No. 692,825. Patented Feb. 11, 1902.

A. CARLISS.

OPERATOR'S KEY.

(Application filed Apr. 1, 1901.)

(No Model.)

Fig. 1.

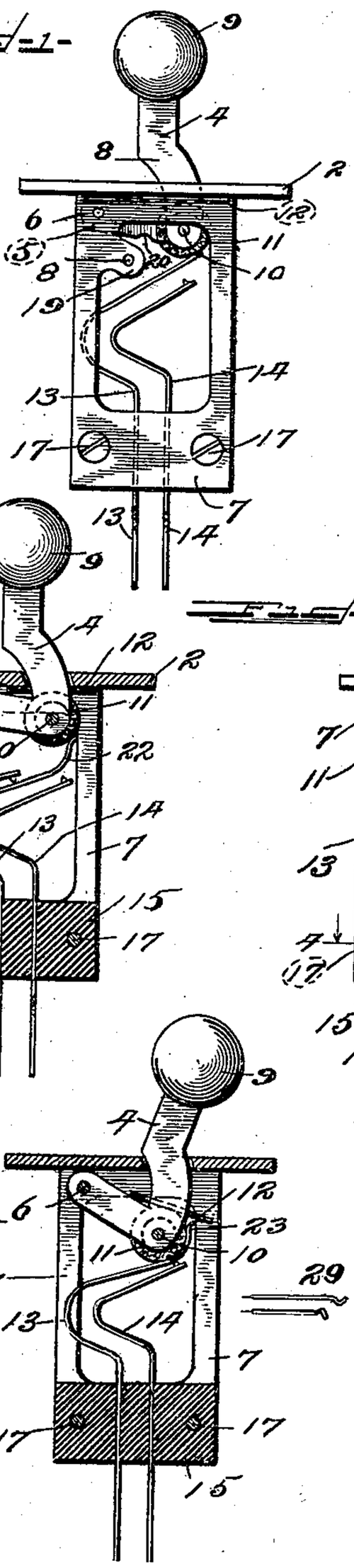


Fig. 2.

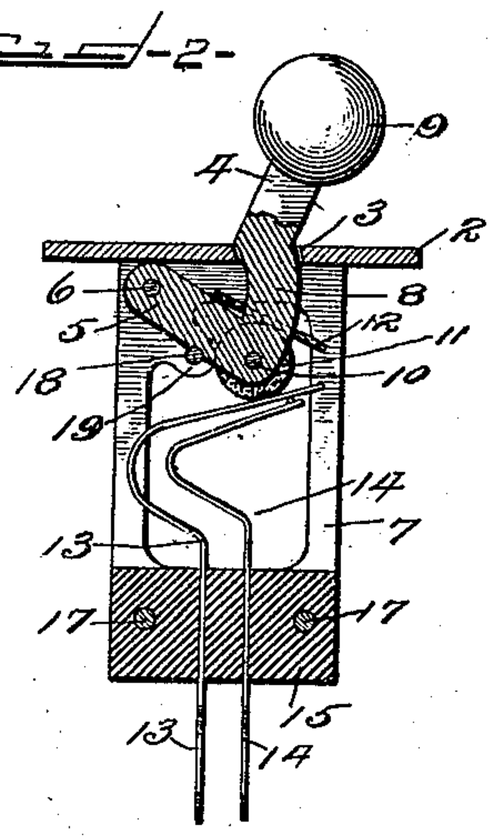


Fig. 3.

