Oct. 18, 1932. G. J. MEUER 1,882,856

STRAIN RELIEVING DEVICE FOR ELECTRICAL CONDUCTOR CORDS

Filed Nov. 4, 1929

Fig. 1

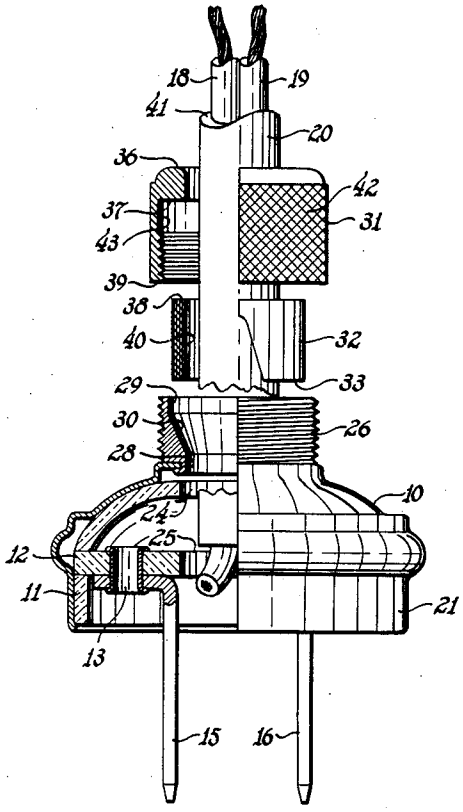


Fig. 2

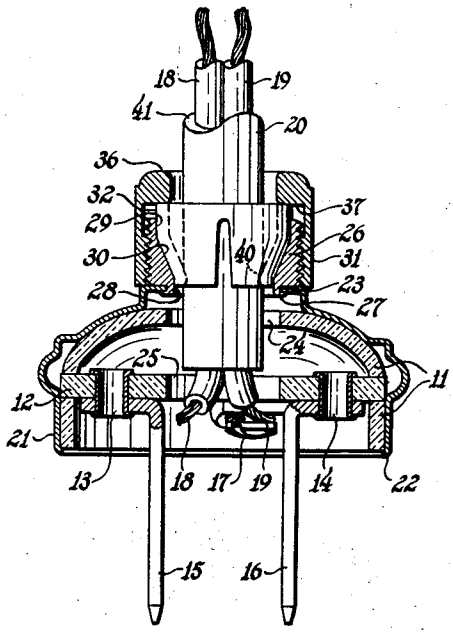


Fig. 3

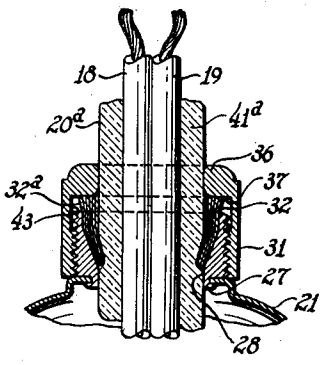
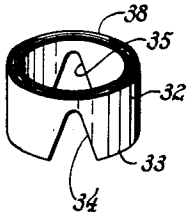


Fig. 4



INVENTOR.
George J. Meuer
BY Fauchild & Dubbard
ATTORNEY

Patented Oct. 18, 1932 1,882,856

UNITED STATES PATENT OFFICE

GEORGE J. MEUER, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO CUTLER-HAMMER, INC., OF MILWAUKEE, WISCONSIN, A CORPORATION OF DELAWARE

STRAIN RELIEVING DEVICE FOR ELECTRICAL CONDUCTOR CORDS

Application filed November 4, 1929. Serial No. 404,837.

This invention relates to improvements in strain relieving devices for electrical conductor cords, and while not limited thereto the device is particularly adapted for use with attachment plug caps of the armored or metal shell type.

An object of the invention is to provide a device of the aforementioned character which is simple and durable in construction and the parts of which are easily assembled.

Another object is to provide a practical form of strain relieving device for cord conductors wherein the gripping element is formed of non-conducting material, thus eliminating any possibility of short-circuiting the conductor wires through rupture of the insulating and protecting covering of the latter.

Another object is to provide a strain relieving device wherein a single size of gripping element is adapted to function in cooperation with conductor cords of different sizes.

Another object is to provide a strain relieving device which is particularly adapted for use in conjunction with plural cord conductors having a common protective covering of flexible rubber or the like.

Another object is to provide a cord gripping device the parts of which may be manually brought into or out of cooperative relationship for the purpose specified, and without requiring use of any tools.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawing illustrates an embodiment of the invention which will now be described, it being understood that the invention is susceptible of embodiment in other forms without departing from the scope of the appended claims.

In the drawing, Figure 1 is a view, partly in section and partly in side elevation, of an armored plug cap having my improved strain relieving or cord gripping device applied thereto,—the parts of the strain relieving device being shown in separated relation.

