Sept. 22, 1931. H. J. HAMMERLY 1,824,137

DISAPPEARING BLADE SWITCH

Filed July 19, 1930 2 Sheets-Sheet 1

Fig. 1.

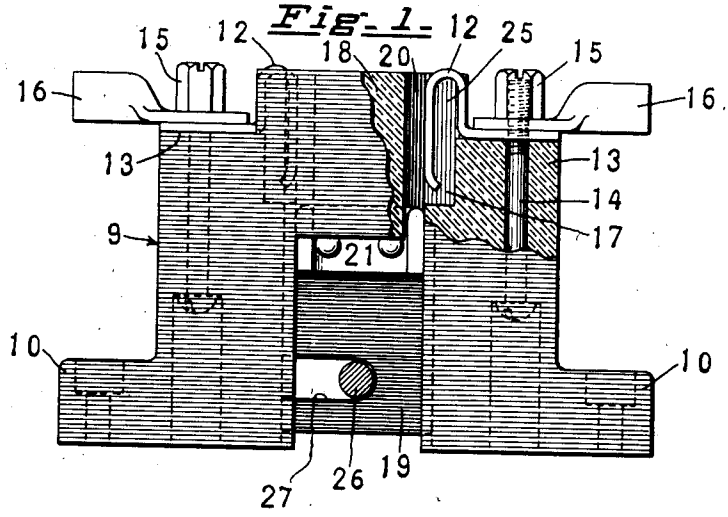


Fig. 2.

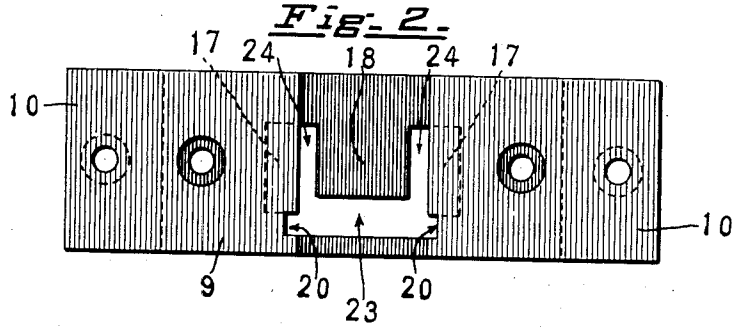
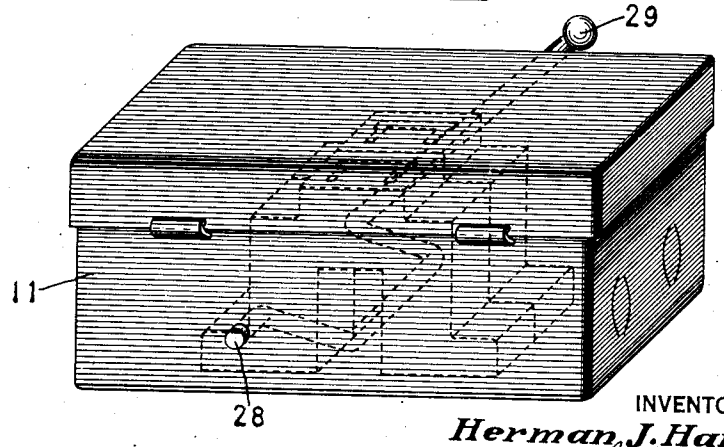


Fig. 3.



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Fig. 4.

