C. C. BRADBURY.

PARTY LINE INDICATING KEY.

APPLICATION FILED MAR. 11, 1907.

899,379. Patented Sept. 22, 1908.

2 SHEETS—SHEET 1.

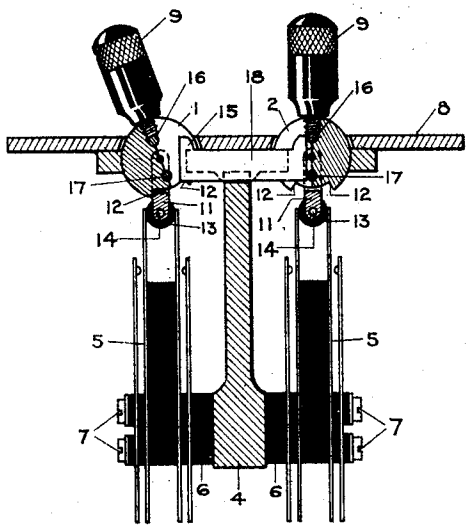


Fig. 1.

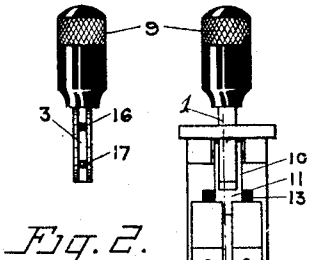


Fig. 2.

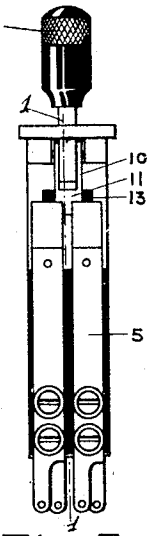


Fig. 3.

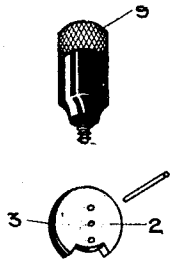
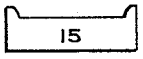
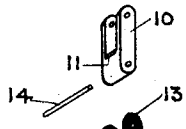


Fig. 4.





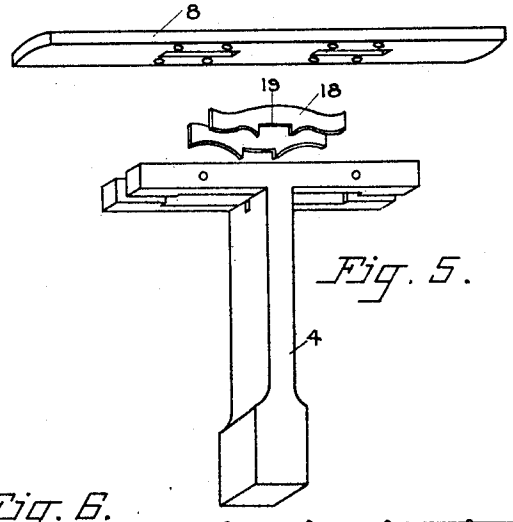
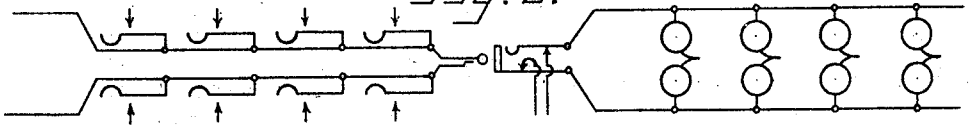


Fig. 5.

Fig. 6.



Witnesses

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2 SHEETS—SHEET 2.

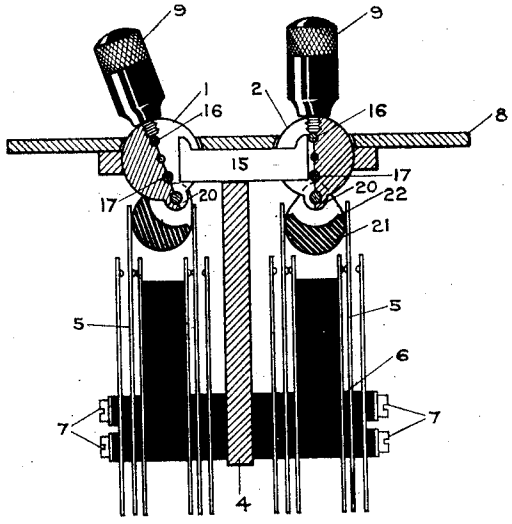

Fig. 7.