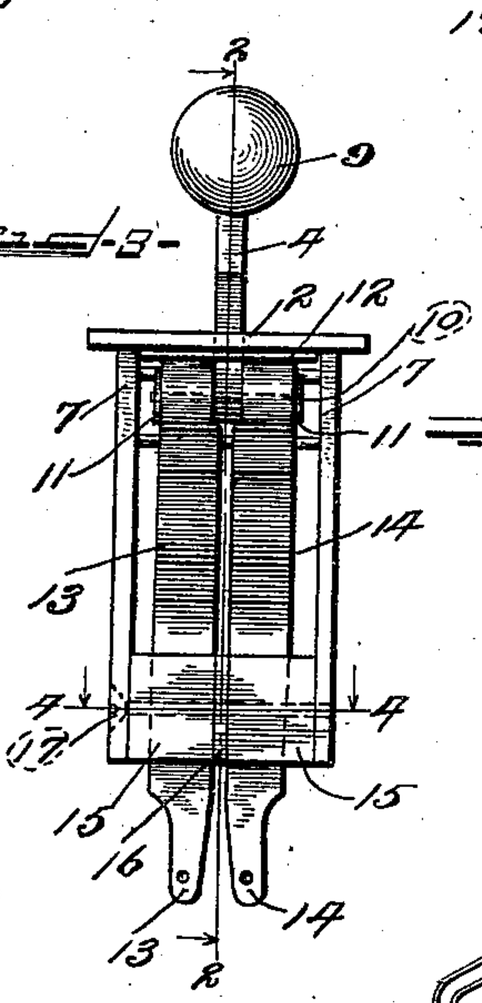


Fig. 4.

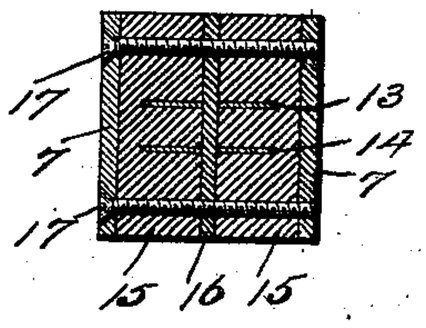


Fig. 5.

