Dec. 16, 1958 F. KULL ET AL 2,864,922

EXCHANGEABLE CONTACT ELEMENT FOR DISCONNECT SWITCHES AND THE LIKE

Filed Sept. 20, 1955

Fig. 4.

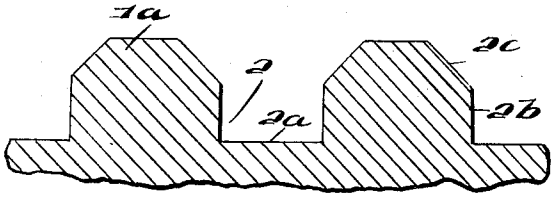


Fig. 3.

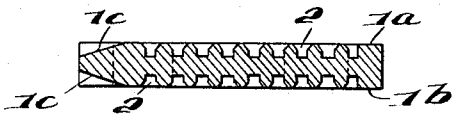


Fig. 2.

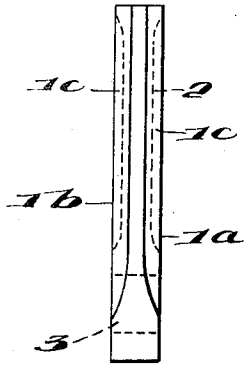
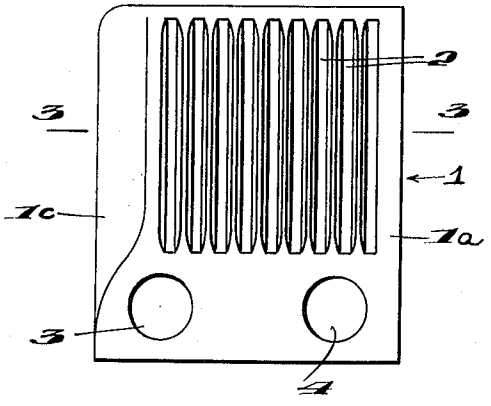


Fig. 1.



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United States Patent Office 2,864,922
Patented Dec. 16, 1958

2,864,922

EXCHANGEABLE CONTACT ELEMENT FOR DISCONNECT SWITCHES AND THE LIKE

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Application September 20, 1955, Serial No. 535,347

Claims priority, application Switzerland May 11, 1954

2 Claims. (Cl. 200—166)

The present invention relates to electric switches of the movable blade type such as those used in high voltage work for breaking circuits under load and is a continuation-in-part of our application Serial No. 507,080, filed May 9, 1955. These switches usually include a pair of spaced parallel stationary contacts and a contact at the outer end of a movable blade member which may, for example, be pivotally mounted so as to be moved into and out of the space between the stationary contacts so as to engage and disengage, respectively, the latter. Since there is considerable wear on the contacts it has been conventional practice to make the wear portions of the contacts at the end of the switch blade exchangeable to the end that worn contacts may be readily replaced thereby avoiding necessity for replacement of the entire switch blade.

In the past, it has been conventional to construct these replaceable contact elements with smooth, i. e. planar contact faces. Such construction has been found, however, to result in poor performance after continued use due to the fact that sticking occurs between the movable and stationary contact elements thus interfering with proper operation of the switches and creating plant disturbances. The sticking can be explained by the fact that where planar surfaces are brought ostensibly into face-to-face engagement, area contact does not actually occur. Rather, the contact characteristic between the two planar switch elements is more of the nature of several point-to-point contacts spread over the area of the faces ostensibly fully engaged. The areas between these point-to-point contacts form cavities of the order of hundredths of millimeters in depth and are filled with lubricant since it is standard practice to lubricate the contacts. As a result of the high voltage utilized and also resinification of the lubricant, the contact faces are inclined to stick.

