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PROTECTIVE SHIELD FOR ELECTRICAL TERMINALS

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FIG. 1

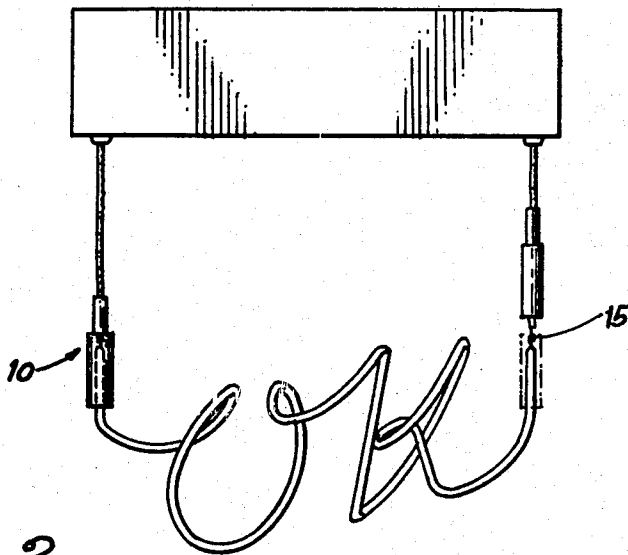


FIG. 2

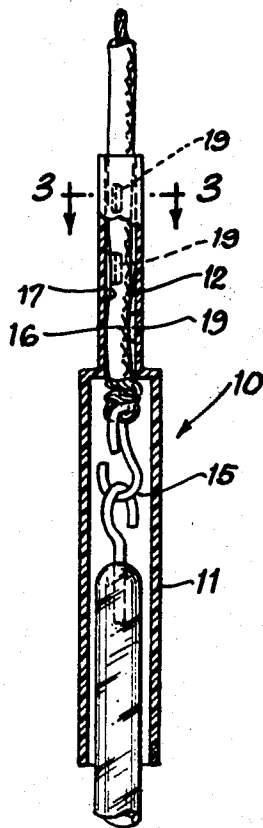


FIG. 3

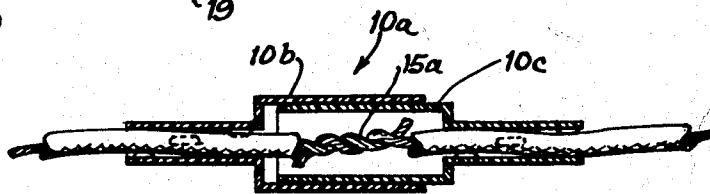
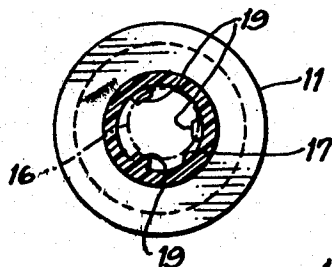


FIG. 4

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1

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PROTECTIVE SHIELD FOR ELECTRICAL
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4 Claims. (Cl. 174-138)

This invention relates to devices for shielding a pair of disconnectible electrical terminals which form the exposed ends of a pair of otherwise insulated, axially aligned conductors, while providing for frequent and ready access thereto for disconnection thereof.

Devices of this character find a typical field of application in connection with signs operating on the principle of gaseous discharge, e.g. a so-called neon sign, wherein the sign proper must be detached from the secondary leads of the associated transformer at frequent intervals for cleaning, repair, access to surrounding surfaces, etc. To this end the conductors of the sign and transformer respectively are terminated in the form of a hook or a separate hook is attached so that disconnection and connection may be rapidly effected. Local ordinances and requirements promulgated by insurance carriers invariably require that the exposed ends of the secondary at the points where they connect with the sign be protected against human contact at all times, even when the sign is detached for only a short period of time.

Accordingly, for this purpose it has been the practice to utilize a sleeve of glass constricted at one end and is of sufficient length to be supported in terminal-shielding position when resting on an adjacent part, e.g. the upper terminal, or which may be taped into position. However, glass is easily broken and the unprotected joints carrying high voltage remain an electrical hazard. Moreover, where tape is required to maintain the operative position of the device a careless attendant may, following detachment of the tape and dislodgment of the sleeve for access, fail to re-tape the sleeve in position. Consequently electrical inspection bureaus and fire insurance underwriters have, more recently, made the use of safe devices practically mandatory. That is to say, the device must be of infrangible material, have high dielectric strength and include features insuring retention of the same in protective position.

Principal objects of my invention reside in providing an insulating sleeve for the indicated function which adequately serves to insulate electrically in accordance with approved practice, may not be easily broken and which is self-retaining in either of its two principal positions, viz., protecting the joint and exposing the joint.

Another object resides in accomplishing the foregoing objects by the use of a one-piece device.

Additional objects will become evident from the following description which, taken with the accompanying drawing, discloses a preferred mode of carrying the invention into practice.

In this drawing:

FIG. 1 is a front elevational view of the invention sleeve as used, for example, with a common form of neon sign; on the left the device is shown in terminal-shielding position and on the right in terminal-exposing position;

FIG. 2 shows a medial, longitudinal cross section of the device;

FIG. 3 is a cross section taken on the line 2-2 of FIG. 2; and

FIG. 4 shows an alternative mode of utilizing the principles of the invention.

