J. F. CAVANAGH.

ELECTRIC SWITCH.

APPLICATION FILED MAR. 30, 1918.

1,303,161. Patented May 6, 1919.

Fig. 1.

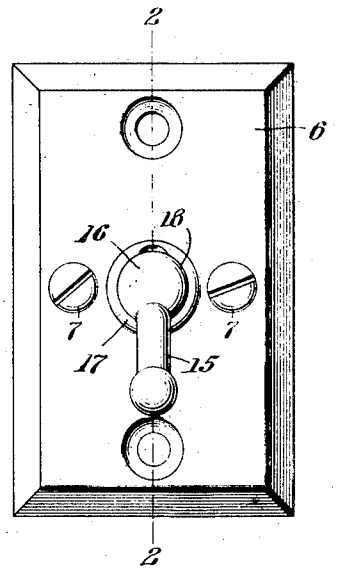


Fig. 2.

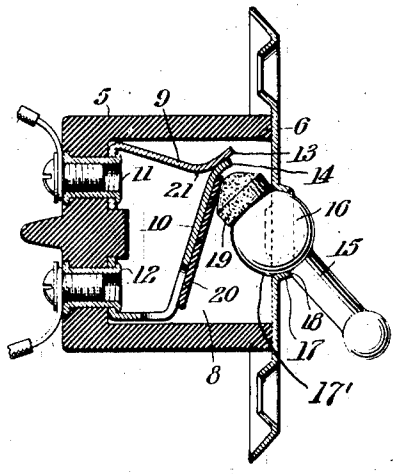


Fig. 3.

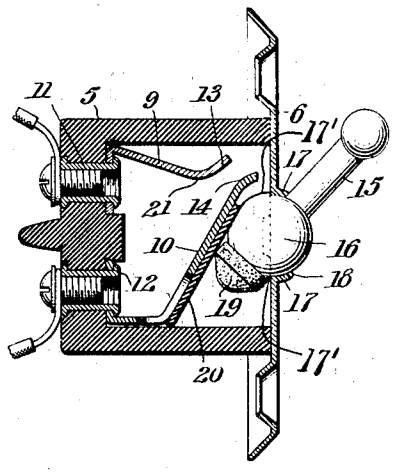
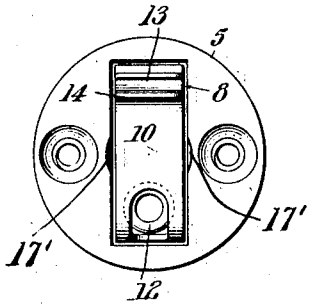


Fig. 4.



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ELECTRIC SWITCH.

1,303,161. Specification of Letters Patent. Patented May 6, 1919.

Application filed March 30, 1918. Serial No. 225,651.

To all whom it may concern:

Be it known that I, JOHN F. CAVANAGH, a citizen of the United States of America, residing at Meriden, New Haven county, Connecticut, have invented a new and useful Electric Switch, of which the following is a specification.

This invention is in the nature of what have been commonly termed tumbler switches, and the objects of the invention are to provide a comparatively simple and inexpensive switch of this general character and which will be positive in operation and thoroughly effective in every respect.

Other objects are to provide such a switch which will be compact in design and of neat attractive appearance.

Further objects of the invention are to secure quick circuit opening and closing movements of the circuit controlling contacts, to insure proper electrical conductivity at such contacts and to protect the contacts from injury by attempted improper operation of the switch and from moisture, dust, etc.

Briefly stated, the invention comprises in a preferred form a supporting base which is of hollow open ended construction to form a housing for the switch contacts mounted therein, one of said contacts being of a yielding nature and having a bearing portion extending substantially transversely across the open end of the hollow base, and which bearing portion is adapted to be engaged and depressed by the inner end of an operating lever which has a swiveled bearing in a face plate closing the open end of the hollow base. The flexure of the yielding contact has a tendency to cause it to "rub" against the relatively stationary contact with which it coöperates, and hence provide good clean contact surfaces, and the insulating base is preferably formed so as to constitute a bearing to prevent the lever being forced back bodily to the injury of the yielding contact.

