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ELECTRICAL SWITCHGEAR

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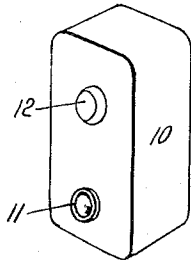


FIG. 1

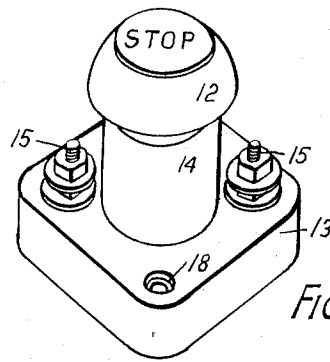


FIG. 2

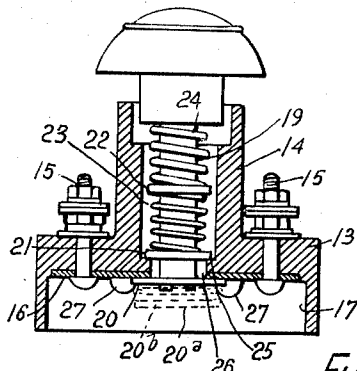


FIG. 3

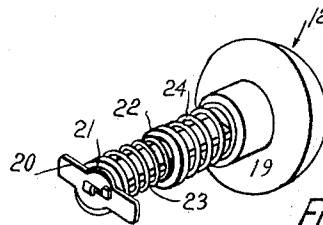


FIG. 4

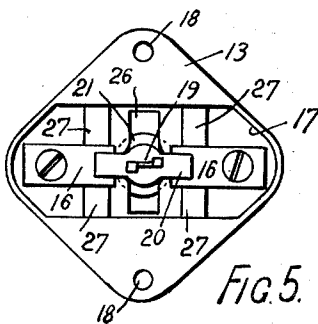


FIG. 5

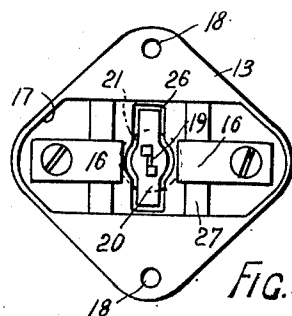


FIG. 6

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UNITED STATES PATENT OFFICE

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ELECTRICAL SWITCHGEAR

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This invention comprises improvements in or relating to electrical switchgear and has for its object to provide an isolating switch for ensuring that current cannot be inadvertently connected to a circuit (for example, to the motor of a machine undergoing repair) without it being necessary to provide and carry around any special key to operate a lock-type switch. A further object is to provide an isolating switch suitable for breaking an electric circuit by a touch (for example as an emergency or normal means for stopping an electrically driven machine).

A further object is to provide a simple, sturdy and reliable switch for the purposes specified.

In accordance with the present invention a switch for isolating and breaking an electric circuit comprises a body of insulating material supporting contacts spaced from one another and an auxiliary member carrying a bridging contact which is movable against spring pressure or tension to move the bridging contact from the other contacts and which is also bodily removable (along with the bridging contact) from the body aforesaid.

The invention further comprises a self-closing push button switch in which the push-button and associated switch contact are constructed as a unit which may be removed from the switch, for the purpose specified, and replaced at will without having to dismantle the body of the switch.

The invention further comprises a switch comprising a body of insulating material, a plunger, a spring encircling the plunger and secured in position thereon, a pair of metallic contacts mounted in the switch body, a metallic contact secured upon one end of the plunger and extending transversely across such end, a head at the other end of the said plunger (the head or the plunger or both being of insulating material) and a bayonet joint interconnection between the transverse contact and the switch body, the arrangement being such that when the plunger is in its service position the transverse contact bridges and electrically interconnects the two other contacts and the spring constrains it into contact with them but manual pressure upon the head moves the plunger further into the switch body against the action of the spring, separating the transverse and other contacts, while by the motion of pressing in, turning and withdrawing the plunger the latter (together with the spring and transverse contact) can be completely removed from the switch body.

Further features of the invention will be ap-

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parent upon consideration of the following description of one constructional embodiment thereof, which will now be given by reference to the accompanying illustrative drawings, in which,

Figure 1 shows a combined "Start" and "Stop" push button assembly,

Figure 2 shows the "Stop" and isolating switch separately,

Figure 3 shows the said switch in medial longitudinal sectional elevation,

Figure 4 shows the "Stop" push-button and associated parts removed from the body of the switch and

Figures 5 and 6 are inverted plan views of the "Stop" and isolating switch showing the mechanism in two different positions.

As seen in Figure 1, a combined push-button switch for control of an electric motor (not shown) fed with alternating current comprises a casing 10 wherein are mounted "Start" and "Stop" push-buttons 11 and 12 respectively. The casing 10 and "Start" push-button switch 11 are of conventional construction and need not be further described.

The novel "Stop" push-button switch of the present invention is shown in the remaining figures.

It has a switch body comprising a rectangular base 13 and cylindrical part 14, moulded from insulating material.

On the base 13 are mounted two terminals 15 electrically connected to two fixed contacts 16 in a recess 17 at the underside of the base 13. (The terminals 15 are protected through being enclosed within the casing 10; if the switch of the invention is not fitted within an outer casing the terminals 15 may be located within the recess 17.)

