April 12, 1932. G. B. WADSWORTH 1,853,752

QUICK ACTING SWITCH

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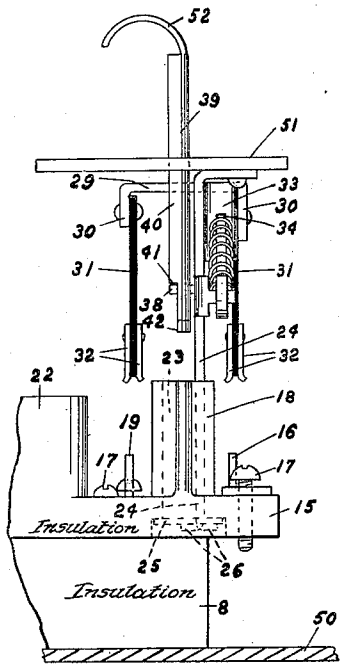


Fig. 3.

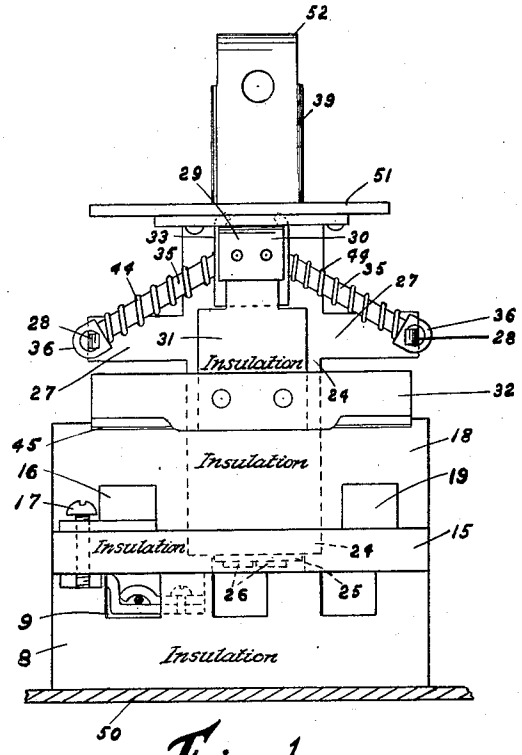


Fig. 1.

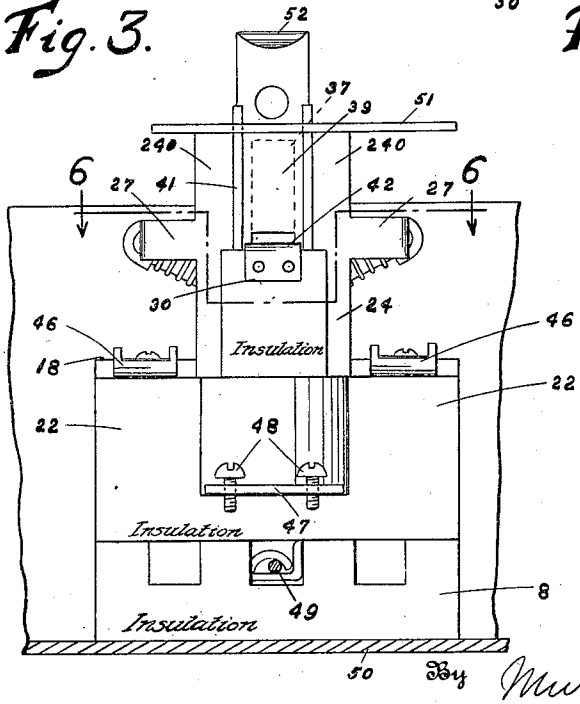


Fig. 2.

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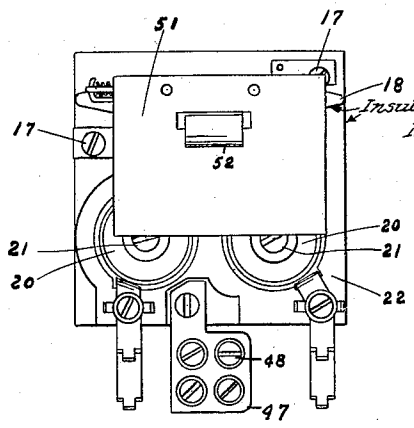


Fig. 4.