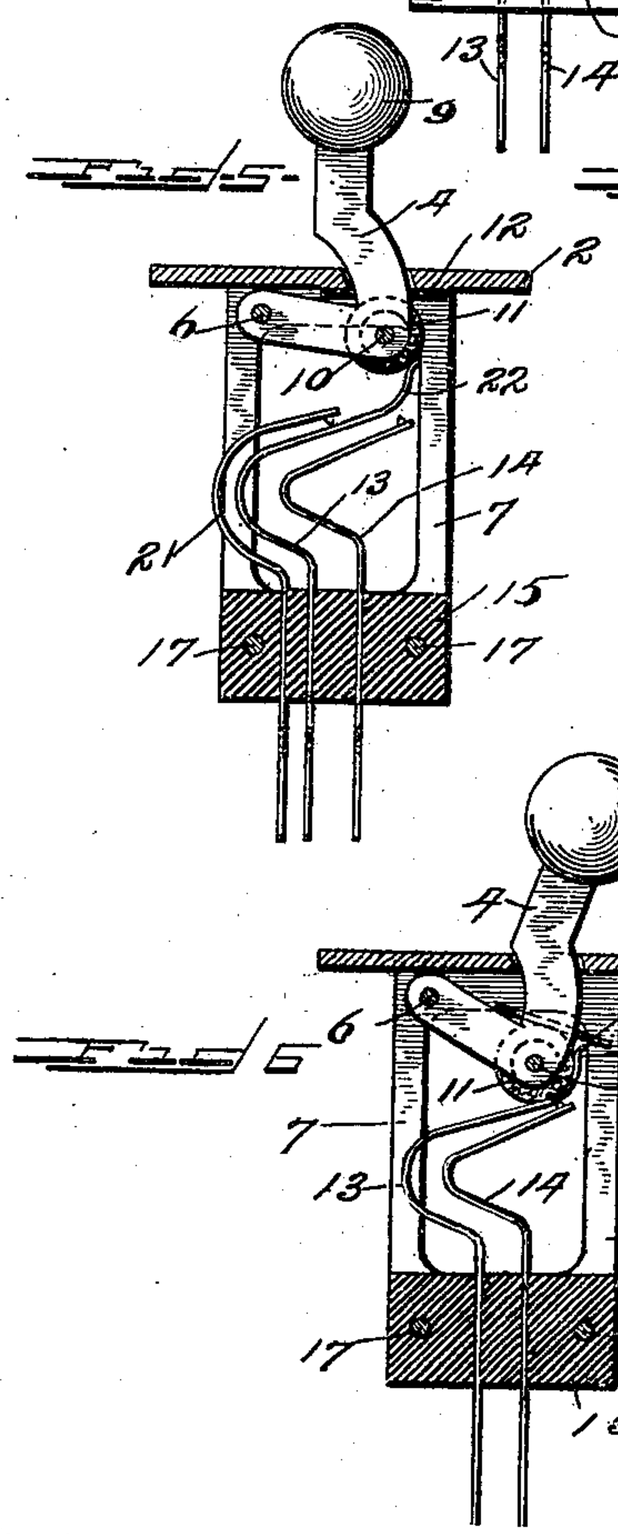
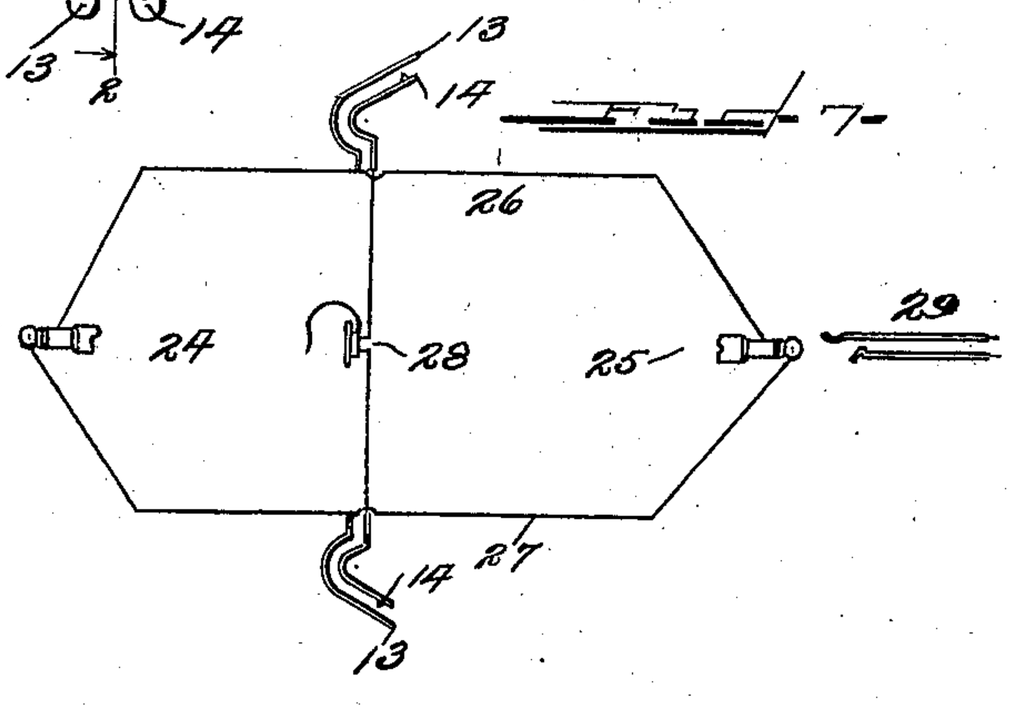


Fig. 6.

Fig. 7.



Witnesses
J. B. Weir
Robert Lewis Ames,

Inventor
Albert Carliss
By Chas. C. Buckley.
Atty

UNITED STATES PATENT OFFICE.

ALBERT CARLISS, OF CHICAGO, ILLINOIS, ASSIGNOR TO AMERICAN ELECTRIC TELEPHONE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION.

OPERATOR'S KEY.

SPECIFICATION forming part of Letters Patent No. 692,825, dated February 11, 1902.

Application filed April 1, 1901. Serial No. 53,775. (No model.)

To all whom it may concern:

Be it known that I, ALBERT CARLISS, a citizen of the United States of America, and a resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Operators' Keys, of which the following is a specification.

My invention relates to switching-keys used in telephone central offices, and is designed more especially for use as an order-key—that is, where an operator connects her telephone in circuit with a circuit running to another operator and called "instruction-circuits"—although in some of its aspects it is of more general application and may be employed in cord-circuits or other relations.

