March 20, 1928. 1,663,081

H. HERTZBERG

SNAP SWITCH

Filed April 17, 1926

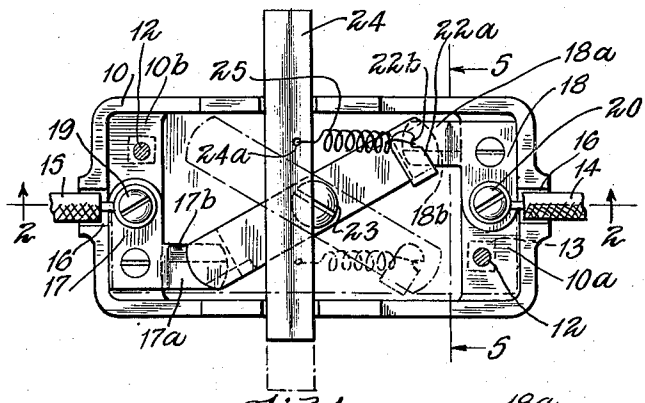


Fig. 1.

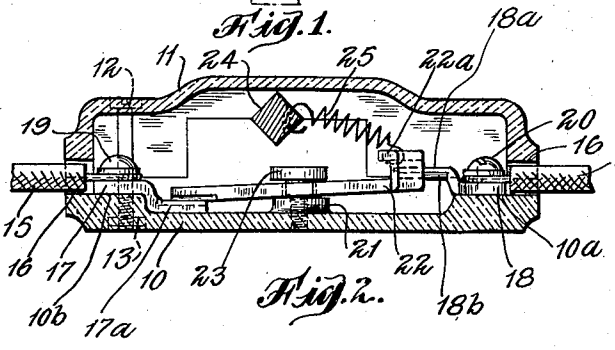


Fig. 2.

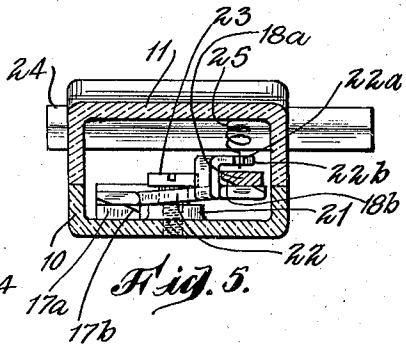


Fig. 5.

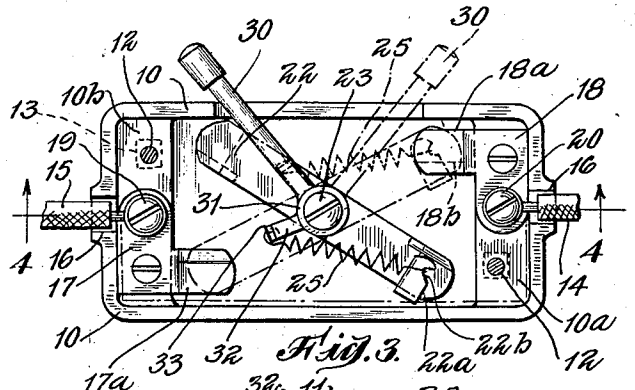


Fig. 3.

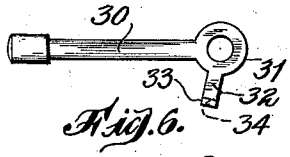


Fig. 6.

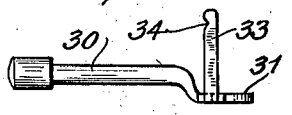


Fig. 7.

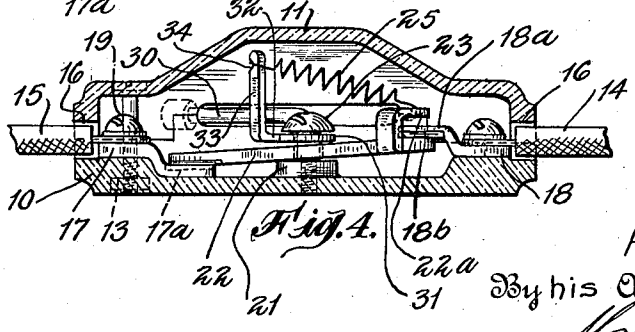


Fig. 4.

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By his Attorney

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UNITED STATES PATENT OFFICE.

HARRY HERTZBERG, OF BROOKLYN, NEW YORK, ASSIGNOR TO M. PROPP CO., OF NEW YORK, N. Y., A FIRM COMPOSED OF MORRIS PROPP AND LOUIS PROPP.

SNAP SWITCH.

Application filed April 17, 1926. Serial No. 102,708.

This invention relates to electric switches of the snap type.

An important object of the invention is to provide a device of the character mentioned which is simple in construction, inexpensive to manufacture and reliable in operation.

