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H. J. HAMMERLY ET AL

2,479,234

ELECTRIC CONNECTOR OF THE PULLER TYPE

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Fig. 1

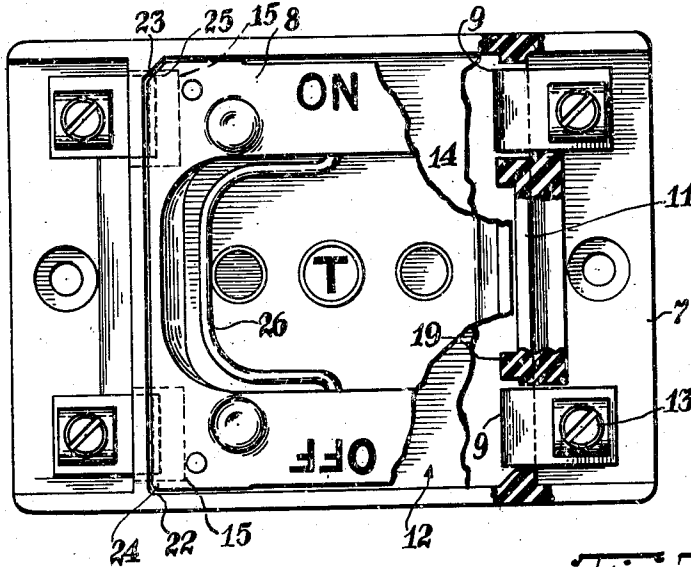


Fig. 2

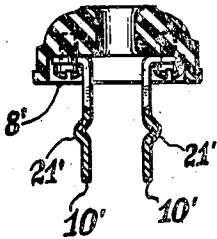


Fig. 3

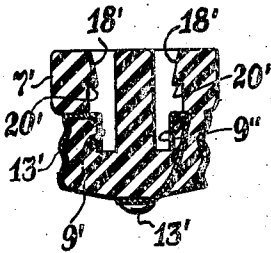


Fig. 4

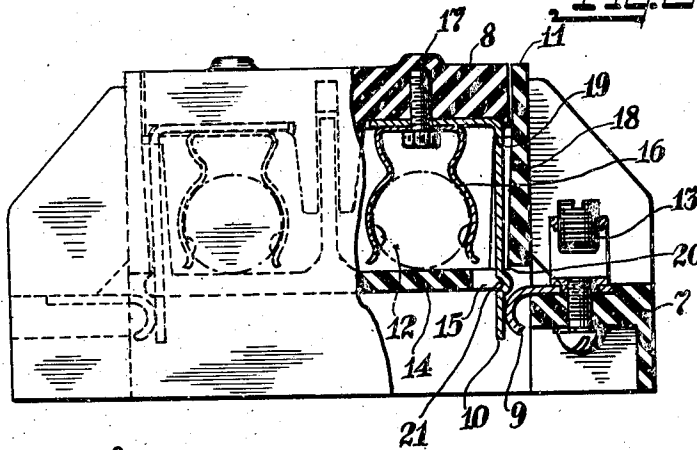


Fig. 5

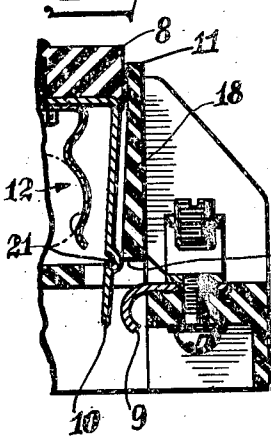


Fig. 6

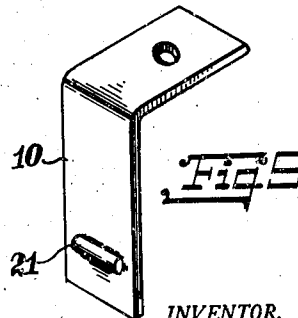
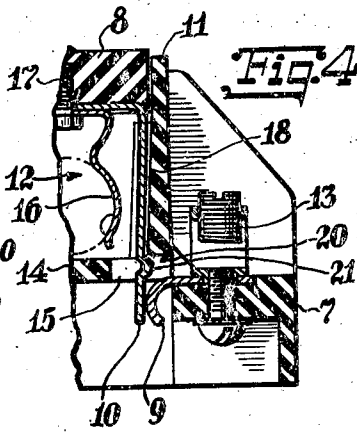


Fig. 8

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## UNITED STATES PATENT OFFICE

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ELECTRIC CONNECTOR OF THE  
PULLER TYPE

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In switches of this type stationary contacts are mounted at the bottom of a recess in an insulating receptacle or base and the contact blades or stabs are carried by an insulating body or plug and adapted to frictionally engage the contacts in the base when the carrier is inserted. In such devices the contacts and stabs frequently become burred or burned due to the arcing which takes place at the points of contact which makes operation difficult or irregular or in fact impossible. In fact, welding of the contacts sometimes takes place which completely disables the device.

