July 18, 1933. W. A. HEINRICH 1,918,542

HINGING MEANS FOR OUTDOOR SWITCHES

Original Filed May 16, 1929

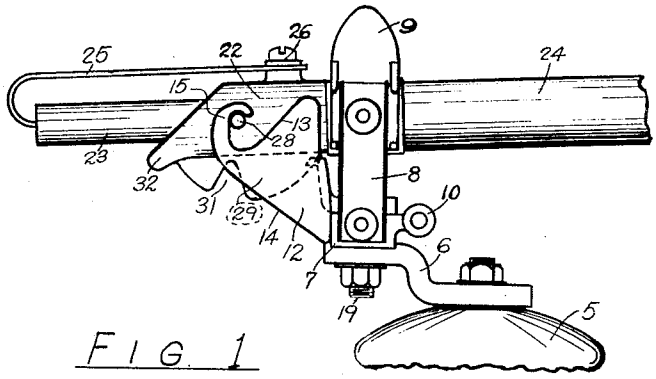


FIG. 1

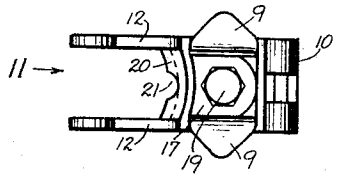


FIG. 2

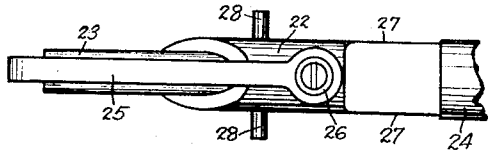


FIG. 3

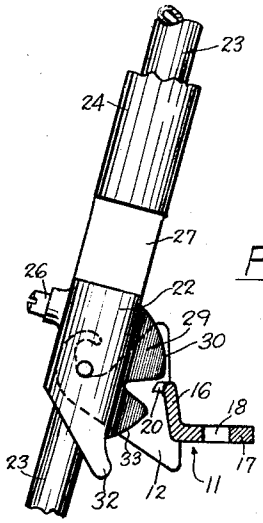


FIG. 4

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HINGING MEANS FOR OUTDOOR SWITCHES

Original application filed May 16, 1929, Serial No. 360,781. Divided and this application filed August 4, 1930. Serial No. 472,999.

This invention relates to electric switches and more particularly to improved hinging means for switches of the class wherein a movable blade member is adapted to be disconnected and entirely removed from the supporting structure. The present construction is particularly applicable to fuse switches such as are employed in high tension circuits. In such switches, the fuse element is usually disposed in a cartridge or insulating tube having metal ferrules at its ends which serve as contact terminals, this assembly forming the switch blade. In general, these switches are operated in the manner of a knife switch, the blade being pivotally mounted adjacent one switch terminal whereby it may be swung into and out of engagemest with the other terminal, to close or open the circuit. When it becomes necessary to renew a fuse, the cartridge is entirely removed from the supporting structure, usually by means of a "fuse stick", which allows the operator to remain clear of the line.

This invention has for an object, the provision of improved blade hinging means which permit of the blade being removed from the contact assembly, only after the switch has been opened and the blade rotated into a predetermined angular zone. By preference, the zone in which the removal of the blade member may be accomplished, is small as compared to the total angular swing of the blade. Also, the zone is located at neither of the limits of blade travel, hence, the blade may not be removed from the supporting structure when in switch closed position, nor when at the limit of its travel in the direction to open the switch. These expedients preclude a casual or unintended removal of the blade member. Also, the switch assembly may be disposed in any desired mounting position such as, for example, upright, angular, or underhung mounting, without danger of the switch blade being accidentally separated from the supporting structure when the switch is in open position.

A further object of my invention is to provide, in connection with the blade mounting means previously indicated, guiding or directing means for trunnion members, which, in the present embodiment, are carried by the switch blade, the guiding means serving to facilitate the replacement of the blade into the mounting structure.

These and other objects and advantages will be more fully explained in the body of the description which follows, and from the drawing, Fig. 1 of which is a fractional side elevation of a disconnect switch embodying my invention. This figure shows the hinging means and associated switch contact assembly and a portion of the switch blade in closed position. Fig. 2 is a plan view of the hinge body and contact structure; Fig. 3 is a plan view of the hinging portion of the switch blade; and Fig. 4 is a sectional side elevation showing the cartridge in position to be removed from the hinging member.

The blade member of the disconnect switch herein shown and described, embodies a fuse cartridge of the expulsion type, the structure and operation of which is outlined in my copending application, Serial No. 360,781, filed May 6th, 1929, of which the present application is a division. The blade mounting means herein set forth is equally well adapted for any form of hinging disconnect switch, whether it be of the fusible or non-fusible type.

Referring now by reference numerals to the drawing, 5 indicates an end portion of a porcelain insulator, upon which is secured, as by means of a stud and nut, an adaptor bracket 6. The bracket 6 supports a switch contact assembly, the details of which are given in the application referred to above, but which, briefly, comprises a terminal base 7, paired, flexible supporting members 8, of which one appears in Fig. 1, extending from opposite sides of the terminal base 7, and contact shoes 9, arranged for self aligning movement at the ends of the supporting members 8. A terminal lug 10 on the base 7 serves to connect the assembly to the line.

