

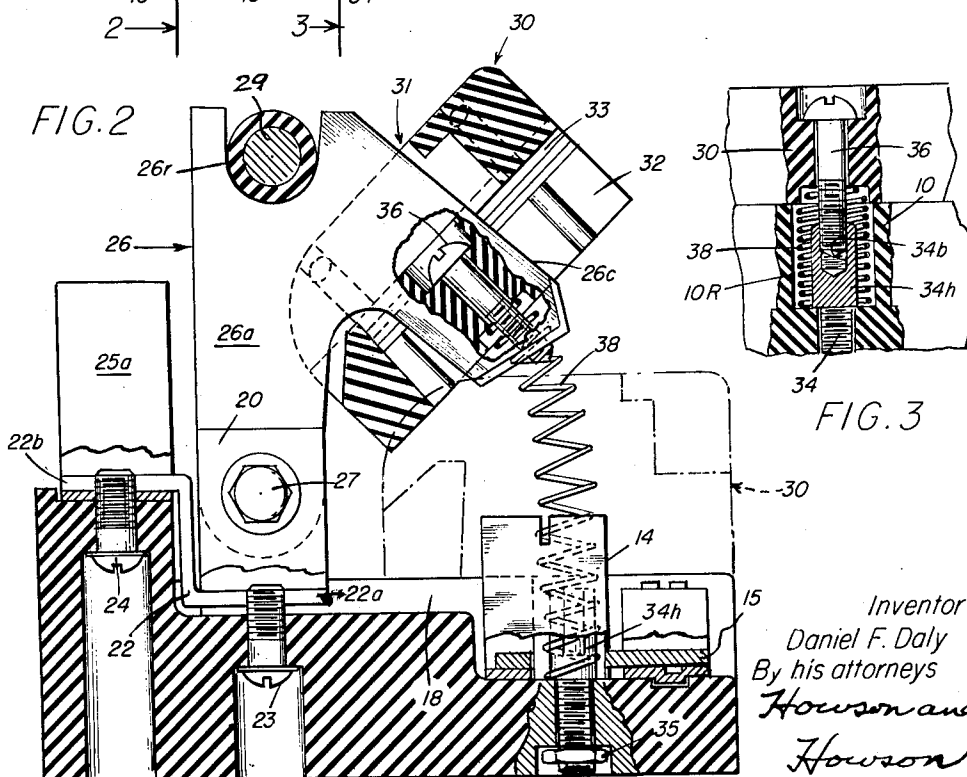
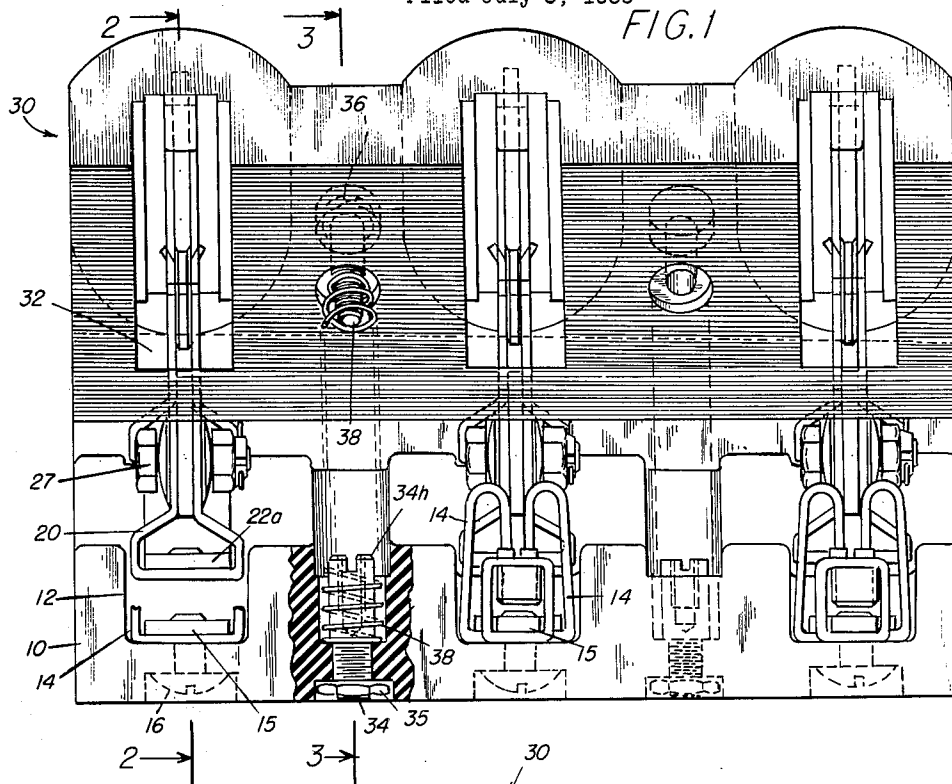
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ARC HOOD SUPPORTING MEANS FOR ELECTRIC SWITCHES

