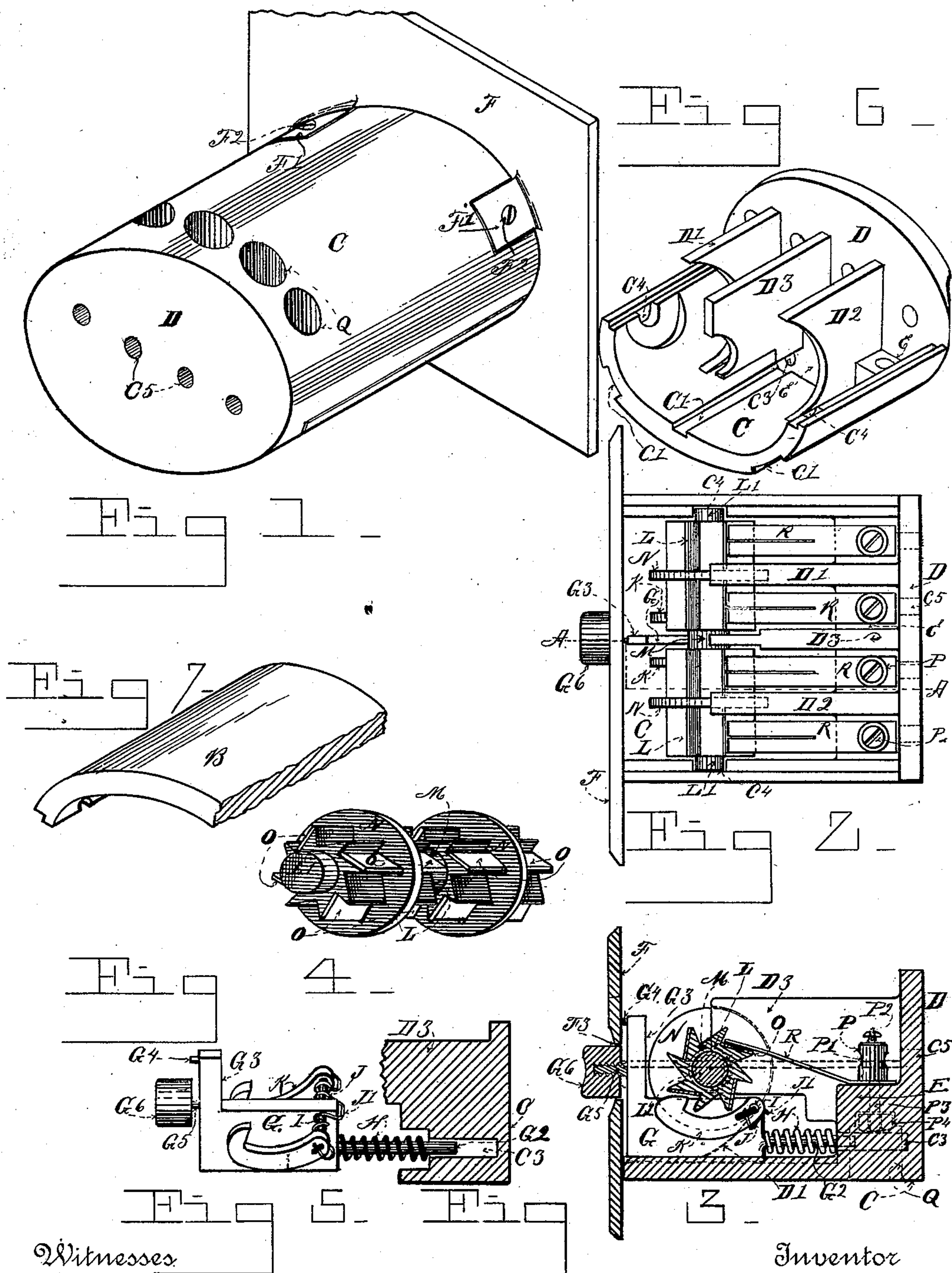


(No Model.)

H. W. LAWRENCE.
ELECTRIC LIGHT SWITCH.

No. 534,269.

Patented Feb. 19, 1895.



Witnesses.

William Allen Blakney.
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By his Attorney

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UNITED STATES PATENT OFFICE.

HARRY WALLACE LAWRENCE, OF DENVER, COLORADO.

ELECTRIC-LIGHT SWITCH.

SPECIFICATION forming part of Letters Patent No. 534,269, dated February 19, 1895.

Application filed May 31, 1894. Serial No. 512,956. (No model.)

To all whom it may concern:

Be it known that I, HARRY WALLACE LAWRENCE, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Electric-Light Switches; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in electric light switches and particularly to electric switches operating by push buttons.