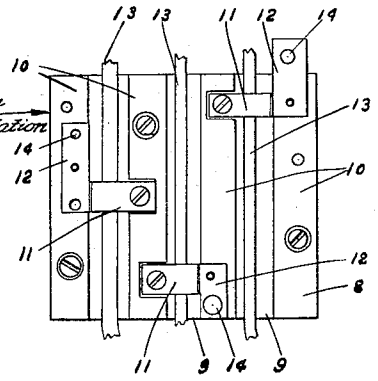


Fig. 5.

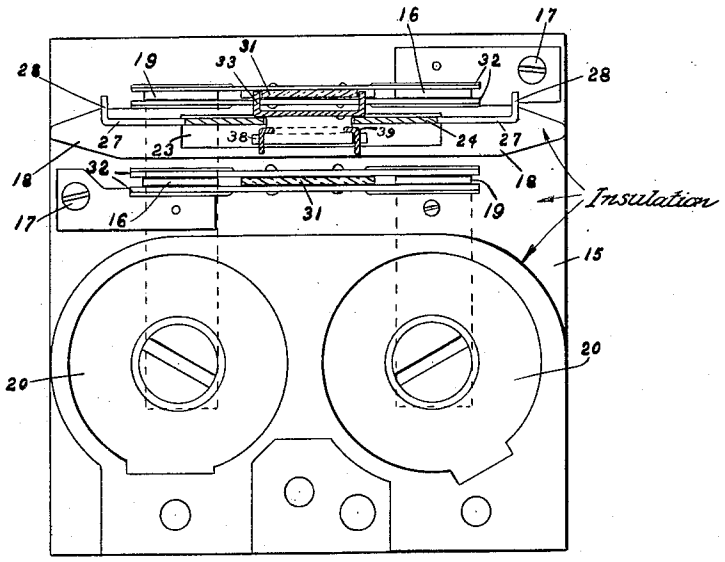


Fig. 6.

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UNITED STATES PATENT OFFICE

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QUICK ACTING SWITCH

Application filed February 7, 1930. Serial No. 426,602.

This invention relates to a quick making and quick breaking switch construction and has for an object the provision of a compact inexpensive switch.

Another object of this invention is to provide a switch of this type wherein the actuating movement takes place wholly within the body lines of the small compact switch base thereby providing an ideal arrangement for use in front operated switch cabinets and in fact in all installations where space is limited or wherein it is desired to utilize a minimum space for the switch.

Another object is to provide a switch of this kind with a channeled sub-base having suitable connectors therein for making electrical contact with line wires disposed in the channels.

These and other objects are attained by the means described herein and disclosed in the accompanying drawings, in which:

Fig. 1 is an end elevation of a switch of the invention in an open position.

Fig. 2 is an elevational view taken from the opposite end of the switch with the switch in closed position.

Fig. 3 is a fragmental side elevation looking from the left of Fig. 1.

Fig. 4 is a top plan view of the switch of the invention on a reduced scale.

Fig. 5 is a top plan view of the sub-base with the switch body removed and showing service wires in position.

Fig. 6 is a cross sectional view taken on line 6—6 of Fig. 2.