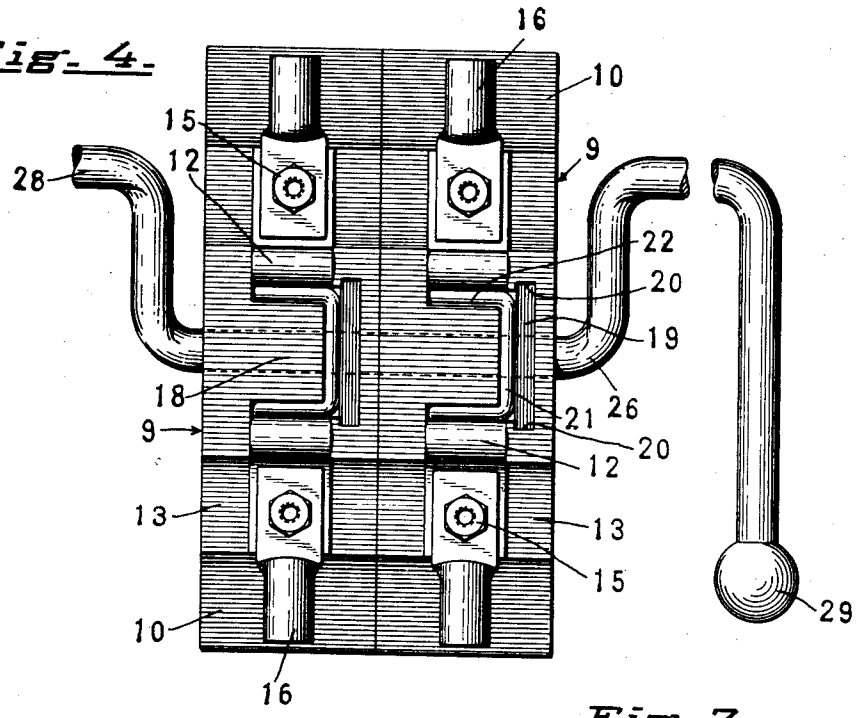


Fig. 7.

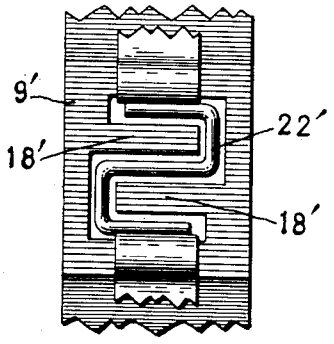


Fig. 5.

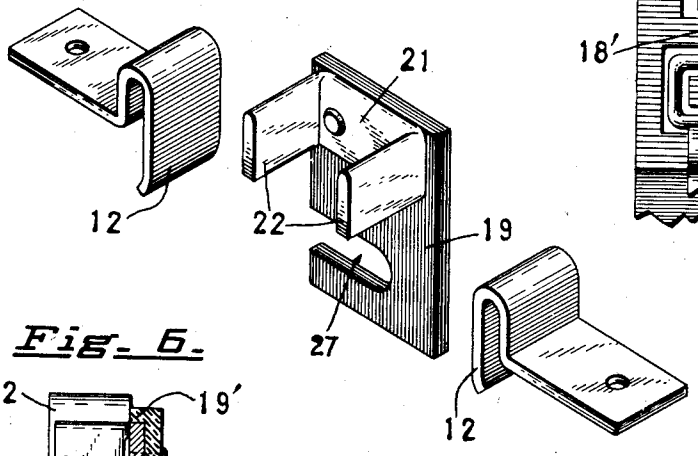
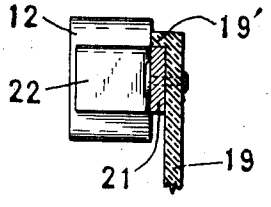


Fig. 6.



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UNITED STATES PATENT OFFICE

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DISAPPEARING BLADE SWITCH

Application filed July 19, 1930. Serial No. 469,152.

My invention relates to electric switches of the class commonly used for controlling motors, lighting systems, etc., which are usually enclosed in a protective casing or box and operated by an external handle.

For various reasons, the protective casings or boxes are usually sealed and sometimes actually locked.

Probably the great majority of switches of this class, when placed in service, are operated by persons who are not familiar with the actual construction of the switch within the box and the operator is guided only by the general sense or instinct that it is merely necessary to move the external handle to its limits of movement in the respective on and off positions. Therefore, as a matter of safety, it is important that a switch of this class should be of rugged construction having the least possible number of parts and that all possible means should be provided to prevent disastrous arcing of the contacts in the operation of the switch.

One object of my invention is to provide a novel switch construction in which are combined many desirable features and which can be made at a comparatively low cost and sold at a correspondingly low price.

Another object is to provide a switch construction which is unusually sturdy, compact, neat and dependable.

Another object is to provide a switch construction in which a separate removable switch unit is provided for each pole of the circuit to be controlled and which units may be operated simultaneously by a single operating handle.

Another object is to provide a switch of such compact construction as to allow for a considerable reduction in size of its enclosing box and yet will safely control a circuit of comparatively great capacity.

Another object is to provide a switch having a very effective arc snuffing means which object is accomplished by the novel co-relation of the contacts, the movable blade unit and the specially designed base and without the use of any movable insulating shutters, baffles or other special parts.

Another object is to provide a switch having an insulating base provided with an integral barrier adapted to be interposed between the stationary contacts so that the space between the contacts may be very much reduced and so effectively that the same spacing of contacts may be used for either a 230 or 575 volt switch and either direct or alternating current.

