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3,476,895

DISCONNECT PICK

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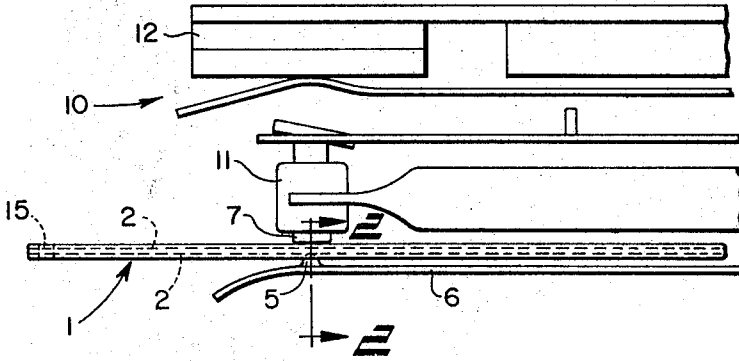


Fig. 1

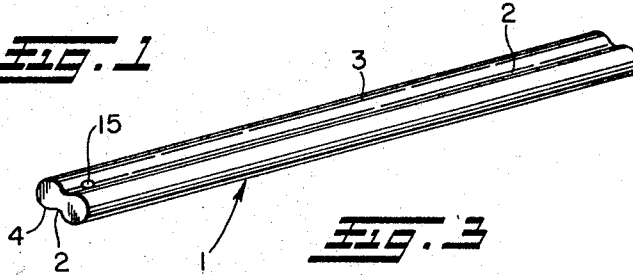


Fig. 3

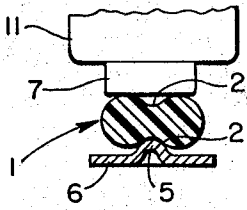


Fig. 2

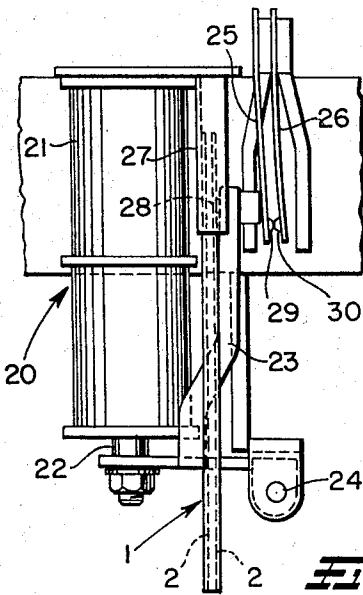
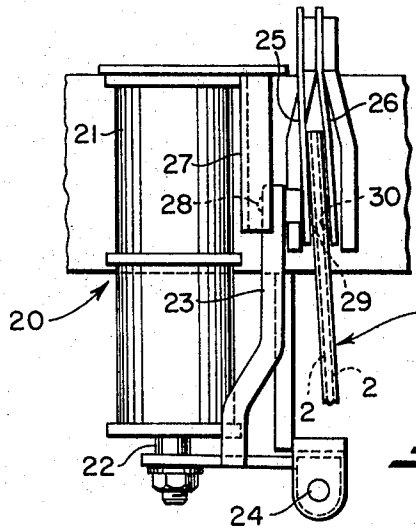


Fig. 4



519.5

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DISCONNECT PICK

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9 Claims

ABSTRACT OF THE DISCLOSURE

A disconnect pick in the form of an elongated member of insulating material having a longitudinal groove in one or both sides for engagement by a projection on a spring contact or the like.

BACKGROUND OF THE INVENTION

The present invention relates generally as indicated to a disconnect pick or plug of suitable insulating material which may readily be inserted and removed from between a pair of relatively movable members for breaking or closing an electrical circuit.

There are many instances in which it is desirable to be able to periodically open or close an electrical circuit where the usual switch or circuit breaker is not practical because of space limitations and cost requirements or other such factors. An example of this can be found in telephone systems which may include banks of thousands of overload relays, one relay for each phone circuit, to protect the phone circuits from harmful high tension electric currents caused by lightning or the like and also permit each phone circuit to be connected and disconnected as the need arises.