One object is to provide a connector wherein incidental pitting or burring of the contact due to arcing will not interfere with the workability of the connector.

The accompanying specification and drawings disclose the invention as applied to switches of the type of Letters Patent 2,289,358.

According to our invention contact is effected by a snap action as the plug is inserted into the receptacle.

Fig. 1 is a front view and partial section showing a device embodying one form of the invention.

Fig. 2 is an end view and partial section of the same, the plug being fully inserted into the receptacle and full contact effected.

Fig. 3 is a fragmentary section showing the plug partially inserted into the receptacle and before contact is effected. It also shows a contact blade in the position it takes when the plug is partially withdrawn.

Fig. 4 is a similar view after contact is effected but before the plug is fully inserted.

Fig. 5 is a perspective view of one form of plug blade or stab embodying our invention.

Figs. 6 and 7 are longitudinal sectional views showing a simplified form of plug and receptacle embodying another form of our invention.

The base or receptacle 1 and the insertable plug body 8 are each preferably formed of suitable insulating material. Each side of the base has two stationary contacts 9 rounded over at their inner ends to receive corresponding contact stabs or blades 10 carried by the plug. The base has a wall 11 surrounding a recess 12 which is adapted to receive the plug 8.

Each contact 9 has a clip 13 for receiving a circuit wire (not shown). The bottom 14 of the base has an opening 15 at each corner of the recess 12 to allow for the passage of a plug blade to engage the contact beneath.

Each contact and a fuse clip 16 is secured to the plug body by a bolt or rivet 17.

In line with each opening 15 is a guide surface

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18 formed on the inner wall of the recess to direct the outer end of a contact blade. This guide surface may be bounded by a rib 19 on each side and is inclined inwardly.

The lower end of the wall 11 terminates in a shoulder 20 spaced apart above each contact 9 and each stab or blade 10 has a projection 21 adapted to slide along a guide surface 18 as the plug is inserted into the recess of the receptacle. This projection 21 is not at the end of the blade but is spaced from it so as to leave the tip free to engage the adjacent contact 9 when the plug is fully inserted into the recess of the base or receptacle.

The bumps or projections 21 may be formed by stamping them out of the blades themselves. In view of the construction of the contacts it is unnecessary to round the tip of the plug blades as was customary.

The plug blades are secured to the plug body and project at substantially right angles to its plane. As the plug is inserted into the receptacle the blades are biased inwardly as they slide down the inclined surfaces 18, 18 until the projections 21 slip below the shoulders 20 and the tips of the blades snap into engagement with the contacts 9 as shown in Fig. 4. On further insertion of the plug the blades slide across the ends of the contacts thus providing a wiping action. There is thus no tendency for the blade to "ride out" as has been previously noted with the plug blades of previous devices. As the plug is withdrawn the blade 10 slides along contact 9. The bump or projection 21 then strikes the shoulder 20 which bends the blade 10 away from the contact 9 at right angles to the plane of the blade.

In the preferred form of the invention the contact blades are all parallel and arranged in pairs so that they are biased laterally toward each other as the plug is inserted in the recess of the receptacle. The edges of the projections should be smooth so as to permit the blades to slide smoothly along the guideways 18 as the plug is inserted. The upper edges of the projections should be rounded off or inclined slightly so as to slide smoothly over the edges of the shoulders 20 and automatically retract the blades as the plug is withdrawn.

In switches of this type as set forth in the Hanny Patent 2,289,358 it is customary to have corners 22 and 23 in the receptacle and corners 24 and 25 on the plug to enable the plug to be inserted in the proper position but prevent insertion in an improper position.

In such a switch the friction of the parts of the plug-in member and its blades when inserted into the stationary member to en-

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gage its contacts is usually so great that considerable force must be applied. The result is that the projections on the blades slip past the stationary shoulders quickly and the blades engage the contacts with a snap action. Conversely, when withdrawing the plug-in member it takes so much force to start the movement that the blades are disengaged quickly from the contacts in a direction normal to their contact surfaces and the danger of sticking or burring is minimized. For most favorable action the upper edges of the projections should be rounded or bevelled off so as to have a cam-like action against the shoulders when the plug-in member is withdrawn. The lower edges of the shoulders may also be somewhat rounded or bevelled off to coact with the projections in the withdrawing action. The shape of the lower edge of the projection is immaterial except that it should be designed to avoid cutting into or scratching the guide surfaces.