Another object is to provide a switch of such simple character that the number of parts is much reduced; the cost of tools is much reduced and the weight of the copper parts and cost of assembling are reduced approximately fifty per cent.

Another object is to provide a switch having an insulating base provided with (1) an insulating barrier for separating the stationary contacts: (2) relatively narrow slots into which the movable blades are drawn in the circuit opening movement of the switch: (3) slots whose walls provide the means for supporting and guiding the movable switch blades and the carrier and (4) a shoulder forming a stop for the switch crank in the circuit closing movement.

Another object is to provide a doublebreak switch in which the line wires may be connected to either the top or the bottom contacts and in which the contacts and movable blades are visible for inspection.

Fig. 1 is a side view of a single unit of the switch itself, the parts being shown in open circuit relation and part being shown in section.

Fig. 2 is a bottom plan view of the insulating block or support which is designed to carry the stationary contacts and to guide the movable switch member.

Fig. 3 is a perspective view of the switch box showing the interior switch mechanism dotted.

Fig. 4 is a plan view showing two switch units with an operating member.

Fig. 5 is a perspective view showing the stationary and movable contacts of the movable switch member.

Fig. 6 is a fragmentary sectional view of a modification.

Fig. 7 is a fragmentary plan view of another modification.

Each switch unit has an insulating block 9 with feet 10—10 spaced apart from each other and adapted to be secured for instance in a box 11 in any suitable manner.

Stationary contact members 12 are mounted on shoulders 13 in a plane above the supporting feet 10 each being held in place for instance by a screw 14 and a nut 15. This same nut may also conveniently anchor the conducting terminal 16. Preferably each stationary contact is in the form of a bowed spring portion as shown in Fig. 1 with its tip in the recess 17 where it may yield. An insulating barrier 18 integral with the block is interposed between the two stationary contacts.

The movable switch member has an insulating carrier bar 19 which is guided in grooves 20 in the insulating support. The conducting part of the movable switch member in one form shown is bent into U shape and has a base 21 riveted or otherwise secured to the insulating bar 19 and projecting blades 22 which are adapted to engage the spring portions of the stationary contacts 12.

The supporting block is provided with a passage 23 which is just large enough for the bar 19 and the part 21 to slide in it. This passage 23 has extensions 24 which are just large enough to accommodate the contact blades 22. The supporting block also preferably has a flange 25 on opposite sides of the contacts 12 to assist in positioning them.

The switch units are so constructed that any number of them can be conveniently assembled and arranged side by side so as to take care of any number of circuits. In Fig. 4 I have shown two of these units mounted side by side so that they assist in supporting each other. A single operating crank 26 passes through the grooves 27 in the supporting blocks and has its ends 28 supported in the box or receptacle 11. This crank has an external operating handle 29 of any suitable character which is actuated in the usual manner. It should be understood of course that any type of actuating mechanism, either slow motion or quick make and break, could be supplied.

To close the circuit it is simply necessary to move the switch member in a clock-wise direction (view from the right) so as to bring the blades 22 into contact with the members 12. To open the circuit the bar 19 is moved in the reverse direction so that both of the blades 22 are simultaneously disengaged from the contacts 12, thus breaking the circuit simultaneously at two places. As the contacts 12 are confined in narrow spaces within the insulating block, there is very little opportunity for the formation of an arc and in fact no dangerous arcing can take place in breaking a circuit of any reasonable capacity.

As an additional safeguard the insulating bar 19 may be provided with a flange 19' which overlaps the upper edge of the base 21 of the movable switch member so as to reduce the possibility of an arc traveling across the upper edge of the base 21 when the circuit is broken.

In the modification shown in Fig. 7 the insulating block 9' is provided with two barriers 18'—18' and the movable switch member 22' is of a double U or Z shaped outline. It should be understood that the movable switch member may be of other shapes and that the supporting block may be correspondingly provided with barriers and passages in order to prevent the jumping of the arc from one stationary contact to the other.

It will be seen that the switch unit is a simple and rugged construction, so that it is not only economical to manufacture but has very little likelihood of being broken or damaged either in transportation or in use. By building up the switch out of a plurality of separately assembled units it is possible to easily make up a switch to handle any number of circuits. It is also a very easy matter to replace a switch unit in case that should become desirable for any reason.

The conducting parts being so completely housed in insulating material, it is possible to make the switch construction very compact, which not only reduces the cost materially but also reduces the cost of shipping and storage as well. It will also be noticed that although the parts are very compact and effectively housed they can all be readily inspected while the switch is in operation.