Fig. 2 is a sectional view similar to that of Fig. 1, but showing the parts of the strain relieving device in assembled relation,—the gripping element being shown in elevation in cooperative engagement with a conductor cord of a given size.

Fig. 3 is a fragmentary view similar to Fig. 2, but showing the gripping element in cooperative engagement with a conductor cord of larger size or diameter, and

Fig. 4 is a perspective view of the gripping element shown in the other figures.

Referring to the drawing, the numeral 10 designates in general an armored attachment plug cap of the character described and claimed in the patent of William C. Tregoning, No. 1,803,983; said plug cap as shown comprising essentially a one-piece insulating lining 11 having interlocking engagement with a relatively thin but relatively rigid insulating disk 12 for support of the latter. Rigidly secured to disk 12 as by means of eyelets 13 and 14 or the like are a pair of plug blades or jacks 15 and 16, and preferably integral with said blades are terminal plates provided with the usual binding screws (one of which is shown at 17) by which the ends of wires 18 and 19, respectively, of the conductor cord 20 are attached. Lining 11 is constrained to assume its proper form as shown by insertion thereof within the protective metal shell 21, the lower edge of the latter being spun inwardly, as shown at 22 (Fig. 2), to retain said parts in assembled relation.

Shell 21, lining 11 and disk 12 are provided with registering perforations 23, 24 and 25, respectively, to provide for passage of the conductor cord 20. The periphery or wall of the opening 23 in shell 21 may be notched or serrated in a well known manner (not shown), said opening being adapted to receive the reduced or relatively thin neck portion or extension of an externally threaded bushing 26, said neck portion being spun or spread outwardly, as shown at 27, to secure said bushing and shell against longitudinal or rotary movement relative to each other.

Bushing 26 is provided with a circular bore comprising a lower portion 28 of a given diameter, an upper portion 29 of rela-

tively greater diameter, and a downwardly tapered portion 30 therebetween. Prior to insertion of the cord 20 through openings 23, 24 and 25 for wiring of the plug cap an internally threaded hollow nipple or nut 31 and a cylindrical section 32 of wound paper tubing or similar laminated insulating material which forms the cord gripping element of the device are sequentially threaded or telescoped onto the cord. After the cap has been wired in the usual manner cord 20 is drawn upwardly to the position in which it is desired to retain the same with respect to the cap, and the section 32 of wound paper tubing is permitted to seat freely within the upper portion 29 of the bore to provide for initial vertical alinement of the former.

The section 32 of wound paper tubing is of substantial thickness, and to facilitate deformation thereof into conformity with the tapered portion 30 of the bore against which it is to be pressed it is preferably provided with one or more V-shaped notches extending upwardly from the lower edge 33 thereof and throughout the major portion of the length of the piece; two of such notches, in diametrically spaced relation, being shown at 34 and 35 in Fig. 4.

The cap or nipple 31 is provided at its upper end with an inwardly extending annular flange 36, the lower surface 37 of which flange is adapted to overlie the upper unbroken or uninterrupted edge 38 of the gripping element 32. The distance between the lower surface 37 of flange 36 and the lower edge 39 of nipple 31 is preferably substantially equal to the length of gripping element 32, so that when the latter is seated within the portion 29 of the bore initial and unobstructed threaded engagement of the nipple 31 with bushing 26 may be effected. Upon further telescopic downward movement of nipple 31 with respect to bushing 26 the lower surface 37 of flange 36 is brought into engagement with the upper edge 38 of gripping element 32 so that the latter is forced downwardly and deformed inwardly by the tapered wall of the portion 30 of the bushing bore. Such inward deformation of element 32 results in pressure of the lower edge 33 and the inner surface 40 thereof against the relatively yielding or resilient protective rubber covering 41 of the cord 20.

In other words, the gripping element 32 is caused to press into or tightly frictionally interlock with the covering 41 of the cord, so that substantially no movement of the cord 20 with respect to the gripping element 32 is permitted, whereas the latter is tighly held by the surface 37 of flange 36 and the tapered portion 30 of the bore against longitudinal movement relative to the plug cap. The exterior surface of nipple 31 is preferably provided with diamond-shaped knurling 42 or otherwise roughened to facilitate rotation of said nipple in either direction by hand.

