No. 610,402. Patented Sept. 6, 1898.

R. L. L. HUNDHAUSEN.

ELECTRIC SWITCH.

(Application filed Dec. 31, 1897.)

(No Model.)

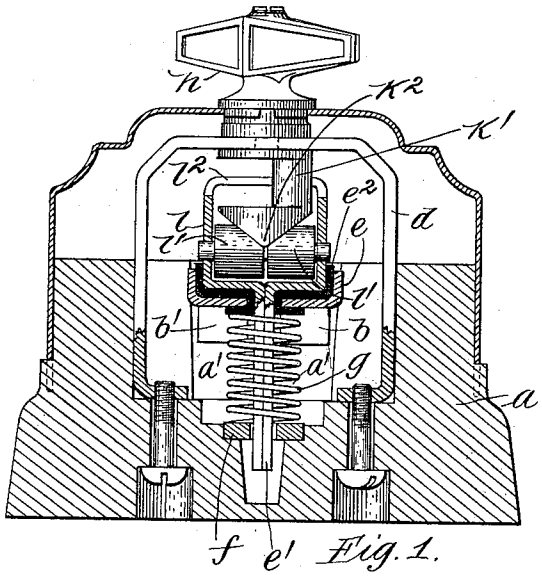


Fig. 1.

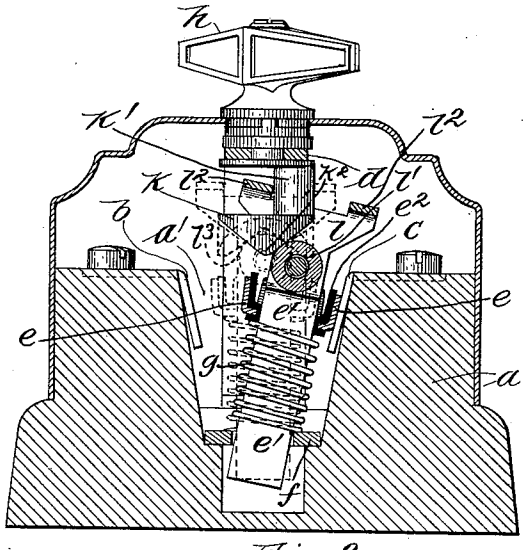


Fig. 2.

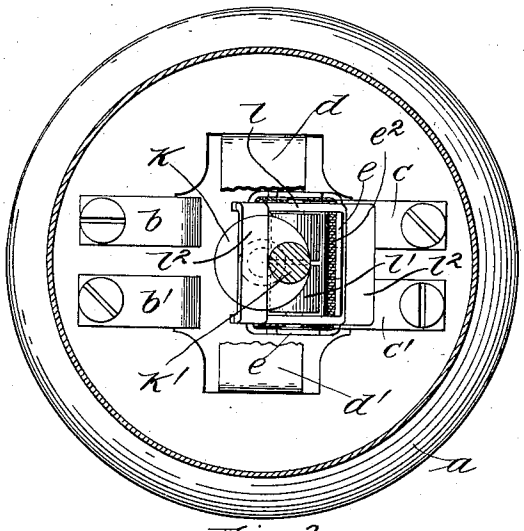


Fig. 3.

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UNITED STATES PATENT OFFICE.

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ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 610,402, dated September 6, 1898.

Application filed December 31, 1897. Serial No. 665,077. (No model.) Patented in Germany October 12, 1895, No. 90,490.

To all whom it may concern:

Be it known that I, RUDOLF LOUIS LEOPOLD HUNDHAUSEN, a subject of the Emperor of Germany, residing at Wilmersdorf, near Berlin, Germany, have invented new and useful Improvements in Electric Switches, (Case No. 106,) of which the following is a specification, reference being had to the accompanying drawings, forming a part of this specification, for which a patent has been granted in Germany, No. 90,490, dated October 12, 1895.

