This invention relates to electric switch construction and is particularly directed to all switches either of the multiple or single type.

In switches of this type it has been the practice to provide stationary contact blocks and a movable contact member of a variety of designs to engage the said stationary contact blocks. Other designs have embodied a laminated or brush type stationary contact block engaged by a solid movable contact member.

An object of this invention is to provide a switch in which a relatively rigid movable contact member is normally maintained in contact relation to a pair of rigid stationary contacts by resilient means comprising in part operating mechanism for the movable contact.

More specifically, an object of this invention is to provide an electrical switch mechanism in which each of a pair of stationary contact blocks includes a V-shaped contact receiving portion, a tubular contact member movable into the V-shaped portions, and resilient means for maintaining engagement between said member and portions.

Another object is to provide a switch operating mechanism including means compensating for dimensional inequalities which are the result of the use of insulating supporting members and thereby facilitating the assembly and operation of a movable contact relative to stationary contacts.

Another object is to provide a switch mechanism in which the movable contact bar is self adjusting so that it may rock freely to properly engage the fixed contacts to insure a perfect contact.

Still another object is to provide a replaceable contact follower for maintaining a delayed electrical connection between the stationary and movable contact members to minimize pitting the movable contact member when separated from the stationary members or when brought into contact therewith, such follower being freely and automatically adjustable to open the circuit after separation of the contact members or to close circuit before contact members are engaged irrespective of wear of the parts.

Further objects and advantages of the invention will be apparent from the following description and from the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Fig. 1 is a view with the end of the switch housing as viewed from the left relative to Fig. 5 cut away to show the switch in closed position.

Fig. 2 is an enlarged view of the operating and latching mechanism shown in Fig. 1 as it appears when the switch is closed.

Fig. 3 is a view similar to Fig. 1 showing the switch in open position.

Fig. 4 is an enlarged view of the operating and latching mechanism shown in Fig. 3 as it appears when the switch is opened.

Fig. 5 is a view partly in section taken on the line 5—5 of Fig. 1 showing the arrangement of the parts in closed position.

Fig. 6 is an enlarged view partly in section showing the movable contact and its mounting on the operating mechanism.

Fig. 7 is a view partly broken away taken on the line 7—7 of Fig. 6.

Fig. 8 is a fragmentary view showing a stationary contact and switch blade engaged therewith as viewed from the right relative to Fig. 1.

The switch illustrated in the drawings is designed for operation in a three phase circuit, but since each of the phases is controlled by switch mechanism similar to that controlling the other phases, it deemed it sufficient to show only one such switch mechanism.

The switch hereafter described is enclosed in a housing comprising a body portion 1 for mounting the switch mechanism, a cover 2, and tank 3 for containing an insulating are quenching oil surrounding the switch contacts. The cover is removably clamped to the body 1 by any suitable means such as bolts 2a, and the tank is supported from the body by swiveled suspension rods 3a. The inner walls and bottom of the tank 3 are lined with insulating panels 3b. Suitable sealing gaskets will, of course, be provided between the several adjacent parts of the housing.

A switch supporting base plate 4 is mounted in the body portion 1 above the tank 3. Spaced insulating bushings 5 surrounding conducting rods 6 are mounted on the base plate 4 and extend from the interior of the body portion 1 to the interior of the tank 3. Nuts "A" on each of the rods 6 secure a line terminal 8 to the rod. A line wire 9a (not shown in Figs. 1 and 3, but shown in Fig. 5) extends from each of the terminals to the exterior of the housing through bushings 9 mounted on the body 1.

Insulating caps 22 cover the upper ends of the bushings 5 and 9 and the line parts projecting therefrom.

The lower end of each conducting rod 6 is provided with a stationary contact block 10 which is held in clamped engagement with the lower end of the corresponding bushing 5 by means of the lower one of the nuts 7. Each block is provided with a contact surface in the form of an inverted V-shape groove 33 transversely of Figs. 1 and 3 to serve as a contact seat for the cylindrical switch block 11 (see Fig. 8). Preferably, each block 10 is provided with a resilient auxiliary arcing contact 12 comprising a wire bent in substantially rectangular form with ends bent toward the other and socketed in a recess on one side of the block 10, offset from the recess in which the other end is socketed on the opposite side of the block 10. This arrangement places the auxiliary contact 12 under stress tending to urge the freely movable side downwardly.
against the blade 11. Pins 12a limit the extent of the downward movement of the free side of the auxiliary contact 12. As indicated, the freely movable side of each auxiliary contact 12 is disposed laterally of the contact block 10 which supports it. This insures that the arcing occurring on opening or closing of the circuits will occur at points spaced from the areas of contact between the blocks 10 and blade 11.