I claim:

1. In a double break switch, a one-piece insulating block having guide perforations therethrough, stationary contacts mounted on said block in line with the outside edges of said perforations, and a switch member slidable in said perforations with spaced contact blades mounted thereon and engageable with said stationary contacts and retractable in said perforations to break the circuit within said block.

2. In a switch, a pair of stationary contacts, an insulating support for said contacts and having a perforation therethrough, an insulating bar movable in said perforation, a movable switch member secured to the bar and having spaced contact blades for engaging the said stationary contacts entirely within said perforation.

3. In a switch, an insulating base having a passage therein open at the back of the base, a slide movable in said passage and having a conducting blade movable in said passage, and stationary contacts mounted within said passage for engagement by the said blade entirely within said passage.

4. In a switch, an insulating block having guide passages therethrough from front to back, stationary contacts mounted on said block with contact surfaces in line with oppo-

site outer edges of said passages, and a U-shaped switch member slidable in said passages with spaced contact portions engageable with said stationary contacts entirely within said passages and retractable to break the circuit entirely within said passages.

5. In a switch, an insulating block having spaced passages therein extending at right angles to the main plane of the block and with grooves along the opposite edges of the passages, a carrier guided in said grooves, a switch member mounted on and moved by said carrier and slidable in said passages, stationary contacts mounted on said block alongside of said passages to be engaged by said switch member within said passages, and an actuating member connected to said carrier for moving said switch member within said passages, the circuit breaking point between the contacts and the switch member being located entirely within said block.

6. In a switch, an insulating block provided with a recess at each of its opposite ends, a stationary contact in each of said recesses and spaced apart, an insulating block disposed between said contacts, a pair of spaced blades adapted to move between said block and said contacts and to engage the latter in the recess and manual means for bodily moving said blades simultaneously into and out of engagement with said contacts.

7. In a switch, an insulating block provided with passages, a pair of stationary contacts disposed in said passages, a pair of spaced blades adapted to be moved between and into and out of engagement with said contacts and a crank for moving said blades, said block being provided with shoulders for limiting the movement of said crank.

8. A double-break switch including an insulating base having a substantially U shaped perforation therethrough and an integral projecting barrier portion between the opposite sides of said U shaped perforation, a stationary contact at each of the opposite sides of said perforation and a contact for bridging said stationary contacts, said bridging contact being operably movable only within said perforation and below the surface of said base.

9. A double-break switch including an insulating base having a perforation extending therethrough, a stationary contact at each opposite end of said perforation, a contact for bridging said stationary contact and movable only in said perforation below the upper surface of said base, an insulating support for said bridging contact, a crank for moving said bridging contact and said support in said base for engaging and disengaging said bridging contact with said stationary contact and said base having an integral barrier portion interposed between said stationary contacts.

10. A double-break switch including an insulating base having a perforation at right angles to the main plane of the base, a stationary contact mounted on said base at each end of said perforation, a movable contact guided in said perforation for bridging said stationary contacts and means for drawing said movable contact away from said stationary contacts and into said perforation to open the circuit.

11. A double-break switch including an insulating base having two spaced recesses and a perforation connecting said recesses, a stationary contact in each recess and adjacent each of the outer edges of said perforation, a movable contact in said perforation for bridging said stationary contacts, an insulating support for said movable contact and crank means for moving said support and said movable contact in the perforation.

12. A double-break switch including an insulating base having a perforation and guide slots, a stationary contact at each end of said perforation, a movable contact for bridging said stationary contacts and adapted to remain in said perforation in all of its operating positions, an insulating connector for supporting said movable contact and movable in said guide slots and means for moving said connector and said movable contact in said base.

13. A double-break switch including a base provided with guide slots and a U shape perforation, a stationary contact adjacent each of the outer edges of said perforation, a U shaped movable contact in said perforation for electrically connecting said stationary contacts, an insulating support for said movable contact and movable in said guide slots and crank means for moving said movable contact into and out of engagement with said stationary contacts, the said movable contact being adapted to remain in said perforation, below the upper surface of said base in all of its operative positions.

14. An enclosed double-break switch including a casing, a cover for the casing, an insulating base in said casing and having a perforation, a stationary contact adjacent each of the far edges of said perforation, a movable contact adapted to remain within said perforation in all of its operating positions, an insulating support for said movable contact and an externally operated crank for moving said support and said movable contact away from said stationary contacts and into said perforation in the circuit opening movement of the switch.

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