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M. F. KOENIG ET AL

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ELECTRIC SWITCH

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2 Sheets-Sheet 2

Fig. 3

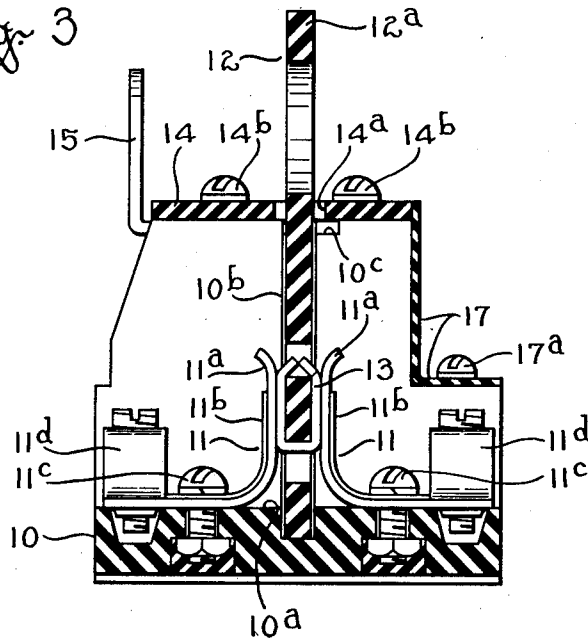


Fig. 5

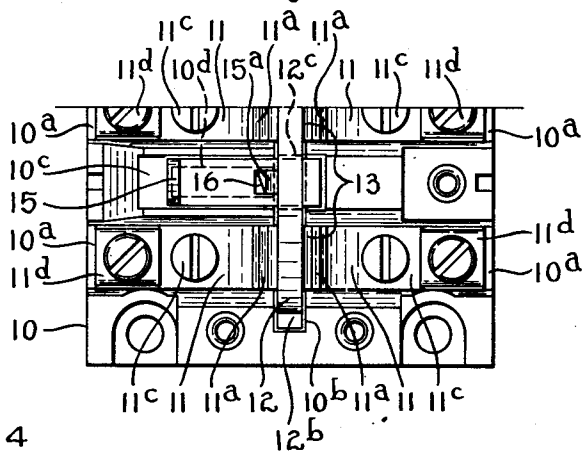
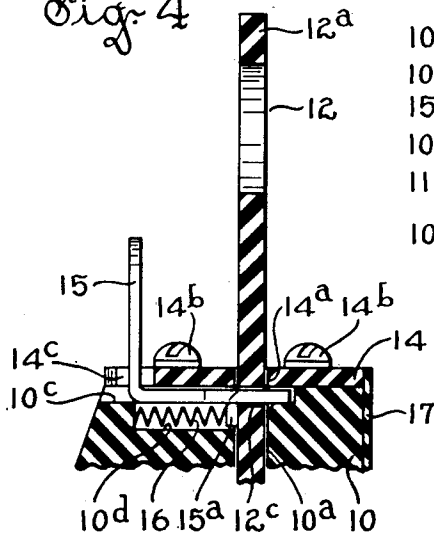


Fig. 4



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ELECTRIC SWITCH

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8 Claims. (Cl. 200—169)

1

This invention relates to electric isolating switches and more particularly to plug type front-operated switches of the push-pull type adapted for use in electrical control centers such as that shown in the Lightfoot Patent No. 2,319,415.

One of the problems encountered in the utilization of control centers such as that shown in the aforementioned Lightfoot patent has been that of providing for the safety of the workmen or electricians whose job it is to maintain and repair such centers. As will be understood, control centers of the type under consideration are made up of a plurality of individual, complete control units readily removable from the supporting and enclosing structure of the control center. Normally such control units include a disconnect switch, which may or may not be interlocked with the door covering the particular control unit, which disconnect switch is adapted to break the electrical circuit to the load. However, when it becomes necessary to repair or remove the control unit from its supporting structure, while the load is disconnected, there still remain live leads connecting the control unit to the source of electrical energy, and more particularly to the line busses of the control center. The presence of such live leads is obviously of considerable hazard to the electrician or maintenance man.

Accordingly an object of the present invention is to provide a switch for isolating control units of the aforementioned character from their respective sources of electrical energy before repair or removal thereof from their supporting and enclosing casings.

Another and more specific object is to provide an isolating switch of the aforementioned character having means for preventing accidental closing of the circuit through such isolating switch.

Another object is to provide an isolating switch of the aforementioned character wherein the position of the switch may be readily ascertained.

A further object is to provide a switch of the aforementioned character wherein the possibility of accidental touching of the live parts of the switch by one operating the switch is substantially prevented.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate a preferred embodiment of the invention, it being understood that the embodiment illustrated is susceptible of modification within the scope of the appended claims.

