Oct. 12, 1926. 1,602,920

W. E. MENZIES

ELECTRIC SWITCH

Filed Feb. 19, 1921

Fig. 1.

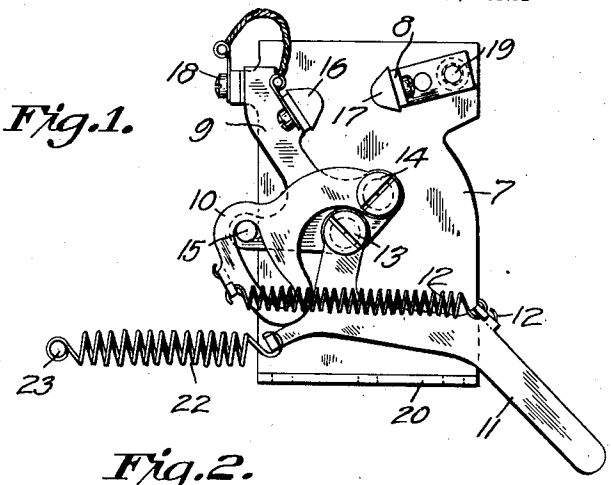


Fig. 2.

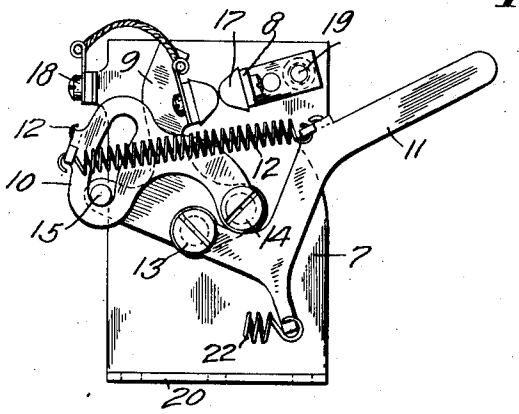


Fig. 3.

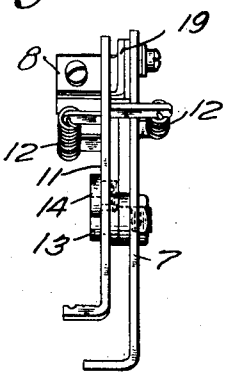


Fig. 4.

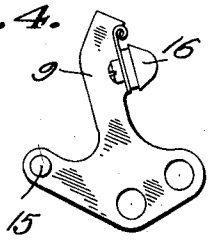


Fig. 5.

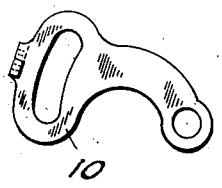
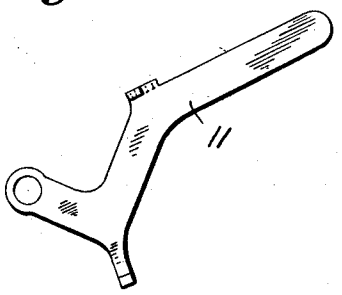


Fig. 6.



WITNESSES:

R. D. Harrison.

A. Martin

INVENTOR

William E. Menzies,

BY

Merle G. Coar

ATTORNEY

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UNITED STATES PATENT OFFICE.

WILLIAM E. MENZIES, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

ELECTRIC SWITCH.

Application filed February 19, 1921. Serial No. 446,309.

My invention relates to electric switches and particularly to those of the quick-make and break type.

One of the objects of my invention is to provide a switch of the character described wherein quickness and accuracy of movement are secured by the use of a minimum number of parts.

Another of the objects of my invention is to provide a switch-actuating mechanism of such construction as to insure against suspension of movement of the tensioned members when the line dividing the opposite angles of pressure is reached, in order to lessen the tendency of the contact members to spark and to thereby conserve their life and efficiency.

Still another object of my invention is the provision of means whereby the tension of an actuating spring is directed against a striker arm for the movable contact member and wherein such striker arm is pivotally supported on the movable contact member in such position that the pressure of the spring is directed against such pivotal point, as well as against the point of striking engagement between the striker arm and the movable contact member, thereby increasing the effectiveness of the spring.

I accomplish the foregoing objects by means of two members pivoted eccentrically to each other, one of them having lost-motion engagement with a movable contact member and each supporting one of the ends of a tension spring in such manner that, when the actuating member is moved a distance sufficient to carry the spring across the center line of one of the pivots, the direction of tension on the other member, or striker arm, will be shifted. The striker arm, by reason of its lost-motion connection to the movable contact member, will strike the movable contact member a hammer blow during its movement to the reverse position, under the action of the spring, and will carry the movable contact member to open or to closed position, as the case may be.

As shown in the accompanying drawings:

Figure 1 is a side elevational view of the switch in open position;

Fig. 2 is a similar view, showing the parts in closed position;

Fig. 3 is a view, looking from the right of Fig. 2, and

Figs. 4, 5 and 6 are detail views of the movable contact carrier, the striker arm and the operating lever, respectively.

The switch is mounted on a base 7 and consists of a stationary contact member 8, a movable contact member 9, a striker arm 10, an operating lever 11 and a pair of springs 12.