A particular object of the invention is the improvement of the contact making parts of the switch by a simplification in their construction which adapt the switch to carry heavier currents than switch of similar type. Further objects and certain advantages of the invention will become apparent from the following description when taken in connection with the accompanying drawings in which:—

Fig. 1 is a plan view of the interior of a push button switch showing the lower half of the casing and the mechanism contained therein. The cap portion of the casing is removed.

Fig. 2 is a sectional elevation on line 2—2 of Fig. 1 showing the cap portion of the casing in place.

Fig. 3 is a plan view showing the interior of a switch of the toggle type embodying the invention, showing the lower half of the casing and the mechanism contained therein. The cap portion of the casing is removed.

Fig. 4 is a sectional elevation on line 4—4 of Fig. 3 showing the cap portion of the casing in place.

Fig. 5 is a transverse sectional elevation on line 5—5 of Fig. 1.

Fig. 6 is a detail plan of switch lever 30.

Fig. 7 is a front elevation of Fig. 6.

Referring to the drawings, 10 represents the bottom part of a switch casing, preferably of moulded or compressed insulating material. This section contains the switch mechanism and is covered by a cap section 11 which is fastened thereto by means of screws 12 which engage nuts 13 preferably moulded into the body part of the insulating material. The opened casing shows the form of an elongated rectangle into which the line conductors 14 and 15 enter through apertures 16 on its longitudinal axis. These conductors are fastened to terminal blocks 17 and 18 by means of binding screws 19 and 20.

Terminal blocks 17 and 18 have angular shape and fit into diagonally opposite corners of the interior rectangle formed by the casing. Their lower faces lie in the dividing plane between bottom part 10 and cap 11 of the casing. The bottom section 10 is recessed in its middle part between 10^a and 10^b which support the blocks 17 and 18. Each one of the terminal blocks is provided with a contact plate 17^a and 18^a respectively forming an integral part of the block but offset into a plane parallel thereto. The contact plate 18^a has a lower face arranged in a plane parallel to but above 18 while contact plate 17^a is so arranged that its upper face lies parallel to but below block 17. The edges 17^b and 18^b of the contact plates are beveled, bevel 17^b is on the upper face and 18^b on the lower face of the respective plate. In the geometrical center of the rectangle formed by the sides of the casing a boss 21 is formed within the recessed portion. A rotatable switch blade 22 is pivotally mounted upon this boss 21 by means of a pivot screw 23 held by the insulating material of boss 21. This pivot screw is slightly smaller than the aperture in blade 22 through which it passes and there is a small space allowed between the upper face of blade 22 and the lower face of the screw head of 23. This arrangement permits the switch blade 22 to take a slightly tilted position as shown in Figs. 2 and 4 of the drawings. From the same figures may be seen that the blade 22 is interposed between the lower face of 18^a and the upper face of 17^a when it closes the circuit. Near one end of blade 22, close to plate 18^a a bracket 22^a is attached thereto which by a reverse bend extends transversely across the blade, parallel to its upper face, leaving a space for the accommodation of plate 18^a. This bracket is provided with a notch 22^b located above the longitudinal axis of 22.

The description of my switch so far covers the push button switch shown in Figures 1 and 2 as well as the toggle switch shown in Figures 3 and 4.

Referring now only to Figures 1, 2 and 5 a square push button operating bar 24 is arranged transversely of the casing to slide in corresponding V notches of the bottom and cap sections. This bar is located slightly to one side and a distance above the pivot screw 23. A helical tension spring 25 by means of rings at its ends is threaded into an aperture 24^a through two adjacent sides

of bar 24 at one end and hooked into notch 22^b at its other end. It will be seen from Fig. 1 that this spring lies parallel to the longitudinal wall of casing 10 and from Fig. 2 that the spring has a downwardly inclined position from bar 24 to bracket 22^a. It has therefore a tendency to lift the tiltable blade 22 upward at plate 18^a and to press it downward at 17^a and to form a secure contact between the switch blade and its two contact plates. A pushing of the operating bar into the dotted position shown in Fig. 1 will first elongate the spring 25 until aperture 24^a passes the axis of the casing, and as soon as this point is passed blade 22 will snap into the opened position of the switch shown in dotted lines on the drawings. In this position one end of blade 22 is slightly raised above the lower face of 18^a and the lower face of the other end depressed below the upper face of 17^a by the action of spring 25. The closing operation of the switch is the same as that described but reversed in direction. To facilitate the engagement of the blade ends with the contact plates both parts are beveled at the engaging edges 17^b and 18^b.

