

No. 750,845.

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J. S. GOLDBERG.
SWITCHING APPARATUS.
APPLICATION FILED NOV. 26, 1902.

NO MODEL.

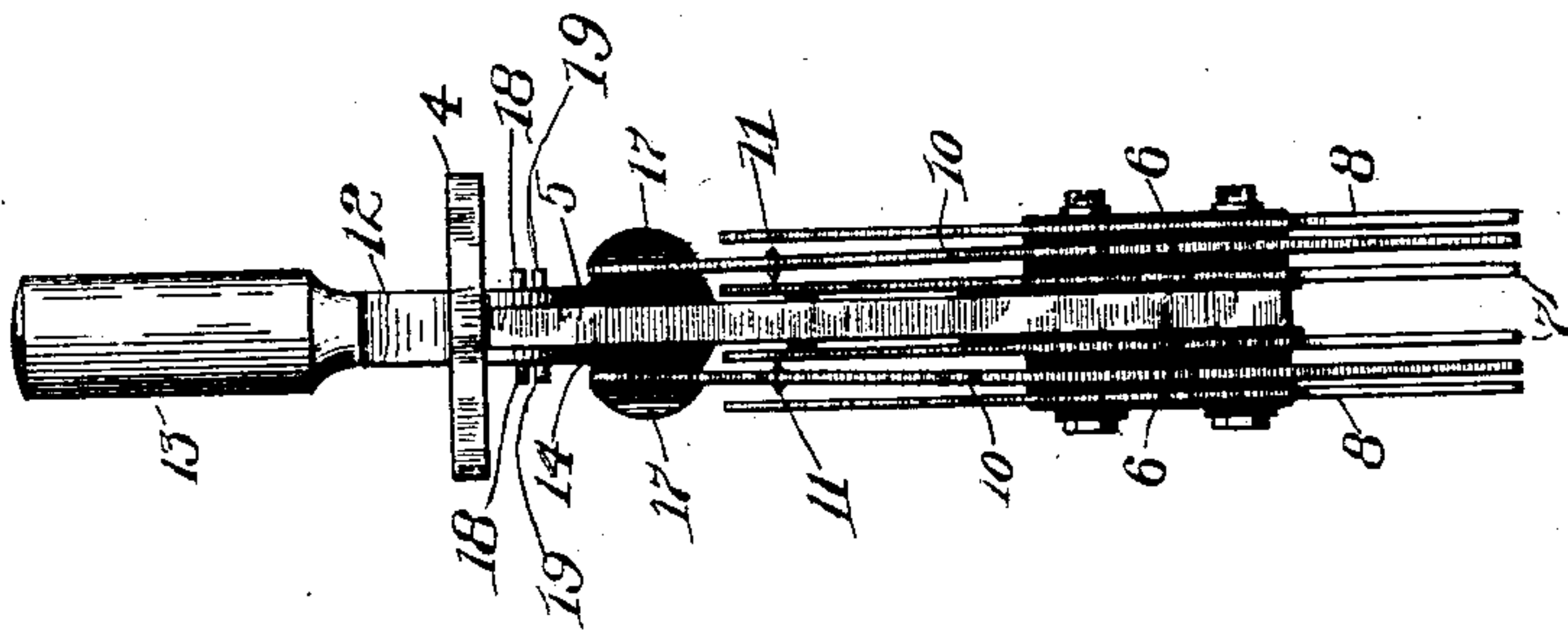


Fig. 2.

