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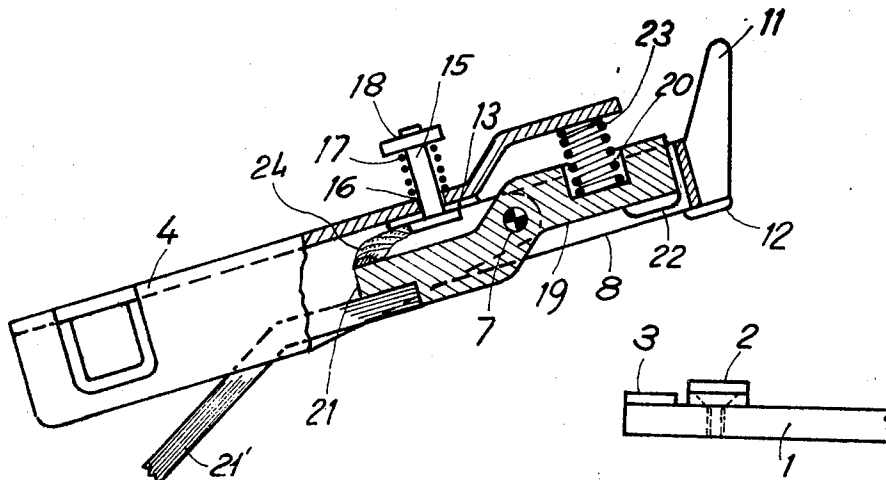
[54] **ELECTRIC SWITCHES**
4 Claims, 2 Drawing Figs.

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[50] Field of Search **200/146**

[56] **References Cited**
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CLAIM: 1. An electric switch, comprising a carrying member movable along a predetermined path between switch-opening and switch-closing positions; a first current-conducting carrier mounted on said member and having a first electric contact and exposed end and lateral surfaces; a second current-conducting carrier mounted on said member for movement relative to said first carrier and having a second electric contact, said second carrier at least substantially surrounding said surfaces of said first carrier; first and second complementary electric contacts respectively located in the path of said contacts on said first and second carriers during movement of said member toward said switch-closing position; and resilient means operating between said second carrier and said member to maintain the contact of said second carrier in such position with reference to the contact of said first carrier that the contact of said second carrier engages the second complementary contact prior to engagement between the contact of said first carrier and said first complementary contact during movement of said member toward said switch-closing position.



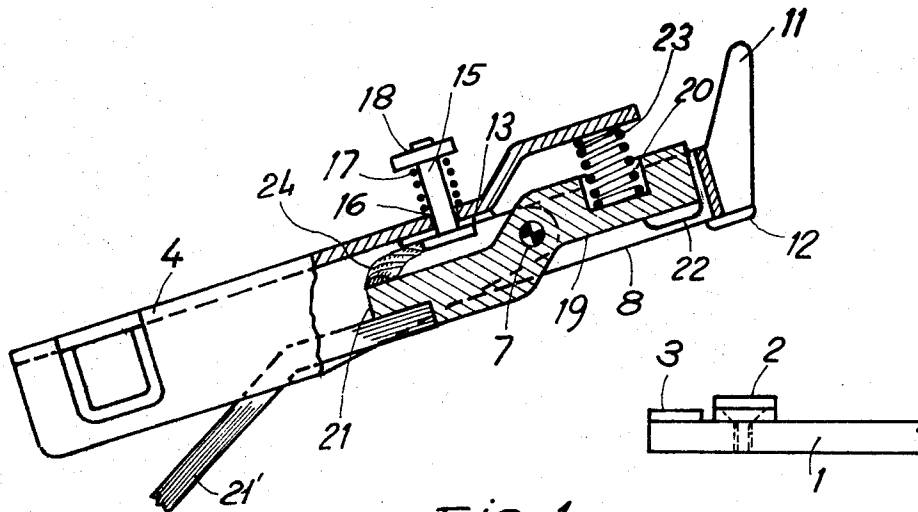


Fig. 1

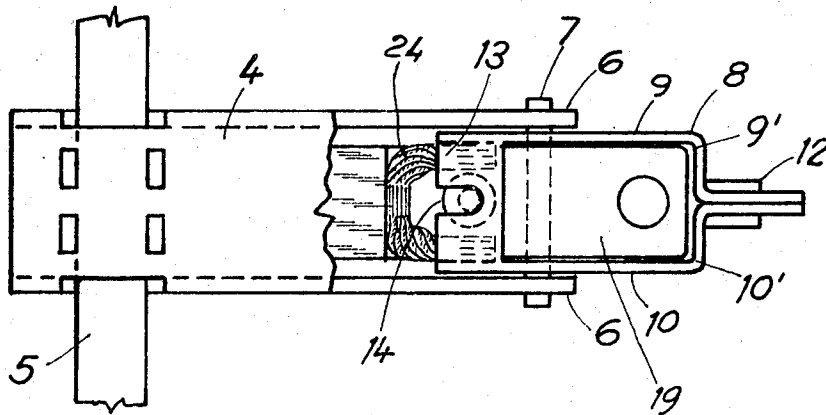


Fig. 2

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ELECTRIC SWITCHES

This invention relates to electric switches.

More particularly this invention relates to electric switches which include means to reduce arcing as the switching is opened and closed. Such arcing is probably the most serious course of trouble in electric switches which are comparatively heavily loaded.

According to the present invention an electric switch includes a first switch member which in use of the switch is movable for the purpose of opening and closing the switch, a first contact carrier carrying adjacent one end a main contact, a second contact carrier carrying adjacent one end an arc-breaking contact, said ends of the first and second contact carriers being adjacent one another and the second contact carrier including two portions which extend respectively from said end of the second contact carrier adjacent two opposite sides of the first control contact carrier, the first and second contact carriers both being pivotally mounted on the first switch member so that in use of the switch the arc-breaking contact makes before and breaks after the main contact.

