July 29, 1947. F. KLUMPP, JR 2,424,759

STRAIN-RELIEF BUSHING

Filed March 2, 1946

FIG. 1

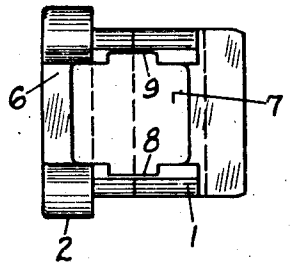


FIG. 6

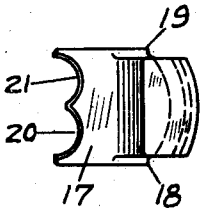


FIG. 5

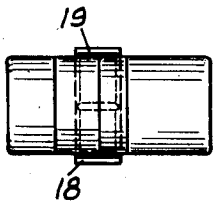


FIG. 2

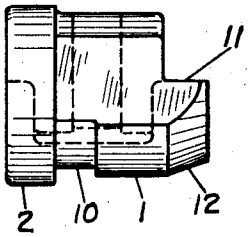


FIG. 3

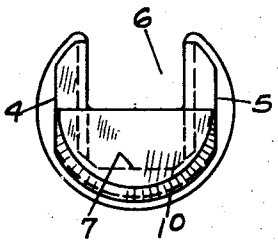


FIG. 4

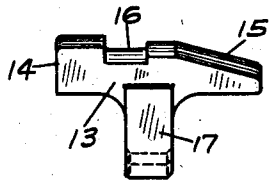


FIG. 8

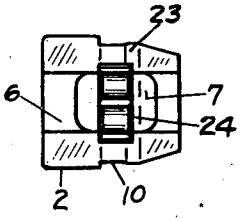


FIG. 7

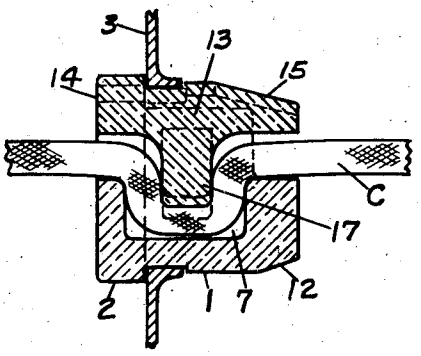


FIG. 10

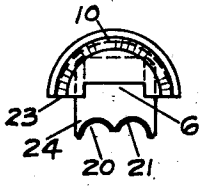


FIG. 11

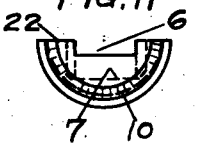
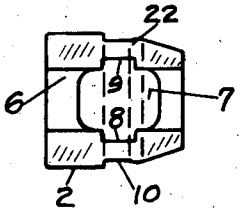


FIG. 9



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STRAIN-RELIEF BUSHING

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Application March 2, 1946, Serial No. 651,548

7 Claims. (Cl. 174—153)

1

This invention relates to a self-locking strain-relief bushing that is adapted to securely lock and hold an electrical conductor or cable in the bushing and to a mounting plate or support having a hole into which the bushing is inserted.

The principal object of my invention is to provide a self-locking strain-relief bushing which is automatically locked in place in the hole in the plate or support by merely pushing the same into position after placing the bushing over the conductor or cable.

Another object of my invention is to provide a strain-relief bushing which will positively lock the conductor or cable in the support plate whereby the conductor or cable is prevented from turning or being moved longitudinally in the bushing and the bushing is prevented from turning in the plate or support member.

The improved features of my new strain-relief structure will be readily understood and appreciated by reference to the annexed drawing wherein,

In all the figures the views are made on an enlarged scale from working models.

In the drawing:

Figure 1 is a plan view of one of the parts of my two-piece bushing, looking at what I term the open or recess side.

Figure 2 is a side view of Figure 1.

Figure 3 is an end view of Figure 1 looking from left to right.

Figure 4 is a side view of the other part of the bushing.

Figure 5 is a top plan view of Figure 4.

Figure 6 is an end view of Figure 5 looking from left to right.

Figure 7 is a sectional view of the two parts in assembled position in the mounting plate showing the manner in which the conductor or cable is gripped or held in position in the bushing.

Figure 8 is a plan view of one of the parts of a slightly modified construction looking at the interior of the part.

Figure 9 is a view similar to Figure 1 but of a part which is adapted to cooperate with the part shown in Figure 8.