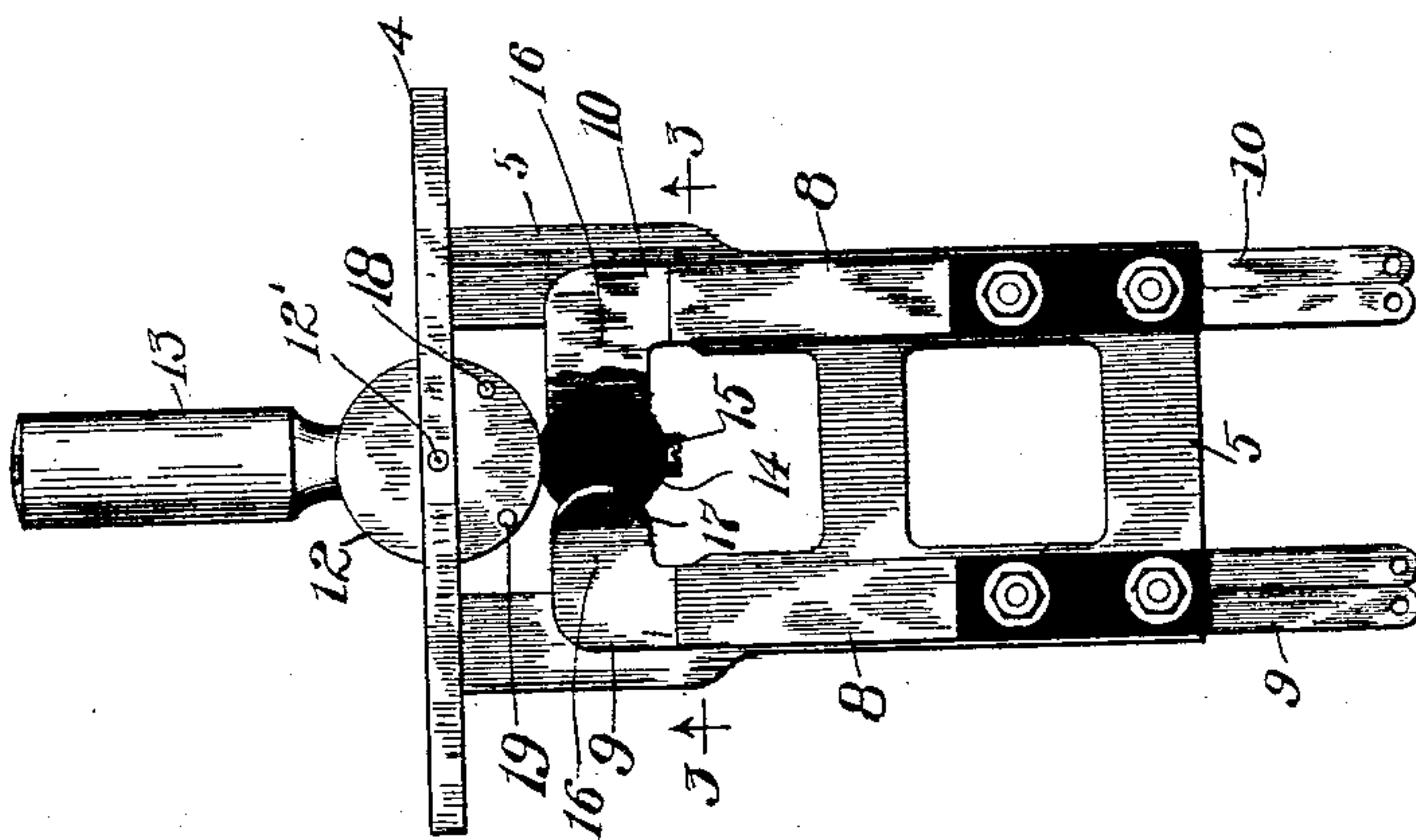


Fig. 1.