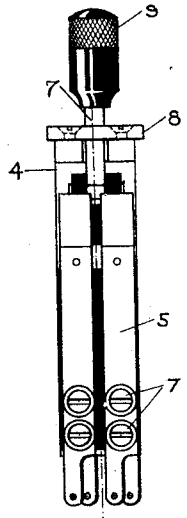

Fig. 8.

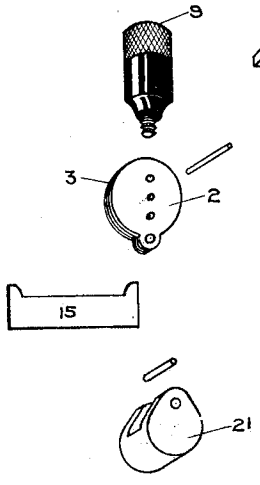

Fig. 9.

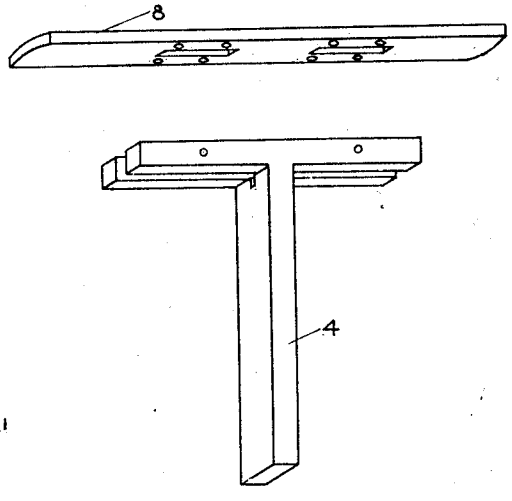

Fig. 10.

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UNITED STATES PATENT OFFICE.

CLIFFORD C. BRADBURY, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PARTY-LINE-INDICATING KEY.

No. 899,379. Specification of Letters Patent. Patented Sept. 22, 1908.

Application filed March 11, 1907. Serial No. 361,815.

To all whom it may concern:

Be it known that I, CLIFFORD C. BRADBURY, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Party-Line-Indicating Keys, of which the following is a specification.

My invention relates to party line telephone ringing keys, and has for its object the provision of a key operating by means of levers, and in which the positions of the levers themselves will indicate to the operator the last key operated. Such a key is called an indicating ringing key, and its particular utility is to indicate to a telephone operator which of a plurality of subscribers on a line has been last called so that if the subscriber does not answer immediately he may be called again without it being necessary for the operator to inquire the number a second time, or to remember which key was last pressed.

A further object of my invention is to construct this key so that it will be impossible to actuate more than one set of springs simultaneously.

A still further object of my invention is to provide a key which shall be simple and inexpensive to manufacture, and which shall be durable and efficient in its practical operation.

My invention is a species of the generic invention disclosed in Patent No. 720,885, only in that it uses the lever itself as the indicating means, the present invention providing means by which a plurality of levers may be arranged to coöperate, and thereby indicate the last of a plurality of subscribers signaled when there are more than two subscribers on the same line. The arrangement of said patent is capable of selectively signaling only two subscribers.

Two specific forms of my invention are shown in the accompanying drawings, in which,

Figure 1 is a section through my key on the line 1—1 of Fig. 3; Fig. 2 is one of the cams of Fig. 1; Fig. 3 is an end elevation of my invention; Fig. 4 is an isometric drawing of the disassembled lever mechanism of Fig. 1; Fig. 5 is an isometric drawing of the frame, friction springs and escutcheon plate; Fig. 6 shows the connection of this key with a telephone system; Fig. 7 is a section on the line 7—7 of Fig. 8 of a different form of my invention; Fig. 8 is an end elevation of this second form; Fig. 9 is an isometric drawing of the disassembled lever mechanism of Fig. 7; and Fig. 10 is an isometric drawing of the frame and escutcheon plate.

