A. KLAY.

RINGING AND LISTENING KEY.

APPLICATION FILED JUNE 23, 1915.

1,333,117. Patented Mar. 9, 1920.

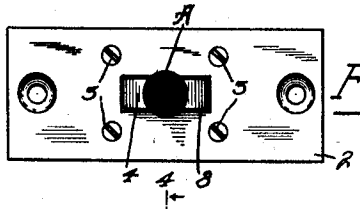


Fig. 3.

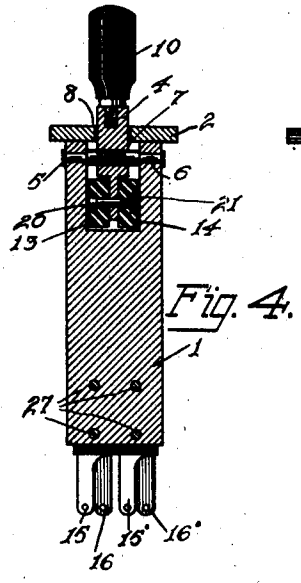


Fig. 4.

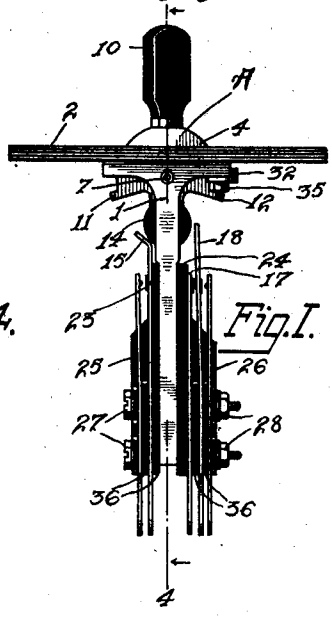


Fig. 1.

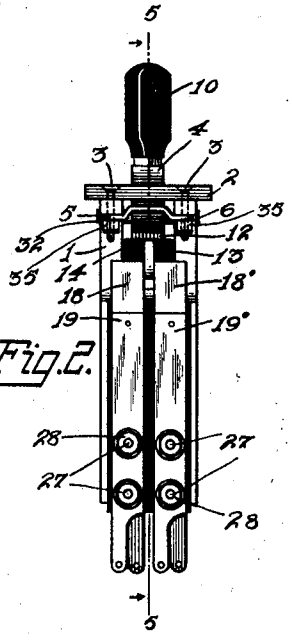


Fig. 2.

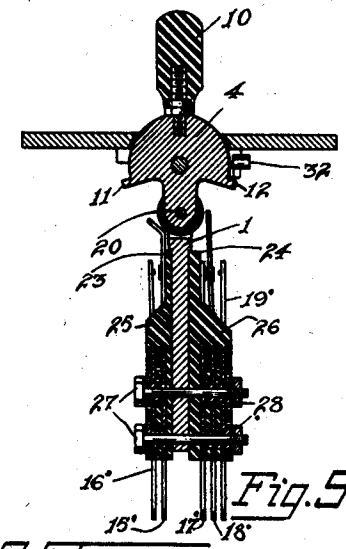


Fig. 5.

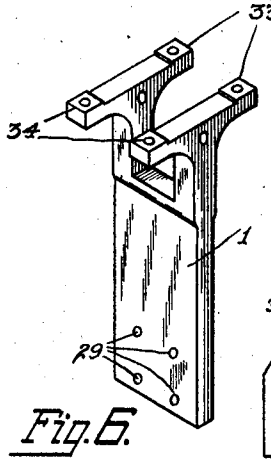


Fig. 6.

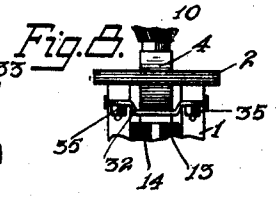


Fig. 8.

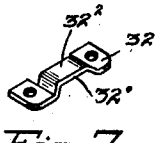


Fig. 7.



Fig. 9.

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UNITED STATES PATENT OFFICE.

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RINGING AND LISTENING KEY.

1,333,117. Specification of Letters Patent. Patented Mar. 9, 1920.

Application filed June 23, 1915. Serial No. 35,770.

To all whom it may concern:

Be it known that I, ALBERT KLAY, 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 Ringing and Listening Keys, of which the following is a specification.

My invention relates to an operator's key or switch for use particularly in telephone switchboards and has for its object the provision of an improved key or switch of the kind described. The keys now in general use in connection with telephone apparatus are either of the double throw type or of the single throw type, that is they are arranged to be operated in two directions or in one direction only according to the functions which they have to perform, they may be further divided into the self restoring and self-locking type according to whether they automatically return to normal from an intermediate off-normal position or whether they lock in an operated position. To accomplish the above operations keys are generally provided with differently formed actuating or cam members, the cams being so constructed as to permit the key to be operated in two directions or in one direction only, and to lock in an operated position or to automatically restore to normal. Keys of the above type are objectionable for the reason that it is necessary to provide many differently constructed keys and also for the reason that it is necessary to change the entire key if it is desired to change the functions of keys already in operation. To overcome this objection, I provide a standard cam for all different functioned keys but in addition I provide an adjustable stop member so that the key may be instantly changed to perform any desired function.