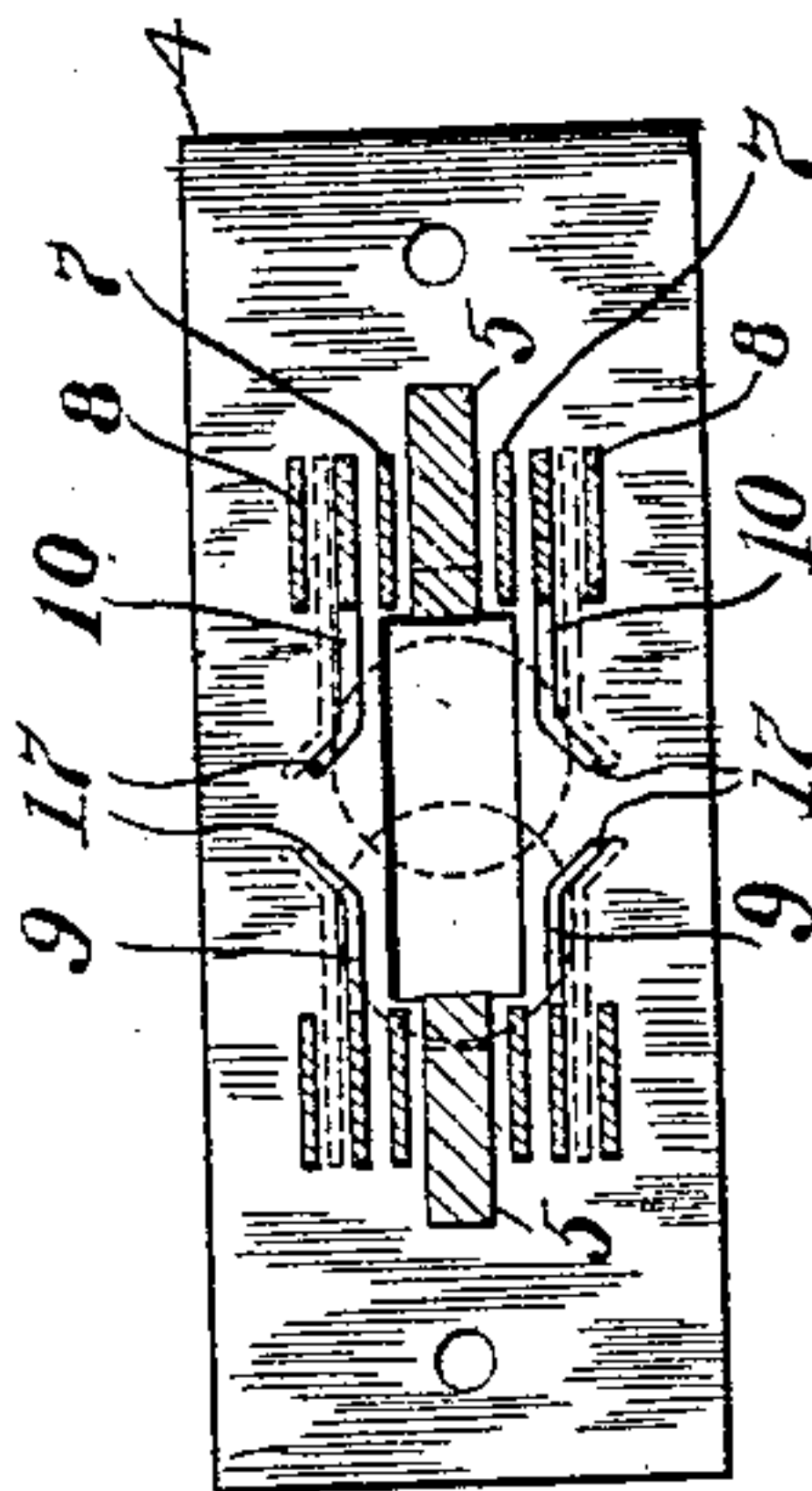


Fig. 3.

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SWITCHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 750,845, dated February 2, 1904.

Application filed November 26, 1902. Serial No. 132,848. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. GOLDBERG, 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 Switching 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 electrical switching apparatus used in the operation of telephone-exchange systems and commonly known as a "ringing and listening key."

In modern switchboard-exchange systems it is customary to employ as a part of each cord-circuit a so-called "ringing and listening key." All of the keys which are used by any one operator are commonly mounted upon the shelf of her switchboard.

