(No Model.)

C. BERNHARDT.

BATTERY CHANGER FOR ELECTRIC CIRCUITS.

No. 524,374. Patented Aug. 14, 1894.

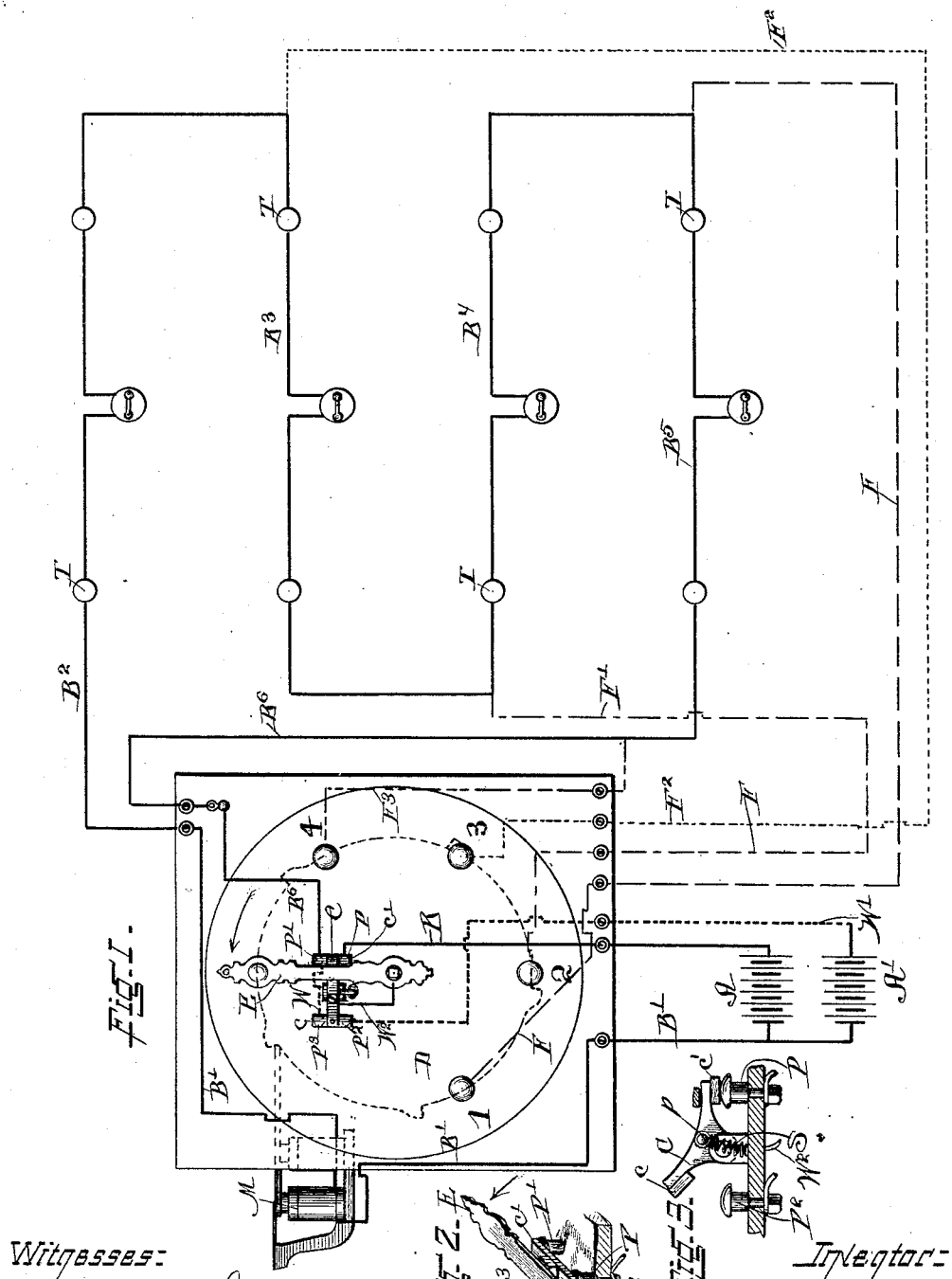

Fig. 1.

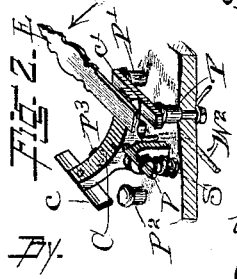

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

CHARLES BERNHARDT, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO WILLIAM H. ALTMAN, OF SAME PLACE.

BATTERY-CHANGER FOR ELECTRIC CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 524,374, dated August 14, 1894.

Application filed November 23, 1891. Renewed January 19, 1894. Serial No. 497,447. (No model.)

To all whom it may concern:

Be it known that I, CHARLES BERNHARDT, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Battery-Changers for Electric Circuits, of which the following is a specification.