Referring now to Figures 3 and 4 which illustrate the toggle operation of the switch it will be seen that between blade 22 and the head of pivot screw 23 an operating lever 30, having the form of a bell crank, is placed by means of a washer like hub 31 which encircles pivot screw 23. The main part of the operating lever 30 extends through a slot in the side of the casing to the outside and is there provided with a knob at its end to form a handle. The hub 31 is provided with a second lever arm 32 which is placed at an angle of about 90 degrees from the lever 30 and which carries a vertical post 33 at its other end. Post 33 is provided near its upper end with a notch 34 for the accommodation of one ring-end of spring 25, giving the spring 25 a tilted position. The other end is attached to notch 22^b as previously described. To operate the switch, lever 30 is moved from its position shown in Figure 3 to the position shown in dotted lines. The turning of the lever swings arm 32 and post 33 from one side of the casing-axis to the other side thereof, first tightening spring 25 and after passing the axis releasing it and snapping blade 22 into closed position, and in contact at its ends with contact plates 17^a and 18^a. Several advantages are gained by this invention, a particular one is the construction of the switch blade 22 and both contact plates 17^a and 18^a from solid plate. In switches of this sliding contact type these contact forming members are generally made from thin brass spring to obtain a good contact. This makes it necessary to subdivide the contact plates or springs in small sections which burn off easily by the slightest arc produced in switching. The capacity of such switches is therefore limited to very light current values.

In the present invention the spring 25 by its arrangement in slanted position serves a double purpose. It furnishes the force for swinging the lever 22 into and out of contact with the plates 17^a and 18^a and it pulls the same blade into the tilted position shown on the drawings. The beveled edges on blade 22 and 17^b—18^b on the contact plates let the switch blade glide into almost horizontal position when in closed position, but the vertical component of the tension force of spring 25 assures an intimate contact at blades 17^a and 18^a without dividing these plates into resilient pieces or providing other resilient means thereon. Blade 22 and contact plates 17^a and 18^a can therefore be made from heavier metal and can safely carry heavier currents than other switches of this type. It should also be remarked that the sliding contact improves by wearing in while switches which close hammer like make contact only at the point or points of impact. If the contact surface is small in a new switch it will not increase by the use of the switch but will do so in a switch of the knife or sliding contact type.

It is a great advantage of this switch that it can be constructed as a push button switch as well as a switch of the toggle type without any alteration of its mechanism but only by application of a different operating element.

It is of particular advantage that the number of parts entering in the manufacture of this switch is reduced rather than increased and that an improved article can be furnished for a smaller price.

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

1. In a switch of the kind described a casing, a pivot centrally located therein, a switch blade having two equal arms oscillatably mounted on said pivot, a contact plate for each end of said blade, one plate being mounted to engage the upper face and the other the lower face of said blade at diagonally opposite places of said casing and common resilient means for snap operation of said blade and for pressing its opposite faces against said contact plates.

2. In a switch a casing, a pair of contact plates held in diagonally opposite corners of said casing, a double armed switch blade, a pivot for said blade arranged centrally between said contact plates a switch operating member above said blade and a tension spring for operating said blade fastened to said operating member at one end, and to one arm of said switch blade at the other end, said tension spring having a slanted position to exert an upward pull on said

switch blade for pressing its lower face against one contact plate and its upper face against the other plate.

3. In a snap switch a casing a switch blade having two equal arms, a pivot centrally located in said casing on its longitudinal axis, said pivot holding said blade oscillatable in a horizontal plane a pair of contact plates adapted to engage the ends of said blade at opposite sides and opposite faces thereof, operating means for said blade, a helical spring having one end attached to said operating means and its other end to said switch blade near one end thereof, said spring forming common means for snap operation of said blade and for tilting it vertically so as to press opposite faces thereof against the contact faces of said plates.

4. In a snap switch a casing a rectangular recess formed therein a pivot in the recess of said casing on the longitudinal axis thereof, contact forming plates at diagonally opposite corners of said rectangle, a bar shaped switch blade, means mounting said blade in slanted position on said pivot a bracket on said blade near one end thereof, transversely movable operating means above said blade and a helical spring joined to said operating means at one end, and to said bracket at its other end, said spring forming common means for snap operation of said blade and for resiliently pressing opposite faces of said blade against said plates by lifting said blade at one end.

5. In a snap switch a circuit closer bar, a double armed lever for operating the same, the arms of said lever forming an angle with each other in the same plane, a common pivot for said bar and said lever, a pair of terminal contacts in the path of said bar one of said contacts being above and the other below the moving planes of said bar at one extreme end of its movement, a tension spring connected to one end of said bar and to one arm of said lever to assume a slanted position, said spring forming common means to oscillate said bar in and out of contact with said terminal contacts and to tilt said bar so as to press it against the flat faces of said terminal contacts.

In testimony whereof I have signed my name to this specification this 14th day of April 1926.

HARRY HERTZBERG.