It has for its object the provision of a key which is practically dust-proof and which is convenient to operate and simple and cheap to construct.

A further object is the provision of means in such a key for mechanically catching and retaining the key-lever at the extreme end or limit of its movement, where its terminals are closed together, until it is positively released, when the lever is returned to normal position.

To accomplish these ends, the invention comprises a top plate, which is adapted to be secured to the switchboard table or apron and is properly inset therein, so as to be flush with the top. An elbow-lever is pivoted at the end of one of its arms beneath the top plate, the other extending up through a slot or aperture in the said top plate by a segmental or arc-shaped portion which closely fits the aperture in the top plate and has its center at the pivot of the other arm, which construction allows the arc-shaped arm to vibrate in the aperture in the top plate without play, whereby but little room for the admittance of dust is allowed. To further guard against the entrance of dust, a small plate, preferably of leather, is mounted on said segmental portion of the arm beneath the top plate, which is carried thereby against the lower side of said plate and around the opening. Insulating-rollers are journaled on each side of the lever at the angle of the arms and are adapted to normally rest upon and be forced upward by contact-springs which are mounted beneath and to press them into contact with other springs when the lever is operated or pressed. Provision is further made to normally complete circuits through said springs and to break such circuits and make others when the lever is operated. Again, it is possible to bend the ends of the springs pressing against the rollers, so that when the lever is operated or thrown over they will catch the rollers and hold the lever in that position.

The invention also consists in the parts hereinafter described, and particularly pointed out in claims.

In the drawings forming a part of this specification, in which the same reference-numerals designate like parts throughout the several views, Figure 1 is a side elevation of an instrument embodying the invention. Fig. 2 is a sectional elevation on the line 2 2 of Fig. 3. Fig. 3 is an end elevation of the device. Fig. 4 is a cross-sectional view on the line 4 4 of Fig. 3. Fig. 5 is a sectional elevation, similar to Fig. 2, of a modification as to the number of spring-contacts and the shape of those bearing upon the rollers. Fig. 6 is a similar view showing the operation of such springs and rollers when the latter are in their depressed position; and Fig. 7 is a diagram of the circuits involved, as the key or switch may be applied to a cord-circuit.

Referring to the figures, the instrument consists of a top plate 2, having an aperture 3, through which projects a key-lever 4. This lever 4 consists of an elbow-lever, one arm 5 of which is pivoted at its end on a pivot-pin 6, supported between the side plates 7, depending from the bottom or lower face of the top plate 2. The other arm 8 of the elbow-lever or switch-lever extends upwardly through the said aperture 3 by a segmental portion and terminates in a straight portion carrying a knob or handle 9, of ebony or other desired substance. The aperture 3 through the top plate is formed on a curve corresponding to that of the segmental portion of the arm 8, the axis 6 of the lever 4 being a center for both. This permits the lever to snugly fit the aperture 3 and vibrate therethrough without undue play, thus doing away with the necessity of a long slot in the top plate 2, as in the usual construction, whereby less dust and dirt are allowed to work into the switch. At the angle or bend in said lever 4 a horizontal pivot-pin or journal 10 is provided, on the ends of which, at both sides of the lever, are journaled insulating-rollers 11. Above

these rollers and about the segmental portion of the lever is carried a small sheet, shield, or piece 12 of leather or any desired material, which will snugly fit the lower side or face of the top plate 2 when pressed thereagainst, as when the lever 4 is in its normal position. This piece is apertured to snugly fit said lever, so that no dust can pass between it and the lever, and it serves to completely close the aperture 3 through the top plate 2 when in normal position against its under side. When the lever 4 is depressed, however, the said plate 12 travels with it, and should any dust or dirt accumulate upon its upper surface it would be thrown or allowed to slide off its lower outer edge and not strike the spring-contacts which are located beneath.