Regarded broadly, the invention comprises a sleeve of electrically-insulating material having some appreciable rigidity for manipulation and function in the intended

2

manner but not so rigid and brittle as to encourage fracture. The sleeve is provided with a lower bore of a diameter to receive the inter-engaged terminals without binding and which is of a depth to insure that the terminals are adequately protected against inadvertent human contact. At the upper end the sleeve has a bore of a diameter slightly larger than the insulation of the conductor entering at that end, e.g. one of the secondary leads of a neon sign transformer. Protruding into the upper bore is a plurality of discrete protuberances spaced axially of said bore and in two dimensions transversely of said bore, and adapted to bear against the insulation with a force sufficient to retain the sleeve in any selected position on the conductor; that is to say, against the force of gravity if the conductor is vertically disposed. The axial length of the protuberances and the extent to which the same extend into the bore and their relative spacing are so chosen that the conductor is securely gripped frictionally and desirably deformed slightly into a convoluted or sinuous configuration, by virtue of the substantial rigidity of the protuberances, whereby variations in the diameter of the insulation are readily accommodated with adequate friction. Thus, the sleeve may be displaced along the conductor against the frictional grip presented by the protuberances to expose the joint and there permitted to remain and, following servicing, when the sleeve has been returned to active position, the sleeve will be safely retained in terminal-shielding position.

Thus, turning to the drawing, I have shown a sleeve of some material which is easily molded, and possesses the electrical qualities required, i.e. dielectric strength, and resistance to burning and embrittlement. Vulcanized rubber and many plastic compositions meet these qualifications.

The sleeve 10 is constituted as a hollow cylindrical body of two diameters, namely a lower portion 11 and an upper portion 12. The portion 11 has an interior length and diameter such as to insure that the disconnectible joint 13 is appropriately shielded against inadvertent contact with humans and adjacent conductive bodies.

The reduced portion 12 of the device has an inside diameter somewhat larger than the diameter of the insulation 16 of the conductor to be passed therethrough, and along the interior of the bore of the portion 12 there is arranged a plurality of protuberances 19. Preferably these protuberances are disposed in helical array, viz., spaced apart both axially and transversely in two dimensions. By way of example, three are shown.

Inasmuch as the diameter of the insulation 16 varies in practice, the diameter of the circle defining the inward termination of the several protuberances will be selected to accommodate the largest of a predetermined group of conductors, e.g. over a range of 1/4 inch diameter to 3/8 inch diameter. The intrusion of the protuberances is of such degree that the insulation 16 is gripped and, when the protuberances are helically or otherwise staggered, the insulation is also deformed from its normal straight alignment into a sinuous or convoluted form. Thus it will have become apparent that the sleeve may be shifted between terminal-shielding and terminal-exposing positions against the friction of the protuberances and, moreover, that the sleeve will remain at either of said positions against the force of gravity and other dislodging forces, such as vibration. FIG. 1 shows the sleeve on the left in terminal-shielding position and the one on the right in terminal-exposing position. Desirably the distal end of the protuberances is blunt to improve their engagement with the insulation. Although a more or less sharp termination may provide improved engagement, such advantage is outweighed by the hazard of a puncture or tearing.

3

Since the protuberances 19 are so dimensioned and spaced that a range of diameters of insulation may be accommodated in the desired manner, a conductor of larger diameter will be deformed and gripped to a greater degree than one of smaller diameter.

It is also within contemplation to provide, in the case of material having some degree of elasticity, a perforate diaphragm at the outer end of the portion 12 with the perforation adapted to fit somewhat snugly but yieldably about the insulation in order to provide a moisture barrier.

The invention sleeve may be employed in telescoped pairs, as shown at 10a in FIG. 4. In such cases a sliding fit will be provided between the enlarged sleeve portions 10b and 10c. Such fit need be no tighter than is required for ordinary sealing of splice 15a against moisture and foreign matter since the force maintaining the parts against separation is provided by the projections 19.

While I have shown particular embodiments of my invention, it will be understood, of course, that I do not wish to be limited thereto since many modifications may be made and I, therefore, contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of my invention.

I claim:

1. In a device of the type described, a sleeve of electrically insulating material having an internal bore of diameter substantially greater than the diameter of the insulation of a conductor to be received in said bore, said sleeve having at least three discrete internal protuberances of substantial rigidity spaced axially of said bore and in two dimensions transversely of said bore and each being separated from the opposite wall of said bore by a

4

distance less than the diameter of said bore, said protuberances engaging the insulation of said conductor frictionally, and the rigidity of said protuberances being sufficient to deform said conductor along said two dimensions when said conductor is inserted in said bore.

2. The device of claim 1, said device being adapted for use with an electrical splice including said conductor, which is to be exposed at intervals for access, said sleeve having a splice-shielding bore in communication with the first-mentioned bore, said sleeve being manually shiftable along said conductor between splice-shielding and splice-exposing positions and being retained in said positions by the engagement of said protuberances with the insulation of said conductor.

3. The device of claim 1, the distal ends of said protuberances defining a cylinder of diameter less than the diameter of said insulation.

4. The device of claim 1, said protuberances being elongated axially of said bore and having blunt distal ends.

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