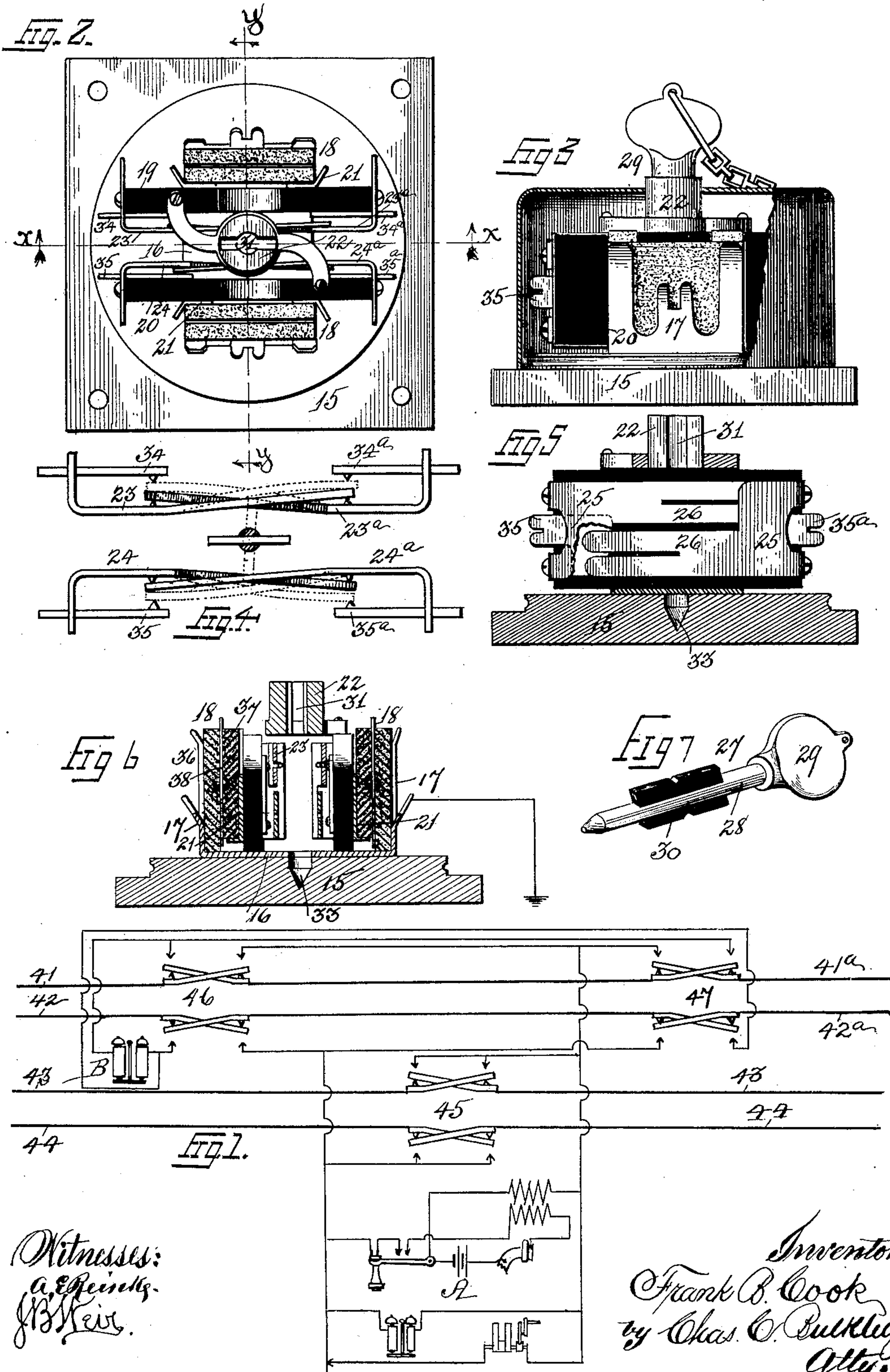


(No Model.)

F. B. COOK.  
SWITCH FOR TELEPHONE CIRCUITS.

No. 596,852.

Patented Jan. 4, 1898.





# UNITED STATES PATENT OFFICE.

FRANK B. COOK, OF CHICAGO, ILLINOIS.

## SWITCH FOR TELEPHONE-CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 596,852, dated January 4, 1898.

Original application filed March 25, 1895, Serial No. 543,070. Divided and this application filed December 1, 1896. Renewed October 25, 1897. Serial No. 656,362. (No model.)