The switch-terminals or contact-springs 13 and 14 are supported by slotted insulating-blocks 15, the spring-strips being located in the slots of the blocks. These terminals consist of two sets or pairs side by side and are insulated by a thin strip 16 of insulating material between the two blocks 15, the whole being firmly clamped in place and together by screws 17, passing through the two side plates 7. The springs 13 and 14 extend below the insulating-blocks 15 and side frames 7, where they are apertured and tinned in order to readily connect the circuit-wires therewith. Above the blocks they are first bent toward one end of the frame and then reversely toward the other side to bring their ends in a more nearly horizontal position to be more effectually acted upon by the lever 4 than if they were to extend vertically from the said blocks. At the same time the advantages of a switch or key having vertically-arranged springs is obtained, so far as requiring but small horizontal space on the switchboard and convenience of attaching wires thereto is concerned. These springs are not normally in contact, and the springs 13 are so formed at their upper ends and so situated as to press against the rollers 11 at all times and normally hold the lever 4 in its raised position; but when the lever is depressed or thrown over they are pressed down or over against the neighboring contacts 14 to close the circuit therethrough. To lighten the construction, the central portions of the side plates 7 are cut out, which results in the additional advantage of convenience and ease in inspection and repairs. To guard against throwing the lever down or over too far, a stop consisting of the rod or bar 18, extending between the side plates 7, is provided, lugs 19 on the side plates 7 being left for the purpose in the cut-out portions of the said side plates. The arm 5 of the elbow key-lever 4 may be notched, as at 20, to allow a further depression of the lever before striking the stop.

In the modification shown in Fig. 5 an additional set of springs 21 is shown, through which the central springs 13 are normally closed. This form of switch could be utilized with advantage as a ringing-key in cord-circuits and would break the normally-closed circuit through springs 13 and 21 and connect the generator-springs 14 with the springs 13.

A further modification exists in forming the ends of the springs 13 bearing against the rollers 11 with a curved portion 22, which normally keeps the lever 4 in raised position, as before; but when it is depressed or thrown over they encircle or bear upon the rollers 11 at some point 23, Fig. 6, above the line joining the pivots 6 and 10, which restrains the lever 4 in that position and prevents its returning to normal position until started back by overcoming the pressure of the springs 13 upon the rollers 11 at 23.

The circuit arrangement is exhibited in Fig. 7 in one possible condition of use of the invention, the plugs 24 and 25 of the cord-circuit being connected by the strands 26 and 27 and the operator's telephone 28 being connected thereto, as desired, through the medium of springs 13 and 14, the plugs being adapted to be inserted in the spring-jacks 29 of the subscribers' lines.

The invention is capable of use in many relations and is not limited to the details of construction, but is held to include all such changes, alterations, and modifications as fairly fall within its scope.

The invention is defined in the following claims.

I claim—

1. In an operator's key, the combination with a top plate having an aperture, of an elbow-lever pivoted beneath the top plate and having a segmental or arc-shaped portion passing through the aperture, a handle for operating the same, projecting above the top plate, contact-springs supported beneath the top plate and in proximity to said lever, and means on said lever for operating the said springs.

2. In an operator's key, the combination with a top plate having an aperture, of an elbow-lever pivoted at the end of one arm beneath the plate, the other arm having a segmental or arc-shaped portion projecting through said aperture and whose center is the pivotal center of the lever, a handle on said projecting arm for operating said lever, spring contacts or terminals supported beneath the plate, and means for operating said springs or terminals by said lever.

3. In an operator's key, the combination with a top plate, of an elbow-lever, one arm of which is pivoted beneath the plate, the other arm projecting through an aperture in said plate, a plate or shield carried by the latter arm and adapted to normally close the aperture about said arm and to be depressed therewith, springs located on said key beneath the plate, and means for operating said springs by said lever.

4. In an operator's key, the combination with a top plate having an aperture therein,

of an elbow-lever pivoted at the end of one arm beneath the plate, the other arm projecting through said aperture, a plate or shield carried by said latter arm and adapted to be pressed against the lower face of said plate when the lever is in normal position to prevent the passage of dust therethrough, the said plate being adapted to be depressed with the lever to throw off any dust or dirt thereon, and contact-springs located beneath said lever and adapted to be operated thereby.