The objects of my invention are, first, to provide a simple and durable single or multiple pole switch; second, to provide a switch which when used as a single pole switch makes or breaks both terminals with the poles; third, to provide a switch which when used as a multiple pole switch makes and breaks all of the contact terminals with the poles, thereby reducing the tendency to sparking to a minimum by dividing it among the four terminals; fourth, to provide a positive multiple pole switch operating with one push button; fifth, to provide a switch that makes and breaks the dynamo as well as the electric light wires. I attain these objects by the mechanism illustrated and described in the accompanying drawings and specifications, in which—

Figure 1 represents a perspective view of my improved switch. Fig. 2 represents a perspective view with the cap B. removed. Fig. 3 represents a longitudinal section through Fig. 2 on line A. Fig. 4 represents a perspective view of the ratchet cylinder. Fig. 5 represents a perspective view of the push button operating mechanism, and a fragment of the base C. in section. Fig. 6 represents in perspective a view of the base of the switch. Fig. 7 represents a fragmentary perspective view of the switch cap.

Similar letters refer to similar parts throughout the several views.

C. designates the base of the switch. It may be made of any suitable non-conductive material, fiber or porcelain being preferred. It is preferably elliptical in cross-section, and

is closed at one end by the wall D. which is formed with a step E. The opposite end is open and attaches to the face-plate F, by the cleat A', which are formed integral with it, and are secured in recesses C⁴ of the base by screws F².

A portion of the base is divided into four compartments by the partitions D', D² and D³ and the side walls of the base. These are formed integral with the base. The central partition D³ is formed integral with the rear wall D and the step E. and extends forward into the body of the base a short distance above its floor. In order to make room under it for the stem G² of the lever G, a groove C' is formed in the base for said lever to rest in, which confines it in normal position. The lever is provided with a stem G², which fits into a hole G³ formed in the step under the central partition.

A coil spring H. surrounds the stem and expansively contacts between the body of the lever and the step.

An upward extension G³ of the lever is provided with a boss G⁴ which contacts with the face plate F. It is also provided with a stem G⁵ to which is secured a push button G⁶. The said stem and push button extend freely through a hole F³ in the face plate. This extension of the lever is narrower than the groove M. of the ratchet cylinder, and strikes against it when the button and lever are pushed in, thus defining the movement of the lever. The lever G. is also provided with a pin I. which passes at right angles through it on which is mounted a spring J. and two pawls K., one at each end. The spring is preferably made continuous from one pawl to the other, being carried around the edge of the lever in order that the loop J' may strike against it when the pawls are forced down by a rotative movement of the ratchet cylinder L. This spring J keeps the pawls in contact with the ratchet teeth when the push button is pressed in which gives the cylinder a partial rotation of one tooth.

The ratchet cylinder L. may be made of fiber or porcelain. At each end it is provided with a trunnion which fits into the circular recesses C⁴ formed in the base C.

The ratchet teeth are interrupted in the center of the cylinder by a circumferential

groove M. The central partition D^3 of the base is adapted to fit snugly against the surface of this groove, and partially surround it. The ratchet teeth are also intercepted centrally between the said grooves and their ends by the collars N. which are preferably formed integral with the wheel. These collars are partially inclosed by the concentric ends of the partitions D' and D^3 . The ratchet teeth are thus divided into four circular divisions thoroughly insulated from one another. An even number of teeth are formed on the ratchet cylinder and the face of every other tooth is provided with an electric conductor O. which forms the poles. These pole pieces pass directly through the collars. They may be made of a strip of copper which can be cast into the teeth when the cylinder is cast if it is made of porcelain. If the wheel is made of fiber they will have to be secured to them, consequently the electric conductors O. make the teeth on which they rest electrically continuous through the collars.

P. designates the terminal binding posts. Each post is provided with wire receiving holes P' and binding screws P^2 . Similar holes C^5 are formed through the wall D of the base in line with the holes of the said posts, to admit the wires to them. The binding posts are secured to the step E. between each partition, and support the contact terminals R.

The posts are provided with a threaded stem P^3 which extends through the contact terminals R. and the step into a counterbored hole Q. which is contracted at the bottom and shaped to fit the nut P^4 to prevent its turning. The contact terminals are composed of a resilient conducting material which forces them to contact forcibly with each tooth as the cylinder is rotated. The contact terminals are preferably split as in this form they further divide the tendency to sparking. They are arranged between the partitions of the base and each contact terminal rests on a division of the cylinder teeth. They are consequently insulated from each other by the said partitions and collars, except when they rest on the conductors O. which closes the circuit between the contact terminals on each side of each collar and breaks the circuit between them when the ratchet is turned a partial rotation of one tooth, which causes all of them to rest on the insulated material of which the ratchet cylinder is composed. The intermittent partial rotation of the cylinder is accomplished by pushing in the push button which causes the pawls K. to engage the ratchet teeth and turn the cylinder. The pawls, lever and button are forced back into normal position when the button is released by the spring H.

The central partition D^3 thoroughly insulates the two intermediate contact terminals by bearing snugly in the groove M. while the breaking of the contact terminals instantaneously with the poles not only thoroughly insu-

lates one from the other, but entirely obviates the danger of arcing or cross circuiting.

This switch can be used as a single pole switch or as a double single pole switch by which two groups of lights in different apartments can be operated by one push button or as a multiple pole switch by which all the wires running from the dynamo and to the lights are opened and closed by one movement of the push button.

The cap B. shown in Fig. 7 is adapted to fit on the base and cover the mechanism of the switch, and can be secured to the base by any convenient means.