It is one of the objects of my invention to provide an efficient and reliable ringing and listening key which shall occupy a comparatively small amount of space on the switchboard-shelf.

As is well understood by those skilled in the art, it is desirable that the ringing and listening key maintain its ringing position only while the manipulating-lever is controlled by the hand of the operator. It is desirable, on the other hand, that the key assume and retain its listening position after being suitably manipulated by the operator and that the key be restored from the listening position by a positive actuation by the operator. In manipulating such keys to restore them from the listening to the normal position it is customary for the operator merely to strike the operating-lever a light blow, whereby the resilience of the springs actuated by the lever serves to throw the spring back into its normal position. It has been one of the objectionable features of ringing-keys as heretofore constructed that when the operating-lever has been thrown back into its normal position by the listening-spring mechanism the lever has been thrown into its reverse or ringing position, thereby instantaneously opening

the talking-circuit and producing a disagreeable click in the telephone-receiver. It is one of the principal objects of my invention to provide a ringing and listening key which shall not be subject to this improper actuation of the generator contact-springs. A preferred method of accomplishing this object is to make the contact-springs actuated by the lever mechanism when in the listening position of lighter material or material having less resilience than the corresponding generator contact-springs.

I will more fully explain my invention by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved ringing and listening key. Fig. 2 is an end elevation of the same, and Fig. 3 is a sectional view taken on line 3 3 of Fig. 1.

Like characters of reference are applied to similar parts in all the figures.

In accordance with my invention I provide a capping-plate 4, to which is attached the perpendicularly-depending supporting-frame 5, which may be of light construction, as shown. On this depending frame 5 are mounted the contact-springs suitably insulated from the frame and each other by the insulating-strips 6 6. These contact-springs may include on either side a pair of short inner springs 7 7 and a pair of short outer springs 8 8. On the listening side of the key are provided a pair of long contact-springs 9 9 and on the ringing or generator side the long contact-springs 10 10. These springs, it will be seen, are adapted to be deflected from their normal position in contact with the inner springs 7 7 to an alternate position in contact with the outer contact-springs 8 8. As most clearly illustrated in Fig. 3, it will be seen that the long contact-springs 9 9 are of lighter-weight metal than the long contact-springs 10 10 on the ringing side of the key. These long contact-springs are desirably provided with contact-points 11 11, adapted to make electrical connections between the long and the short springs. In a suitable slot in the capping-plate of the key is provided a disk 12, pivoted at 12' and form-

ing a part of a lever which includes the manipulating-handle 13 and the ball of insulating material 14, which is carried on the screw 15. The manipulation of the handle 13 to one side
5 or the other causes a corresponding movement of the ball 14 either to the right or the left.

As best illustrated in Fig. 1, the long contact-springs are desirably provided with inwardly-extending projections 16, whose end
10 portions 17 are desirably turned outward, as shown. These inwardly-extending projections, with their upturned ends, partially surround the ball 14, and it will be seen that a manipulation of the handle 13 will cause a
15 movement of the ball, forcing it between a pair of the long contact-springs, thus wedging them apart and causing a break in the electrical connection with the inner contact-springs 7 7 and a connection to be made with the outer
20 contact-springs 8 8. By suitably actuating the lever the ball 14 may be moved to either side, the two alternate positions of the ball being indicated in dotted lines in Fig. 3, where the corresponding alternate positions of the
25 long contact-springs are also indicated in dotted lines. Stop-pins 18 and 19 are inserted in the disk 12, thus serving to limit the motion of the lever on account of the striking of these pins against the lower side of the capping-
30 plate 4. It will be seen that the pin 18 is placed so as to allow a smaller movement of the lever than that permitted by the pin 19. The movement of the lever permitted by the position of the stop-pin 19 is sufficient to cause
35 the ball 14 to be forced between the inwardly-extending projections on the pair of long contact-springs 9 9, which, it will be remembered, are connected with the operator's listening telephone set. As the ball is forced between
40 the outturned end portions of these projections the contact-springs first experience a slight twisting strain. The springs as whole are then wedged apart, and the ball assumes a position between the substantially parallel
45 inner sides of the contact-springs. The resilience of the springs causes them to regain their normal position, thus causing an inward pressure on two diametrically opposite sides of the ball 14. These opposed pressures on
50 opposite sides of the ball do not tend to force the same out of the position between the contact-springs, but serve merely to retain the ball and its associated lever in its abnormal or listening position. It is therefore necessary
55 in order to restore the key to its normal condition that the handle 13 be forced toward the left by a light pressure thereon. The pin 18 is so located as to limit the movement of the lever to such an extent that the ball cannot be engaged by the parallel parts of the
60 projections on the springs 10 10. The ball comes into contact only with the outwardly-turned end portions of these springs. Therefore upon a release of the manipulating-handle
65 the resiliency of the springs causes them to

