring 6 outwardly and to
 be returned by said spring to its normal po-
 sition upon release of the handle, actuation of
 the handle in the opposite direction causing 60
 the button 16 to engage the top of the inclined
 end 21 to be locked in such a position, sub-
 stantially as described.

In witness whereof I hereunto subscribe my
 name this 5th day of October, A. D. 1901.

WILLIAM MEYER.

Witnesses:

MAX W. ZABEL,
 HARVEY L. HANSON.