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ARC HOOD SUPPORTING MEANS FOR ELECTRIC SWITCHES

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5 Claims. (Cl. 200-144)

This invention relates to electric switches and more particularly to heavy-duty knife-blade electric switches of a type suitable for making and breaking circuits carrying from 100 to 465 amperes and 250 to 600 volts. However, the invention is not limited to that particular range.

Switches of this sort commonly are provided with arc quenching or suppressing means in an arc shield or hood over the fixed contacts.

When it is necessary to inspect, repair or replace fixed contacts of such switches, the arc shield must be removed. It is essential that the arc shield be replaced afterwards as failure to do so will result in putting the switch in service in such condition that it may soon fail or become unfit for service due to pitted and scarred contacts; or it may allow dangerous or destructive arc interplay within the housing.

It is an object of this invention to provide supporting means for an arc hood in a knife-blade electric switch which will readily enable removal of the hood for inspection, repair or replacement of the fixed contacts or other adjacent parts, but which will insure the replacement of the arc hood afterwards.

Another object of the invention is to provide an arc hood which will remain assembled to the switch mechanism, but in a withdrawn or retracted position, during inspection, repair or replacement so that the hood will not become lost or misplaced.

Another object of the invention is to provide an arc hood having the foregoing characteristics which may be economically manufactured and assembled in its normal position of securement over the fixed contacts and yet will readily allow removal and equally readily allow replacement.

Other objects and advantages of the invention will become apparent as it is described in connection with the accompanying drawing.

In the drawing:

FIG. 1 is a front elevation view, partly broken away, with the switch open and the arc shield withdrawn from its normal position over the fixed contacts.

FIG. 2 is a transverse section view taken along line 2-2 of FIG. 1 and partly broken away.

FIG. 3 is a fragmentary detail view broken away and in section along line 3-3 of FIG. 1 to show the means for securing the arc shield in normal position.

Referring to the drawing, the switch parts are mounted upon a base of ceramic or molded insulation and recessed and formed to accommodate the individual parts as will hereinafter more fully appear.

In the form of invention illustrated, three poles are shown, but it will be understood that the invention is equally adaptable to switches having two or any other multiple of poles. Since the contact structure for each of the poles is identical, a description of one will suffice.

The top of the base 10 is provided with a recess 12 at one side for a fixed contact clip 14 which may be of conventional form, but preferably is of U-shape with the arms of the U reversely bent inwardly toward one another to provide for firm frictional engagement of a movable contact blade between their adjacent contact surfaces. To secure the clip on the base, a terminal plate or bar 15 may be placed with one end overlying the

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transverse portion of the fixed contact clip and receiving in a tapped hole a securing bolt 16 passing upwardly through a hole in the base. Wire terminal securing means may be attached to the other end of the terminal plate 15 of any suitable or conventional sort.

The upper surface of the switch base is also formed with a recess 18 for a hinge clip 20 upon which is mounted a movable switch blade designated generally by the numeral 26. The hinge clip may be secured to the base by a Z-shaped bus or connector bar 22, one leg 22a of which seats upon the transverse portion of the hinge clip 20 and receives in a tapped hole a screw bolt 23 passing through a hole in the base from the bottom.

