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(54) Electric isolator switch.

(57) An electrical isolator switch has a moving contact member (20) as a link bridging between spaced stationary contacts (22,24) in its make position. the moving contact member (20) has associated means (28) biasing it towards its make position. Operation of associated break-forcing means (18) results in preference for the moving contact member (20) to break its contact (24B) with one of the stationary contacts (24A of 24) rather than the other (22A of 22), but the other contact (22A,22B) will break if the one contact (24A,24B) is reluctant to break. The break-forcing means has a link (18) pivotted to a switch dolly (14) and retained on the moving contact member for positive action.

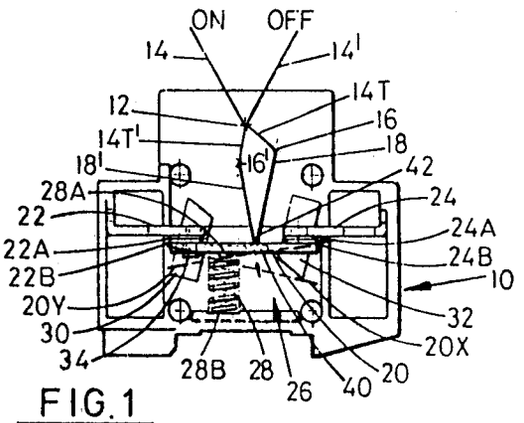

FIG. 1

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Description

Electric Isolator Switch

This invention relates to electric switches applicable to mains electrical customers' units for isolation purposes.

It is commonplace to find isolator switches between incoming mains and sub-circuit fuses or circuit breakers. Such isolator switches may be of knife-action type, typically double knife-action for live and neutral lines, or of biased cantilver type. Moreover, it is increasingly the case that such isolator switches are being made available in a modular form, typically a slim casing with the switch lever or dolly protruding from one edge. It is an object of this invention to provide a viable alternative switching mechanism suitable for isolator switches.

According to this invention, an electrical isolator switch has a moving contact member in the form of a link bridging between spaced stationary contacts in its make position, and the moving contact member is both biased towards make and associated with break-forcing means so that operation of the latter results in preference for the moving contact member to break its electrical contact with one of the stationary contacts rather than the other.

Stationary break action results where the moving contact member effectively pivots against it bias and about its engagement of said other stationary contact, but can be broken at the latter if the moving contact member is reluctant to break from the said one stationary contact, such as can occur at contact welding.

In one embodiment, the biasing is applied to the moving contact member by a spring acting at a position between the stationary contacts but closer to said other than to said one thereof, or at least to one side of a moving contact engager of the break-forcing means which serves to act on the moving contact member between its bias spring position and said one stationary contact.

Preferred break-forcing means is of toggle action in continual engagement between a switch dolly or handle and the moving contact member, preferably with positive retaining relation between the link and the moving contact member. A link or lever of the break-forcing means may be hinged or pivotted to the switch dolly or handle. Such a link should at least bear on the moving contact member if not be further hinged or pivotted thereto. A suitable link can be entrant via an end into a relieved location of the moving contact member, and a suitable relieved location is a through-hole into or through which enters an end portion of the link or lever that is shouldered or pinned to engage on the moving contact member, preferably further pinned or spread beyond the latter for positive retraction of the moving contact member back into its make state.

Such an isolator switch mechanism may be of single, or more, phase action. It is readily installed in a slim housing of the type mentioned above, one for each phase if preferred, say then with its switch dollys or other operating means engaged. Typically, a preferred insulator switch mechanism has its fixed spaced contacts to be bridged by the moving contact member located between spaced plates, and its moving contact member guided between such plates, preferably, at least for one end, say its unfavoured break end (but possibly for both ends), via co-operting formations, for example involving grooves or other indentation of those side plates.

Specific implementation of this invention is now described, by way of example, with reference to the accompanying drawing, in which:

Figure 1 is a section through an incomplete isolator switch;

Figure 2 is a fragmental transverse sectional view of its slim casing; and

Figures 3 and 4 show alternative moving contacts.