The present invention is designed to overcome any tendency on the part of the contacts to stick and is characterized by a contact piece or element whose surface at the area designed to be removably engaged with another contact element is formed with grooves. These grooves may have plane bottoms and plane side walls. Moreover, the grooves may run parallel to the longitudinal direction of the blade to which the contact piece containing the grooves is attached, or the grooves may extend diagonally to the longitudinal direction of the switch blade. The grooves can also be curved along their length e. g. circular as distinguished from a rectilinear parallel or diagonal arrangement.

With reference now to the drawings which illustrate a typical embodiment,

Fig. 1 is a top plan view of a contact element in which the grooves are straight and extend parallel to the longitudinal direction of the switch blade member to which the element is adapted to be attached;

Fig. 2 is a side elevation;

Fig. 3 is a transverse section on line 3—3 of Fig. 1; and

Fig. 4 is a fragmentary view in section drawn to an enlarged scale to better show the transverse configuration of the grooves.

In the drawings it will be seen that the exchangeable contact element is comprised of a plate-like base member 1 having parallel upper and lower contact faces 1*a*, and 1*b*. The lower face 1*b* and the upper face 1*a* are provided with a plurality of parallel, spaced, straight, i. e. rectilinear grooves 2 which extend in the longitudinal direction of the switch blade member to which the contact member 1 is adapted to be attached by bolts and nuts, the bolts being passed through spaced holes 3, 4 in the contact element 1 between its upper and lower faces in a region at the end portion of the element where the grooves 2 do not exist, i. e. at a portion where the upper and lower faces 1*a* and 1*b* are planar throughout. To simplify the drawings, neither the blade nor the attaching bolts have been illustrated. As indicated in the drawing the grooves 2 do not extend to the edges of the element but lie wholly within an area spaced from the edges.

The upper and lower faces 1*a*, 1*b* of the contact element are inclined along one side thereof as at 1*c* so as to present sides of gradually increasing thickness as clearly shown in the side elevation of Fig. 2 thereby facilitating movement of the contact element sidewise into the space between the fixed contact elements, not illustrated.

In the illustrated embodiment of the invention, and as clearly shown in the sectional view of Fig. 4 the bottom 2*a* of each groove is plane and parallel to the upper and lower faces 1*a*, 1*b*. The sides of each groove extend perpendicularly from the bottom 2*a* for a distance about equal to one-half their height and then diverge planarly to the top of the groove. The perpendicular portions of the groove sides are indicated by 2*b*, and the diverging, planar portions by 2*c*. If desired, the diverging side wall portions can be curvilinear rather than plane.

The advantage of the grooved face construction for the contact area portion of the contact element is that it provides an increased number of contacting points for the flow of current between engaging contact faces thereby reducing the between-contact resistance and hence also the amount of heat. The lubricant is not affected by the grooves. That is, there is little tendency of the lubricant particles to stick together as a result of pressure, thanks to the presence of the grooves 2 that are filled with the lubricant and which add materially to the thickness of the lubricant layer. Consequently there is little sticking of the contacts even when resinification of the lubricant occurs. There is also less wear on the contact surfaces thus resulting in a correspondingly longer contact life.

In conclusion it will be understood that various changes in the arrangement of the grooves as well as their configuration may be effected without, however, departing from the spirit and scope of the invention as defined by the appended claims.

We claim:

1. In a disconnect switch comprising a pair of spaced parallel stationary contact members and a removable contact member located at the outer end of a movable switch blade member arranged to be slidably moved into and out of the space between said stationary contact members so as to engage and disengage the latter respectively, the improvement wherein each of the opposite contacting faces of said removable contact member is provided with a plurality of lubricant-filled grooves, each of the grooves having a plane bottom surface parallel to the contact faces of the contact member, perpendicular side wall portions adjacent the groove bottom extending approximately one-half the height of the groove, and outwardly divergent side wall portions at the upper half of the groove.

2. A disconnect switch as defined in claim 1, wherein the forward edge of the removable contact which initially contacts the stationary contacts on switch engagement is inclined along one side thereof so as to present sides of gradually increasing thickness thereby facilitating movement of the contact element sidewise into the space between the fixed contact elements.

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