July 29, 1947. F. KLUMPP, JR 2,424,758

STRAIN-RELIEF BUSHING

Filed June 14, 1945

FIG. 1

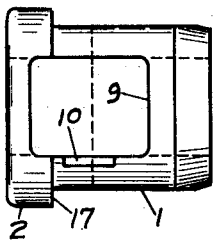


FIG. 5

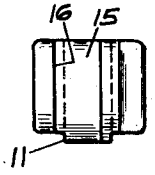


FIG. 2

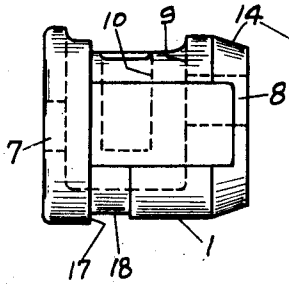


FIG. 3

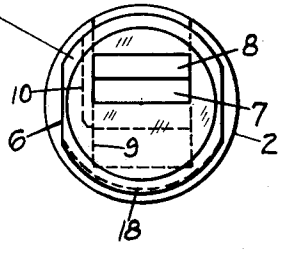


FIG. 4

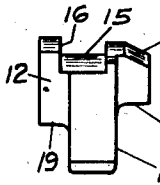


FIG. 6

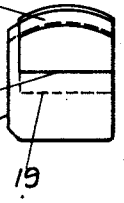


FIG. 8

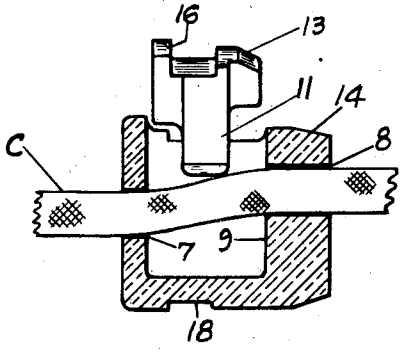


FIG. 7

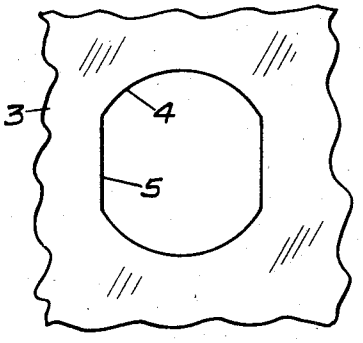
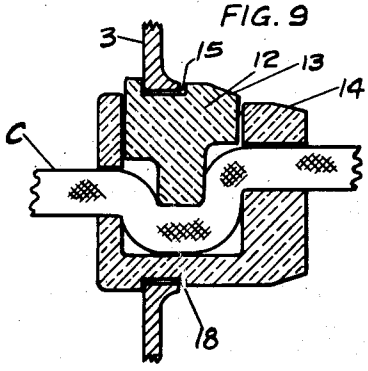


FIG. 9



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STRAIN-RELIEF BUSHING

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Application June 14, 1945, Serial No. 599,494

9 Claims. (Cl. 174—153)

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This invention relates to a self-locking strain-relief bushing which is adapted to securely lock an electrical conductor or cable in the bushing and to a plate or support in which the bushing is inserted. It is the principal object of my invention to provide a self-locking strain-relief bushing which can be easily installed in a plate or support but which will more positively lock a conductor or cable to the bushing than any other strain-relief bushing with which I am familiar. At the same time the bushing is designed to co-relate with its mounting plates so that it cannot be turned in the support member thereby preventing any chance of the conductor or cable being displaced from its mounting in the support plate. The improved characteristics of my new strain-relief structure will be readily appreciated by reference to the annexed drawing wherein the figures illustrate my new structure on an enlarged scale, approximately three to one, of one form of the device.

In the drawing:

Figure 1 is a plan view of the body member 1 supporting the conductor or cable.

Figure 2 is a side view of Figure 1.

Figure 3 is a view of Figure 2 looking from right to left.

Figure 4 is a side elevational view of the gripping block which is used with the body portion.