In Figures 1 and 2, a slim housing 10 is shown with a pivot position 12 for a switch dolly or handle indicated only by lines 14 for the ON position and 14' for the OFF position, and shown angled at the pivot position to present a toe 14T itself pivoted or hinged, see 16, to a link or lever 18 that acts on a moving contact member 20 shown bridging a space between two fixed contact members 22, 24 and electrically interconnecting same in the ON state, and with the normal OFF and alternative OFF positions indicated by dashed lines 20X and 20Y, respectively.

Electrical connection is indicated in Figure 1 as being by mating contacts 22A, 22B and 24A, 24B formed in or on or suitably secured to end-adjacent positions on the contact members, say in the well-known rivetted manner in holes through those members. A variant shown in Figure 3 has a domed contact 22B' at the normally pivotting end of the moving contact member, and Figure 4 shows no contact at the other end of the moving contact member, say where reliance is made simply on suitable facing of at least that end. However, any suitable contact system may be used, in like manner as can any switch dolly or handle that can be linked to the moving contact member to achieve desired breaking action relative thereto.

The moving contact member 20 is in a well 26 of the housing 10 and is shown biased by a compression spring 28 suitably located in the well 26 and on the contact member 20, say be seating recess 28A and a pip 28B as shown, or vice versa, or some other suitable system. The position of the spring 28 is between end positions of the moving contact member 20 and closer to one end, shown to the left hand side of Figure 1 and carrying the contact 22B.

Accordingly, when the switch dolly or handle is moved to the OFF position a toggle action via the link will force a displacement of the moving contact member 20 into the well 26 against the compression spring 28. However the position of the latter will obviously favour breaking of contact at the end of the moving contact member 20 most remote from the spring 28, i.e. to the other side of the position at which the toggle link 18 engages the member 20 and shown to its right hand side in Figure 1 carrying the contact 24B.

Both of the asymmetric location of the spring 28 relative to the moving contact member 20 and the oppositely asymmetric location of engagement of the toggle link 18 also relative to the length of the moving contact member 20 contribute to favouring break (20X) at the contact 24B, but a disinclination so to do does not preclude alternative breaking (20Y) at the contact 22B, say where there is a contact weld at the contact 24B. Such alternative contract breaking (22Y) will encourage breaking of such weld.

The moving contact member 20 is conveniently guided between spaced parallel locating plates 30A, 30B and 32A, 32B with at least one pair thereof preferably providing further guidance/location for the moving contact member 20, say via grooves, slots or other recesses (33A, 33B) therein or protrusions 34 from sides of the moving contact member 20, though an opposite arrangement of ribs on the locating plates and indents of the moving contact is feasible.

The position of engagement for the toggle link 18 to the moving contact member 20 is conveniently provided via a recess in the latter to take the end of the link 18, conveniently a hole 40 into or through which that end can pass, with a shoulder or cross pin (see dot 42 in Figure 1 and dashed in Figure 3) to push the moving contact member shown. Where, as can be particularly advantageous, the end of the toggle link end goes clear through the hole 40 a cross pin or further cross pin below the moving contact member can serve to assure positive action of the isolator switch relative to its moving contact member 20, see dashed in Figure 3 at 44. Any other suitable positive retaining engagement between the link 18 and the moving contact member 20 can be used, for example pivotting the former to an upstand of the latter.

Embodiments hereof readily give breaks of several millimetres, say 6mm.

Claims

1. An electrical isolator switch comprising a moving contact member (20) in the form of a link bridging between spaced stationary contacts (22,24) in its make position, the moving contact member (20) having associated means (28) biasing it towards its make position, and break-forcing means (18) operation of which results in preference for the moving contact member (20) to break its contact (24B) with one of the stationary contacts (24A of 24) rather than the other (22A of 22).

2. An electrical isolator switch according to claim 1, wherein operation of the break-forcing means (18) will break the other contact (22A,22B) if the one contact (24A,24B) is reluctant to break.

3. An electrical isolator switch according to claim 2, wherein the bias means (28) acts on the moving contact member (20) at a position between the stationary contracts (22A,24A) closer to the other (22) than to the one (24) thereof.

4. An electrical isolator switch according to claim 2 or claim 3, wherein the bias means (28) acts on the moving contact member (20) between its contact with said other stationary contact (22A) and its engagement (42) by part (18) of the break-forcing means.

5. An electrical isolator switch according to claim 4, wherein said part (18) of the break-forcing means is pivotted or hinged (16) to a switch dolly or handle (14).

