(No Model.)

# A. BERRENBERG & J. UMBEHEND.

## SWITCH.

No. 422,705. Patented Mar. 4, 1890.

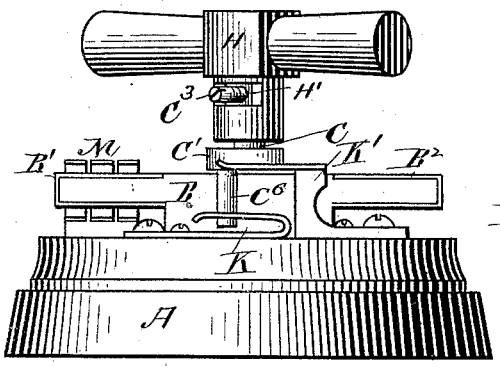

Fig. 1.

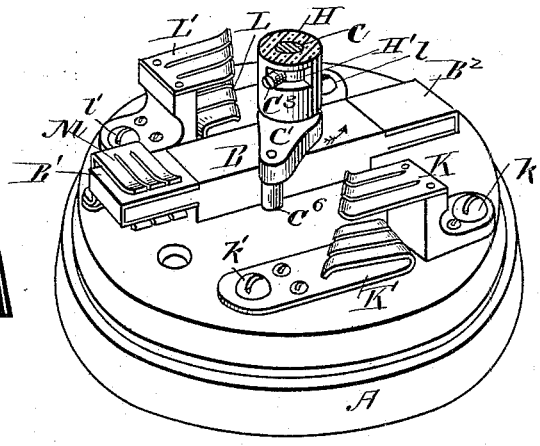

Fig. 2.

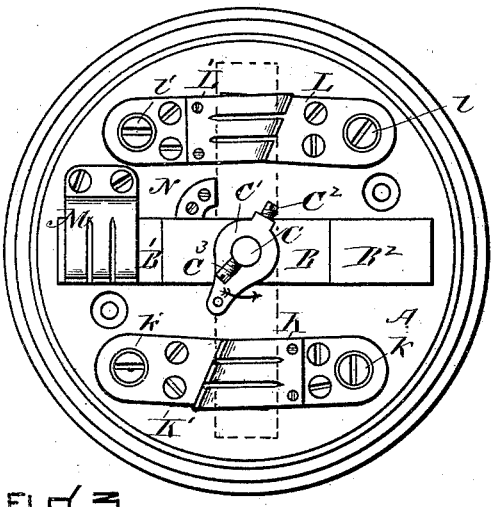

Fig. 3.

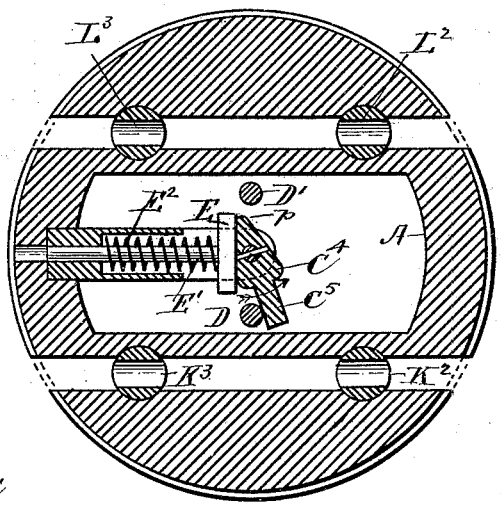

Fig. 4.

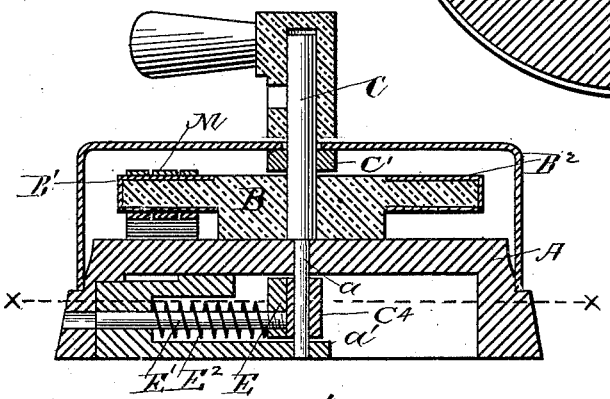

Fig. 5.

