Oct. 16, 1923. 1,470,868

W. J. NEWTON

SWITCH

Filed March 2, 1922

FIG. 1.

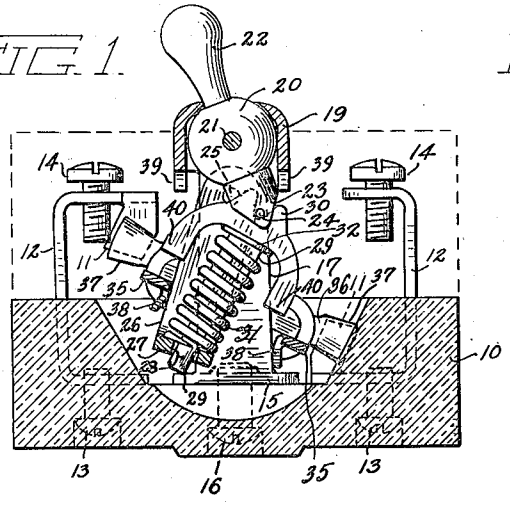


FIG. 2.

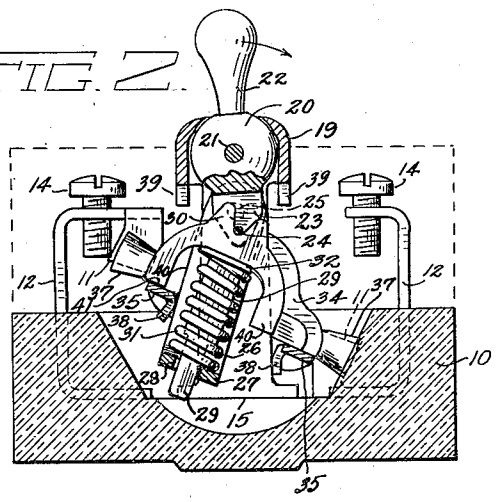


FIG. 5.

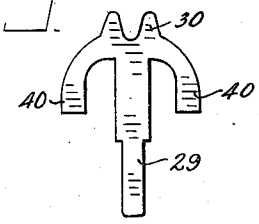


FIG. 3.

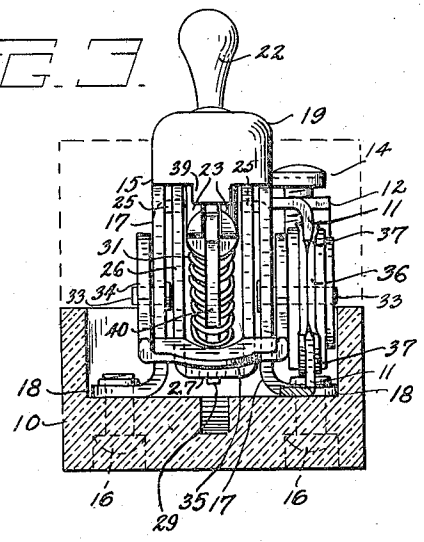
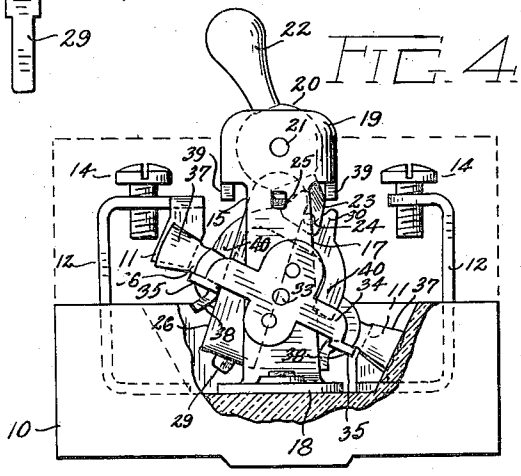


FIG. 4.



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Patented Oct. 16, 1923. 1,470,868

UNITED STATES PATENT OFFICE.