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

1. The combination in a switch of a base provided with resilient contact terminals adapted to engage the teeth of a ratchet cylinder having its teeth divided by one or more collars interposed between the said contact terminals, and every other tooth of which is provided with a conductor passing through the said collars, and adapted by resilient contact with said terminals to close the circuit, and a push-button and mechanism for imparting therewith to said ratchet cylinder a predetermined partial rotative motion, as herein specified.

2. In a multiple electric switch the combination of a non-conductive base and a non-conductive ratchet cylinder mounted thereon of collars and a groove arranged intermediate of the ends of said ratchet cylinder to separate the teeth into divisions, and having every other tooth of each division connected by poles of conductive material through said collars of resilient contact terminals arranged to bear on said teeth and conductors on each side of the said collars of the contact terminals insulated from each other by partitions forming part of the base extending between them to the said groove and to the said collars, and a push button attached to a lever provided with pawls arranged to contact with said teeth by a movement of said button to impart to the cylinder a partial predetermined rotative motion whereby the contact terminals are intermittently connected and disconnected by contact with said cylinder, as herein specified.

3. In an electric switch the combination of a non-conductive ratchet cylinder provided with a circumferential groove dividing the ratchet teeth centrally, and with collars intermediate of the groove and its ends, and having every other axially arranged tooth of said cylinder connected by poles of conductive material passing through said collars; of a lever provided with pawls arranged to engage said teeth and an expansive spring secured between said lever and the base adapted to keep the push button mechanism in operative engagement with said cylinder, and contact terminals arranged to bear on the same

axially arranged teeth of the cylinder on opposite sides of the said collars, and a suitable base for supporting the several mechanisms, the combination operating to make and break
5 both contact terminals with the poles of the cylinder, as set forth.

4. The combination with a non-conductive base supporting resilient contact terminals insulated from one another, a non-conductive
10 ratchet cylinder engaging said terminals having its teeth interrupted and insulated from each other by collars interposed between the contact terminals and having each alternate tooth of said cylinder connected through the
15 collars by poles of conductive material and a push button mechanism adapted to give a partial rotative predetermined movement to said cylinder whereby all the contact terminals are instantaneously switched in or out of circuit, as specified.

5. A single or multiple pole switch comprising a non-conductive base, one or more sets of contact terminals attached to said base and insulated from one another; a non-conductive ratchet cylinder mounted on said base
25 and engaging said contact terminals having said cylinder provided with collars adapted to separate the ratchet teeth into circular divisions, of an electric conductor passing
30 through the said collars and attached to every other tooth of each division, and means substantially as described for imparting a predetermined step-by-step rotative motion to said cylinder, whereby all the contact terminals may instantaneously impinge the conducting and non-conducting teeth of said cylinder, as herein specified.

6. The combination in a multiple switch of an insulated base and resilient contact terminals secured thereto a non-conductive ratchet
40 cylinder provided with trunnions forming a part thereof, mounted on said base to engage successively on each tooth at the same time all of the contact terminals, a groove formed
45 interrupting and separating the ratchet teeth into two or more divisions, and collars arranged centrally in the center of each division between each pair of contact terminals adapted to insulate them at their pole ends,
50 and poles of conductive material passing through said collars and secured to every other tooth of said cylinder, and a pawl supporting lever provided with a push button, and an expansive spring mounted between
55 the said lever and the said base and arranged

in operative engagement with said ratchet cylinder, whereby an intermittent step by step movement is imparted to said cylinder, and the said contact terminals successively make and break with the said cylinder, as
60 herein set forth.

7. In a multiple pole switch the combination with the non-conductive base provided with contact terminals of a non-conductive
65 ratchet cylinder separated into circular divisions of teeth by collars arranged in juxtaposition with projections of said base, of said contact terminals arranged to engage successively the cylinder teeth and each alternate tooth of said cylinder in each division provided with poles of conductive material passing through said collars, and a lever supported by a groove in said base having a stem extension carrying an expansive spring, and journaled in an aperture in said base; a pin passing
75 at right angles through said lever, and spring actuated pawls attached to said pin in operative relation to the teeth of said cylinder, and a face plate secured to said base provided with an aperture; a push button secured to
80 said lever and extending through said aperture, the combination operating to intermittently rotate said cylinder, thereby making and breaking successively all of the contact terminals with the poles, as herein specified. 85

8. The combination in a multiple switch of a base, a cap, and a detachable face plate of suitable material supporting bifurcated contact terminals, a non-conductive ratchet cylinder mounted in engagement with said terminals and having every other tooth provided with conductive poles engaging said contact terminals and means substantially as described for insulating said terminals against cross circuiting, and a push button movable
95 through an opening in said face plate, a lever supporting said button and provided with an expansive spring arranged in said base to reciprocate said lever, and supporting spring actuated pawls arranged in operative engagement with said ratchet cylinder, all arranged
100 as and for the purpose herein set forth and described.

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

HARRY WALLACE LAWRENCE.

Witnesses:

WILLIAM ALLEN BLAKENEY,
CHARLES JAMES BLAKENEY.