Figs. 6 and 7 show a simplified form of connector in which the insulating base 7' and the insulating body 8' are in the form of an attachment socket and plug. The stationary contacts 9' and 9'' in the body are connected to conventional screw shell and center terminals 13' and 13'' respectively. The body has inclined guide surfaces 18' leading to the shoulders 20' just above the contacts 9' and 9''.

The plug 8' has two resilient contact blades 10' each of which has a cam-like projection 21' adapted to engage an inclined wall 18' as the blades are inserted into the body. This bends the ends of the blades toward each other until the projections 21' pass the shoulders 20' whereupon the ends of the blades move outwardly and engage the stationary contacts 9' and 9''.

When the plug is withdrawn the blades slide along the contacts until the projections 21' reach the shoulders 20'. Continued withdrawal of the plug forces the blades outwardly and thus breaks the contact connection in a direction normal to the plane of the contacts.

We claim:

1. An electric connector switch comprising a base having a recess, a carrier insertable into said recess, contacts carried by said base, the inner side walls of the recess having guiding surfaces inclined toward each other and having shoulders at the inner ends of said surfaces spaced away from the respective contacts, and resilient contact blades carried by said carrier adapted to engage the respective contacts when the carrier is fully inserted into said recess, each blade having a projection spaced from its tip for sliding along one of said guiding surfaces as the carrier is inserted into said recess and biasing said blade away from the adjacent contact until the projection passes the adjacent shoulder, said shoulder serving to engage the projection as the carrier is withdrawn from the recess and disengage the tip of the blade from the contact by a movement at right angles to the plane of the blade.

2. An electric connector switch comprising an insulating base having a recess, an insulating carrier insertable into said recess, contacts carried by said base, the inner side walls of the recess having guiding surfaces leading toward said contacts and having shoulders spaced away from the respective contacts, and resilient contact blades carried by said carrier adapted to engage the respective contacts when the carrier is fully inserted into said recess, each blade having a

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projection spaced from its end for sliding along one of said guiding surfaces as the carrier is inserted into said recess and bending said blade away from the adjacent contact until the projection passes the adjacent shoulder, whereupon the blade snaps into engagement with the adjacent contact, said shoulder serving to engage the projection as the carrier is withdrawn from the recess and disengage the end of the blade from its contact by a movement at right angles to the plane of the blade.

3. An electric connector switch comprising an insulating base having a recess, an insulating carrier insertable into said recess, contacts carried by said base, the inner side walls of the recess having guiding surfaces inclined toward each other and having shoulders spaced away from the respective contacts, and parallel contact blades carried by said carrier adapted to engage the respective contacts when the carrier is fully inserted into said recess, each blade having a projection near its end for sliding along one of said guiding surfaces as the carrier is inserted into said recess and biasing said blade away from the adjacent contact until the projection passes the adjacent shoulder, whereupon the end of the blade engages with the adjacent contact, said shoulder serving to engage the projection as the carrier is withdrawn from the recess and disengage the blade from its contact by a movement normal to the plane of the blade.

4. An electric connector comprising an insulating member having a recess, oppositely disposed contacts carried by said member adjacent the bottom of said recess, said member having guiding surfaces converging toward each other and, at least one of which terminates at a shoulder spaced away from one of said contacts, and a plug-in member having resilient contact blades insertable into the recess in said insulating member to engage said contacts, at least one of said blades being fixed at one of its ends and free to move at its other end and having a projection slidable along one of said guiding surfaces when said plug-in member is inserted into the recess of said insulating member and serving to prevent the movable end of said blade from engaging the contact until said projection passes said shoulder, said latter blade being spring loaded as the plug-in member is inserted into said recess and snaps into engagement with its contact as said projection passes said shoulder, said shoulder serving to be engaged by said projection and move the blade which has the projection away from its contact in a direction normal to the active surface of its contact when the plug-in member is withdrawn from said insulating member.

5. An electric connector comprising an insulating member having a recess, oppositely disposed contacts carried thereby, said member having guiding surfaces converging toward each other and adjacent said contacts and terminating at shoulders spaced away from said contacts, and a plug-in member having contact blades each secured to said plug-in member at one end of such blade and free to move at its other end, insertable into the recess in said insulating member to engage said contacts, each of said blades having a projection slidable along one of said guiding surfaces when said plug-in member is inserted into said insulating member and serving to move the blades toward each other and prevent said blades from engaging said contacts until said projections pass said shoulders, said blades being resilient and spring loaded as they are pressed toward each

other by their coaction with the converging guiding surfaces of the insulating members as the plug-in member is inserted into said recess and snap into engagement with the respective contacts as the projections pass said shoulders, said shoulders serving to be engaged by said projections and move said blades away from said contacts in a direction normal to the active surfaces of said contacts when the plug-in member is withdrawn from said insulating member.

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