WILLIAM J. NEWTON, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO HARVEY HUBBELL, INCORPORATED, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

SWITCH.

Application filed March 2, 1922. Serial No. 540,395.

To all whom it may concern:

Be it known that I, WILLIAM J. NEWTON, a citizen of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Switches, of which the following is a specification.

This invention relates to operating mechanism for electrical switches, steam and water valves, and the like, and particularly to so-called snap action mechanisms, and has for an object to provide a mechanism of this type in which there is no possibility of the contacts in an electric switch, or a valve and its seat, freezing or sticking so that the switch, valve, or whatever device is to be operated, will always operate as intended.

It is a further object of the invention to provide a device of this type in which a power means, such as a spring, is employed to impart rapid make and break, or opening and closing movements, to the member to be operated, with independent positively acting means for imparting the initial movements to the said member so that the contacting elements will not freeze or stick and the switch, valve, or device to be shifted, will always be operated.

With these and other objects in view, I have devised the mechanism illustrated in the accompanying drawing, in which

Fig. 1 is a longitudinal, sectional elevation through an electric switch mechanism embodying my invention, showing the switch in closed position.

Fig. 2 is a sectional elevation similar to Fig. 1, but showing the positions of the elements as the positively acting means begins to act upon the contact member.

Fig. 3 is a transverse, sectional elevation at one side of the switch mechanism and looking from the right of Fig. 1.

Fig. 4 is a side elevation of the switch in closed position, a portion of the insulating base being broken away to more clearly show the construction, and

Fig. 5 is a side view of the toggle arm.

For the purpose of illustrating my invention, I have shown and will describe it as applied to an electric switch, but it is by no means limited to such use as it may, with equally advantageous results, be employed in operating a steam or water valve, and so forth. The principle of my invention is adapted for use in various types of switch and valve, or the like, mechanisms and, therefore, I do not wish to be limited to the employment thereof with the specific mechanism disclosed. For the purpose of illustrating the invention, I have shown it as applied to the type of switch disclosed in my prior Patent, No. 1,346,553, issued July 13, 1920.

In the device illustrated, the switch mechanism is mounted upon the insulating base 10. The fixed contacts 11 are formed upon the contact carriers 12 which are secured to the base 10 by suitable screws 13, and carry the binding screws 14 whereby the lead wires may be connected thereto. Between the contacts, is mounted a support or frame 15 secured to the base by any suitable means, such as screws 16, and in which are mounted the movable switch elements. This support or frame is substantially U-shaped in cross section, including upstanding legs or side members 17 having outwardly turned feet 18 to receive the securing screws 16. The upper ends of these legs or side members are connected by the dome 19 in which is pivotally mounted the operating member 20, the pivot being indicated at 21, and the member having a suitable handle 22 to facilitate the manual operation thereof. Any other suitable operating mechanism may be employed, such as push buttons, or the like. The lower end of this member is forked, as shown at 23, in which is mounted a transverse pin 24 to operate the toggle mechanism. Lugs 25 are struck inwardly from the upper portion of the side members 17 to form pivots for the actuating member 26 which, in the form shown, is substantially U-shaped, and is inverted and located between the side members 17. The connecting portion 27 is provided with an opening 28 therein through which extends the lower end of the toggle arm 29, this arm being adapted to have a sliding and rocking movement in said opening and is forked at its upper end, as shown at 30, to embrace the pin 24, the upstanding sides of this fork extending between the sides of the fork 23 of the operating member 20. A compression spring 31 embraces the toggle arm 29, bearing at its upper end against a washer 32 and at its lower end against the portion 27 of the actuating member 26.

