

(No Model.)

P. H. BRANGS.
ELECTRICAL SWITCH.

No. 395,609.

Patented Jan. 1, 1889.

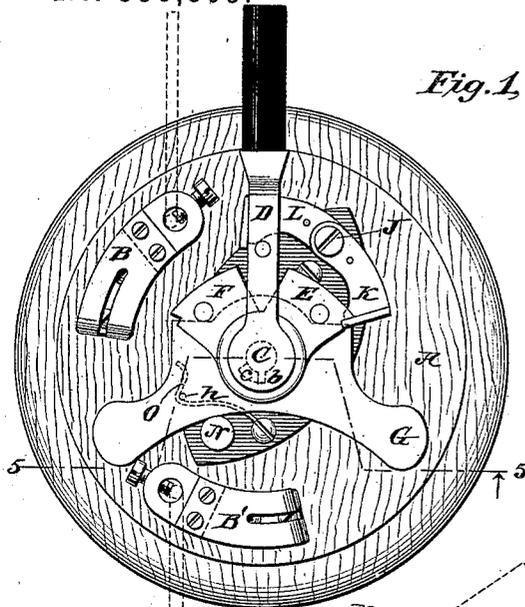


Fig. 1.

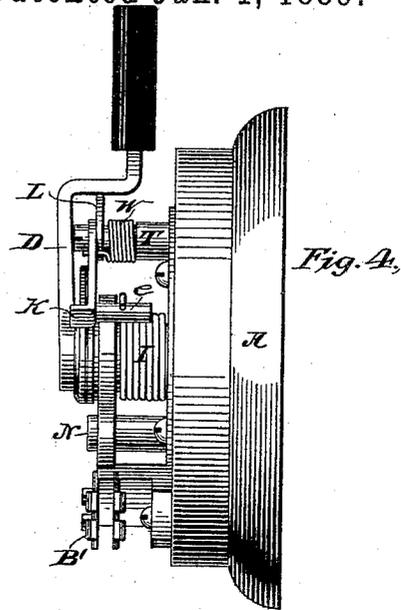


Fig. 4.

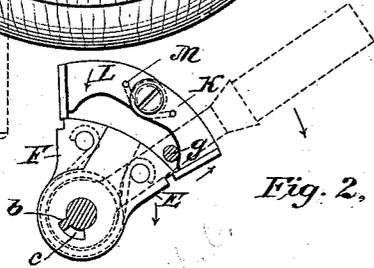


Fig. 2.

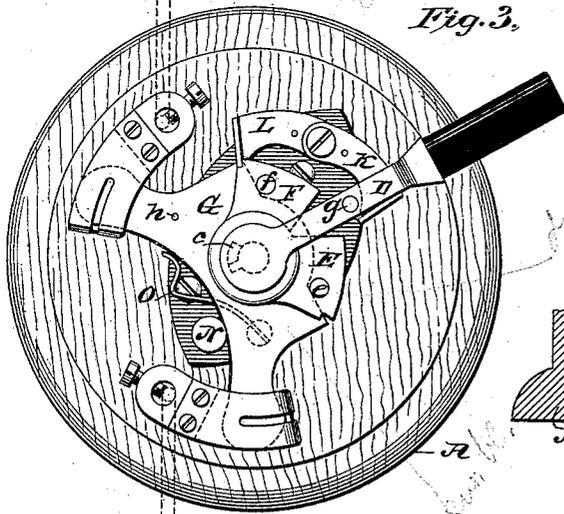


Fig. 3.

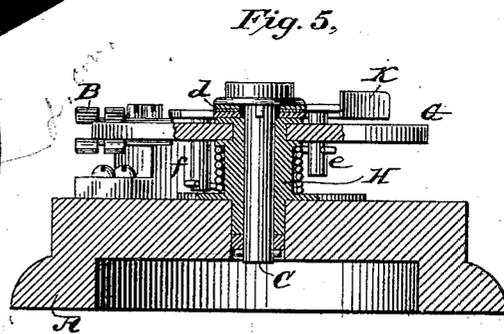


Fig. 5.

Witnesses
Geo. W. Brock.
Edward Thorpe.

Inventor
Paul H. Brangs
By his Attorneys
Dureau, Curtis & Sage.