6. An electrical isolator switch according to claim 4 or claim 5, wherein said part (18) of the break-forcing means is in continual positively retaining engagement with the moving contact member (20).

7. An electrical isolator switch according to any preceding claim, wherein the moving contact member (20) is guided between locating plates (30,32) for movement into or out of its contact position.

8. An electrical isolator switch according to claim 7, wherein the moving contact member (28) and the locating plates (30) have mutually interengaging parts (33,34) for further guidance/location.

9. An electrical isolator switch according to claim 8, wherein said mutually interengaging parts (33,34) are located at least adjacent to said other stationary contact (22).

10. An electrical isolator switch according to any preceding claim, wherein the moving contact member (20) is in a well (26) of a slim housing (10).

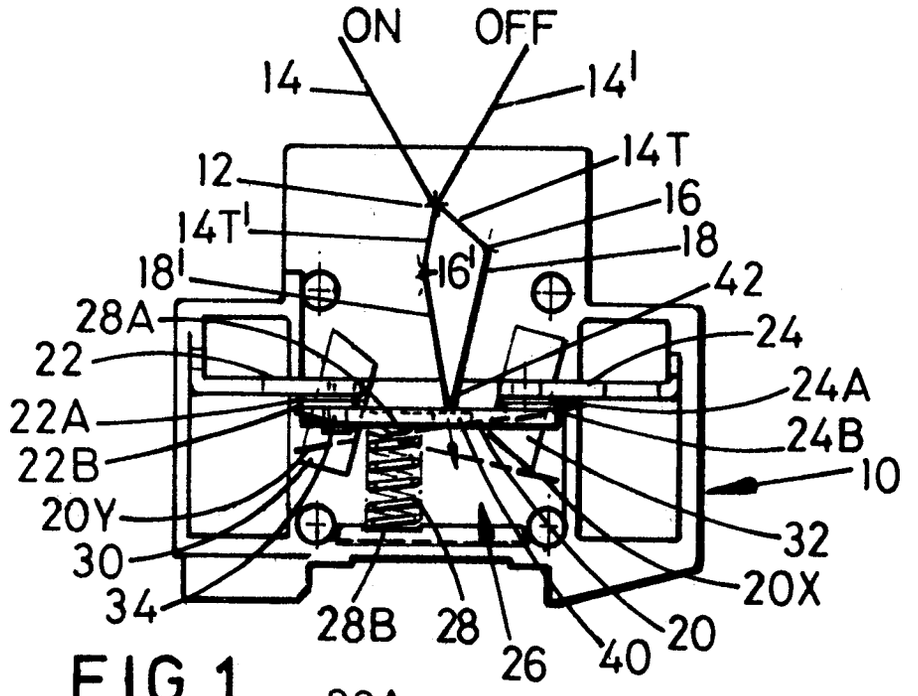

FIG. 1

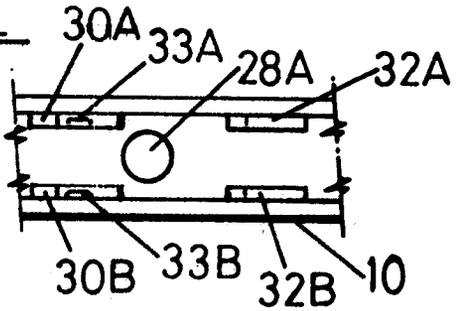

FIG. 2

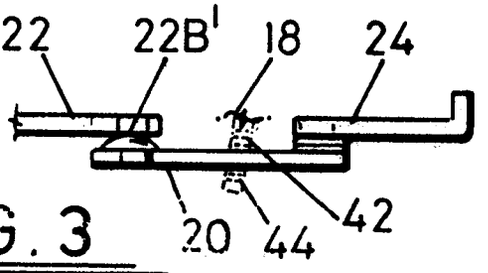

FIG. 3

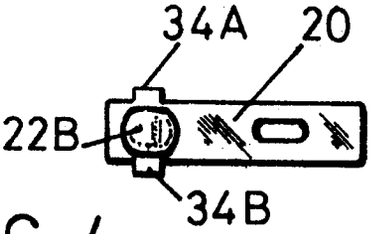

FIG. 4