Figure 5 is a top plan view of Figure 4.

Figure 6 is a view of Figure 4 looking from right to left.

Figure 7 is a fragmentary view of the mounting plate showing a preferred type of hole for receiving the strain-relief device.

Figure 8 is a part sectional and part elevational view of the strain-relief device in an initial step of gripping a cable or conductor.

Figure 9 is a part sectional and part elevational view showing the strain-relief device fully installed in the mounting plate with the conductor or cable in locked position.

In the various views wherein like numbers refer to corresponding parts, 1 is the body portion of the strain-relief device which is made of strong insulating material. The body 1 has a flange 2 which is adapted to engage one side of a mounting plate or support member 3 having a hole 4 therein with at least one straight side 5, two being shown, to engage cooperative flat sides 6 on the body 1 to prevent the body 1 from turning in the mounting plate.

The body 1 has a longitudinal passageway therethrough. This passageway is divided into two offset sections, 7 and 8 as is best shown in Figures 8 and 9. As illustrated, these passageways are rectangular in shape to receive a twin conductor. Intercepting this passageway is an opening 9 that is rectangular in shape. As shown in Figure 1 the opening 9 projects a slight distance into a portion of the flange 2 for a purpose

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which will be later explained. The opening 9 also has a channel 10 leading into said passageway to receive the edge 11 of a gripping block 12 made of strong insulating material which is adapted to slidably fit in the opening 9. The block 12 has a tapered surface 13 to cooperate with the corresponding surface 14 on the body 1 to assist in assembling the strain-relief device into the mounting plate 3. The block 12 has an arcuately formed groove 15 having an edge 16 which is adapted to come into alignment with the inner edge 17 of the flange 2 whereby the groove 15 will be in the same plane with an arcuately formed groove 18 in the body 1 and extending at least part way around the body 1 as indicated by the dotted line 18 in Figure 3. These grooves are provided to engage the mounting plate 3 when the device is assembled as shown in Figure 9. The block 12 has offset shoulders 19 and 20 to cooperate with the offset passageways 7 and 8 in the body 1. It will be seen that when the device is forced into the hole 4 in the mounting plate 3 the cable or conductor C will be forced by the gripping block 12 into a position somewhat similar to that shown in this figure. The gripping block 12 has some clearance in the opening 9 so that it will tilt somewhat when a pulling strain is applied to the conductor C and will further increase its grip on the conductor.

Where, in the claims, I have used the term conductor this is meant to include a single insulated conductor or twin conductor it being understood that the passageways 7 and 8 in the body of the strain-relief bushing are made to suit the type of conductor which is to be employed with the bushing.

I have found from many tests that the insulation of the conductor is not injured by the gripping block of my improved bushing as is the case with many other types of strain-relief devices. The reason for this is that the conductor is given a bend that does not injure the insulation but, as will be readily appreciated, the bend securely positions the conductor in the body of the bushing. To facilitate handling of the bushing prior to and during assembly, the gripping block 12 may be held in the position approximately as shown in Figure 8 by a thin film material, or equivalent means, which can be readily broken away by the pressure applied to the block when assembling it into the position shown in Figure 9.

What I claim is:

1. A strain relief bushing of strong insulating material for holding an electrical conductor in a mounting plate hole, comprising a body portion having a flange at one end only to engage a mounting plate on one side thereof, the bushing having a single transverse opening through its wall and extending beyond the central longitudi-

nal axis of the bushing with a longitudinal passageway at each end of the body leading into said opening, a grip block slidably but non-rotatably fitting in said opening and having a groove on its outer surface so positioned that at least one side of the groove is in substantially the same plane with the inner edge of the flange, the block having a height such that when it is forced into a hole in a mounting plate, it will project well below the axes of said longitudinal passages and will be forced into strong gripping engagement with a conductor which may be inserted through said passageways.