Figure 10 is an end view of Figure 8 looking from right to left.

Figure 11 is an end view of Figure 9 locking from right to left.

In the various views wherein like numbers refer to corresponding parts, 1 is the body portion comprising one of the parts of the bushing. The body or part 1 has a flange 2 which is adapted to engage one side of a mounting plate 3 having a

2

hole therein to receive the bushing as shown in Figure 7. The body 1 has side flat portions 4 and 5 to fit in a cooperative hole in the mounting plate or support 3 so as to prevent the bushing from turning in the plate or support 3. The body 1 is provided with a longitudinally extending channel 6 the bottom surface of the channel is interrupted by a reecss 7 while the side walls having the outer flat sides 4 and 5 are provided with guide channels 8 and 9 which are adapted to receive the other piece 13 of the bushing which may be termed a grip block having a downwardly extending portion 17 the sides 18 and 19 of which are adapted to fit in and slide in the guide channels 8 and 9. The end 14 of the grip block 13 is shaped to conform to and form part of a holding flange. Rearwardly of the flange 2 on the member 1 there is an arcuate groove 10 and a corresponding groove 16 in the member 13, these cooperative grooves being adapted to receive material around the hole in the mounting plate 3 as shown in Figure 7. The part 1 has a portion 11 which forms the rear end of the longitudinal channel 6. The portion 11 has an arcuate tapered surface 12 and likewise the part 13 has the tapered end 15, both tapered ends being for the purpose of ease in assembling the two-part bushing into the hole in the mounting plate 3. It will be noted in Figure 6 that the downwardly projecting portion 17 has formed at its extremity arcuate surfaces 20 and 21. These are for the purpose of engaging a twin conductor or cable C. It is to be understood that if a single conductor or cable is used one arcuate surface would take the place of the two shown in Figure 6. When the bushing is installed in a plate or support 3 as shown in Figure 7 it will be seen that the two parts are forced toward each other and the projection 17 engages the cable C pushing it downwardly into the recess 7 in the part 1 thereby absolutely locking the cable or conductor securely in the bushing so that it cannot be turned therein or pulled longitudinally.

In the modified forms shown in Figures 8 to 11 the part 22 corresponds to the part 1 of the structure shown in Figure 7. The part 22 has the same recess 7 and guide channels 8 and 9, flange 2 and groove 10 as in part 1. Likewise part 23 has a downwardly projecting part 24 having arcuate recesses 20 and 21 the same as shown in Figure 6, and in addition this piece also has a part of the longitudinal channel 6 therein, the channel being intercepted however, by the projection 24 while in the piece 22 the channel 6 is intercepted by the recess 7 as in Figure 1. The

manner of gripping the cable by the parts shown in Figures 8 to 11 inclusive is the same as shown in Figure 7.

While in Figures 8 to 11 inclusive I have illustrated and described the strain-relief device as being made in two parts the downwardly projecting part 24 may be made as a separate piece, slidable into the guide channels 8 and 9. With this modification the two identical parts 22 would be utilized together with the removable projection 24. With this construction only two moulds would be required as in Figure 1 since the two parts 22 would be identical. Also by reason of this latter construction the device is more readily adaptable for a single conductor as only the very small mould would be required for the part 24 having a singular arcuate surface for a single conductor, whereas in the construction shown in Figure 6 a more expensive mould would be required to make a complete new part.

From the preceding description it will be seen that I have provided a strain-relief structure which supplies all the advantages heretofore set forth.

Having thus described my invention, what I claim is:

1. A strain relief bushing of strong insulating material for holding an electrical conductor in a suitable hole in a mounting member, comprising a body portion having a flange only at one end to engage the mounting member on one side thereof with a locking groove around its periphery longitudinally adjacent said flange, the body having a longitudinal channel therethrough with a single recess positioned below the channel and having walls at both ends of the body portion, the body having guide channels positioned on opposite sides of said longitudinal channel, a grip block adapted to be positioned in said longitudinal channel and having a single downwardly extending portion with an end formation to engage an electrical conductor and also having slide portions for engaging said oppositely positioned channels, said grip block having on its outer peripheral surface a groove, one side of which is in substantially the same plane as the inner edge of said body flange, the block having a height such that when it is forced into said hole in the mounting member with the body portion, it will be forced by the wall of said hole into strong gripping engagement with a conductor located in said longitudinal channel, both parts of the bushing having their ends opposite said flange tapering inwardly for the purpose described.