To facilitate opening and closing of selected phone circuits, each relay may be provided with a pair of contacts, usually normally closed, but which may be spread apart to open the circuit by inserting a relatively inexpensive pick or plug of insulating material therebetween. Accidental dropout of the picks is precluded by providing holes in one or both ends of the picks for engagement by the contact projections, but this necessitates accurate alignment of the holes with respect to the contact projections during insertion of the picks, and once the picks are properly in place, they cannot readily be removed without first spreading apart the contacts.

SUMMARY OF THE INVENTION

With the foregoing in mind, it is a principal object of this invention to provide a disconnect pick of the type generally described, but which can more quickly and easily be inserted and removed from between a pair of relatively movable members for opening and closing a pair of contacts or the like.

Another object is to provide such a pick which despite its ease of insertion and removal from between relatively movable members, will not accidentally drop out of place.

These and other objects of the present invention may be achieved by providing a disconnect pick with a longitudinal groove in one or both sides for engagement by a projection on one or both of the relatively movable members.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features herein-after fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail a certain illustrative embodiment of the invention, this being indicative, however, of but one of the various ways in which the principles of the invention may be employed.

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BRIEF DESCRIPTION OF THE DRAWING

In the annexed drawing:

FIG. 1 is a fragmentary side elevation view of a portion of an overload relay for a phone circuit or the like, and having a preferred form of disconnect pick constructed in accordance with this invention inserted between a pair of relatively movable contacts;

FIG. 2 is an enlarged transverse section through the pick of FIG. 1, taken on the plane of the line 2—2 thereof;

FIG. 3 is an enlarged isometric view of the pick of FIG. 1; and

FIGS. 4 and 5 are top plan views of a typical armature relay in which the pick of FIGS. 1—3 is used in FIG. 4 to hold the relay contacts permanently closed, and in FIG. 5 to hold the relay contacts permanently open, regardless of whether the relay is operated or not.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawing and first especially to FIGS. 1 through 3, there is shown by way of example a disconnect pick or plug 1 preferably in the form of a relatively long and slender strip of plastic or other suitable insulating material having a longitudinal groove 2 in one or opposite sides 3 and 4 thereof. The longitudinal groove or grooves 2 are of sufficient width and depth that a projection 5 on a contact 6 or the like will engage the groove 2 under slight spring force to such an extent that the pick may be freely moved longitudinally with respect to the projection without disengaging and yet upon release of the externally applied forces, the pick will be retained in place by the projection. Moreover, the groove 2 should extend at least to one end of the pick and desirably the full length thereof, thus permitting either end of the pick to be readily inserted between the contact 6 and an adjacent contact 7 with immediate engagement of the projection 5 in one or the other of the grooves 2 for guiding the pick as it is inserted between the contacts and retaining the pick in place upon release of external forces as aforesaid.

In FIG. 1, the contacts 6 and 7 constitute part of a typical overload relay 10 such as may be found in a phone circuit, including a heat coil 11 with contact 7 thereon adapted to be engaged by the spring contact 6 for closing the phone circuit, and carbon brushes 12 for protecting the circuit from high tension electrical discharges such as may be caused by lightning. To break the phone circuit, the disconnect pick 1 is simply inserted between the contacts 6 and 7 as shown with the projection 5 on contact 6 received in one of the grooves 2 for guiding the movement of the pick and retaining the pick against inadvertent dropout. Removal of the pick is accomplished simply by applying a light pulling force to the pick. Thus, as will now be apparent, the pick need not be oriented with respect to the contacts during insertion therebetween to open the circuit except to the extent that one of the grooves must be aligned with at least one projection, and the contacts need not be spread apart to facilitate removal of the pick, since it is only retained in place by the force of the spring contact 6 urging the projection 5 into such groove.