WITNESSES.

Frank S. Parker

Fred E. Dieterich

INVENTORS.

Adolph Berrenberg

Jacob Umbehend

N. PETERS, Photo-Lithographer, Washington, D. C.

# UNITED STATES PATENT OFFICE.

ADOLPH BERRENBERG, OF SOMERVILLE, AND JACOB UMBEHEND, OF CAMBRIDGE, MASSACHUSETTS.

## SWITCH.

SPECIFICATION forming part of Letters Patent No. 422,705, dated March 4, 1890.

Application filed October 18, 1889. Serial No. 327,424. (No model.)

*To all whom it may concern:*

Be it known that we, ADOLPH BERRENBERG, of Somerville, in the county of Middlesex and State of Massachusetts, and JACOB UMBEHEND, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Electric Switches, of which the following, taken in connection with the accompanying drawings, is a specification.

The object of our invention is to so construct an electric switch that its action shall be semi-automatic—that is, automatic at the time of making or breaking the electric connection so as to be free from sparking or arc forming, and also positive by the movement of the hand of the user in case it fails to act automatically. These objects we attain by the mechanism shown in the accompanying drawings, in which—

Figure 1 is an elevation of our switch, the top part of the casing being represented as removed so as to show the working parts. Fig. 2 is a view in perspective, the upper part of the handle being removed for the purpose of showing the other parts more clearly. Fig. 3 is a plan, the handle being removed to show other parts. Fig. 4 is a horizontal section taken on line *x x* of Fig. 5. Fig. 5 is a vertical section taken through the center.

In the drawings, A represents the base-piece of our instrument, in the center of which we have a spindle C, adapted to turn freely and held vertically in place by the base at *a* and *a'*, (see Fig. 5,) and having a handle H, by means of which it may be turned. The handle H is loosely attached to the spindle C by means of the screw-pin $C^3$, which extends from the spindle C through the opening H′ in the handle H. (See Figs. 1 and 2.) By connecting the handle H to the spindle, as above described, the said spindle C is not controlled entirely by the handle, but may be moved to a limited extent by the action of a spring and tumbler, as will be explained.

B represents a switch-bar turning freely on the spindle C. This switch-bar is made of some good insulating material, and has at its ends metal contact-plates B′ $B^3$, each of the plates extending around the end, as shown in Figs. 1, 2, and 5, so as to cover a part of each side of the switch-bar B, and thus, when the switch is closed, to come in contact with both the lower and upper brushes K K′ and L L′—that is, when the switch is closed, the brush K will be connected to the brush K′ by the metallic plate B′, (see Fig. 2,) and the brushes L and L′ by the metallic plate $B^2$. It will be observed that in the drawings the switch is shown in full lines as open—that is, the switch-bar B stands at right angles to its closed position, which is indicated by dotted lines in Fig. 3.

For the line of one pole the brush K is connected to the line-post $K^2$, Fig. 4, by the screw *k*, (see Fig. 2,) and the brush K′ to the line-post $K^3$, Fig. 4, by the screw *k'*, Fig. 2. For the line of the other pole the brush L is connected to the line-post $L^2$, Fig. 4, by the screw *l'*, Fig. 2, and the brush L′ is connected to the line-post $L^3$, Fig. 4, by the screw *l'*, Fig. 2.

M, Figs. 1, 2, and 3, is a spring-clasp, into which the switch-bar B is forced when the switch is open and serves to hold the switch-bar in place.

N, Fig. 3, is a stop affixed to the base A and serves to limit the motion of the switch-bar B when it is unswitched and in the position shown in full lines in Fig. 3, and also when it is thrown into the closed position, as indicated by dotted lines, Fig. 3.