### *To all whom it may concern:*

Be it known that I, FRANK B. COOK, 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 Improved Switch for Telephone-Circuits, of which the following is a specification.

This application is a division of Serial No. 543,070, filed March 25, 1895.

My invention relates more particularly to the form, construction, and arrangement of an electric-circuit switch more especially adapted for use in connection with toll-line telephone-circuits.

The object of my invention resides in the provision of means whereby a telephone equipment may be at will connected with or disconnected from any one of a number of telephone-circuits passing through or terminating in the said switches or cut-outs, the character of the apparatus being such as to render it applicable to circuits of the several different kinds encountered in telephone work, said apparatus being adapted for series or bridging grounded or metallic circuit systems.

In what are known as "toll-line" systems, employed to connect a number of telephone stations and exchanges together, it often becomes necessary to cut in or out of the circuit the telephone equipment. This result in practice has heretofore been accomplished by means of spring-jacks and plugs. I provide a single self-contained piece of apparatus capable of performing this result and also capable of effecting the very many combinations which must be accomplished with apparatus of this character. This apparatus is designed to do away with the use of the flexible conducting-cords attached to the plugs, which cords are often broken or short-circuited and which are not capable of as positive action and ready manipulation.

Reference may now be had to the accompanying drawings, in which—

Figure 1 is a diagram of circuit arrangement to illustrate some of the various combinations which may be effected with my switch. Fig. 2 is a plan view of the switch, the cover being removed. Fig. 3 is a side

view of the same, a portion of the cover being broken away. Fig. 4 is a detail view of the spring-contact switch. Fig. 5 is a cross-section on the line *x x* of Fig. 2. Fig. 6 is a sectional view on the line *y y* of Fig. 2. Fig. 7 is a perspective view of the key.

This cut-out switch, adapted to be operated by keys, which will be described, consists of a suitable base 15, upon which the parts of the device are mounted. Secured to the base 15 is a conducting-plate 16, having up-turned ends 17, which constitute holders or supporters for the open-space cut-outs or lightning-arresters to be described and which are designated as 18. Secured to the base 15 and mounted upon the conducting-plate 16 are the two insulating-blocks 19 and 20, to which blocks, respectively, the two sets of contact line-springs and contact-points are secured. Also secured to the insulating-blocks 19 and 20 are the conducting-plates 21, which also serve as holders for the open-space cut-outs or lightning-arresters. Secured to and mounted upon the upper edges of the insulating-blocks 19 and 20 is the key-holder 22. The contact line springs or strips, which I will now describe, are so constructed and disposed as normally to preserve the continuity of a given circuit in which they are connected. These contact line-springs (shown more fully in Figs. 4 and 5) are designated 23 and 23" and 24 and 24", it being understood that a switch for complete metallic circuits is now being described.

The contact line-springs consist of body portions 25 and extended strips 26, cut out to form this construction, and the line-springs of each pair are disposed, the one overlapping the other, to provide double contacts between said contact-springs and insure a more perfect electrical contact and also to preserve the circuit normally continuous. The key 27, which is shown in Fig. 7, consists of a stem 28, a head 29, and a web 30; of insulating material, projected from the stem 28. This key 27 is adapted for insertion between the two sets of contact-springs through the key-way 21 of the holder 22, the end of the stem 28 of the key engaging a recess 33 in the base 15. Upon turning the key the web 30 there-



of engages the contact-springs 23 23<sup>a</sup> and 24 24<sup>a</sup>, forcing them laterally from the position shown by the full lines in Fig. 4 into the position shown by the dotted lines in that figure, by this means breaking the connection between the pairs of springs and establishing connection of each individual spring 23, 23<sup>a</sup>, 24, and 24<sup>a</sup>, respectively, with the contact-points 34, 34<sup>a</sup>, 35, and 35<sup>a</sup>. The cut-outs or lightning-arresters 18 consist of carbon plates 36 and 37, separated, as is usually the case in this class of cut-outs, by a thin sheet of mica 38.

It will be observed more particularly by reference to Fig. 6 that the two lightning-arresters 18, arranged on either side of a set of contact-springs, are electrically connected together and held in position by the conducting-plate 16, which conducting-plate is connected to earth. It is evident that the conducting-plates and holders 21 may be connected with the line-springs, thus forming a branch from the line, or they may be connected with the contact-points, thus forming a branch from a line only when the line-springs are brought against the contact-points by the key.

