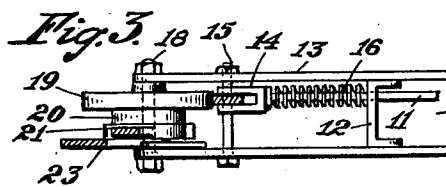
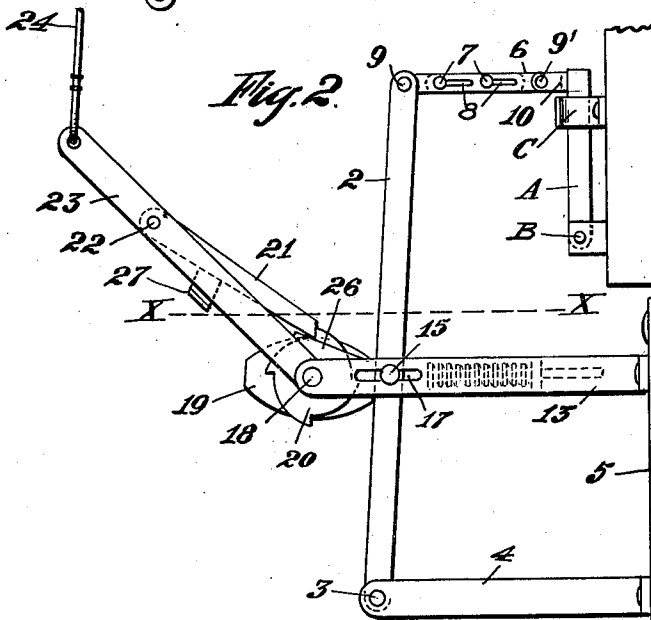
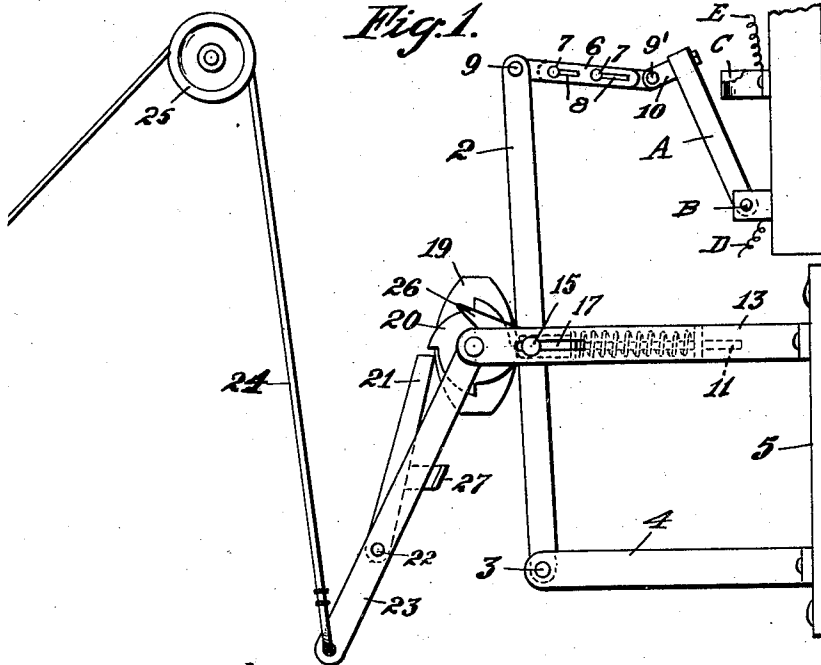


H. R. BICKFORD.
ELECTRIC SWITCH.
APPLICATION FILED APR. 5, 1912.

Patented Dec. 17, 1912.

1,047,372.



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UNITED STATES PATENT OFFICE.

HENRY R. BICKFORD OF MONTEREY, CALIFORNIA.

ELECTRIC SWITCH.

1,047,372.

Specification of Letters Patent.

Patented Dec. 17, 1912.

Application filed April 5, 1912. Serial No. 688,630.