Holes 18 in the base 13 permit the switch to be secured in position.

The push-button assembly is shown in Figure 4 removed from the switch body, as it may be in practice without disassembling it or the switch body.

This assembly comprises the push-button head 12 itself, which is moulded from insulating material, a flat metal strip plunger 19 which is at one end set firmly into the head 12 and at its other end carries a bridging contact 20 non-rotatably secured to the plunger 19 and protruding transversely therefrom. There are also two washers 21 and 22 and two coil springs 23 and 24 mounted upon the plunger 19.

The washers 21 and 22 have rectangular holes through which the plunger 19 passes with clear-

ance. The end washer 21 rests against the contact 20 when the assembly is removed from the switch body, the washers and springs being captive upon the plunger 13. The washer 22 separates the two springs 23 and 24.

These two springs 23 and 24 are of different strengths. The spring 24, which acts between the head 12 and the washer 22, is stronger than the spring 23, which acts between the washer 22 and the washer 21.

Inspection of Figure 3 will show that when the push-button assembly of Figure 4 is in its operative position in the switch-body 13, 14 the head 12 and washer 22 fit with clearance in portions of the interior of the cylindrical part 14 of different diameters, but the washer 21 rests upon a ledge 25 at the bottom of the switch body.

This ledge 25 is around a gap 26 in the switch body, the shape of which (seen most clearly in Figure 5) is such as to permit passage of the end of the plunger 13 and the contact 20 when the latter is aligned with the axis of the gap (as shown in Figure 6) but not when it is at right-angles thereto (as shown in Figure 5).

The normal operative position of the parts is shown in Figures 3 and 5. It will be seen that the weaker spring 23 is slightly compressed, drawing the bridging contact 20 into engagement with the contacts 16 and keeping the circuit through the terminals 15 normally closed. Pressure with the finger upon the push-button 12 will further compress the weaker spring 23, moving the bridging contact 20 to the position 20a (Figure 3) in which the circuit through the terminals 15 is broken, so stopping the electric motor. Release of the finger pressure completes the circuit again, but the motor will not re-start until the "Start" button 11 is pressed.

When the bridging contact 20 is in the position 20a it cannot turn round out of alignment with the fixed contacts 16 because of four projections 27 moulded upon the lower side of the switch body. But a stronger push inwards upon the push-button 12, sufficient to compress both the spring 23 and the stronger spring 24, moves the contact 20 to the position 20b in which it is clear of the projections 27 and can easily be turned to the position shown in Figure 6 when the contact 20 is in alignment with the axis of the gap 26 and may be withdrawn therethrough.

Thus a firm inward pressure upon the push-button 12 followed by turning it through a right angle and withdrawing it (after the manner of undoing a bayonet joint) permits the whole assembly shown in Figure 4 to be withdrawn as a unit from the switch body, thus effectively preventing accidental or unauthorized re-energisation of the motor circuit.

It will be appreciated that the invention is not limited to the particular arrangements of springs, fixed and bridging contacts illustrated in the accompanying drawings and above described.

I claim:

1. A switch comprising a body of insulating material, at least two electrical contacts mounted thereon and spaced from one another, an aux-

iliary member, a bridging contact mounted upon the said auxiliary member and a spring arranged to constrain the said bridging contact into contact with the other said contacts, the said auxiliary member, spring and bridging contact being withdrawable as a unit from the said body and being rotatable therein to bring said bridging contacts into or out of contact with the other said contacts.

2. A switch comprising a switch body, a plunger, a push button mounted thereon at one end and a contact at the other end of the said plunger, all three being rotatable as a unit in said switch body, two electrical contacts mounted in said switch body and so positioned that the first mentioned contact is adjacent thereto when the plunger is in its operative position, a spring arranged to constrain the first mentioned contact into engagement with both the second mentioned contacts and interengaging parts associated with the said plunger and switch body so disposed as to prevent accidental separation of the said plunger and switch body but to permit bodily removal and replacement of the said plunger, push button and first mentioned contact as a unit.

3. A switch as claimed in claim 2 in which the spring specified is a coil spring surrounding the plunger specified.

4. A switch as claimed in claim 2 in which there are two coil springs of different strengths surrounding the plunger specified.

5. A switch comprising a plunger, a push button mounted thereon at one end, a contact at the other end of the said plunger, a switch body, two electrical contacts mounted in said switch body and so positioned that the first mentioned contact is adjacent thereto when the plunger is in its operative position, a spring arranged to constrain the first mentioned contact into engagement with both the second mentioned contacts the said first mentioned contact projecting transversely from the end of the said plunger and there being a slot in the switch body of a size to permit passage of said first mentioned contact when aligned with the said slot but not when transverse thereto, the said first mentioned contact being transverse to and beyond the said slot when in its operative position aforesaid.

6. A switch as claimed in claim 5 in which the spring specified is a coil spring surrounding the plunger specified.

7. A switch as claimed in claim 5 in which there are two coil springs of different strengths surrounding the plunger specified.

8. A switch as claimed in claim 5 comprising also projections from the rear of the switch body specified adjacent the margins of the slot specified.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,546,001	Immel	Mar. 20, 1951