The operating lever 11 and the movable contact member 9 are independently pivoted at 13 to the base 7, and the striker arm 10 is pivoted at 14 to the movable contact member 9. The striker arm 10 is provided with a slot that co-operates with a lug 15 on the striker arm to constitute a lost-motion connection between the movable contact member and the striker arm.

The movable contact member 9 is provided with a usual tip 16 that is moved into and out of engagement with a tip 17, and these contact tips are connected respectively to terminals 18 and 19.

When the operating lever 11 is in its lower or open position, as shown in Fig. 1, the tension of the springs 12 serves to maintain the movable contact member 9 in open position, by reason of the engagement between the striker arm 10 and the lug 15. It will be seen that the striker arm 10 abuts against the lever 11 to limit the movement of both of such members toward their open positions. It will be noted that the rotation of said members about the pivot 13 is limited by reason of the engagement between the outer end of the movable contact member 9 and the under side of the terminal 18, and also by reason of the engagement of the lever 11 with an end wall 20 of the base 7.

Upon movement of the operating lever 11 to its upper or closed position, the springs 12 are carried across the pivots 13 and 14, causing the striker arm 10 to be thrown to the position illustrated in Fig. 2, and to thereby move the contact member 9 to closed position. When in this position, the tension of the springs 12 is directed against the movable contact member 9 through both the lug 15 and the pivot 14.

If, now, the operating lever 11 be moved toward its open position, the springs 12 will be carried past the pivots 14, and pressure will be exerted against such pivots until the springs reach approximately a position op-

posite the ends of the pivot 13. Pressure is thus imparted against the movable contact member, through the pivot 14, in addition to, and irrespective of, the pressure exerted thereon through the striker arm 10 and the lug 15. When the line of tension, as exemplified by the springs 12, has crossed the pivot 14, the striker arm 10 will be immediately thrown to the position illustrated in Fig. 1, thereby effecting a quick opening of the switch and minimizing the tendency to arc.

During closing movement of the lever 11, the spring is carried across the pivot 13, in advance of its passage across the pivot 14, and there is, consequently, not the same degree of pressure exerted on the movable contact member by the spring at the early stages of its closing movement that is present at the start of its opening movement, but the necessity for such effectiveness is not as great during the closing movement, because there is less tendency of the contacting tips to arc when they are moving toward one another.

While I have shown two springs 12, one spring would suffice, the two springs being provided merely to secure a balancing of the tension exerted on the pivots and to overcome any tendency to bind.

A tension spring 22 is provided for returning the operating lever 11 to its open position when the switch is to be used as a control switch and it is desired to guard against permitting it to be inadvertently left in closed position. This spring has one end fastened to the operating lever and its other end secured at any fixed point 23 adjacent to the switch.

It will be apparent that the invention may be applied to a variety of switches. For instance, it may be conveniently employed in connection with multi-pole switches wherein the movable contact member will, at each actuation thereof, close a circuit through any one of a plurality of stationary contact devices, as desired.

Various other modifications will be readily apparent to those familiar with the art, and the scope of my invention is limited only as defined in the claims appended hereto.

I claim as my invention:—

1. An electric switch comprising, in combination, a movable contact member, a striker arm pivoted thereon and having a portion thereof adapted to make lost-motion engagement with the movable contact member, a pivoted operating lever, and resilient means between the operating lever and the striker arm so positioned as to move across the pivotal point of the striker arm in advance of its passage across the pivotal support for the operating lever when the switch is being moved to open position.

2. An electric switch comprising, in combination, a movable contact member, a striker arm pivoted thereon and having a portion thereof adapted to make lost-motion engagement with the movable contact member, a pivoted operating lever, and a tension device between the operating lever and the striker arm so positioned as to move across the pivotal point of the striker arm in advance of its passage across the pivotal support with the operating lever, when the switch is being moved to open position, and to cross the point of pivotal support for the operating lever in advance of the pivot for the striker arm when the switch is being moved to closed position.

3. A switch comprising, in combination, a movable contact member and an operating lever both mounted on a fixed pivot, a striker arm pivoted on the movable contact member at a point removed from the said fixed pivot, a lost-motion connection between the outer end of the striker arm and the movable contact member, and means for biasing the operating lever and the striker arm toward each other, the parts being so positioned that the line of force will pass across the movable pivot in advance of its passage across the fixed pivot when the switch is being moved toward one of its positions.

4. A switch comprising, in combination, a movable contact member and an operating lever both mounted on a fixed pivot, a striker arm pivoted on the movable contact member at a point removed from the said fixed pivot, a lost-motion connection between the outer end of the striker arm and the movable contact member, and a spring connecting the operating lever and the striker arm, the parts being so positioned that the line of tensional force will pass across the movable pivot in advance of its passage across the fixed pivot when the switch is being moved toward one of its positions and will move across the fixed point of pivotal support in advance of the movable pivot when the switch is being moved to its other position.

5. An electric switch comprising, in combination, a pivotally supported contact member, an operating lever for said member, a striker arm, means for exerting tension between the operating lever and the movable contact member, and means whereby, during an opening movement of the switch, the striker arm is caused to impart an opening movement to the movable contact member in advance of the passage of the line of tensional force across the pivotal point of the movable contact member.

In testimony whereof, I have hereunto subscribed my name this 8th day of February, 1921.

WILLIAM E. MENZIES.