To all whom it may concern:

Be it known that I, HENRY R. BICKFORD, a citizen of the United States, residing at Monterey, in the county of Monterey and State of California, have invented new and useful Improvements in Electric Switches, of which the following is a specification.

This invention relates to an electric switch and particularly pertains to a mechanism for operating same.

It is the object of this invention to provide a device for controlling an electric switch and which is adapted to be operated from a remote point.

Another object is to provide a switch operating mechanism, by means of which an electric circuit may be quickly broken, thereby reducing the spark at the breaking point to a minimum, and which mechanism is applicable for use on most electric switches now generally in use and may be attached to the ordinary knife switch with very little alteration of the switch structure.

A further object is to provide a device of the above character which is simple in construction, efficient in operation and capable of being manufactured at small cost.

Other objects and advantages of this invention will appear hereinafter.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a view in side elevation of the invention, showing the switch in its open position. Fig. 2 is a similar view showing the switch in its closed position. Fig. 3 is a horizontal section on the line X—X, Fig. 2.

In the drawings, A represents the movable arm of an ordinary knife switch, which arm is pivoted at B and is adapted to be forced edgewise between spring contacts C to couple to an electric circuit, as is well known; the arm A connecting with one terminal of a conductor D leading from any suitable source of electrical energy, and the contacts C connecting with one terminal of a conductor E leading to any desired point of application of the power, or vice versa.

The present invention resides in a mechanism for operating the switch arm A from a remote point to throw the switch arm in and out of engagement with the contact plates C. This mechanism is here shown as consisting of an arm 2, one end of which is pivoted at 3 to a post or bracket 4 mounted on a base plate 5, the other end of which is connected to the outer end of the switch arm A, means for normally holding the arm 2 in its outermost position, and means actuated from a distance for holding the arm in its innermost position.

The connection between the outer end of the arm 2 and the switch arm A comprises an adjustable link 6 formed of a pair of flat plates placed face to face and connected together by means of screws 7, which are threaded in one of the plates and extend through longitudinally extending slots 8 formed in the other of the plates. The slotted plate is here shown as pivotally connected at 9 to the outer end of the arm 2 and the other plate carrying the screws 7 is pivotally connected at 9' to a boss or yoke 10 mounted on the outer end of the switch arm A. By forming the link 6 as just described, its length may be varied to suit, by sliding the plates of which it is formed longitudinally in relation to each other and binding them together, by means of the screws 7.

The means here shown as employed for normally holding the arm 2 in its outermost position consists of a reciprocable bar 11, slidably mounted in a guide bearing 12 carried on a pair of brackets or standards 13 on the plate 5, which bar has a yoke 14 on its outer end pivotally connected to the arm 2 by means of a bolt 15 and has a helical expansible spring 16 wound thereon and bearing between the yoke 14 and the bearing 12 to normally retain the bar 11 and the arm 2 in their outermost positions. The outer ends of the bolt 15 pass through and are guided in oppositely disposed longitudinally extending slots 17 formed in the brackets 13.

The means for moving the arm 2 into its innermost position and retaining it there in opposition to the spring 16, so as to throw the switch arm A into engagement with the

spring contacts C and hold it securely against displacement, is here shown as constructed as follows:

Mounted on and connecting the outer ends of the brackets 13 is a bolt 18, on which a cam-plate 19 is revolvably mounted. This cam-plate is in the form of an ellipse, in outline, with its ends squared, and is mounted at its center on the bolt 18 in such position that one edge will normally contact the outer edge of the arm 2. Formed on one side of the cam-plate 19 and integral therewith is a four-point ratchet 20, the points of which are disposed on the major and minor axes of the elliptical cam-plate, and are designed to be engaged by a pawl 21 pivotally mounted at 22 on a lever arm 23, as will presently be described.

The lever arm 23 is loosely pivoted at one end of the bolt 18 adjacent the ratchet 20 and normally extends in a downward direction in the position shown in Fig. 1, by reason of its weight. The pawl 21 is of such shape and length that its upper end will be disposed adjacent the under side of the teeth on the ratchet 20, when the lever arm 23 is in its lowermost position, in readiness to engage the tooth when the lever arm 23 is moved upwardly on its pivotal mounting.