UNITED STATES PATENT OFFICE.

PAUL H. BRANGS, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE UNITED STATES ELECTRIC LIGHTING COMPANY, OF NEW YORK, N. Y.

ELECTRICAL SWITCH.

SPECIFICATION forming part of Letters Patent No. 395,609, dated January 1, 1889.

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To all whom it may concern:

Be it known that I, PAUL H. BRANGS, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electrical Switches, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

10 This invention is an improvement in electrical switches, or that class of devices which are used for making and breaking an electric circuit, or for shifting the current from one circuit to another, or for other and similar
15 purposes, and it pertains more especially to that particular kind or form of switch in which the circuit making and breaking or shifting element or part is thrown or shifted from one position to another by a sudden or
20 practically instantaneous movement. In such devices as heretofore made this action has generally been accomplished by shifting the line of tension of either a compressed or dis-
25 tended spring across the fulcrum of the contact making and breaking element or of a pivoted part adapted to encounter in its path of movement the said element, whereby the
30 force of said spring acting upon the shifted mechanism throws or turns it from one position to the other with a sudden movement or snap.

My present invention pertains to a class of electrical switch involving another mode of operation, for, instead of varying the direction of the line of tension of a spring relatively to the fulcrum or pivot of the part to be shifted and thereby causing it to cross said fulcrum, I employ a spring or springs, the direction of the force exerted by which
40 when in a state of tension is always the same, and I effect the shifting or movement of the switch by releasing the tension at proper times, whereby the shifting will be effected directly or indirectly by the reaction of the
45 released spring and in a direction determined by the side of the fulcrum of the part to be shifted to which the force is applied.

In carrying out my invention I use with suitable circuit terminals a contact plate or
50 lever, and I pivot it loosely on a spindle, using, in cases where it is deemed necessary, any

proper means for preventing too free a movement relatively to other parts of the switch mechanism. Around the spindle I place a coiled or spiral spring, and the ends of this
55 spring I connect, respectively, to two plates or arms, also pivoted on the spindle. The spindle is provided with a handle or key by which it may be turned, and the above-mentioned arms or plates are keyed to it, but with
60 a certain degree of lost motion—that is to say, lugs or keys are carried by the spindle which extend into keyways or cut-away portions of the arms—and as the latter are loose upon
65 the spindle they are capable of a certain independent movement around the spindle. The spindle, when turned to operate the switch, encounters one of the arms and moves it toward the other. The other is restrained or held
70 against movement by a spring catch or detent; therefore the movement of the first toward it winds up the spring around the spindle. The handle which turns the spindle carries a projection or pin which encounters
75 and sets free the detent and releases the restrained arm. At the same time a second detent engages with the moving arm, so that one end of the spring being restrained the other
80 by its reaction draws the released arm around with great force and rapidity, and as a projection on the said arm is arranged to encounter the contact-lever the latter is shifted instantly. The converse of this occurs when
85 the lever or handle is turned back, the arm first moved being now restrained from movement while the backward movement of the unrestrained arm winds up the spring. The pin on the lever or handle springs or releases the restraining-detent, and at the same time
90 the arm moved by the lever is brought into engagement with the other detent.

In this particular form of switch the movement of the handle effects the shifting of the switch first by winding up a spring or bringing it into a state of tension and then releasing
95 a spring that shifts the contact-lever. It is obvious that what is here performed by one spring may be similarly accomplished by two, for the movement and locking of one arm in an advanced position and then releasing the
100 other arm is the equivalent to having a spring under tension by one movement of the han-

dle and releasing it by the other. The use of a simple spring, however, has many obvious advantages.

To explain in detail the mechanism by which I carry out my invention, I now refer to the accompanying drawings, in which—

Figure 1 is a plan view of the switch. Fig. 2 is a detached detail in plan of the swinging arms and detent. Fig. 3 is a plan view of the switch in the opposite extreme position in which it is shown in Fig. 1. Fig. 4 is a view in side elevation of the instrument. Fig. 5 is a broken section on line 5 5 in Fig. 1.