2

In the drawings,

Figure 1 is a top plan view of the switch shown in the closed position;

Fig. 2 is a side elevation from the left of the switch shown in Fig. 1; the switch, however, being shown in the open position;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary section taken on the line 4—4 of Fig. 1, but showing the switch in the open position and more particularly illustrating means for preventing accidental closure of the switch; and

Fig. 5 is a top plan view, similar to that of Fig. 1, of a portion of the switch, but with the cover member removed and the switch parts in open position.

Referring to the drawings, the numeral 10 designates a molded base of a suitable insulating material, such as "Bakelite." As best shown in Figs. 2 and 5, base 10 is formed with a plurality of transverse slots 10^a at the bottom of which are mounted pairs of spaced cooperating stationary contacts 11, the number of such slots and pairs of stationary contacts depending upon the number of poles desired in the switch (the switch illustrated being a 3-pole switch). As best shown in Fig. 3, each of said stationary contacts 11 preferably comprises an L-shaped member 11^a and a correspondingly shaped resilient spring member 11^b; said members 11^b tending to urge the free end portions of said pair of members 11^a toward each other, and said members 11^a and 11^b being attached jointly to the bottom surface of the respective slot 10^a, as shown, for example, by means of a bolt and nut 11^c. Each of said contact members 11^a also has attached thereto at the outer end thereof a terminal lug 11^d preferably of the solderless type and of well known form.

Base 10 is also provided with a longitudinal recess 10^b (Figs. 1, 3 and 5) extending downwardly from the top surface thereof, as best shown in Fig. 3, said recess 10^b being so dimensioned as to receive with a free sliding fit the full width portion of a flat insulating plate 12 comprising a bridging contact carrier and switch operator. Contacts 11 are so positioned in slots 10^a as to have interposed between each pair thereof some portion of plate 12.

As best shown in Figs. 1, 2 and 3, plate 12 carries a bridging contactor 13 for each pair of stationary contacts, plate 12 being adapted to slide within recess 10^b in a manner to effect simultaneous movement of contactors 13 into or out of bridging engagement with the respective sets of

3

contacts 11, 11. For this purpose plate 12 is provided at its outer end with an operating or handle portion 12^a to be grasped by the operator to push or pull plate 12 as the case may be, to selectively open and close the electrical circuit through the switch.

The switch is provided with a flat cover member 14 of insulating material (Fig. 3) having appropriate markings or legends as best shown in Fig. 1, said cover member 14 being slotted as at 14^a to afford projection therethrough of the handle portion 12^a of contact carrier 12. The slot 14^a is of the shape best shown in Fig. 1 and preferably is shorter in length than recess 10^b underlying it, the handle portion 12^a of contact carrier 12 preferably being reduced in width to form a shoulder as at 12^b (Fig. 2) to engage the lower face of cover member 14 thereby limiting outward displacement of member 12 and also affording indication of the fact that the switch is in the open or "off" position. Cover member is attached to base 10 as by means of screws 14^b (Fig. 1).

To prevent accidental closure of the switch a spring biased latching means is provided (see Fig. 4) comprising an L-shaped latching member 15 adapted for sliding movement in a recess 10^c in the upper surface of base 10. (Fig. 5), cover member 14 preventing upward displacement of member 15 and being notched as at 14^c (Figs. 1 and 4) to permit transverse movements of member 15. As best shown in Fig. 4, plate 12 is slotted as at 12^c to accommodate the inner end of latching member 15 to lock plate 12 in the open position. Member 15 is shown as provided with an integral downwardly extending lug 15^a to be engaged by a compression spring 16 disposed below latching member 15 in a recess 10^d opening upwardly to the aforementioned recess 10^c in base 10, said spring being compressed between the end wall of recess 10^d and lug 15^a to urge latching member 15 at all times against plate 12. As will be apparent, as plate 12 is pulled outwardly slot 12^c therein will become aligned with the inner end of latching member 15 and the latter under the bias of spring 16 will enter into slot 12^c to latch the switch in the open position.

While the aforementioned safety latching arrangement positively prevents accidental closure of the switch, it will be apparent that the operating means 12 may be simply unlatched when the operator grasps the handle portion 12^a and extends his fingers through the opening formed thereby to easily slide latching member 15 to the left with his finger tips, from the position thereof shown in Figs. 4 and 5, to permit manual closure of the switch.

An additional safety means, to prevent the operator from accidentally placing his fingers in contact with the "live" line side terminals or stationary contacts when closing or opening the switch, consists of an L-shaped insulating cover 17 attached to base 10 as by screws 17^a and enclosing the righthand open ends of slots 10^a into which the operator might accidentally insert a finger or fingers. Thus the top and right hand sides of the switch are substantially enclosed to prevent accidental contact with live parts.