The blade 11 is mounted on the lower end of the insulating rod 23 by means of a pair of opposed angle straps 14 each of which is apertured at 25 to loosely embrace the blade 11. Spaced cotter pins 13 extend transversely through the blade 11 and allow limited shifting movement of the blade 11 on the angle straps 14 but permit the blade 11 to rock in the apertures 25 sufficiently to allow proper alignment with the V-slots 39 in the contact blocks 10.

The insulating rod 25 extends upwardly through the aperture 27 in the base plate 4 and into the space defined by the body 1 and cover 2 of the housing. Mounted on upper end of the rod 25 is an inverted U-strap 28 having an aperture 31 in its base. Extending horizontally between the legs of the strap 28 is a crosshead bar 18 having threaded post 30 projecting upwardly through the aperture 31 in the base of the strap 28 and supported by nut 33 secured against rotation by lock nut 32. A coil spring 35 surrounding the post 30, urges the bar 18 downwardly.

The left end of the crosshead bar 18 as viewed in Fig. 5 is apertured at 21 to receive a guide post 22 and the side opposite the threaded post 30 is provided with a depending tongue 23 to which a pair of links 11 is connected. A second guide post (not shown) is provided for the opposite end of the bar 18.

The operating mechanism includes a handle 23 exteriorly of the housing secured to a rocker shaft 15 projecting into and journaled in the walls of the body 1. Secluded to the shaft interiorly of the body 1 is a lever 16 pivotally connected at its free end with the lower ends of links 11. The free end of the lever 16 is provided with a projecting stop member 19 engageable with stop pin 26 connecting the links 17 intermediate the pivotal connection of the links 17 with tongue 23 on the bar 18 and the pivotal connection of the links 17 with the lever 16. The stop member 19 and pin 20 are so arranged that the pivotal connection between the links 17 and the lever 16, as viewed in Fig. 4 is disposed slightly to the right of a plane common to the axis of the shaft 15 and the pivotal connection between the links 17 and tongue 23 on the bar 18, thus preventing collapse of the connection between the shaft 15 and the bar 18 when the switch blade 11 is in the closed position as illustrated in Figs. 1 and 5.

When the switch blade 11 is moved to the open position shown in Fig. 3, the handle 23 which will normally extend horizontally to the left will be rotated counter-clockwise until the lever 16 rests on the stop lug 24 on the base 4. Movement of the lever 16 in the manner indicated carries the lower ends of links 17 downwardly to the left of the insulating rod 25 and permits the switch blade 11 and its supporting structure to descend to the position illustrated in Fig. 3.

As the switch blade 11 leaves the contact blocks 10, the auxiliary contacts 12 will maintain an electrical connection between the blade 11 and contacts 16 until the auxiliary contacts rest on the stop pins 12a. This mode of operation between the blade 11, auxiliary contacts 12 and blocks 16 insures that arcing will occur only between the blade 11 and auxiliary contacts 12 and at points on the blade 11 spaced from points of contact thereof with the contact blocks 10.

As clearly illustrated in Fig. 2, the crosshead bar 18 is maintained in a position which carries the post 30 upward to a point where the nut 33 is spaced from the base of the U-strap 28. This permits the bar 18 to maintain the movable switch blade 11 in resilient contact with the spaced stationary contact blocks 10 through the action of the coil spring 35 on the U-strap 28.

I have stated that the disclosed switch is designed for a three phase circuit. It is believed that it will, without duplicating the view of the switch shown in Fig. 5, be obvious that each phase of the circuit will have a similar arrangement, each phase switch being operated simultaneously with the others through the shaft 15 common to each switch.

It will appear from the foregoing, that a novel switch operating mechanism is disclosed, that such mechanism embodies a combination of elements which afford the use of simple, solid contacts in abutting relation and that simple effective means are provided for avoiding arcing between the contacts.

I claim:

1. In a switch, comprising a pair of spaced stationary contact blocks, each having a V-groove in substantial alignment with the other, and a cylindrical switch blade normally seated in said grooves in bridging relation to said blocks and movable therefrom; and an auxiliary arcing contact carried by each of said blocks and comprising a resilient wire loosely embracing said block with each of its ends journaled in a side of said block on an axis offset from the axis of the other, the journaled mounting of the arcing contact producing a stress in said wire biasing the freely movable side of said wire into contact with said switch blade.

2. In a switch, comprising a pair of spaced stationary contact blocks, each having a contact surface in substantial alignment with the other and a switch blade normally seated on said contact surfaces in bridging relation to said blocks and movable therefrom; an auxiliary arcing contact carried by each of said blocks and comprising a resilient wire loosely embracing said block with each of its ends journaled in a side of said block opposite that of the other in an axis offset from the axis of the other, the journaled mountings of the arcing contact producing a stress in said wire biasing the freely movable side of said wire into contact with said switch blade.

GEORGE LEON THIERY.

REFERENCES CITED

The following references are of record in the file of this patent:

<table>
<thead>
<tr>
<th>UNITED STATES PATENTS</th>
<th>FOREIGN PATENTS</th>
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<td>Number</td>
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