C′ is an arm rigidly attached to the spindle C by the set-screw $C^2$, Fig. 3. From the arm C′ a pin $C^6$, Figs. 2 and 3, extends downward, so that as the spindle C is turned the pin $C^6$ will come in contact with the switch-bar B and cause it to turn also.

At the lower end of the spindle C a tumbler $C^4$, Figs. 4 and 5, is rigidly attached by means of a pin or otherwise. This tumbler has two flat sides, as shown in Fig. 4, against one of which the head-piece E of the sliding rod E′ rests. A spring $E^2$, Figs. 4 and 5, forces the head-piece E against the tumbler $C^4$. The action of the spring $E^2$ has a tendency to hold the tumbler either in the position represented in Fig. 4—that is, with the extension $C^5$ against the stop D—or in the reverse position—that is, with the extension $C^5$ resting against the stop D′. When the spin-

dle C is turned in the direction indicated by the arrow, Figs. 2, 3, and 4, then the point $p$ of the tumbler $C^4$ (see Fig. 4) will press the head-piece E′ back and increase the tension on the spring $E^2$. Now a continued motion of the spindle will carry the point $p$ of the tumbler past the center of the head-piece E, and the spring $E^2$ will have a tendency to throw the tumbler over to the other side—that is, so that the extension $C^5$ will rest against the stop D′. As the tumbler $C^4$ and the arm C′ are both rigidly attached to the spindle C, it is obvious that the motion of one must be the same as the other, and as the switch-bar B is moved by the pin $C^6$ on the arm C′ it (the said bar) must also move when the tumbler moves. Thus the action of the spring $E^2$ is transmitted to the switch-bar, and when left free to act it (the spring) will throw the switch-bar from one position to another with great rapidity.

The operation of our device is as follows: If we suppose that the handle H and switch-bar B is in the position represented in Fig. 2—that is, open—and we wish to close it, if the handle is turned in the direction indicated by the arrow, the end of the slot H′, being in contact with the screw-pin $C^3$, will force the spindle C around, causing the arm C′ to turn and to take the switch-bar B with it. At the same time that the switch-bar B is turning the tumbler $C^4$ is also turning, so as to bring the point $p$ past the center of the head-piece E. As soon as this takes place the spring $E^2$, acting through the head-piece E, will force the tumbler quickly around, and, acting through the spindle C and arm C′, cause the switch-bar to rapidly snap from the intermediate position (into which the handle has placed it—that is, at a point just before it has left the spring-clasp M) into contact with the brushes K K′ and L L′, as indicated by dotted lines in Fig. 3, and thus close the lines of both poles. This rapid movement just described is independent of the operator, as the open slot H′ in the handle H allows the screw-pin $C^3$ to move independently of the handle still held by the operator, and as the screw-pin $C^3$ is free to move of course the spindle C and its connected parts, the arm C′ and the tumbler $C^4$ are also free to be acted upon by the spring $E^2$, so that after the operator has turned the handle a certain distance and caused the switch-bar and tumbler to move a determined distance, then the spring will act and the movement of the switch-bar B will be automatic and instantaneous, allowing no time for an arc to form. In case the switch-bar B should not be thrown by the spring $E^2$, as above explained, then by continuing to turn the handle H the switch-bar can be forced into the desired position. Thus the device can be worked positively as well as semi-automatic.

The action of unswitching is in all respects like the above-described action, except that it is the reverse.

We claim—

In an electric switch, the switch-bar B, loosely attached to the spindle C, spindle C, the arm C′, having a pin $C^6$, adapted to engage with the switch-bar B, and also having a tumbler $C^4$, adapted to be operated in both directions by a spring, as described, and a spring by which the said tumbler is operated, substantially as and for the purpose set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, on this 11th day of October, A. D. 1889.

ADOLPH BERRENBERG.
JACOB UMBEHEND.

Witnesses:
FRANK G. PARKER,
WILLIAM SEARS.