In the accompanying drawing I have illustrated the invention as embodied in a practical, commercial form but at the same time would have it understood that various changes and modifications may be made without departure from the true spirit and scope of the invention.

In this drawing:

Figure 1 is a front or face view of the switch.

Fig. 2 is a sectional view of the same taken substantially on the line 2—2 of Fig. 1 showing the switch parts in one position.

Fig. 3 is a similar view showing the switch parts in a different position.

Fig. 4 is a front view of the switch base showing the contacts in position therein, the face plate and toggle lever having been removed in this case.

The body of the switch consists in the main of two parts, a hollow open-ended switch base 5 and a face plate 6 closing the open end of the base, and suitably secured thereto as by means of the screws 7. The switch base is preferably made of suitable insulating material so as of itself to form an insulating support for the switch contacts mounted therein and, as shown, is of substantially cylindrical external shape with a parallel-sided recess or pocket 8 formed therein.

The switch contacts are designated 9 and 10 and as shown, are made of flat strips of spring metal secured by means of the tubular rivets 11 and 12 to the closed bottom or end wall of the switch base. The first of these contacts (9) may be considered as a relatively stationary contact and is shown formed with an inclined somewhat transversely disposed end portion 13 providing a contact surface to be engaged by the overlying yielding and transversely disposed portion 14 of the second contact, this latter yielding portion extending substantially across the open end of the switch base and being confined against lateral movement by the confining side walls of the recess or pocket in the base.

15 designates the so-called operating lever which has a swiveled bearing in the face plate and is adapted to operatively engage directly with the transversely disposed spring arm portion of the yielding contact. The bearing for this operating lever is here formed by providing the lever with a substantially spherical head or ball-shaped enlargement 16 which seats in a socket or depression formed in the inner face of the cover plate 6, said depression providing an outstanding partly spherical flange 17 confining the ball in the socket and open at the center as indicated at 18 to allow for the swinging or oscillating movement of the projecting handle portion of the lever. The opening 18 for the switch handle may be substantially circular, as indicated, and the confining flange 17 may be concaved transversely to subtan-

tially fit the spherical surface of the ball. Inward shifting movement of the ball away from its socket is prevented in the present disclosure by socketing the base at opposite sides of the transverse recess therein, as indicated at 17', so as to form in effect a bearing for the back of the ball.

The inner contact-engaging end of the switch lever is shown in the form of a substantially conical abutment 19 of insulating material and additional insulation is here shown provided between the switch lever and contacts in the form of a flat strip of insulating material 20, which is simply rested upon the transversely extending bearing portion of the spring contact and is shaped to conform to the side walls of the recess in the switch base. This double insulation is not necessary in all cases, and it will be understood that under some circumstances one or the other of the insulating members disclosed may be omitted.

The operation will be readily understood from the foregoing. In the first position illustrated in Fig. 2, the end of the spring contact is disengaged from the relatively stationary contact and the switch lever is held in the position shown by the pressure of said yielding contact against the inner end of said lever. When the lever is swung to the opposite extreme of its movement, as indicated in Fig. 3, the yielding contact will be depressed into engagement with the other contact and the force of the spring contact will, as the lever reaches the dead center, snap said lever into its extreme position. This same snap action takes place when the lever is shifted to break the circuit, the spring reacting in both cases in the nature of a toggle construction to snap the parts into circuit-open or circuit-closed position. The spring contact also serves to hold the operating lever firmly seated in its socket in either position and prevents the lever from rattling or working loose. In addition the spring contact takes up any wear that may occur between any of the parts.