My invention relates to improvements in battery changers for electric circuits, the special use for which it is designed and that in which it is illustrated in the drawings forming a part of this application, being in combination with a fire alarm system, and its object in that system being to bring into the fire alarm circuit a fresh battery at the moment when certain parts of the system come into operation, and, at the same time, to cut out of the circuit the battery which ordinarily forms a part thereof.

The invention is fully described and explained in this specification and shown in the accompanying drawings, in which—

Figure 1 is a front elevation of the indicating dial of a fire alarm system, the dial being provided with my battery changing device and the fire alarm system being diagrammatically represented in connection with the dial. Fig. 2 is a perspective view of the battery changing bridge or switch, and Fig. 3 is an end elevation thereof, the hand of the indicating dial being shown in its operative relation to the bridge in both Figs. 2 and 3.

In the views A is a battery of any ordinary construction, one pole of which is connected by means of a wire, B, with a binding post, P, set in the face of a dial, D, the other pole of the battery being connected with a second binding post, P′, near the post, P, by means of a continuous wire, made up of parts lettered, respectively, B′, B^2, B^3, B^4, B^5, B^6, the parts, B^2, B^3, B^4, B^5, being provided with thermostats and being intended to represent a fire alarm circuit in the various stories or apartments of a building. One of the terminal posts, P′, is connected by means of a short wire, W, with another post, P^3, at a short distance from it, and a fourth post, P^2, lies in the same relation to the post, P^3, as that of the post, P, to the post, P′. The post, P^2, is connected by a wire, W′, with one of the poles of a second battery, A′, the opposite pole of the battery being the terminal of the wire, B′, which connects the corresponding pole of the battery, A, with the circuit already described.

The four binding posts, P, P′, P^2, P^3, form a rectangle, the posts, P, P′, being at one end of the rectangle, and the posts P^2, P^3, at the opposite end thereof; and between the two ends of the rectangle thus formed are placed suitable stationary supports, in which is pivoted a rocking curved bridge or switch, C, having at its ends transverse bars, *c*, *c*′, each of which is adapted, when in proper position, to rest upon and connect the pair of binding posts at the corresponding end of the rectangle.

The bridge, C, is of such form and is so pivoted that when one of its ends is in contact with the corresponding pair of binding posts, the other end is raised considerably above the pair of posts at the other end of the rectangle, and a spring, S, fastened to the bridge at a point above its pivot, connects it with the face of the dial in such a way as to hold either of the ends of the bridge in contact with the corresponding pair of posts, the spring being so arranged as to cross the center on which the bridge rocks, at each change of position of the bridge.

The dial is provided with a hand, E, whose normal position is directly across the bridge, as shown in Figs. 1, 2, and 3, and this hand is connected with the bridge, C, by means of a wire, W^2, and is operated by means of a suitable spring and provided with a ratchet wheel rotating with the hand and adapted to be stopped by the armature of a magnet, M, lying in the fire alarm circuit, the connection of these parts and the principle and manner of their operation with the fire alarm circuit being fully illustrated and explained in another application filed herewith and having the Serial No. 412,709. The dial is also provided with a series of conducting points or buttons, 1, 2, 3, 4, lying in the path of rotation of the hand, E, and connected by means of wires, F, F′, F^2, F^3, with the various parts of the fire alarm circuit, in the manner illustrated in Fig. 1.

When the hand, E, is in its normal position, the fire alarm circuit is closed, and includes

the battery, A; the circuit being made up of of the battery, A, the wire, B, the binding posts, P, P′, and cross-bar, c', and the wires, $B^6, B^5, B^4, B^3, B^2, B'$, the magnet, M, being in the circuit. When this circuit is broken, either through the operation of the thermostats or by the breaking of the wire, or in any other way, the armature of the magnet, M, is released, and releases the ratchet wheel attached to the hand, E, thereby permitting the hand to turn in the direction indicated by the arrow at its point, in Figs. 1 and 2, until, upon reaching the proper button, 1, 2, 3, or 4, it completes a circuit through the wire, W^2, and the wire, F, F′, F^2, or F^3, terminating in the button, draws the armature again to the magnet, and thus arrests the motion of the ratchet wheel and its own rotation as well. This operation is fully illustrated and described in my other application, already referred to.