In the present embodiment an insulating sub-base 8 has ways or channels 9 extending therethrough from the top face thus providing a plurality of parallel top faces 10. Suitable connector plates 11 and 12 are secured in the upstanding ridges between the channels and have their top faces flush with or counter-sunk below the parallel faces 10. Suitably insulated service wires 13 are disposed in the channels 9 and have the insulation removed therefrom beneath the plates 11 so as to provide electrical communication from the service wires to the connector plate 12. These plates have threaded perforations 14 therein which serve at once to mount the switch base 15 thereon and to provide electrical connection with certain of the switch blades 16 through fastening screws 17. The switch base 15 has an integral transverse rib 18 which is interposed between the switch blades 16 and which also isolates the companion switch blade 19. The blades 19 extend through suitable slots in the base 15 and along the under side thereof to points beneath the center of the fuse receptacles 20 where electrical contact is provided by means of screws 21. The fuse receptacles are disposed in an elevated boss 22 integral with the base 15 and closely adjacent the insulating rib 18. The rib 18 has a transverse slot 23 extending therethrough adjacent the bottom of which is anchored a slotted upright 24. This mounting may be simply accomplished by inserting a counter-sunk slotted plate 25 in the bottom of base 15 and turning over the ends of a pair of lugs 26 formed on the bottom of the upright 24. The upright 24 has a pair of oppositely extending arms 27 provided with lugs 28. A reciprocating member 29 extends through the slot in the upright 24 and has its opposite ends turned down as at 30. Insulating members 31 are secured to the portions 30 and carry at their lower depending ends pairs of resilient copper plates 32, the free ends of which form jaws for receiving the switch blades 16 and 19. A slotted clip 33 is also fixed to the member 29 and has slots 34 on its opposite ends for slidably receiving the adjacent ends of pivoted bars 35 which have their remote ends 36 provided with suitable perforations for receiving the lugs 28 on the arms 27. The arms 240 in the upright 24 provided by the slot 37 receive the member 29 between them and also a projecting end 38 of the clip 33. Thus the member 29 and member 38 have a slidable mounting in the slot 37. An operating member 39 has flanges 40 cut off at 41 to provide shoulders which contact the projecting portion of the member 38. The member 39 likewise has a slot therein which receives the member 29 and the member 38. This slot, which is best shown at 42 in Fig. 2, permits limited free reciprocation of the operating member 39 upon the members 29 and 38. Additional

movement of the operating member 39 however will cause the closed end 42 of the slotted member 39 to engage the member 38 on the upward movement so that the clip 33 and member 29 will be bodily lifted. This movement is resisted by the compressional forces of springs 44 as the clip 33 is raised (from the position shown in Fig. 2) and causes the ends of the pivot bars 35 to move into the clip 33 through the slots 34. This resistance continues and increases until the clip 33 is moved above the horizontal plane of the lugs 28 whereupon the force of the springs is released for effecting a rapid and uncontrolled upward movement of the member 29 and the switch jaws 32 associated therewith. It is to be noted that the initial movement of the jaws after the free movement of the operating member 39 has been taken up does not remove the switch jaws from contact with the blades, this movement occurring automatically and beyond the control of the operator upon release of the compressional forces of the springs.

Upon closing the switch the operating member 39 is depressed, the lost motion being first taken up in the downward movement until the shoulders 41 engage the top of member 38. Continued pressure then moves the clip 33 downward and compresses the springs 44. This compression continues and the switch jaws 32 begin to descend until the slots 34 in clip 33 pass the horizontal plane passing through the lugs 28. At this moment the switch jaws 32 have not quite reached the companion switch blades 16 and 19. A slight additional movement however releases the compressional forces of the spring and quickly thrusts the switch jaw members 32 downwardly over the blades 16 and 19. The jaws 32 are flared outwardly slightly at 45 so that the blades are received between them with certainty. The downward force of this movement slightly separates the resilient jaws and insures perfect electrical contact.

This quick make and quick break of electrical contact eliminates arcing upon opening and closing of the switch and the insulating rib 18 affords ample protection between the adjacent pairs of companion blades 16 and 19.

As has been shown the connection between the switch and the incoming service wires are amply separated by portions of the insulating base and sub-base as are also the connections from the blades 19 to the fuse receptacles. The load side of the switch has suitable connector terminals 46 disposed on the boss 22 remote from the operating mechanism to which wires may be connected for directing current which is passed through the service fuses in the fuse receptacles to a meter (not shown). A terminal plate 47 seated in a suitable recess in the boss 22 has a number of terminal connecting screws 48 for receiving return wires from the meter and from a plurality of branch fuse circuits and electrically connects them with the return wire 49 which is disposed in centermost channel or way in the sub-base.

Thus the entire switch, operating mechanism therefor and the service fuse receptacles are compactly but accessibly arranged on a very small base which may be mounted upon a cabinet wall such as 50.

For covered installations, the actuating member 39 may be permitted to project through a small aperture in a switch box door, (not shown), in which case a baffle plate 51 fixed on suitable flanges on the upright 24, is employed to preclude access to the switch parts when the box is closed. The plate 51 has a suitable aperture therein to permit movement of the actuating member 39 therethrough. A suitable finger hook 52 facilitates operation of the switch and occupies a minimum of space.