return to their normal position with a corresponding return movement of the ball 14 and its associated lever. It is customary for an operator in restoring the manipulating-lever to
70 its normal position after its having been retained by the pressure of the springs in the listening position to strike the handle a light blow. The ball 14 on returning to its normal central position receives an impetus from
75 the pressure of the outturned end portions of the springs 9 9. This force throws the ball over into its reverse position in contact with the generator contact-springs. When the listening-springs 9 9 have the same or greater
80 resilience than that of the generator-springs 10, the ball is very frequently thrown against these latter springs with such force as to wedge them apart, thereby momentarily changing the electrical connections of the generator-springs. In order to overcome this defect,
85 I have found it desirable to make the contact-springs 9 of material of less stiffness or material thinner than that of which the springs 10 are made. For this reason the force with which the resilience of the springs 9 throws
90 the ball 14 against the springs 10 is not sufficient to actuate them to any appreciable or undesirable extent. Furthermore, the inwardly-extending projections on the ends of the contact-springs 10 10 provide a means
95 whereby the pressure of the ball first effects a twisting movement of the spring and later the movement of the contact-spring as a whole. The mere twisting of the springs does not effect the electrical connections of
100 the contacts 11 11, but does serve to check and stop the movement of the ball 14, whereafter it returns to its normal position.

While I have shown an embodiment of my invention in which the pairs of contact-springs
105 are made of the same material, such as spring-brass of different degrees of thickness, it will be apparent to those skilled in the art that the pairs of springs may be made of different kinds or qualities of material, thereby securing
110 the same beneficial results.

It will be apparent to those skilled in the art that many other changes or modifications might profitably be employed without departing from the spirit of my invention, and I do
115 not, therefore, wish to limit myself to the precise disclosure herein set forth; but,

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

1. In a switching device, the combination
120 with a contact-spring, of actuating means for deflecting said spring to cause a change in the electrical connection thereof, and a second spring adapted to be deflected upon a reverse
125 actuation of said deflecting means, said second spring being made of stiffer material than said first spring, substantially as described.

2. In a switching device, the combination with a pair of contact-springs, of actuating
130 means for deflecting said springs to cause a

change in the electrical connections thereof, and a second pair of springs adapted to be deflected upon the reverse actuation of said deflecting means, said second pair of springs being of stiffer material than said first pair of springs, substantially as described.

3. In a switching device, the combination with a pair of contact-springs, of actuating means adapted to spread said springs apart to cause a change in the electrical connections thereof, and a second pair of springs adapted to be spread apart upon a reversal of said actuating means, said second pair of springs being of stiffer material than said first pair of springs, substantially as described.

4. In a switching device, the combination with a pair of substantially parallel contact-springs having perpendicularly-projecting end portions, of mechanism adapted upon suitable actuation to engage said perpendicularly-projecting portions to spread said springs apart to change the electrical connections thereof, and a second pair of contact-springs having perpendicularly-projecting end portions adapted upon a reverse actuation of said mechanism to be spread apart, said second pair of springs being of stiffer material than said first pair of springs, substantially as described.