Another feature of my invention is the provision of an alinement strip which is inserted between the two sets of springs to keep them in vertical alinement.

It is a further object of my invention to produce an improved device of the class described which will embody desirable features and advantages all in a simple, efficient and economical manner; and to this object and such other objects as already pointed out and as may appear, my invention consists in the novel details of construction, parts and combinations of parts hereinafter described and particularly pointed out in the appended claims, reference being had to the accompanying drawing in which like parts in the different figures bear the same reference numerals, and in which:

Figure 1 is a side view in elevation of the preferred form of my invention;

Fig. 2 is a right end view of Fig. 1;

Fig. 3 is a plan view of Fig. 1;

Fig. 4 is a sectional view along the line 4—4 of Fig. 1;

Fig. 5 is a sectional view along the line 5—5 of Fig. 2;

Fig. 6 is a perspective view of the frame upon which the several key parts are mounted; and

Fig. 7 is a perspective view of the adjustable stop;

Fig. 8 shows the stop mounted in a position to lock the key against movement in one direction;

Fig. 9 shows one of the insulating strips used to separate the springs.

Referring now more in detail to my invention as illustrated, the preferred form of my key comprises a T-shaped frame 1, which is suitably fastened to the escutcheon plate 2 by means of the screws 3. An actuating member A, for actuating the various contact springs, comprises a pivoted body or cam 4 pivotally supported in the frame 1 at the points 5 and 6 by the pivot pin 7. The body 4 is semi-circularly shaped and extends through an opening 8 in the escutcheon 2. A lever or handle 10 of suitable insulating material is provided with a stud which has screw-threaded engagement with the upper portion of the cam 4. I also provide stops 11, 12 which are integral with the cam 4, the said stops 11 and 12 engaging the adjustable stop 32 or the escutcheon plate, depending upon the position that the key is to be moved to. The operation of the cam 4 in conjunction with the adjustable stops, will be hereinafter more fully described.

Mounted upon the lower end of the cam 4 are the rollers 13 and 14, of suitable insulating material, rotatably secured thereto and positioned between the free ends of the pairs of springs 15, 15^1, and 18, 18^1. The rollers 13 and 14 as before mentioned, are rotatably mounted upon the shaft 20, and

are held in position upon the shaft by a nut 21 which has screw-threaded engagement with the shaft 20.

For the purpose of illustrating my invention, I show four sets of springs secured to the mounting frame 1. I also provide a pair of spacing strips 23 and 24 which form the insulation means between the springs 15, 15^1 and 17, 17^1, and the frame 1. Formed integrally with the strips 23 and 24 and at right angles thereto, are the alinement spacing strips 25 and 26. The said alinement strip 25 separates the two sets of springs 15, 16 and 15^1, 16^1, and the alinement strip 26 separates the two sets of springs 17, 18, 19 and 17^1, 18^1, 19^1. The springs 15 and 16, etc., and 17, 18, 19, etc., are securely mounted on the frame 1 by means of suitable insulated screws 27, the screws passing through suitable openings 29 in the frame 1 and nuts 28 having screw-threaded engagement with the screws 27 thus securely holding the spring sets in place upon the frame 1. The alinement strips 25 and 26 are inserted between the two sets 15, 16 and 15^1, 16^1 and 17, 18, 19 and 17^1, 18^1 and 19^1 for keeping them in vertical alinement, and to prevent them from touching each other or becoming short circuited due to the slight shifting which might occur.

I provide an adjustable stop 32, channel shaped and mounted upon the arms 33 or 34 of the T-shaped frame 1, in either of two positions as illustrated in Figs. 2 and 8, depending upon the operation of the key that is desired. The stop 32 is held securely in place upon the arms 33 and 34 by means of the screws 3 and nuts 35, the said nuts having screw-threaded engagement with the screws 3, the said screws also holding the frame 1 to the escutcheon plate 2. With the stop in the position as shown in Fig. 2, should the lever 10 be moved to the left, the movement of the cam and lever would be limited by the stop 12 of the cam 4 engaging the surface 32^1 of the stop 32. The rollers 13 and 14 engage the springs 18, 18^1 causing the said springs to be moved so as to disengage the contacts 17 and 17^1 and engage the contacts 19, 19^1 and when thus actuated the key is self-restoring, and when the pressure upon the lever 10 is released, it is restored to normal by the moved springs 18, 18^1. Now if the key is to be arranged so that cam can be actuated in one direction, the stop 32 is placed in the position shown in Fig. 8, so that the stop 12 of the cam 4 will engage the surface 32^2 of the stop 32, thus preventing actuation of the key in one direction. If no stop is provided to limit the movement of the key to the right, an actuation of the said lever will cause the rollers 13 and 14 to engage the angular surface of the springs 15, 15^1 flexing them and retaining them in an alternate position causing the said springs 15 and 15^1 to engage the contact springs 16, 16^1 and when thus actuated the key is in an indicating position and can only be returned to normal by operating the lever in the opposite direction.