2. A strain relief bushing of strong insulating material for holding an electrical conductor in a mounting plate hole, comprising a body portion having a flange at one end only, with a circular groove next to the flange and arcuately extending at least part way around the body so as to engage a mounting plate, the bushing having a longitudinal passageway therethrough and an opening through the wall of the body into said passageway, a grip block having a contour to slidably but non-rotatably fit said opening and having a groove in arcuate alignment with the partial groove in the body, the block having a height such that when it is forced into a hole in a mounting plate it will be forced by the wall of the plate hole into strong gripping engagement with a conductor which may be inserted through said passageways, the body having at least one flat surface positioned adjacent the flange and at right angles thereto to engage a cooperating surface in a mounting plate to prevent the body from turning in said plate.

3. A strain relief bushing as set forth in claim 2 further characterized in that the two parts of the longitudinal passageway, which is intercepted by said grip block opening, are offset whereby the grip block when in locked position puts a reverse locking bend in the conductor.

4. A strain relief bushing of strong insulating material for holding an electrical conductor in a mounting plate hole, comprising a body portion having a flange at one end and a rectangularly shaped transverse opening adjacent said flange, the bushing having offset conductor passageways located one at each end of the bushing and leading into said opening, one of the side walls of the said opening having a channel therein, a grip block having a form to slidably fit said opening including the channel, the outer part of said block having a groove therein to fit a mounting plate, the body having at least a groove of some arcuate length located opposite to the groove in the grip block when it is in gripping position, the height of the block being such that when it is directly acting on and forced inwardly and held by the wall of the hole in the mounting plate it will force a conductor going through the passageways into a locking reverse bend, the body having means to cooperate with a mounting plate to prevent the bushing turning in the plate.

5. A strain relief bushing as set forth in claim 4 further characterized in that the grip block opening extends into the flange and the block has shoulders of different heights to cooperate with said offset passageways and further characterized in that the body and block have tapered ends for assisting in assembling the bushing in the mounting plate hole.

6. In combination with a mounting plate having a hole therein to non-rotatably receive a strain relief bushing, a bushing of strong insulating material to fit said hole, the bushing having a transverse side opening and two longitudinal offset passageways located one at each end of the bushing and leading into said opening, a grip block of strong insulating material slidably but preferably tiltably fitting said opening and adapted, when forced with the bushing into the plate hole, to be moved across said passageways to grip a conductor by bending it and means on the block and body to lock the bushing in the plate hole.

7. The combination with a mounting plate having a hole therein to receive a strain relief bushing, of a bushing having a body of good insulating material to fit said hole with means for preventing rotation of the body in the hole, said body having a transverse opening with longitudinal passageways located one at each end of the body and leading into said opening and a block of good insulating material slidably fitting in said opening and having means cooperative with the body for locking the bushing to the plate when inserted in the plate hole, the block when in locking position extending outwardly beyond the body of the bushing and being directly engaged by the wall of the plate hole and forced into strong gripping engagement with a conductor going through the passageway.

8. The combination of a mounting plate and a strain relief bushing as set forth in claim 7 further characterized in that said passageways are offset in the body and the block has parts to cooperate therewith so as to put a bend in the conductor within the bushing when installed in said plate.

9. The combination of a mounting plate having a hole therein to receive a strain relief bushing of suitable insulating material, the bushing being composed of two parts to grip an electrical conductor or cable placed between them, one part having a recess therein while the other part is slidable as a whole into the recess toward the longitudinal axis of said one part, said slidable part having a projection for engaging said conductor or cable, each part having a tapered end to assist in entering the parts into said hole, the two parts being directly forced toward each other by the wall of the hole so the said projection will force the conductor or cable downwardly into said recess, both parts having cooperative arcuate grooves to lock the parts to the mounting plate.

FERDINAND KLUMPP, JR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,240,844	Gregur	Sept. 25, 1917
2,277,637	Eby	Mar. 20, 1942
945,350	Tinsley	Jan. 4, 1910

FOREIGN PATENTS

Number	Country	Date
412,712	Great Britain	July 5, 1934
641,828	Germany	Feb. 15, 1937