The loose insulating strip 20 has in effect a "floating fit" within the switch recess and may slide over the bearing surface of the yielding contact so as to form a smooth easy acting bearing between the inner end of the operating lever and the yielding contact. The conical shape of the inner end of the operating lever assists in the snap action of the switch, enabling the lever to snap over quickly past the dead center from one position to the other. The relatively stationary contact may be bowed somewhat intermediate its ends as indicated at 21, so that said contact may yield under the pressure of the outer contact, and thus cause a "wiping" engagement between the two contacts and a firm electrical connection in the circuit closed relation.

By reason of the construction disclosed, the switch can be made very compact and with but the single moving part there is practically no chance for the switch getting out of order. The switch parts are all inclosed within a casing which can be made practically water-proof, the tension of the yielding contact against the inner end of the switch lever serving to maintain the pivot ball seated practically water-tight in its socket in the face plate. The complemental socket 17' formed in the front of the insulating base to receive the back of the pivot ball assists in forming a bearing for the lever and prevents the lever being shifted bodily inward against the spring. This so-called back-bearing thus protects the yielding contact from being injured by direct pressure on the operating lever and insures operation of the switch only in the proper way, that is, by rocking the switch lever on its pivot.

I claim:

1. An electric switch comprising, a base of insulating material having a relatively deep substantially parallel-sided recess therein, a pair of normally separated contacts mounted in said recess and confined against lateral movement by the side walls of said recess, one of said contacts having a portion extending substantially transversely across the outer end of the recess, a face plate secured to said base and closing the contact-containing recess and a switch operating lever swiveled in said face plate and engaging at its inner end the transversely extending portion aforesaid of the contact for forcing said contact into engagement with the other contact.

2. An electric switch comprising, a supporting base, operating contacts mounted on said base, one of said contacts being inherently resilient and having a laterally extending bearing portion overlying the other contact and a swiveled operating lever having a substantially conical bearing point of insulating material on the inner end thereof and engaging the laterally extended bearing portion of the resilient contact and serving as an insulating connection causing said lever to be snapped in opposite directions as the same is shifted to open and close the circuit.

3. An electric switch comprising, an insulating base having a recess therein, a yielding contact mounted in said recess and having a bearing portion extending substantially across the open end of said recess, a strip of insulating material slidably resting on said bearing portion of the yielding contact and confined to said bearing portion by the adjoining walls of the recess, a second contact in the recess for engagement by said first contact, a face plate secured to the base over said recess and an operating

lever swiveled in the face plate and bearing at its inner end on said slidably supported strip of insulating material.

4. An electric switch comprising an insulating base having a recess therein, a yielding contact mounted in said recess in the base and having a bearing portion extending substantially across the open end of said recess, a strip of insulating material resting on said transversely extending bearing portion of the yielding contact, and shaped to substantially conform to the walls of the recess so as to be positioned thereby, a face plate secured to the base over said recess, and an operating lever swiveled in the face plate and bearing at its inner end on said strip of insulating material.

5. An electric switch comprising, a supporting base, a spring contact secured in one end of said base having a contact portion at its opposite end and bowed intermediate its ends to enable said contact to yield when engaged by a second contact, a second spring contact secured at one end of the base having a contact portion overlying the end contact portion of the first contact and a swiveled operating lever engaging the second contact for forcing the same into engagement with the first contact.

6. An electric switch comprising, a supporting base, coöperating contacts mounted on said base, one of said contacts being inherently resilient and having a laterally extending bearing portion overlying the other contact and a swiveled operating lever having a substantially conical bearing point at the inner end thereof engaging the laterally extended bearing portion of the contact aforesaid and serving to cause said lever to be snapped in opposite directions as said lever is shifted in reverse directions.

7. In an electric switch, a pair of cooperating contacts, a switch operating lever having a ball shaped enlargement, a bearing plate having a socket in which said ball shaped enlargement is swiveled, and a bearing for said ball shaped enlargement at the back of said bearing plate.

8. In an electric switch, an insulating base having a bearing at the front end thereof, a face plate applied to said insulating base and provided with a complemental bearing, a switch operating lever having a ball shaped enlargement seated in said complemental bearings, and a switch contact operatively engaged by the inner end of said switch operating lever.

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