5. In an operator's key, the combination with a top plate having an aperture, of an elbow-lever pivoted at the end of one arm beneath the plate, its other arm projecting through the aperture and carrying a sheet or plate of leather which is adapted to normally press against the lower surface of the plate and to be depressed and tilted with the lever when it is operated, contact-springs arranged beneath the lever, and adapted to be operated thereby.

6. In an operator's key, the combination with a top plate, of an elbow-lever pivoted at the end of one of its arms, the other arm having a segmental portion passing through an aperture in said plate, the said aperture being curved to fit the part of the lever passing therethrough, the center of that portion being at the pivotal center of the lever, and contact-springs arranged beneath the lever and adapted to be operated thereby.

7. In an operator's key, the combination with a top plate, of an elbow-lever pivoted therebeneath at one end of its horizontal arm, the other arm projecting through an aperture in said plate, a stop for said horizontal arm, contact-springs arranged therebeneath, and insulating-rollers carried by the arm to engage with said contact-springs.

8. In an operator's key, the combination with a top plate having a curved slot therein, side frames or plates depending from the lower side of said plate, an elbow-lever pivoted at the end of one of its arms between the side plates and having its other arm which comprises a curved portion projecting through said slot, both the curved slot and curved portion being centered at the pivot of the lever, a knob or handle for the latter arm above the top plate, a small plate carried by said latter arm and adapted to be normally pressed against the lower side of the top plate, insulating-blocks between the lower edges of the side plates, contact-springs secured in said blocks and having their upper ends in proximity to the angle of said lever, and insulating-rollers journaled on said lever at its angle and adapted to operate upon said springs.

9. In an operator's key, the combination with a top plate, of side plates depending therefrom, insulating-blocks between said side plates at their lower edges, contact-springs secured in said blocks and passing vertically therethrough, the ends of said springs above the blocks being reversely bent toward one side of the side plates and back to bring their free ends beneath the elbow-lever and at an angle to their vertical portions, an elbow-lever pivoted between said side plates and having one arm projecting through the top plate carrying a handle, and means carried by said lever to operate said springs.

10. In an operator's key, the combination with a top plate, of side plates depending therefrom, an elbow-lever pivoted between said side plates and having one arm projecting through the top plate and provided with a handle for its operation, insulating-blocks between the lower edges of the side plates, two sets of springs mounted side by side in said blocks, a plurality of springs in each set, all of said springs being reversely bent above the blocks so as to lie at an angle to their other parts and beneath said elbow-lever, and insulating-rollers journaled on each side of the elbow-lever to operate each set of springs.

11. In an operator's key, the combination with a top plate, of an elbow-lever pivoted at the end of one of its arms beneath the plate, the other arm extending through an aperture in the top plate for the operation of the lever, contact-springs mounted beneath the lever with their free ends in proximity to said lever, rollers mounted at the angle of said lever to operate upon said springs, the ends of said springs being so formed as to hold the lever in its depressed position.

12. In an operator's key, the combination with a support, of an elbow-lever pivoted at the end of one of its arms on said support, a handle at the end of its other arm, rollers journaled at its angle, contact-springs mounted on said support with their free ends adjacent said rollers and so formed as to hold the lever in raised position normally and to also hold it depressed when operated.

13. In an operator's key, the combination with a top plate, of side plates depending therefrom, an elbow-lever pivoted at the end of one arm between the side plates, its other arm having a segmental portion operating in an aperture in the top plate, the said arm being provided with a knob or handle for operating it, a plate carried by the latter arm beneath the top plate to normally close the opening therethrough, insulating-blocks located between the lower edges of said plates, two sets of springs passing vertically through said blocks and held thereby, the said springs being reversely bent above said blocks so as to set their free ends at an angle beneath the lever, and insulating-rollers carried on each side of the angle of said lever and normally held in raised position by a pair of said springs, the said springs being so bent or formed as to also hold the lever in its depressed position when operated.

Signed by me at Chicago, Cook county, Illinois, this 23d day of March, 1901.

ALBERT CARLISS.

Witnesses:
CHAS. C. BULKLEY,
H. P. CLAUSEN.