The operation of the switch has been explained concurrently with the description of the structure. It will be noted that the member 39 has a limited amount of lost motion or movement independent of the member 29 and that the lower end of the member 39 including the cross bar 42 is received in the hollow interior or slot 23 in the insulating rib 18. Thus when the switch is closed the end of the actuating member 39 projects only a short distance above the baffle plate 51 or the top of member 29. As will be readily appreciated the lost motion or partial independent movement of the members 29 and 39 permits the automatic or spring actuated movement of the member 29 entirely free of control by the operator.

What is claimed is:

1. A quick make and quick break electrical switch comprising an insulating base having two pairs of spaced aligned switch blades, an upright extending from the base, a transverse member mounted for slidable movement longitudinally of said upright, a pair of arms pivoted at their outer ends to the upright and having their inner ends slidably received in the transverse member, a compression spring on each of said arms yieldingly resisting movement of the arms for a pre-determined distance whereby the springs are compressed and an actuating member having a limited free moving connection with the transverse member for moving the transverse member and permitting the compressional force of the springs to move the jaws into and from electrical contact with the switch blades independently of the actuating member after predetermined movement of said actuating member.

2. In a device of the class described the combination of an insulating base having a transverse integral rib, an upright mounted

in the rib and extending upwardly therefrom, pairs of switch blades disposed on opposite sides of the rib, means slidable on the upright and having its opposite ends over hanging the pairs of blades, a pair of switch jaws electrically insulated from and carried by said overhanging ends, means for effecting manual reciprocation of the slidable member and arranged for limited uncontrolled movement relative thereto and spring means adapted for compression during the controlled manual movement of the slidable member and for subsequent uncontrolled spring impelled movement of the slidable member to effect electrical connection and disconnection of the pairs of switch blades and the jaws.

3. A quick acting switch comprising a pair of spaced blade members, a fixed upright, a member slidable on the upright, a jaw member mounted on the slidable member and electrically insulated therefrom, a pair of arms having pivotal mounting on the upright and having their free ends reciprocably received in the slidable member, compression springs surrounding said arms and abutting the slidable member whereby to normally retain the slidable member at one of its limits of reciprocation on the fixed upright and means having limited uncontrolled relative longitudinal movement with the slidable member and operable to move the slidable member for compressing the springs whereby the ends of the arms are moved relative to their pivotal mountings for compressing the springs, continued movement of the arms by said member releasing the slidable member to the compressional forces of the springs whereby the jaws on the member are projected into and from electrical connection with the blades.

4. In a device of the class described the combination of an insulating base having an integral recessed rib extending therefrom, a slotted upright fixedly mounted in said recess, a transverse member slidable in the slot in the upright, a clip fixed on the slidable member and having a portion slidable as a guide in the slot of the upright, arms extending outwardly from the upright and having pivots thereon, pivotally mounted arms on said pivots and having their free ends slidably received in the clip, compression springs surrounding the pivotally mounted arms and abutting the clip and yieldingly resisting movement of the clip past the arms on the upright and a slotted actuating member slidable on the upright for effecting movement of the slidable member, the slot in said actuating member providing for limited independent movement of the actuating member and slidable member, a pair of spaced switch blades fixedly mounted on the base and a jaw member for effecting electrical connection between said blades mounted on the slidable member and electrically insulated therefrom.

5. A quick make and quick break electrical switch comprising an insulating base having two pairs of spaced aligned switch blades, an upright extending from the base, a transverse member mounted for slidable movement longitudinally of said upright, a pair of arms pivoted at their outer ends to the upright and having their inner ends slidably received in the transverse member, a compression spring on each of said arms yieldingly resisting movement of the arms for a predetermined distance whereby the springs are compressed and an actuating member having a limited free moving connection with the transverse member in the direction of movement of the transverse member for moving the transverse member and permitting the compressional force of the springs to move the jaws into and from electrical contact with the switch blades independently of the actuating member after predetermined movement of said actuating member.

Signed January 13, 1930.

GEORGE B. WADSWORTH.