For convenience, in this instance the operative parts are mounted on an insulating-base, A, upon which are secured terminals B B', between or through which in the usual ways it is desired to make and break an electric circuit. In the center of the base is set a spindle, C, to which the handle, key, or lever D is fixed. This spindle passes through two arms or plates, E F, and is provided with keys or projections *b*, which extend into the keyways or cut-away portions *c*, to secure a limited lazy or lost motion between the spindle and the arms E F. Suitable washers, *d*, are inserted between the several parts that have an independent movement about the spindle. The spindle C passes through a sleeve, H, on which the contact lever or plate G turns loosely and around which is coiled a spring, I. The ends of this spring are respectively connected to pins *e f* set in the arms E F.

J is a post, to the upper end of which two catches or detents, K L, are pivoted. A spiral spring, M, in this case surrounding the post J, has its ends connected to the two detents, and serves to draw them together. On the lever D is a projection or pin, *g*, which forces back and releases the detents from the arms E F when the lever is shifted.

The operation will be readily understood. Assume that detent K is in engagement with the arm E and the circuit broken. Turning the switch-lever then toward the engaging detent, the arm F is shifted, winding up the spring I. When the pin *g* encounters the detent-K, it forces it back and out of engagement with the arm E, releasing said arm. The reaction of the spring under the strain imparted to it by the movement of the arm F carries the arm E around the spindle with considerable force. In this movement, which is within the range of the lost motion around the spindle, the pin *e* strikes or pushes the lever G, and with a sudden and positive movement drives it into contact with the spring plates or terminals B B'. The opposite movement of the lever D effects a similar shifting of the lever in the opposite direction. A post, N, is provided as a stop to limit the movement of the lever D.

In a switch of this kind, in which the contact-lever is shifted from the terminals without encountering others, there is little to pre-

vent the movement of the lever, as it is loosely mounted on the spindle; but any kind of break or catch may be employed to retain it in position until shifted by the operation of the spring. In the example I have shown a light spring, O, forming a yielding detent for engaging with a pin, *h*, extending down from the lever D when said lever is at "break-circuit."

This principle of construction and operation of switches is one of great utility and efficiency. The requisite number of parts or elements is very small and the construction simple. Besides this, the action is positive and instantaneous, and a wide separation of the points of contact is readily and easily effected.

What I claim as my invention is—

1. The combination, with the pivoted contact-plate of an electric switch, of a spindle about which the plate turns, two spring-actuated parts adapted to encounter the plate on opposite sides of its fulcrum, detents for engaging with and locking the said pivots in a state of tension, and a handle or key adapted when turned to force the spring-actuated parts into position to engage with the detents and to release the detents from such engagement alternately, as set forth.

2. The combination, with the shifting contact plate or lever, of two spring-actuated arms adapted to bear upon or encounter said lever upon opposite sides of its fulcrum, detents in position to engage with and restrain the said arms, and a lever or handle for alternately shifting or turning the arms against the tension of their actuating-springs into a position to engage with the detent and to release them from such engagement, as set forth.

3. The combination, with a spindle and a contact plate or lever mounted loosely thereon, of two spring-actuated arms secured with lost motion to the spindle and adapted to encounter the contact-lever on opposite sides of its fulcrum, and detents for restraining the arms placed in the path of the handle or key that turns the spindle where a given movement of said handle will release the detents from engagement with the spring-actuated arms, as set forth.

4. The combination, with a spindle and a contact lever or plate mounted loosely thereon, of two arms secured to the spindle, but with a lost motion around the same, and adapted to encounter the contact-lever, a spiral or coiled spring surrounding the spindle and having its ends connected to the two arms, respectively, detents for engaging and restraining the arms, and a handle or lever adapted to turn said arms into position to engage with the detents and to release the detents from such engagement alternately, as set forth.

5. The combination, with the spindle, a contact-plate turning loosely thereon, and a han-

dle or lever for turning the spindle, of two arms capable of a limited lost motion around the spindle, a spiral spring surrounding the spindle, with its ends connected to pins set in
5 said arms, that are adapted to encounter the contact-lever on opposite sides of the fulcrum, and two spring-detents for engaging with the arms, and a pin on the operating handle or lever adapted to force back or release either of said detents when caused to bear thereon.
PAUL H. BRANGS.

Witnesses:

THOMAS C. PROVOST,
MOSES J. DERBITT.