5. In a ringing and listening key, the combination with a pair of substantially parallel contact-springs, of lever mechanism adapted upon suitable actuation in one direction to wedge said springs apart, and a second pair of substantially parallel contact-springs adapted to be wedged apart upon a reverse actuation of said lever mechanism, said second pair of contact-springs being made of stiffer material than said first pair of contact-springs, substantially as described.

6. In a switching device, the combination with a pivoted actuating-lever thereof, of a ball of insulating material carried thereby, a pair of contact-springs adapted to be wedged apart by the interposition of said ball upon the manipulation of said lever, and a second pair of contact-springs adapted to be wedged apart by the interposition of said ball upon the reverse manipulation of said lever, said second pair of contact-springs being of stiffer material than said first pair of contact-springs, substantially as described.

7. In a switching device, the combination with a pivoted actuating-lever thereof, of a ball of insulating material carried thereby, a pair of contact-springs having outturned end portions adapted to be wedged apart by the interposition of said ball upon the manipulation of said lever, and a second pair of contact-springs having outturned end portions adapted to be wedged apart by the interposition of said ball upon the reverse manipulation of said lever, said first pair of springs serving to retain said ball in its alternated actuated position between said springs, and said second pair of contact-

springs requiring a greater actuating force than said first pair of contact-springs, substantially as described.

8. In a switching device, the combination with a pivoted actuating-lever thereof, of a ball of insulating material carried thereby, a pair of contact-springs having outturned end portions adapted to be wedged apart by the interposition of said ball upon the manipulation of said lever, and a second pair of contact-springs having outturned end portions adapted to be wedged apart by the interposition of said ball upon the reverse manipulation of said lever, said second pair of contact-springs being of stiffer material than said first pair of springs, substantially as described.

9. In a telephone switching device, the combination with a pair of contact-springs provided with perpendicularly-extending projections having outturned end portions, of a second pair of contact-springs provided with perpendicularly-extending projections having outturned end portions, a ball of insulating material partially surrounded by said outturned end portions, and lever mechanism adapted to interpose said ball between the outturned end portions of either pair of said contact-springs, the second pair of said contact-springs being made of stiffer material than the said first pair of springs, substantially as described.

10. In a telephone switching device, the combination with a pair of contact-springs provided with perpendicularly-extending projections having outturned end portions, of a second pair of contact-springs provided with perpendicularly-extending projections having outturned end portions, a ball of insulating material partially surrounded by said outturned end portions, and lever mechanism adapted to interpose said ball between the outturned end portions of either pair of said contact-springs, said first pair of contact-springs being adapted to retain said ball in position when interposed between them, and said second pair of contact-springs being made of stiffer material than said first pair of springs, substantially as described.

11. In a ringing and listening key, the combination with a pair of contact-springs adapted upon suitable manipulation to connect an operator's telephone set with a cord-circuit, of a second pair of contact-springs adapted upon suitable manipulation to connect a ringing-generator with the cord-circuit, and means for actuating said contact-springs, said second pair of contact-springs being of stiffer material than said first pair of contact-springs, substantially as described.

12. In a ringing and listening key, the combination with a pair of sheet-metal contact-springs adapted upon suitable manipulation to connect an operator's telephone set with a cord-circuit, of a second pair of sheet-metal

contact-springs adapted upon suitable manipulation to connect a ringing-generator with the cord-circuit, and means for actuating said contact-springs, said second pair of contact-springs being of thicker material than said
5 first pair of contact-springs, substantially as described.

In witness whereof I hereunto subscribe my name this 20th day of November, A. D. 1902.

JOHN S. GOLDBERG.

Witnesses:

CHARLES A. BROWN,
JOHN STAHR.