In Fig. 9 I have shown one of the insulating strips that holds the contact springs separated. I preferably slope the upper surface 35^1 of the strip 36 so that any small particle that might accidentally fall between the springs and tend to short circuit them, will readily slide out and be conveyed away from contact with the springs. I have found this a very desirable feature in the commercial operation of keys. The separating strips 25 and 26 are beveled off in the same manner. Should it at any time be found necessary to change the function of the key it is only necessary to remove the cam stop or to reverse its position depending upon the function of the key that is desired.

From the foregoing, it is seen that I provide a key that may be readily changed from a one-way key to a two-way key or vice versa, and which may be changed from a self-restoring to a self-locking or indicating key or vice versa, depending upon the desired operation of the key, thus doing away with the necessity of changing keys when ever it is found desirable to change the switchboard circuits.

While I have described my invention embodying one form, I do not wish to be limited to the same as my invention may be adapted to other forms of keys as illustrated and many changes and modifications can be made without departing from the invention, therefore I aim to cover all such modifications as come within the spirit and scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by United States Letters Patent, is—

1. An operator's key including a mounting plate, an escutcheon plate to which said mounting plate is secured, vertically disposed sets of contact springs secured to opposite sides of said mounting plate, a rocking cam pivotally secured to said mounting plate for actuating said contact springs, said cam having a normal and operated and intermediate off-normal positions, integrally-formed ears for said cam adapted to engage said escutcheon plate to limit the operation of said cam, and a U-shaped member adapted to be secured to said mounting plate in such a manner as to prevent the said cam from being moved from its normal to one of its intermediate or operated off-normal positions, said U-shaped member also being adapted to be secured to said mounting member in a different manner to prevent said cam from being moved past one of its inter-

mediate off-normal positions to one of its operated off-normal positions.

2. An operator's key including an escutcheon plate, a vertically disposed mounting plate secured at right angles to said escutcheon, sets of contact springs secured to opposite sides of said mounting plate, a cam member pivotally secured to said mounting plate for actuating said contact springs, said cam member being provided with integrally formed ears for limiting the operation thereof, and an auxillary device adapted to be secured to said mounting plate in the path of movement of one of said ears for further limiting the operation of said cam or for completely preventing the operation of said cam in said direction, depending upon the manner in which said device is attached.

3. An operator's key including a T-shaped mounting plate provided with a bifurcated end portion, an escutcheon plate to which said mounting plate is secured, a plurality of sets of vertically disposed switch contact springs mounted upon opposite sides of said mounting plate, a cam member for operating said springs and adapted to be moved in either of two directions and to remain in an operated position after a set of springs has been operated, and a metal strip adapted to be attached to said mounting plate in the path of movement of said cam to prevent the cam from being moved from its normal position in one direction, or to prevent movement of said cam in said direction past its intermediate off-normal position to its operated position.

4. In an operator's key, the combination with a mounting plate attached to an escutcheon plate of a cam member pivotally secured to said mounting plate and having a portion thereof extending through and above the said escutcheon plate, sets of contact springs secured to said mounting plate and operable by said cam member, a pair of lugs or ears upon said cam member beneath said escutcheon plate, the operation of said cam being limited by the engagement of said lugs or ears with the said escutcheon plate, and a member for attachment to said mounting plate in the path of movement of one of said lugs to prevent the cam member from being moved from its normal position, said plate also being adapted to be attached to said mounting plate in the path of movement of said lug to prevent the movement of said cam past an intermediate off-normal position to the position where the lug engages the escutcheon plate.

5. A device of the character described including a plurality of parallel sets of contact springs, strips of insulating material between the contact springs of the different sets and between the different sets of contact springs, said strips of insulating material having a beveled portion to conduct any foreign matter away from between said springs.

6. A device of the character described comprising a mounting member, a plurality of related contact springs secured to said member, strips of insulating material between said springs to insulate one from the other, said strips of insulating material each having an oblique surface to discharge any article of foreign material that may accidentally fall between said springs.

7. A device including a mounting member, a plurality of sets of parallel vertically mounted contact springs secured to said member, a strip of insulating material vertically mounted between adjacent sets of said contact springs, each of said strips of insulating material having a sloping edge extending away from said mounting member to prevent foreign material from becoming lodged between said sets of contact springs.

8. A device including a plurality of sets of contact springs, strips of insulating material between the said sets of springs, said strips of insulating material having oblique surfaces to discharge any foreign matter that may fall between the said sets of springs.

9. A device of the character described including a mounting member, a set of contact springs secured to said mounting member, strips of insulating material mounted between the different springs of the set, said strips of insulating material being provided with sloping edges to prevent foreign material from becoming lodged between said springs.

10. A device of the character described including a mounting plate, two sets of contact springs secured to said plate, strips of insulating material between the contact springs of the different sets and between the different sets of contact springs, said strips of insulating material having beveled edges to conduct any foreign matter away from between the springs of the sets of springs and between the two sets of springs.

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

ALBERT KLAY.

Witnesses:
GEO. A. YANOCHOWSKI,
B. O'BRIEN.