Preferably the switch also includes a second switch member which in use of the switch is fixed and which carries a further main contact and a further arc-breaking contact which cooperate respectively with the main contact and the arc-breaking contact of the first switch member, the arrangement of said contacts being such that when the switch is open the spacing between the adjacent surfaces of the two main contacts is greater than the spacing between the adjacent surfaces of the two arc-breaking contacts.

Switches in accordance with the present invention can be made to small dimensions, so enabling protection against arcing to be provided in switches which although comparatively small are heavily loaded.

An electric switch in accordance with the present invention will now be described by way of example with reference to the accompanying drawing, in which:

FIG. 1 is a side view, partially in cross section, of the essential parts of the switch,

FIG. 2 is a plan view, partly broken away, of a switch member forming part of the switch.

Referring to the drawing, the switch comprises a fixed contact carrying member 1 and a movable contact carrying member 4 which is pivotable by a shaft 5 between switch opening and closing positions. The shaft 5 can be suitably driven by some known means (not shown).

The member 1 is formed by a copper plate which is connected to a terminal of the switch, and which carries a main contact 3 and an arc-breaking contact 2. The arc-breaking contact 2 projects further towards the member 4 than does the main contact 3.

The member 4 includes two spaced-parallel strips 6 which carry adjacent their outer ends a pivot pin 7.

Mounted on the pin 7 in the space between the strips 6 is a first contact carrier 19 in the form of a small copper bar of large cross section which carries adjacent the outer end a complementary main contact 22 aligned with the main contact 3.

Also mounted on the pin 7 in the space between the strips 6 is a second contact carrier 8 which comprises a loop-shaped portion including two parallel strips 9 and 10 which extend closely adjacent the two exposed opposite lateral surfaces or sides of the contact carrier 19 and at their outer ends 9' and 10' are closed together closely around the exposed outer end surface of the contact carrier 19. Where the ends 9' and 10' join they form an ear 11 which carries an arc-breaking contact 12 aligned with the arc-breaking contact 2.

The inner ends of the strips 9 and 10 are connected by a bridge 13 in which is a slot 14. A pin 15 passes through the slot 14 and also through an aperture 16 in the top of the member 4. The projecting part of the pin 15 is encircled by a helical spring 17 which is lightly compressed between a head 18 and the top of the member 4. The action of the spring 17 is therefore to tend to urge the arc-breaking contact 12 in the

direction of the complementary arc-breaking contact 2.

Near the outer end of the contact carrier 19 is a recess 20 which locates a helical spring 23, more powerful than the spring 17. The spring 23 is lightly compressed between the recess 20 and the underside of the top of the member 4, so that its action is to tend to urge the main contact 22 in the direction of the complementary main contact 3.

The inner end 21 of the contact carrier 19 is connected to a lead 21' which is preferably flexible. A flexible lead 24 connects the contact carriers 8 and 19, and also has the effect of retaining the contact carrier 19 in the position shown in FIG. 1 such that when the switch is open the arc-breaking contact 12 projects beyond the main contact 22. In other words, the spacing between the adjacent surfaces of the arc-breaking contacts 2 and 12 is less than the spacing between the adjacent surfaces of the main contacts 3 and 22.

The main contact 22 and the arc-breaking contact 12 are aligned lengthwise of the member 4, although in an alternative embodiment the contact carrier 19 could be duplicated and with it the main contacts 3 and 22, etc. Both such contact carriers 19 would be disposed within the contact carrier 8.

In operation of the switch the shaft 5 pivots the member 4 towards the member 1 whereupon the arc-breaking contacts 2 and 12 make followed by the main contacts 3 and 22. When the switch is closed the springs 17 and 20 continue to urge the respective contacts together.

When the switch is opened the main contacts 3 and 22 break first, followed by the arc-breaking contacts 2 and 12. Any arc which develops during closing or opening will extend along the strips 9 and 10 so that the main contact 22 is protected.

It will be appreciated that the switch can be made with quite small dimensions, and also that the member 4 can readily be disassembled for the purpose of replacing the contact carrier 8 or 19.

Various modifications may be made without departing from the invention as defined by the appended claims.

I claim:

1. An electric switch, comprising a carrying member movable along a predetermined path between switch-opening and switch-closing positions; a first current-conducting carrier mounted on said member and having a first electric contact and exposed end and lateral surfaces; a second current-conducting carrier mounted on said member for movement relative to said first carrier and having a second electric contact, said second carrier at least substantially surrounding said surfaces of said first carrier; first and second complementary electric contacts respectively located in the path of said contacts on said first and second carriers during movement of said member toward said switch-closing position; and resilient means operating between said second carrier and said member to maintain the contact of said second carrier in such position with reference to the contact of said first carrier that the contact of said second carrier engages the second complementary contact prior to engagement between the contact of said first carrier and said first complementary contact during movement of said member toward said switch-closing position.

2. An electric switch as defined in claim 1, wherein said carrying member is pivotable between said switch-opening and switch-closing positions and said carriers are pivotable with reference to said member about an axis which is at least substantially parallel to the pivot axis of said member.

3. An electric switch as defined in claim 2, further comprising second resilient means operating between said member and said first carrier to yieldably bias said first carrier in a direction to enable said member to continue its movement toward said switch-closing position when the contact of said first carrier engages said first complementary contact.

4. An electric switch as defined in claim 1, wherein said first carrier is a bar and said second carrier comprises a loop-shaped portion which surrounds said surfaces of said first carrier.

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