We claim:

1. A front operated manual plug-type isolating switch having a push-pull operating member having a transverse opening therethrough and a flat latching member for extending through said opening to effect locking of the operating member in its outermost or switch-opening position,

4

thereby to prevent accidental closure of the switch, said latching member being disposed adjacent said operating member to afford sequential unlatching thereof and closure of the switch by one hand of an operator.

2. A front operated manual plug-type isolating switch having a push-pull operating member comprising an insulating plate having an opening therethrough, and latching means for locking said operating member in its outermost or switch-opening position to prevent accidental closure of the switch, said latching means comprising a flat member slidable through said opening to lock said operating member.

3. A front operated manual plug-type isolating switch having a push-pull operating member comprising a flat insulating plate having a transverse slot therethrough, and latching means for locking said operating member in its outermost or switch-opening position to prevent accidental closure of the switch, said latching means comprising a flat member slidable into and out of said slot, and spring biasing means underlying said flat latching member for urging the latter toward said operating member and effecting passage thereof through said slot when said operating member is pulled to its said outermost position.

4. A front operated plug-type isolating switch comprising an insulating base having a longitudinal recess opening to the front surface thereof and having at least one transverse slot, a pair of cooperating and spaced stationary contacts mounted in said slot, a combined operating member and bridging contactor carrier comprising a flat insulating plate disposed within said longitudinal recess with a free sliding fit and being interposed between said stationary contacts at all times, said operating member having mounted thereon a contactor for bridging said stationary contacts when said operating member is in its innermost position, and latching means for preventing accidental movement of said operating member to its innermost position comprising a flat sliding member adapted for passage through an opening in said operating member when in its outermost position, and spring means underlying said sliding member to urge the latter through the opening in said operating member to automatically effect latching of the latter when the aforementioned opening therein becomes aligned with said sliding member.

5. A front operated plug-type isolating switch comprising an insulating base having a longitudinal recess opening to the front surface thereof and having at least one transverse slot, a pair of cooperating and spaced stationary contacts mounted in said slot, a combined operating member and bridging contactor carrier comprising a flat insulating plate disposed within said longitudinal recess with a free sliding fit and being interposed between said stationary contacts at all times, said operating member having an opening therein and also having mounted thereon a contactor for bridging said stationary contacts when said operating member is in its innermost position, and latching means for preventing accidental movement of said operating member to its innermost position comprising a flat sliding member adapted for passage through said opening in said operating member when in its outermost position, and spring means urging said sliding member toward said operating member to automatically effect latching of the latter when the aforementioned opening therein

5

becomes alined with said sliding member, and an insulating cover member for maintaining said sliding member in assembled position and to shield live parts of the switch.

6. A front operated manual plug-type isolating switch having a push-pull operating member comprising a flat insulating plate having a transverse slot therethrough and having a handle portion, and latching means for locking said operating member in its outermost or switch-opening position to prevent accidental closure of the switch, said latching means comprising an L-shaped member slidable into and out of said slot and spring biasing means for urging said slidable member toward said operating member and automatically effecting passage of one arm of said slidable member through said slot when said operating member is pulled to its said outermost position and said slot is in alinement with said one arm of said slidable member, the other arm of said slidable member being positioned adjacent to said handle portion of said operating member to provide for sequential unlatching thereof and closure of the switch by one hand of an operator.

7. A front operated plug-type isolating switch comprising an insulating base having a longitudinal recess opening to the front surface thereof, an operating member disposed within said longitudinal recess with a free sliding fit and having a slot, said insulating base also having a shallow transverse recess in the top surface thereof extending to either side of said longitudinal recess, a latching member slidable in said transverse recess adapted to pass through said slot in said operating member and into that portion of said transverse recess lying on the opposite side of said operating member, and a cover member overlying said transverse recess to maintain said latching member in assembled position, passage of the latter through said slot affording latching of said operating member against movement in either direction.

6

8. A front operated plug-type isolating switch comprising an insulating base having a longitudinal recess opening to the front surface thereof, an operating member disposed within said longitudinal recess with a free sliding fit and having a small slot, said insulating base also having a shallow transverse recess in the top surface thereof extending to either side of said longitudinal recess, a flat L-shaped latching member one arm of which is slidable in said transverse recess and is adapted to pass through said slot and into that portion of said transverse recess on the opposite side of said operating member, a cover member overlying said transverse recess to maintain said latching member in assembled position, and biasing means underlying said latching member to urge the latter toward said operating member to automatically lock the latter when said slot therein and said latching member are in registry, the other arm of said latching member in this position of the switch being adjacent said operating member to afford unlatching of the operating member and movement thereof by one hand of an operator.

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