The other leg 22b of the Z-bar may have mounted thereon a conventional fuse clip 25 which is held between the leg 22b and the base by a screw bolt 24.

The movable contact blade 26 is of C-shape having one arm 26a pivotally mounted between the opposite arms of the hinge clip 20 by a screw or pin 27 passing transversely through the arms of the hinge clip and the arm 26a of the blade. The other arm 26c of the movable contact is adapted to engage and disengage the fixed contact 14 as the movable blade 26 is pivoted about its mounting. This may be accomplished by a bail 29 fitting in a recess 26r formed in the top portion of the movable blade in conventional fashion. It will be understood that the bail of the switch operating handle will seat in aligned recesses of all of the blades of all of the poles of the switch so that all of the switch blades will be simultaneously moved in usual fashion.

Over the fixed contacts there is normally positioned an arc hood or cover 30 of molded phenolic or ceramic insulating material. The hood is of such length as to cover fixed contacts of all the poles of the switch in similar fashion. Over each fixed contact, the hood is provided with a recess 31 passing from the upper surface through the lower surface of the hood to permit passage of the switch blades in their movement to engage and disengage the fixed contacts.

A laterally extending passage 32 communicates with the passage 31 and is directed toward the side of the hood remote from the side nearer the hinge of the movable contact. These communicating passages permit the blowing out of the arc gases of an arc drawn when the movable contact separates from the fixed contact under load. Preferably, the hood will be formed with a plurality of parallel slots in the sides of the passage 32 to receive H-shaped magnetic arc suppressing plates. The form and construction of these plates and their functions are more fully described in my copending application Serial No. 825,746 entitled "Arc Suppressing Plate and Hood for Electric Switches," filed concurrently herewith, said application having become abandoned in favor of a continuation-in-part application Serial No. 31,407 which remains copending herewith.

For inspection, replacement and repair of the fixed contacts or adjacent hardware, it is desirable to be able to remove or withdraw the arc hood, but it is also equally desirable that the hood shall be replaced afterwards and not forgotten or misplaced. So that the hood will always be attached to the switch mechanism and, hence, never forgotten and shall yet be readily withdrawn from normally secured position over the fixed contacts, the arc hood is mounted for swinging movement with the movable switch blades away from the fixed contacts, if the means which normally hold the hood secured in place has previously been released.

To that end, the hood is normally secured in the following manner.

In a bore in the base 10 alongside the fixed contacts is a cap screw 34 secured in place by a nut 35 on the under-

side of the base. The cap screw has an elongated head projecting upwardly within a countersunk recess 10r in the upper surface of the base around the cap screw. An axial bore 34b in the head 34h of the cap screw is adapted to receive the end of the screwbolt 36 which extends through a bore in the arc hood next to or between the passages 31 of adjacent poles. When the end of the screwbolt 36 is screwed into the tapped bore 34 of the cap screw, the hood is held secured over the fixed contacts in position for the movable blades 26 to pass through the hood and to engage the fixed contacts 14. This normal position of securement of the hood is shown in broken lines in FIGURE 2.

When the bolt 36 is unscrewed and the switch blade is swung from the position of engagement with the fixed contacts to the full-line position of FIGURE 2, the arc hood is normally held in position of securement over the pressure of a plurality of coiled compression springs 38. These springs are similarly mounted and positioned. Each spring 38 is seated at its lower end in the countersunk recess 10r around the head 34h of the cap screw while the upper end of the spring seats in a countersunk recess in the underside of the arc hood around the screwbolt 36 about the end of which it is coiled. The top convolution of the spring 38 around the screwbolt 36 is of reduced diameter so as to embrace and hold onto the screwbolt 36 while allowing the bolt 36 to be screwed and unscrewed from the head of the cap screw 34.