Referring to the form of my invention shown in Figs. 1 to 5, the so-called cams 1 and 2, each being circular in form, are provided with a slot 3, such as might be formed with a thin saw, such slot extending from the inner edge of each of these cams half way through. These cams are mounted in the T shaped frame 4, which carries at its lower end a plurality of sets of springs 5, mounted upon insulating blocks 6 and secured to the frame by the screws 7. The escutcheon plate 8, which may be of metal or rubber, is secured to the upper face of the frame for the purpose of presenting a comely external appearance. Each cam is supplied with a lever 9, which is adapted to be tilted by the telephone operator in the act of ringing or calling a desired subscriber. Pivoted to the center of each of the cams 1 and 2 are the straddling members 10, having the cross portions 11 adapted to be engaged by the shoulders 12 when the cams are tilted sufficiently in either direction. A pair of rollers 13 is secured to the lower end of each of the members 10 by means of a pivot 14, these rollers normally standing between the long springs of the groups 5 in such manner that when the lever is thrown to its full tilt in either direction the rollers will engage the long springs which bear upon one side of the rollers, and thereby deflect the springs to control the circuits through the associated contacts. These contact springs have sufficient resilience to return the rollers to their normal position when the pressure is removed from the lever, but owing to the extra space between the shoulders 12, the cam and lever will not be returned to their normal positions, but will stand in a position intermediate of the erect and actuating positions, this intermediate position being known as the indicating position.

In order that the actuation of either lever will restore the first or actuated lever from its indicating position to its erect position a small sliding plate 15 is placed with its ends extending into the slots 3 of each of the cams.

This plate rests upon a shoulder in the key frame and is prevented from tilting by its contact along its upper edge with the escutcheon plate. Each of the cams 1 and 2 is provided with the pins 16 and 17 which extend through the cam and present curved faces to the ends of the plate 15 within the slots, such that when either lever is tilted to its full extent in either direction, one of these pins will engage the plate, and slide it firmly against the pins of the other cam, and thereby restore the other cam to its vertical position. It will be seen by this that when a lever is tilted inwardly or when one lever is tilted towards the other the pin 16 of the tilted lever becomes actuative and engages the end of the plate, while if a lever is outwardly tilted or tilted away from the other the pin 17 of the tilted lever will become actuative to slide the plate.

In order that the cams will not move from the indicating position to the erect or vertical position too readily the thin springs 18 are placed between the horizontal limbs of the frame, and are adapted to press against the sides of each of the cams with a slight pressure. These springs are provided with the notches 19 which register with the top of the vertical portion of the frame for the purpose of holding the springs in place.

Other means may be employed for furnishing the resistance to the movement of the limbs, one example of which is shown in the second modification of my invention. In this modification similar parts to those described in the first modification are indicated by the same characters. The cams of this modification are, however, of slightly different form and carry upon their lower portions the extensions 20, to which are secured the large rubber or insulated spring actuating members 21. The lower part of each of these members is cylindrical in form, while the upper part is extended and slotted so that it will straddle the extension 20 upon the lower part of the cam. This member 21 is provided with the shoulders 22 within the slot, one of these shoulders being adapted to engage the side of the cam when the latter is tilted to the position shown in Fig. 6, which is the indicating position. A further actuation of this lever will press the member 21 against the long spring of the group 5 such as to actuate the contacts in the usual manner. The resilience of this spring will immediately return the lever to the position shown. The long springs on each side of the member 21 are provided with sufficient resilience and normal pressure against the member 21 to offer considerable resistance or friction against its movement about its supporting pivot. In this manner the lever 9 is held with considerable firmness in any position in which it may be placed between the limits of its two indicating positions. The indicating feature of this key is the same as that described in connection with the first modification, the small plate 14 being adapted to be longitudinally moved by the actuation of either lever in either direction to restore the other lever to its erect position.

Heretofore multiple contacts upon ringing keys have been objectionable for the reason that the actuation of more than one key connected two or more of the ringing current sources together through the key contacts. These ringing current sources when thus short circuited would often furnish sufficient current to destroy the protective devices of the circuit and thus cause considerable delay and inconvenience. This short circuiting of sources is, however, impossible with my key, because the plate 15 is made of sufficient length that two of the levers may not be moved to a tilt greater than the indicating position simultaneously. It will be seen that if it is attempted to simultaneously tilt the levers toward one another the pins 16 will engage the plate 15 and stop the movement of the levers before any of the springs become actuative. If the levers are tilted away from one another the pins 17 will engage the plate, and if the levers are tilted in the same direction the pin 17 of one cam and the pin 16 of the other will engage the plate.