2. A strain relief bushing of strong insulating material for holding an electrical conductor in a suitable hole in a mounting member, comprising a body portion having a flange at one end only to engage the mounting member on one side thereof with a locking groove adjacent said flange, the body only having a longitudinal channel therethrough with a single recess positioned below the channel, a grip block adapted to fit in said channel with means for preventing it shifting endwise in the channel, said block having a downwardly extending portion with an end formation to engage an electrical cable, the block also having on its outer surface a groove, one side of which is in substantially the same plane as the inner edge of said body flange, the block having a height such that when it is forced into said hole in the mounting member with the body portion, it will be forced by the wall of said hole into strong gripping engagement with a conductor located in said longitudinal channel, both parts of the bushing having their ends opposite said flange tapering inwardly for the purpose described.

3. A strain relief bushing of strong insulating material for holding an electrical conductor in a suitable hole in a mounting member, comprising a body portion having a flange at one end to engage the mounting member on one side thereof with a locking groove adjacent said flange, the bushing having a longitudinal channel therethrough with a recess positioned below the channel, a T-shaped grip block having the horizontal part of the T of substantially the same length as said body portion and fitting in said channel, one end having a locking groove to receive a surface on the mounting member while its opposite end is tapered inwardly in a direction away from the groove to assist in inserting the bushing into the mounting member hole, the vertical part of the T extending toward said recess and having an end formation to grip a cable positioned within said channel, the dimensions of the T being such as to cause the vertical part of the T to force the cable out of the plane of the bottom of the channel toward the bottom of said recess when the bushing is inserted into said suitable hole in the mounting member.

4. A strain relief bushing of strong insulating material for holding an electrical conductor in a suitable hole in a mounting member, comprising a body portion having a flange at one end to engage the mounting member on one side thereof with a locking groove adjacent said flange, the bushing having a longitudinal channel therethrough with a recess positioned below the channel, a T-shaped grip block having the horizontal part of the T of substantially the same length as said body portion and fitting in said channel, with means for preventing its shifting lengthwise in the channel, one end of this horizontal part having a locking groove therein for arcuate alignment with the locking groove in said body portion when the grip block is in assembled position, the end of the grip block farthest from the locking groove being inwardly tapered in a direction away from the groove to assist in inserting the bushing into the mounting member, the vertical part of the T extending toward said recess and adapted to be forced by the wall of the mounting member hole onto a cable extending through the channel so as to deflect it into said recess.

5. A two-piece strain-relief bushing of suitable material for holding a conductor or cable in a suitable hole in a mounting member, both pieces having cooperative means for holding the pieces securely in the mounting member hole when inserted therein, one piece having a longitudinal channel therethrough and a single recess positioned below the plane of the bottom of the channel, the other piece having a part adapted to lie within the channel with cooperative means on the two parts for preventing longitudinally shifting of the two parts, said other piece having a downwardly extending portion positioned over said single recess and adapted to be forced by the wall of the mounting plate hole onto the conductor or cable to cause it to be deflected into the recess.

6. The combination of a mounting plate having a hole therein and a strain relief bushing of suitable insulating material to fit in said hole, the bushing being in plural parts, and adapted to grip an electrical conductor cable, one part having a main channel longitudinal of its length,

the bottom wall of the channel being broken by a recess while the opposite side walls of the main channel have guide channels therein, the other part of the bushing having a projection the opposite edges of which are adapted to slide in said guide channels when the two parts are forced toward each other by insertion of said parts into said hole whereby said projection will force the conductor or cable into said recess, each main part having a tapered end to assist in entering the bushing into the hole, both main parts having cooperative circular type grooves to lock the parts to the mounting plate.

7. A strain relief bushing of strong insulating material for holding an electrical conductor in a suitable hole in a mounting member comprising, two parts of substantially the same length and having a peripheral locking groove positioned at one end to form a circular flange to engage the mounting member on one side thereof, the opposite ends of said parts being inwardly tapered for assisting in the assembly of said parts into the mounting member hole, at least one of said parts having a longitudinal channel therethrough with a recess positioned below the channel, the other part carrying a projection of suitable length positioned over said recess when the parts are in operative position and having an end formation to engage an electrical cable, the two parts having a height such that they will be forced by the wall of the hole in the mounting member toward each other whereby the said projection will force the cable toward the button of said recess.

FERDINAND KLUMPP, JR.

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