By reference to Fig. 1 some of the many combinations which may be effected with this apparatus are illustrated. Two metallic circuits are shown, consisting of the leads 41 41<sup>a</sup>, 42 42<sup>a</sup>, and 43 44. One of the switches, designated as 45, included in the circuit 43 and 44, is adapted to bridge onto this circuit the telephone equipment designated generally at A. Included in the circuit 41 and 41<sup>a</sup> and 42 and 42<sup>a</sup> are two switches, designated, respectively, as 46 and 47. When the key is in circuit and turned in the switch 46, this circuit, which is normally preserved continuous, is broken, the telephone equipment A is connected with the leads 41 and 42, and a signal device B is connected with the leads 41<sup>a</sup> and 42<sup>a</sup> at the same time. When the key is inserted and turned in the switch 47, the conditions are simply reversed, the telephone equipment A being connected with the leads 41<sup>a</sup> and 42<sup>a</sup> and the signal device B connected with the leads 41 and 42. It is obvious, of course, that many other combinations of like character may be effected.

Throughout the foregoing specification I have described this switch in connection with telephone-circuits; but I do not wish to be understood as limiting its use entirely to such circuits.

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

1. In an electric switch a pair of crossed springs adapted for contacting at two points on the opposite sides of each and means for operating the springs whereby to establish or disestablish the aforesaid contacts.

2. In an electric switch, four independent contact-springs and four separate contact-plates therefor mounted and disposed one con-

tact-plate in proximity to each contact-spring, the springs in pairs with two contacts on the opposite sides of each spring normally established between each individual pair and means comprising a key, whereby, with the same movement, to break all the normal contacts and make a new contact between each independent contact-spring and its separate contact-plate.

3. A telephone-circuit switch, consisting of a suitable base and pairs of line-springs mounted upon said base, each line-spring of each pair being normally in contact with the other line-spring of that pair at two points on the opposite sides of each, a key-holder providing a keyway located in proximity to the pairs of line-springs and a key adapted for insertion in the keyway of the key-holder and when turned adapted to break the contact between the pairs of line-springs together with contacts also mounted on said base with which each individual line-spring is brought in contact when the key is turned.

4. An electric-circuit switch, consisting of pairs of overlapping and diagonally-crossed line-springs normally preserving the continuity of the circuit, a key-holder forming a keyway located in proximity to the pairs of line-springs, a contact-point located in proximity to each one of the line-springs and a key adapted to break the contact between the pairs of line-springs and connect each line-spring with its respective contact-point.

5. A telephone-circuit switch, consisting of pairs of overlapping line-springs, the line-springs of each pair bearing upon each other at two different points on the opposite sides of each to form double contacts and normally preserve the continuity of the circuit, and a key adapted to break the contacts between the pairs of line-springs and establish another contact with each individual line-spring.

6. A combined telephone-switch and lightning-arrester, consisting of pairs of line-springs mounted on a suitable base, each line-spring normally preserving the continuity of the circuit, a lightning arrester or arresters disposed on each side of the line-springs, and a conducting-plate and holder also mounted on the base which serves to electrically connect the lightning-arresters together and hold the same in position, together with means for operating the line-springs.

7. A telephone-circuit switch, consisting of a suitable base, insulating-blocks mounted upon said base, a pair of crossed springs normally contacting at two points on the opposite sides of each secured to each of the insulating-blocks and adapted to normally preserve the continuity of the circuit, and contact-points secured to the said blocks with which the line-springs are each adapted to be connected by means of a key inserted and turned between the pairs of line-springs.

8. An electric switch comprising the insulating-blocks 19 and 20 mounted upon a suitable base and two contact-springs consisting



of the body portion 25 and extended strips 26  
mounted upon each of the insulated blocks in  
such a manner that a portion of the extended  
strip of one spring overlaps the body portion  
5 of the other spring upon the opposite side to  
provide for a normal contact between the  
springs and a key which with one and the  
same movement breaks the normal contacts

and simultaneously establishes new contacts  
with any or all of the aforesaid springs. 10

In testimony whereof I affix my signature  
in presence of two witnesses.

FRANK B. COOK.

Witnesses:

CHAS. C. BULKLEY,  
L. M. BULKLEY.