The keys may, of course, as is well known in the art, be supplied with series contacts upon one side, and multiple contacts upon the other side, or may be supplied with any other combination of contacts desired for the particular circuit with which the keys are to be used.

My invention is illustrated and described with respect to two specific modifications, to which, however, I do not wish to be unduly limited, it being quite possible to construct other modifications without in any way departing from the spirit or scope of my invention.

What I claim is:

1. In a self-indicating operator's key, a plurality of levers, switch springs actuated by the tilting of said levers, and means for causing the levers themselves to indicate the last set of switch springs actuated and released, substantially as described.

2. In a self-indicating operator's key, a plurality of coöperating levers, sets of switch springs individually actuated by the individual operation of said levers, and means for causing the lever last operated to itself indicate the last set of springs actuated and released, substantially as described.

3. In a self-indicating operator's key, the combination with a plurality of levers, switch springs actuated by the operation of said levers, said levers having a normal position, an actuating position and an intermediate indicating position, and means for restoring one of the levers from its indicating position to

its normal position when another lever is tilted to its actuating position, substantially as described.

4. In a self-indicating operator's key, a plurality of levers, switch springs actuated by the tilting of such levers, means for indicating by the lever itself the last set of switch springs actuated and released, and means for removing such indication when another set of springs is actuated, substantially as described.

5. In a key, the combination with a support, of a pair of levers mounted in the support and having normal, indicating and actuating positions, switch contacts controlled by the levers, and means to return one lever to its normal position when the other is moved to its actuating position, substantially as described.

6. In an operator's ringing key, the combination with a plurality of levers, each adapted to be tilted in two directions, two sets of switch springs for each lever, one set being adapted to be actuated when its lever is tilted in one direction, and another set being adapted to be actuated when the same lever is tilted in the other direction, each lever having a vertical position, two indicating positions and two actuating positions, means for automatically returning to its indicating position the lever last pressed to its actuating position, and means to return said lever to its normal position when another lever is pressed to its actuating position, substantially as described.

7. In an operator's indicating key, a pivoted lever having a normal, an indicating and an actuating position, switch springs for the key adapted to be actuated when the lever is moved to its actuating position, a second lever associated therewith, and means to restore the first lever to its normal position when the second lever is moved to its actuated position, substantially as described.

8. In an operator's ringing key, the combination with a plurality of pivoted levers, each lever having a vertical position, a partially tilted or indicating position and a completely tilted or actuating position, means to restore either lever from its indicating position to its vertical position when another lever is thrown to its actuating position, and means to prevent the levers from too readily moving from the normal to the indicating position, substantially as described.

9. In an operator's ringing key, the combination with a plurality of pivoted levers, each having a vertical position, a partially tilted or indicating position, and a further tilted or actuating position, an abutment above and below the pivot of each lever, a movable member extending between the levers and adapted to be pressed against the upper or lower abutment of either lever to move the lever to its vertical position, such member being moved by the actuation of either lever to restore the other lever, substantially as described.

10. In an operator's ringing key, the combination with a plurality of levers, switch springs disposed upon each side of said levers, a set of said springs being individually actuated by the deflection of each lever in each direction, each lever having five positions, a normal position, and an indicating and an actuating position on each side of the normal position, and means for restoring a lever from either of its indicating positions to its normal position by the movement of another lever to either of its actuating positions, substantially as described.

11. In an operator's ringing key, the combination with a plurality of levers, said levers having normal, indicating and operative positions, switch springs controlled by the actuation of said levers, and means operative when one of said levers is moved to its actuated position for preventing the movement of another of said levers, substantially as described.

12. In an operator's ringing key, the combination of a support, pivoted cams mounted in the support, contact springs, means for actuating said springs, said means permitting the movement of the cams to an indicating position without actuating the springs, and means to restore one cam to a vertical position when another is moved to its actuating position, substantially as described.

13. In a key, the combination with a support, of cams mounted in the support, a plate mounted in the support and extending into slots in the cams, said plate being moved by the movement of either of the cams to move the other cam, substantially as described.

14. In an indicating key, a plurality of switches and a plurality of switch actuating levers adapted to indicate by their positions the last switch actuated and released, substantially as described.

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

CLIFFORD C. BRADBURY.

Witnesses:
EDITH F. GRIER,
MARJORIE E. GRIER.