Where many such picks 1 are in use at one time as would be the case with banks of overload relays, selected picks may be tied together by passing a cord through holes 15 in the outer ends of the picks to permit them to be pulled out simultaneously, as when it is desired to transfer over from old to new equipment, for example. To facilitate identification of certain relays from others, the picks may be color coded, and the picks should be somewhat flexible to permit slight bending when inserting and removing the picks from difficult-to-reach areas and the like without breakage.

Of course, it should be understood that such picks are not limited to use in overload relays for phone circuits and the like; they can have similar utility in any number of different types of electrical circuits, either to hold a pair of contacts open or closed. Thus, for example, in FIGS. 4 and 5 there is shown a typical armature relay 20 including an armature coil 21 which when energized pulls the core 22 into the coil to effect pivotal movement of the contact arm 23 connected thereto about a fixed pivot 24, which forces the spring contact 25 into engagement with the adjacent spring contact 26. De-energization of the coil 21 allows a spring (not shown) to move the core 22 outwardly thus to move the contact arm 23 out of engagement with the spring contact 25 and permit separation of the spring contacts 25 and 26. A suitable lost-motion connection between the core 22 and contact arm 23 permits such rotational movement of the contact arm 23 during axial movement of the core 22.

If it is desired to hold the spring contacts 25 and 26 permanently closed independently of whether the armature relay 20 is actuated or not, this may be accomplished simply by inserting the pick 1 between the contact arm 23 and a backstop 27 on the armature relay 20. A slight projection 28 may be provided on the back side of the contact arm 23 for receipt in the groove 2 of the pick 1 for guiding and holding the pick in place as previously described.

Alternatively, the pick 1 may be used to hold the spring contacts 25 and 26 permanently open independently of whether the armature relay 20 is actuated or not by inserting the pick between the spring contacts as shown in FIG. 5, with the contact projections 29 and 30 received in the longitudinal grooves 2 of the pick 1. Now, if the armature coil 21 is energized to move the contact arm 23 into engagement with the spring contact 25, both contacts 25 and 26 are deflected without contacting each other as shown.

From the above discussion, it can now be seen that the disconnect pick of the present invention is of a relatively inexpensive and simple construction which permits it to be readily inserted and removed from between a pair of relatively movable members to close or break a circuit, and yet will not inadvertently drop out when left in place.

Other modes of applying the principles of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore, particularly point out and distinctly claim as my invention:

1. A pick for insertion between a pair of relatively movable members to prevent contact therebetween com-

prising an elongated strip of insulating material having a longitudinal groove in one side for engagement by a projection on one of the members to guide said pick during insertion therebetween and preclude accidental drop out.

2. The pick of claim 1 further comprising a longitudinal groove in the opposite side of said pick, whereby regardless of which side of said pick may be facing such projection, such projection will engage one of said grooves.

3. The pick of claim 1 wherein said groove extends for a substantial length of said pick to one end thereof.

4. The pick of claim 3 further comprising a hole in the other end of said pick to facilitate tying plural picks together.

5. In combination, a pair of relatively movable members, means biasing said relatively movable members toward each other, and a pick in the form of an elongated strip inserted between said relatively movable members, said pick having a longitudinal groove in one side, and one of said relatively movable members having a projection engaging said groove for guiding said pick between said relatively movable members and precluding accidental drop out.

6. The combination of claim 5 wherein said pick has a similar longitudinal groove in the opposite side, whereby regardless of which side of said pick is facing said projection, said projection will engage one of said grooves.

7. The combination of claim 5 wherein said groove extends for a substantial length of said pick to one end thereof.

8. The combination of claim 5 wherein said pair of relatively movable members are electrical contacts, at least one of said contacts being a spring contact, said pick being made of insulating material.

9. The combination of claim 5 wherein one of said relatively movable members is a fixed stop and the other is an arm movable away and toward said fixed stop into and out of engagement with a spring contact.

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H. O. JONES, Primary Examiner