In its normal position, the hand, E, lies across the bridge near one of its ends, and almost immediately over the cross-piece, c', but in the first few degrees of its rotation the hand traverses the entire length of the bridge, pressing downward the cross-piece, c, and raising the cross-piece, c', the piece, c, being thus brought into contact with the binding posts, P^2, P^3, and held firmly thereon by means of the spring, S. The cross-piece, c, and the corresponding end of the bridge being thus depressed, the hand passes over it and away from the bridge, and moves on until arrested in the manner already referred to. As soon as the cross-piece, c, drops down upon the posts, P^2, P^3, and the cross-piece, c', leaves the posts, P, P′, the original circuit is broken and a new circuit is formed, including the battery, A′, and leaving out the battery, A. This new circuit includes the battery, A′, the wire, W′, the binding posts, P^2, P^3, and cross-piece, c, and the wires, $B^6, B^5, B^4, B^3, B^2, B'$, the magnet, M, being in this circuit as well as in the original circuit. Through this operation the dial, the hand and the short circuits terminating at the buttons, 1, 2, 3, 4, together with the magnet, M, receive their electrical energy from the fresh battery, A′, which is thus brought into use at the instant when it is most needed to operate the indicating mechanism. It will be seen that there is an instant when both the cross-pieces, c, c', are out of contact with their respective pairs of binding posts, and during this time neither of the circuits is closed; but as the hand, E, is rotated by a spring wholly independent of the electrically operated parts except as they serve to release the hand, this interruption of the circuit is of no consequence, and only continues for the brief instant required for the movement of the hand across the center of the bridge.

This battery changer, either in the exact form shown and described or in some other equivalent form, is peculiarly adapted for use in the system with which I have shown it and for which it was originally designed; it is evident, however, that it may be used in various other situations, and I desire, therefore, not to limit my invention to its use in combination with the particular elements or devices making up the circuit or system with which it is shown and described herein.

In the foregoing description and explanation no particular forms or kinds of batteries are specified for use in combination with the circuit, and my intention is not to limit the invention in that respect, but to leave it to the judgment of the skilled electrician to select batteries of such construction and elements as to operate properly in the respective situations for which they are designed. It may be said in general terms, however, that the battery, A, should be of such construction and elements as to operate successfully in a permanently closed circuit, while the battery, A′, should be what is known as an "open circuit battery" adapted for use in a circuit normally open, but working successfully for any reasonable length of time, in a closed circuit. Batteries adapted to these different uses are well known in the art, and any person competent to construct such a circuit or system as is illustrated in the drawings and described herein, can readily select such batteries as will work satisfactorily in the positions given to the batteries A and A′, in the drawings.

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

1. The combination with a normally closed electric circuit, a battery lying therein, and a movable device operated by the breaking of the circuit, of a second battery, and a switch operated by said movable part and adapted, when so operated, to connect one of said batteries with said circuit; substantially as shown and described.

2. The combination with the batteries, A, A′, and binding posts, P, P′, P^2, P^3, of a wire connecting the corresponding poles of the two batteries with the binding post, P′, the wire, B, connecting the opposite pole of the battery, A, to the binding post, P, the wire, W, connecting the binding posts, P′, P^3, the wire, W′, connecting the opposite pole of the battery, A′, with the post, P^2, and the oscillating bridge or switch, C, adapted, when in one position, to connect the posts, P, P′, and when in the other position, to connect the posts, P^2, P^3, whereby, at each change of position, it brings one of the batteries into circuit and cuts out the other; substantially as shown and described.

3. The combination with the dial, the binding posts, P, P′, P^2, P^3, mounted thereon, the batteries, A, A′, and wires connecting said batteries with said binding posts, substantially as shown and described, of the oscillating bridge, C, adapted, when in one position, to connect the posts, P, P′, and when in the other position, to connect the posts, P^2, P^3, and the hand, E, lying normally across the bridge and adapted, in moving from or into its nor-

mal position, to change the position of the oscillating bridge, thereby connecting the posts P, P′, or the posts, P^2, P^3, and bringing one battery into the circuit and cutting out the other; substantially as shown and described.

4. The combination with the batteries, A, A′, the dial, the binding posts, P, P′, P^2, P^3, set therein, and wires connecting the batteries with the binding posts, substantially as shown and described, of the oscillating bridge, C, provided with the terminal cross-pieces, *c*, *c*′, adapted to connect respectively, the opposite pairs of binding posts, the hand, E, lying normally across the bridge and adapted, in its motion in either direction, to swing the bridge over its center and change its contact with the binding posts, and the spring, S, holding the end of the bridge in contact with the corresponding pair of binding posts when in either position; substantially as shown and described.

5. The combination with the fire alarm circuit, the batteries, A, A′, the dial, D, the binding posts, P, P′, P^2, P^3, wires connecting the batteries with the binding posts, substantially as shown and described, the buttons, 1, 2, 3, 4, and wires connecting them, respectively, with various points on the fire alarm circuit, and the oscillating bridge, C, adapted, when in one position, to connect one pair of binding posts, and when in the other position, to connect the opposite pair, of the hand, E, the wire, W, connecting the bridge and the hand, and means for operating the hand, whereby, the hand is in electrical connection with the circuit in either position of the bridge; substantially as shown and described.

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