Pivoted on the outside of the side members 17, at a point 33, is a yoke 34, the

side sections of which are connected by spaced cross pieces 35, and secured to this yoke and electrically insulated therefrom, is a swinging contact member 36 carrying the electrically movable contact elements 37 adapted to engage the fixed contacts 11. It will be evident that swinging of the yoke 34 on its pivots will swing the contacts 27 to and from engagement with the contacts 11, the yoke being provided with suitable stops 38 adapted to engage the sides of the members 17 to limit the movements of the yoke in opposite directions. The operating member 20, toggle arm 29, spring 31, and actuating member 26 form a spring controlled toggle mechanism for swinging the yoke 34 and the contact member 36 on its pivots, the actuating member 26 being located between the cross pieces 35 and these pieces being spaced apart a sufficient distance to allow the actuating member to have a certain amount of swinging movement relative thereto. Starting, for example, with the parts in the position shown in Fig. 1, swinging of the handle 22 of the operating member 20 to the right, as shown by the arrow in Fig. 2, will compress the spring 31 until the pin 24 is on a line joining the pivot 21 and the center of the opening 28. As the pin 24 passes beyond this line, the spring expands moving the lower end of the actuating member to the right, as shown in Figs. 1, 2 and 4, bringing the edges of the actuating member 26 in contact with the right hand or lower cross piece 35, giving it a blow which will swing the yoke and contact member on its pivot and separate the contacts 37 from the contacts 11. Downwardly projecting stops 39 are also provided on opposite sides of the dome 19 to engage the sides of the fork 23 to limit the movements of the operating member 20.

Carried by the toggle arm 29, adjacent the upper end thereof, are two oppositely extending, projecting elements 40, which elements are extended downwardly a sufficient distance and are also so located sidewise of the arm, that when the operating member 20 is swung on its pivot to move the toggle through its neutral position, preferably just before the toggle reaches this neutral position, the lower end of one of these projections will contact with the corresponding cross piece 35, as shown at 41 in Fig. 2, so that, as the toggle moves through its neutral position, this projecting member will press against the cross piece to positively swing the yoke carrying the contact member 36 to move the contacts 37 relatively to the fixed contacts 11, and to impart initial movements thereto. The result of this is that, as the action of the spring takes effect on the yoke, and through it the contact member, valve, or whatever element is to be shifted, the movable contacts or element are already in motion. It will be clear from this that the action of the spring controlled toggle mechanism is not relied upon to start the movable contacts or element from the stationary contacts, but there is means for positively starting this movement so that there is no possibility of the contacting elements freezing as is sometimes the case when the spring is relied on to break the contact, the result being that the switch, or valve, or similar element, is always operated as intended.

Having thus set forth the nature of my invention, what I claim is:

1. In a switch, a swinging contact member, a swinging actuating member, an operating member, a toggle arm connected to the actuating member and the operating member, said actuating member and arm comprising a toggle, a spring between the toggle arm and actuating member, cooperating engaging parts on the contact and actuating members, said spring acting to swing the actuating and contact members after the toggle has been moved through its neutral position, and means operated by the operating means for positively shifting the contact member as the toggle passes through its neutral position.

2. In a switch, a swinging contact member, a swinging actuating member, an operating member, an operative connection between the operating member and the actuating member including a spring controlled toggle, and means carried by the toggle for positively shifting the contact member as the toggle passes through its neutral position.

3. In a switch, a support, a contact member comprising side pieces pivoted to the support and spaced apart cross pieces, an actuating member independently pivoted to the support and located between the cross pieces and adapted to engage the same to actuate the contact member, an operating member, a toggle arm pivoted to the operating member and having sliding engagement with the actuating member, a compression spring carried by the toggle arm and bearing against the actuating member, and means carried by the toggle arm for positively swinging the contact member as the toggle passes through its neutral position.

4. In a switch, a swinging contact member, a swinging actuating member, a spring controlled toggle mechanism acting on the actuating member to swing both the members, means for moving the toggle mechanism through its neutral position to swing said members, and means carried by the toggle mechanism to positively move said contact member as the toggle mechanism passes through its neutral position.

In testimony whereof I affix my signature.

WILLIAM J. NEWTON.