Attached to the outer end of the lever arm 23 is a cord or cable 24, which passes over a direction pulley 25 and is carried to any desired point convenient to reach.

In operation, when it is desired to either open or close the electrical switch, the cord 24 is pulled, so as to raise the outer end of the lever arm 23 from the position shown in Fig. 1 to the position shown in full lines in Fig. 2. This action causes the pawl 21 to engage a tooth on the ratchet 20 and, as the lever arm 23 moves upward, causes the ratchet 20 and the cam-plate 19 thereon, to rotate on the bolt 18 one-fourth of a revolution; the lever arm 23 gravitating back to its normal depending position when the cord 24 is released.

When the cam-plate 19 is in the position shown in Fig. 1, with one of its curved sides on its short diameter in contact with the arm 2, the latter will be situated in its outermost position, by reason of the action of spring 16, thereby holding the switch arm A in its outermost or open position. By turning the cam-plate one-fourth of a revolution, the curved edge thereof adjacent the lever 2 will bear against the latter, and cause it to move inwardly in opposition to the spring 16, thereby advancing the switch arm A between the spring contact members C to close the switch. When the cam-plate 19 has been rotated one-fourth of a revolution, one of the squared ends thereof will be positioned adjacent the lever arm 2, thereby holding the lever arm 2 and the switch arm

A in their innermost positions; the flat contact between the lever arm and the cam-plate preventing the latter from traveling beyond center.

A stop or abutment 26 on one of the brackets 13 acts to limit the upward movement of the lever arm 23 and prevents the cam-plate 19 from being rotated more than the required distance. The cord 24, on being released, allows the lever arm 23 to gravitate back to its normal position shown in Fig. 1, as before stated; the pawl 21 falling below the next tooth on the ratchet 20 in readiness for another operation, which is repeated when it is desired to open the switch. In the latter case, the cam-disk 19 is rotating from the position shown in Fig. 2 to that shown in Fig. 1, will release the arm 2; the spring 16 acting to quickly restore the arm to its outermost position, thereby throwing the switch arm A out of engagement with the contact plate C with great speed and thus reducing the spark at this point to a minimum.

The pawl 21 is limited in its backward movement by means of a stop 27 formed thereon and positioned to engage the underside of the lever-arm 23, thereby preventing the pawl from being displaced.

From the foregoing it will be seen that I have provided a switch operating mechanism which may be easily and quickly operated from a distance, either to throw the switch on or off, and which mechanism is simple and durable and not liable to get out of order.

It is manifest that the device may be positioned horizontally, as well as vertically; only the latter arrangement being shown in the drawings, and it is evident that slight changes might be resorted to in the form and arrangement of the several parts described without departing from the spirit and scope of my invention.

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

1. The combination in a switch operating device, of a rockable member attached to a switch, resilient means opposing said rockable member to retain the switch in an open position, means for actuating the rockable member in opposition to said resilient means to close the switch, including a revoluble cam plate, means on said plate for holding the rockable member in its innermost position, and means for rotating said cam plate, consisting of a ratchet formed integral with the cam plate, a pawl engageable with the ratchet, and a lever arm fulcrumed on the center of rotation of the cam-plate on which the pawl is mounted.

2. In a device of the class described in combination, a switch operating device, a

lever, an adjustable link for operatively
connecting said lever with the switch to be
operated, a resilient spring normally tend-
ing to operate said lever to throw said
5 switch open, a rotatable cam mounted to co-
operate with said lever at a point substan-
tially opposite the said spring, said cam be-
ing adapted to control said lever to operate
the same against pressure of said spring to

close the switch, and ratchet means for op- 10
erating said cam.

In testimony whereof I have hereunto set
my hand in the presence of two subscribing
witnesses.

HENRY R. BICKFORD.

Witnesses:

CARMEL MARTIN,
FRED A. TREAT.