Assuming use of my improved strain relieving device in conjunction with a cord 20 of the approximate diameter shown in Figs. 1 and 2, it will be noted that the gripping element 32 is permitted to pass downwardly to a point slightly below the lower end of the tapered portion 30 of the bore, so that full cooperative engagement of nipple 31 with the threaded bushing 26 may be effected without substantial deflection or distortion of the upper edge 38 of the gripping element. In Fig. 3, however, the cord 20^a is shown as being of such diameter as to rather closely fit within the lower vertical portion 28 of the bore, so that the gripping action of element 32 takes effect at a considerable distance above the lower end of said tapered portion 30 of the bore. The result is that the upper end of element 32 is caused to flare or spread outwardly to some extent, as illustrated at 32^a; and I therefore preferably provide within the nipple 31 an unthreaded portion 43 of relatively larger diameter than the threaded portion, whereby the spread end is accommodated.

The wound paper tubing from which the sections 32 are cut may be formed in any well known manner to provide for proper adhesion of the convolutions or laminations thereof with respect to each other.

While the conductor cord may be very tightly gripped in the manner aforedescribed to relieve all strain upon the wire terminals, and to provide for utilization of the cord itself as a handle for withdrawing the plug cap from the usual receptacle, nevertheless the gripping element may be readily released if desired by merely unscrewing the nipple or nut 31.

The material of which gripping element 32 is formed does not appreciably deteriorate with age, and hence renewal of this part is not ordinarily required in practice. Moreover, the gripping element herein disclosed does not in anywise obstruct the cord passage during assembly of the parts, so that wiring of the plug cap may be effected with the usual facility.

What I claim as new and desire to secure by Letters Patent is:

1. The combination with a plug cap having a metal armor or shell, an externally threaded bushing rigidly secured to said shell, a nipple having threaded engagement with said bushing, said nipple having an inwardly extending flange and said bushing having a frusto-conical bore, and a gripping element interposed between said flange and said bore, said element consisting of a substantially cylindrical section of wound or laminated paper tubing having notches extending upwardly from the lower edge thereof, the lower end of said element being guided by said

frusto-conical bore into gripping engagement with a conductor cord passing therethrough upon movement of said nipple and said bushing into telescoping relation with each other.

2. In a device of the character described, the combination with a plug cap having a perforated metal shell, an externally threaded metal bushing having a reduced end penetrating the perforation in said shell and rigidly secured thereto, said bushing having a cylindrical bore portion at the upper end thereof and a downwardly tapering bore portion adjacent thereto, a gripping element adapted to initially seat within said cylindrical bore portion, said element consisting of a section or length of wound paper tubing, said element having a pair of spaced substantially V-shaped notches extending upwardly from the lower edge thereof, and an internally threaded nipple adapted for engagement with said bushing, said nipple having an inwardly extending annular flange adapted for engagement with the upper edge of said gripping element upon movement of said nipple and bushing toward each other, said tapering bore portion being arranged to deform the lower edge of said gripping element into frictional engagement with a conductor cord passing therethrough.

3. In a device of the character described, in combination, an externally threaded metal bushing having a downwardly tapering bore, a substantially cylindrical gripping element formed of wound paper tubing adapted to seat within said bore, said element having notches extending upwardly from the lower edge thereof, a nipple having an internal thread at its lower end adapted for cooperative engagement with said bushing and a flange at its upper end adapted to overlie said gripping element, and a rubber covered cord conductor freely insertable lengthwise through said gripping element, the latter being forced into tight frictional engagement with the rubber covering of said cord upon movement of said nipple into telescopic engagement with said bushing.

4. In a device of the character described, in combination, an externally threaded metal bushing having a downwardly tapering bore, a substantially cylindrical gripping element formed of wound paper tubing adapted to seat within said bore, said element having notches extending upwardly from the lower edge thereof, a nipple having an internal thread at its lower end adapted for cooperative engagement with said bushing and a flange at its upper end adapted to overlie said gripping element, a rubber covered cord conductor freely insertable lengthwise through said gripping element, the latter being forced into tight frictional engagement with the rubber covering of said cord upon movement of said nipple into telescopic engagement with said bushing, the notches in said element being of substantially V-shape to provide for deformation of the lower edge thereof into gripping engagement with conductor cords of different size, and said nipple being externally knurled or roughened to facilitate operation thereof by hand.

5. In a strain relieving or gripping device for electrical conductor cords, the combination with a separately formed gripping element consisting of a cylindrical section or length of wound paper tubing, said element having at least one substantially V-shaped notch extending throughout the major portion of the length thereof and opening to one edge thereof, and means comprising a pair of threaded members cooperable with each other and with said element to deform the notched edge of the latter into gripping engagement with a conductor cord inserted thereinto.

6. In a strain relieving device for electrical conductor cords, a separately formed gripping element consisting of a cylindrical section or length of wound or laminated paper tubing, said element having a plurality of notches extending from the lower edge throughout the major portion of the length thereof, the open ends of said notches being flared to provide for deformation of said element into substantially frusto-conical shape without buckling of the material.

In witness whereof, I have hereunto subscribed my name.

GEORGE J. MEUER.