My invention relates to improvements in electric switches, and has for its object the provision of a switch adapted to effect very suddenly the connection and disconnection of the circuit-terminals, while at the same time insuring a firm and efficient contact within the switch when the switch parts are in engagement.

The device of my invention, which fulfils these purposes admirably, is therefore adapted to secure the control of current without danger of arcing within the switch and the attendant disadvantages caused thereby.

As is well known, any considerable arcing in the switch very quickly destroys the contact parts thereof and causes heating within the switch, which soon renders it incapable of properly controlling the connected circuits.

The switch of my invention herein shown and described is provided with a tilting or laterally-movable contact part actuated by a spring and inclined or sloping faces adapted to force said contact part into and out of engagement with the circuit terminal or terminals. The parts are so arranged that the spring is permitted to act very suddenly when the circuit changes are effected, so that a practically instantaneous action of the switch is obtained.

I will describe my invention more in detail by reference to the accompanying drawings, wherein—

Figure 1 is a vertical sectional view of my improved electrical switch with the circuit open therethrough. Fig. 2 is a similar view on a plane at right angles to that of Fig. 1, the parts being in position to effect circuit closure. Fig. 3 is a plan view of said switch, some parts being broken away to illustrate more clearly its construction, the contacts of said switch also being shown in engagement.

The same letters of reference are used to designate like parts throughout the several figures of the drawings.

Upon the base a, formed of any suitable insulating material, such as porcelain, are mounted the circuit-terminals b b' and c c', having depending tongues or contact-faces which extend within a well a', formed in the insulating-base. Within the said well or opening a' is disposed an arch d, which supports the movable contact part of the switch and its actuating connections. The said tilting contact part e is mounted upon a stem e', extending through a slotted plate f in the base of the opening a', upon which stem is mounted the compression-spring g, acting to force said contact part and its several connections upward.

Suitable insulation e^2 is interposed between the tilting contact e and its connections, thereby maintaining the actuating parts of the switch electrically disconnected from the circuit.

Centrally mounted in the top of the arch is the thumb-piece h, which is rotatable in said arch and is connected with the double V-shaped actuating parts k by the eccentrically-disposed post k'.

A frame l, connected with the tilted contact part e and the stem e', carries the rollers l', which engage the inclined faces of the actuating part k, and cross-pieces l^2 of said frame extend upon either side of the said post, in which opening the same is rotated, but with which the post engages in its eccentric movement as the switch is actuated.

Fig. 1 illustrates the several switch parts as they appear when the circuit or circuits are opened, said rollers l' then resting within the V-shaped recess l^3, provided between the depending extremities k^2 of the actuating part. When the circuit is to be closed—as, for example, when the contacts c c' upon the right are to be electrically united—the thumb-piece is rotated in a clockwise direction, thereby causing the rollers l', respectively, to ride upon opposite inclined faces of the actuating part, thus forcing contact e and its connec-

tions downward and compressing the spring. This continues until the extremities k^2 of the said actuating part are rotated approximately into the plane of the arch d and the contact-post is brought into engagement with one of the cross-pieces l^2, the eccentric movement of which serves to force the tilting contact of the switch and its connections slightly to one side, when the spring, thus suddenly released, again forces the parts upward, the rollers then coming into engagement with similar inclined or coacting faces of the actuating part, and the contact e is forced suddenly aside and into engagement with the depending faces or tongues of the terminals c c'. Circuit is thus established between said terminals through the contact e. The same action would occur if the thumb-piece had been rotated in the opposite direction, except that the tilting part would have been forced to the opposite side, thus electrically uniting the terminals b b'. When the circuit is to be opened, the thumb-piece may be rotated in either direction, causing one or the other of the inclined faces of part k to ride upon the corresponding roller and depressing the spring until the eccentrically-disposed post k' has been rotated sufficiently to force the roller beyond the point or apex k^2 of the part k through the medium of the cross-piece l^2, when the tilting part is snapped upward into its median position by the action of the spring, and the rollers l' will occupy the recess between the said points. The contact part e, however, is maintained firmly in engagement with the circuit-terminals until the moment of actual separation, since the rollers, through the medium of the inclined faces provided upon the actuating part k, tend always to maintain said tilting part in its extreme position until the moment in which the same is snapped back. The contact part e, therefore, is moved only in approximately a vertical plane until the spring, suddenly released, serves to snap said contact into or out of engagement with the circuit-terminals and close the circuit. This movement is so sudden that only the slightest sparking occurs between the separated contact parts, and no arc whatsoever can be formed. Any slight wearing of the movable parts of the switch caused by use is readily compensated for by the spring, which will then serve to force the tilting contact-piece and its connections a little higher within the arch, and, furthermore, this action of the spring always secures the closest engagement between said contact-piece e and the several circuit-terminals when the same is moved from its median position.

