

UNITED STATES PATENT OFFICE.

ERNST WOLTMANN, OF CHICAGO, ILLINOIS.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 518,800, dated April 24, 1894.

Application filed July 11, 1893. Serial No. 480,140. (No model.)

To all whom it may concern:

Be it known that I, ERNST WOLTMANN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Electric Switches, of which the following is a specification.

My invention relates to an improvement in electric switches, for general employment, though more especially for use in incandescent lighting-circuits; and my object is to provide a switch of a simple and generally improved construction to render it particularly durable and reliable in its operation.

In the drawings—Figure 1 is a sectional plan view of my improved switch device showing the working parts in the position of opening the circuit; Fig. 2, a similar view showing the same parts in the position of closing the circuit; Fig. 3, a section taken on line 3 of Fig. 1, and viewed in the direction of the arrow; Figs. 4 and 5 views similar to Fig. 1, but showing my improvements applied to a multiple switch in which the terminal of a main conducting wire is adapted to be switched into and out of contact, respectively, with the terminals of branch conducting wires, and Fig. 6, a section taken on line of Fig. 2.

A is a base-plate of insulating or insulated material and B an escutcheon or face-plate secured thereto. Held against the base-plate is a wheel C having at intervals, upon its periphery, cam teeth C', and provided on its side with a crown ratchet. The cam teeth C' may be formed as shown to produce the differential and alternating tangent surfaces *s* and *r*, of equal extent, the surfaces *s* being in an arc farther removed from the center of rotation of the wheel than the surfaces *r*.

D is a swinging arm pivoted at one end to the base A, and pivotally connected, toward its opposite end, with a push button *q* which works in an opening through the escutcheon. The arm D is held normally against a stop *p* by a spring *p'* on the base plate. Pivoted at one end upon the arm, to swing laterally thereof, is a pawl D', held at its free end normally in engagement with the ratch *t* by a spring *p''*.

E and F are binding posts mounted upon the base-plate. Extending from the binding post E is a resilient contact terminal in the

form of a spring switch-finger E' which bears at its free end against the periphery of the wheel C, and in the rotation of the latter, as hereinafter described, is engaged by the surfaces *s* of the cam teeth C' and sprung outward, and returns by its resilience to the surfaces *r* when passed by the surfaces *s*. Extending from the binding post F is a contact terminal in the form preferably of a springy switch-finger F' which extends normally into the path of the surfaces *s*, and outside the path of the surfaces *r*. The circuit is made by forcing the terminal E' against the terminal F' and broken by the separation of the terminals.

In operation the push button *q* is forced in to swing the arm D on its pivot and cause the pawl D' to engage a tooth of the ratch *t* and turn the wheel. The teeth of the ratch correspond in number with the surfaces *r* and *s* and in each operation the wheel is turned the distance of one tooth which corresponds with the length of one of said surfaces. In one operation therefore the finger E' is forced outward, by the engagement of a surface *s*, against the finger F' and remains in that position, to close the circuit, while the arm D and push button are returned to normal position, and the pawl D' slides over the ratch to engage the next tooth. In the next operation the surface *s* is moved past the finger E' whereby the latter springs away from the finger F', against the relatively deeper surface *r* of the next tooth, to break the circuit. Thus in successive operations of the same push button the circuit is alternately opened and closed. At the rear ends of the surfaces *s* are stops *s'* across which the finger E' wipes in the progressive rotation of the wheel and which engage the end of the finger E' to prevent backward turning of the wheel under the friction against the ratch of the pawl D', in the movement of the latter to its initial position. It will be seen that the circuit is made by positive engagement between the contact terminals, no intervening conductive connections being employed, and the terminals are arranged to afford engaging surfaces of comparatively large area, whereby a reliable contact may be always effected. The wheel C and ratchet wheel *t* may be formed of an integral piece of insulating material, preferably

vulcanized fiber, so that its construction shall be particularly simple and inexpensive.

In the multiple switch shown in Figs. 4 and 5, there are three binding posts E, F and G, and contact terminals E', F' and G', the parts E E' and F F' corresponding with the similarly designated parts in the other construction; the post E communicating with the main conductor wire and the posts F and G with separate branch wires, respectively. The cam wheel C is formed substantially like the wheel C described, and its teeth C' present differential surfaces to the terminals. The terminal G' is bent over at its end portion to afford a comparatively large engaging surface for the terminal E', and both the said terminals bear normally against the teeth, while the terminal F' extends into the path of the outer ends or points of the teeth C' only. The end of the terminal G' is somewhat in advance of that of the terminal E', whereby in the movement of the wheel when the terminal E' is pressed outward to contact with the terminal F' the terminal G' springs inward to the next tooth away from the terminal E', as shown in Fig. 5; and when the terminal E' springs away from the terminal F', the terminal G' is pressed outward against the terminal E', as shown in Fig. 4.

The working parts of my device are housed by means of a casing H which may fit into a rabbet α around the three free edges of the base A, and against the rear side of the escutcheon. The casing may be held in place by a screw H' passing across the chamber and into the base, as shown in Fig. 3.

While I prefer to construct the device as shown and described, it may be modified in the matter of details of construction without departing from the spirit of my invention as defined by the claims.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an electric switch, the combination of a rotary ratchet wheel provided with peripheral cams, a contact terminal, a second, resilient, contact terminal, normally out of engagement with the first named terminal, riding upon the said cams and actuated thereby, in successive predetermined partial rotations of the wheel, alternately to engage and separate

from the said first named terminal, a push button, and spring pawl mechanism between the push button and ratchet wheel actuated by the push button in each operation thereof to engage and turn the wheel a said predetermined partial rotation, substantially as and for the purpose set forth.

2. In a multiple electric switch, the combination of two branch-wire contact-terminals, a main resilient contact terminal, movable between said branch-wire terminals, a rotary cam of insulating material, against which said main terminal bears, operating in predetermined partial revolutions to produce movement of said main terminal, whereby in successive operations the main terminal engages and releases the respective branch terminals alternately, and means for actuating the cam, substantially as described.

3. In an electric switch, the combination of a rotary wheel of insulating material formed with peripheral cams and a crown ratch, a contact terminal, a second, resilient, contact terminal riding upon the said cams and actuated thereby in successive partial rotations of the wheel, alternately to engage and separate from the said first named terminal, a pawl engaging the said ratch and means for actuating the pawl to rotate the wheel a partial revolution with each operation, substantially as and for the purpose set forth.

4. In a multiple electric switch, the combination of a rotary wheel of insulating material formed with peripheral cams, a push-button for actuating said wheel to rotate a partial revolution with each operation, a contact terminal, F', a resilient, contact terminal E' riding upon the said cams and normally out of contact with the terminal F', a contact terminal G' with which the terminal E' tends normally to contact, the cam wheel operating in every second partial rotation to move the terminal E' into contact with the terminal F', and in every second intermediate partial revolution to release the terminal E', whereby it springs to the terminal G', substantially as and for the purpose set forth.

ERNST WOLTMANN.

In presence of—

M. J. FROST,

J. W. DYRENFORTH.