For hingedly supporting the switch blade, I provide a member indicated generally at 11, which, preferably, is separable from the terminal assembly. The member 11 may be formed of any suitable material, either conducting or non-conducting, and embodies a

pair of substantially triangular-shaped, parallel arms 12, spaced to accommodate the cartridge or blade therebetween, as will hereinafter appear. The converging edges 13 and 14 terminate in hook portions 15, which form pivot seats for trunnion members, (hereinafter designated) on the cartridge. Connecting the arms 12 at sides opposite the pivot seats, is an angulate member having a portion 16 extending between and spacing the arms, and a projecting portion 17 (Fig. 4) which is provided with an aperture 18. A screw 19, disposed through the aperture 18, the terminal base 7, and the bracket 6, secures these members together. The portion 16, by preference, is provided with a projection or lip 20, the extent of which is broken by a centrally disposed, arcuate recess 21.

The fuse cartridge, which in the present example forms the switch blade, comprises a pair of spaced, metal terminal members, disposed on an insulating tube, each having means for securing one end of the fusible element which extends longitudinally through the tube. In the drawings, 22 indicates a cartridge terminal member, 23 a portion of an insulating tube, 24 a portion of an outer insulating covering tube, and 25 a portion of a fusible element secured to a binding post 26 on the terminal. Extending transversely from opposite sides of the terminal member 22 and spaced at a substantial endwise distance from contact surfaces 27, are the trunnion members hereinbefore mentioned, and now designated as 28. As a means for preventing unintended or accidental disconnection of the cartridge, I provide on that member a longitudinally disposed fin, or cam 29, having a margin 30 of arcuate contour, which is normally kept in proximity to a margin of the recess 21. The cam is provided with a notch or indent 31, the position and extent of which determines the zone in which the blade member may be removed from, and replaced in the hinge member.

Fig. 4 illustrates the hinge assembly with the cartridge in position for removal. As shown in this figure, the notch 31 lies adjacent the upper edge of member 16 and the trunnions engage the bottoms of the hinge seats. While in this position, a translatory movement of the cartridge may be effected and the trunnions slipped out of the bearing seats. If it is desired to maintain the switch open (assuming the switch to be mounted in a horizontal, upright position) the cartridge is swung to a position beyond the vertical, until a tail portion 32 comes into contact with the portion 16. The trunnions are then held in the bearing seats by reason of the cam portion 33 engaging the member 16. In certain installations, such as in the case of an angle mounting of the switch, it may be desirable to extend the portions 20 farther along the portions 12. By this provision, the range of angular opening movement of the cartridge or blade is restricted, so that as will appear, the tail portion 32 will engage the portion 20 earlier in the opening movement than is possible with the arrangement shown by the drawing.

The replacing of a cartridge into the mounting structure is rendered a relatively simple operation, the sloping edge surfaces 13 on the hinge member 11 serving to direct the trunnions into the pivot seats.

It will be obvious to those skilled in the art that various changes may be made in the particular hinge construction herein shown and described, without departing from the invention as defined in the appended claims.

I claim:

1. In a switch assembly, a removable blade member, trunnions projecting from opposite sides of the blade member, near one end thereof, a longitudinally disposed fin projecting laterally of the blade member between said trunnions, and having an arcuate, notched margin, a hinge member for supporting the blade member during rotation thereof to effect a change of switching conditions, said hinge member having spaced, recessed arm portions adapted to receive the trunnions, and a notched portion extending transversely between the arms for engagement by said fin, whereby to prevent removal of said blade from the hinge member except when the blade is rotated sufficiently to bring said notched portions into substantial coincidence.

2. In a switch assembly including a demountable blade member, trunnions projecting from opposite sides of the blade member, near one end thereof, a longitudinally disposed fin having a recess in the margin thereof, projecting laterally of the blade member between said trunnions; a hinge member for the blade, comprising laterally spaced arm portions terminating in open trunnion seats, said arms having projections facing the open sides of said seats, which serve to guide or direct the trunnions therein, and a cross piece connecting said arm portions at the ends thereof opposite the trunnion seats, said fin being adapted slidably to engage said cross piece during pivotal movement of the blade member.

3. In an electric switch including a demountable blade member having trunnions projecting from opposite sides, near one end thereof, a hinge member for the blade comprising a pair of laterally spaced arms connected at one end by a cross piece, the free ends of the arms terminating in hooked portions forming open bearing seats for said trunnions, and means for maintaining the trunnions in the bearing seats during opening and closing movement of the switch blade, said means comprising an arcuate fin pro-

jecting laterally from the blade, adapted to engage the cross piece of said hinge member, said fin having a marginal recess to permit of the blade, when swung to a position to bring such recess opposite said cross piece, being removed from the hinge member.

4. In a switch assembly, a demountable blade member having trunnions projecting from opposite sides near one end thereof, and an arcuate fin having a recess in its outer margin, projecting from the blade member between said trunnions; a hinge member comprising a pair of substantially flat, parallel arms, having marginal portions terminating convergingly in open sided trunnion seats, and a cross piece connecting the arms, having a centrally recessed lip adapted for engagement by said fin, said fin and lip coacting to prevent removal of the blade from the hinge member except when the blade is rotated sufficiently to bring the recessed portion of said fin opposite the notched portion of said lip.

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