I have illustrated and described two sets of terminals b b' and c c', disposed upon opposite sides of the insulating-base a and adapted alternatively to be engaged as desired by the tilting contact part. It is obvious, however, that the precise arrangement and electrical connection of the parts may be altered to suit the conditions under which the switch is used, and, furthermore, that the tilting contact part may be otherwise arranged to effect such connections and disconnections without departing from the spirit of my invention, which, broadly considered, contemplates a tilting contact part associated with an actuating part having inclined faces or their equivalents and means for securing the sudden movement of said tilting part into and out of engagement with an electrical contact, whereby the control of the connected circuit is secured.

I therefore claim, and desire to secure by Letters Patent, the following:

1. In an electric switch, the combination with a movable contact part, of a second contact part with which it is adapted to engage, the relatively-movable actuating part k having an inclined face, the coacting roller l' engaging said face and a spring g associated with said movable contact part and adapted to secure its sudden engagement with and its disengagement from the second contact part, substantially as described.

2. The combination in an electric switch with tilting contact part e adapted to be moved into and out of engagement with a terminal of the controlled circuit of an actuating part k, provided with inclined faces, associated with the tilting contact part, a spring g connected with said contact part and adapted to be placed under tension upon each movement of the contact part whereby the spring is caused to effect the sudden connection and disconnection of the tilting contact part with the circuit-terminal of the switch, substantially as described.

3. The combination with the movable contact part e, of a switch terminal or terminals with which it is adapted to close circuit, an actuating part k provided with inclined faces associated with said contact and a spring g connected with contact e, adapted to be placed under tension upon each movement of the contact part whereby the controlled circuit is suddenly opened or closed upon the rotation of the actuating part, substantially as described.

4. In an electric switch, the combination with the tilting contact e, of a spring g adapted to force the same upward, a rotatable actuating part k associated with the said contact part opposing the force of said spring, the said contact part k having an inclined face, the position of which controls the movement of the tilting contact, and a post k' or equivalent part adapted upon rotation of part k to direct the movement of the tilting contact part into or out of engagement with a circuit-terminal, whereby the control of the connected circuit is effected, substantially as described.

5. In an electric switch, the combination with the laterally-movable contact e adapted to be actuated into and out of engagement with the circuit-terminals of said switch, of a compression-spring g associated with the said contact, a rotatable actuating part k hav-

ing inclined faces, the relative position of which controls the movement of the said contact part, a recess l^3 adapted to maintain said contact out of engagement with the circuit-terminals, and a post k' associated with part k adapted to direct said movement of the tilting contact e into and out of engagement with the circuit-terminals of the switch, substantially as described.

6. The combination in an electric switch with the vertically-disposed tilting contact part e of a rotatable actuating part k having inclined faces superposed above the contact part, a spring g adapted to force said contact part e upward and against the inclined faces and to be placed under tension upon each movement of the part whereby the latter is suddenly tilted toward or from the vertical and a circuit terminal or terminals adapted to be engaged and disengaged by the tilting contact upon successive movements thereof, substantially as described.

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

RUDOLF LOUIS LEOPOLD HUNDHAUSEN.

Witnesses:

PAUL ROEDIZER,

CHAS. H. DAY.