In order to unscrew the bolt 36, the switch blades should be in switch-open position, as it would be hazardous to attempt to loosen the arc hood 30 while the switch is closed and the circuit is "live." In the invention as illustrated, it is impossible to remove the bolts 36 for removal of the hood 30 until the blades have separated from the fixed contacts. Because the bail 29 and its insulating cover lie directly over the bolts 36 in switch-closed position, they prevent access to the bolts 36.

From the foregoing, it will be observed that the arc hood is normally held in position of securement over the fixed contacts and is so formed as to permit the movable switch blade to engage with and disengage from the fixed contacts without movement of the hood. However, upon unscrewing the screwbolts 36 and disengaging them from the cap screws 34, which can be done only with the switch in open position, the arc hood is permitted to rise and engage the movable contact blades as it moves away from the fixed contacts. Moreover, the swinging movement of the arc hood away from the fixed contacts and into engagement with the movable contacts is compelled by the action of the coiled compression springs 38.

When the switch is in open position with the arc hood released from the base, it will occupy the position of FIGURE 2 in which it is possible to inspect, replace or repair the fixed contacts or to make new connections or different connections of the line wires to the fixed contact terminals without interference by the arc hood.

It will also be noted that the arc shield is constructed and positioned so that when the securing screwbolts 36 are disengaged from the cap screws 34, the shield has no positive securement to any other fixed or movable part of the assembly and thus floats freely between the fixed and movable contacts. It is held in assembled condition solely by reason of the pressure of the springs 38.

Whilst it is very easy to remove the arc shield by removing the springs or by overcoming the spring pressure and withdrawing the shield from the movable contacts, conscious thought and positive action are required to do that. Moreover, the springs can be touched and handled without shock hazard because they are not electrically connected with any current-carrying part.

Many modifications within the scope of the invention will occur to those skilled in the art. Therefore, I do not limit the invention of the specific embodiment illustrated and described.

What is claimed is:

1. In an electric switch, fixed contact members, movable contact members engageable with and disengageable from said fixed contact members, a base on which said fixed and movable contact members are mounted, an arc shield overlying said fixed contact members, means normally securing said shield to said base during opening movement of said movable contact members, spring means normally held inactive by said securing means but released when said securing means is rendered ineffective and thereupon removing said shield from contact-covering position when said movable contact members are separated from said fixed contact members, said spring means also holding said shield in position to be moved back to contact-covering position by movement of said movable contact members when the latter are moved to reengage said fixed contact members, means on said base for locating and positioning said spring means at one end, means carried by the shield including a screw around the end of which the other end of the spring is contracted and embraces for locating and positioning said spring at said other end.

2. In an electric switch, fixed contact members, movable contact members engageable with and disengageable from said fixed contact members, a base on which said fixed contact members are mounted, pivotal supporting means on said base for pivotally supporting said movable contact blade, a free-floating arc shield overlying said fixed contact members and having passages through which said movable contact members may pass to engage with and disengage from said fixed contact members, means normally securing said shield to said base, coiled compression spring means pressing at one end on the base and at its other end against the shield and operable when said securing means is rendered ineffective to cause said shield to move into engagement with said movable contact members and away from said fixed contact members to uncover said fixed contact members and make them accessible, said spring means also holding said shield in position to be moved back to contact-covering position by movement of said movable contact members when the latter are moved to re-engage said fixed contact members.

3. An electric switch as claimed in claim 2 having means to prevent access to said securing means and release of said arc shield while said fixed and movable contacts are engaged.

4. An electric switch as claimed in claim 2 having means for operating said movable contact members and overlying said securing means in switch-closed position and preventing access to said securing means and release of said arc shield in that position.

5. An electric switch as claimed in claim 2 in which the securing means is a screwbolt, and a bail for operating the movable contact blades, said bail overlying said screwbolt in switch-closed position preventing access thereto and release of said arc shield.

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**UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION**

Patent No. 3,035,140

May 15, 1962

Daniel F. Daly

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 17, for "hood is normally held in position of securement over the" read -- hood is caused to rise and engage the blades by the --.

Signed and sealed this 11th day of September 1962.

(SEAL)

Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
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