

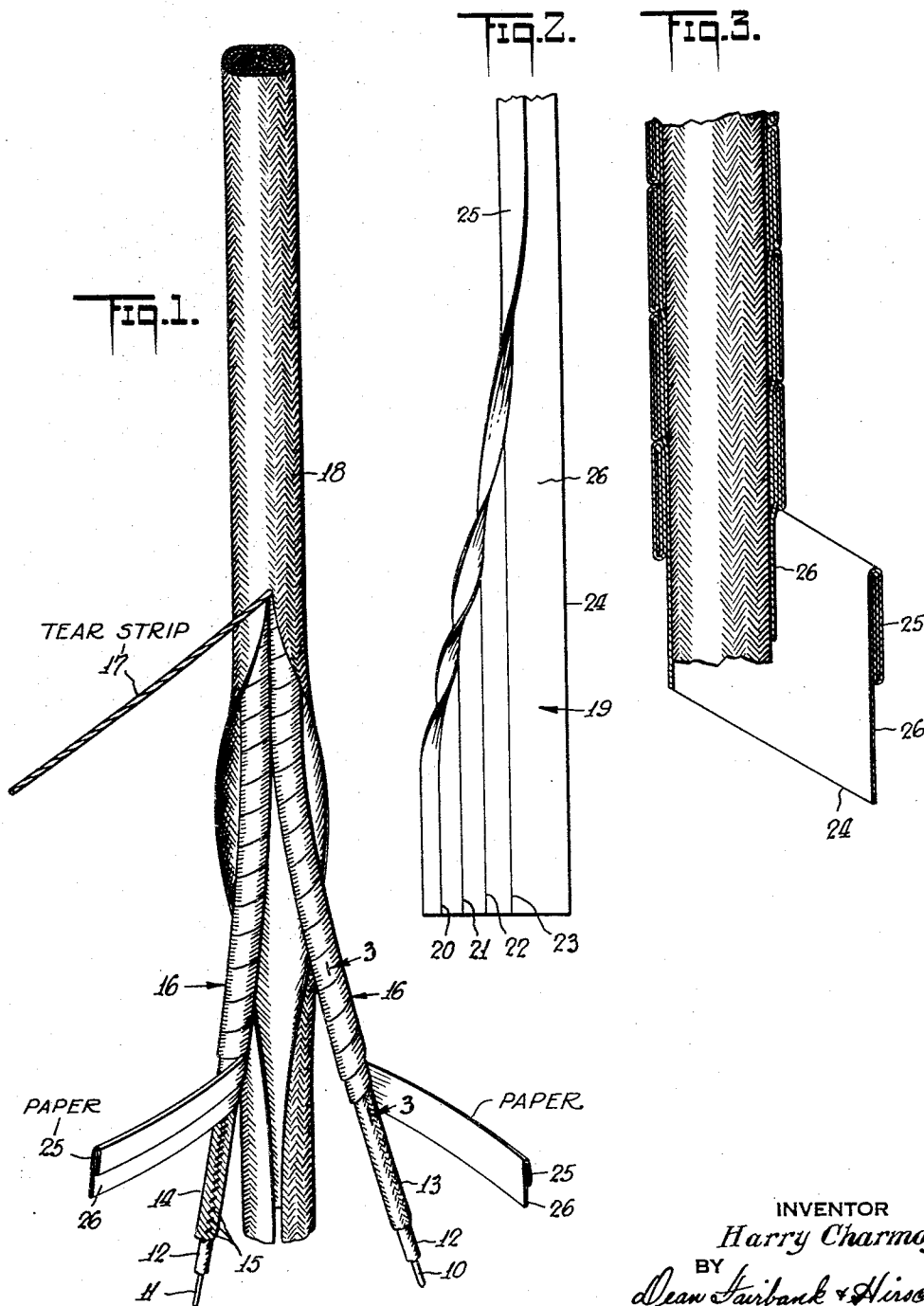
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ELECTRIC CABLE

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ELECTRIC CABLE

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The present invention relates to electrical cables, more especially of the type provided with a non-metallic braided covering sheath. It finds a special field of application to such cables with two or more insulated conductors therein with insulating braid covering of discriminating color or markings to distinguish polarity.

Among the objects of the invention are to provide a cable of the above type, of simple and inexpensive construction, which, however, shall be thoroughly proof against moisture and which shall, moreover, be both fire resistant and rodent repellent.

As conducive to a clear understanding of the invention, it may be noted that aside from the primary utilities of the invention indicated in the aforementioned object, it is important that the pitch which impregnates the cable and imparts thereto the characteristics noted, shall not reach the braid or other insulation which encloses the individual conductors, as otherwise the discriminating color or surface markings of these conductors would be obliterated and the polarity thereof could not be readily distinguished.

According to the invention, the sheath may be made of ordinary braid or the like, devoid of any means for excluding pitch, but rather facilitating the penetration of pitch into the interior thereof, yet without likelihood of reaching the individual wire coverings of discriminating appearance. To this end the individual insulated conductors are shielded from entry of pitch thereto by an insulating covering of paper which is lap-wound in such manner as to avoid undue or excessive thickness or stiffness at the lap joint but is substantially proof against the penetration of pitch therethrough.

In the accompanying drawing in which is shown one of various possible embodiments of the several features of the invention,

Fig. 1 is a perspective view of a cable with the insulating sheath thereof slit open, part of the covering of the individual conductors being unwound to better reveal the construction,

Fig. 2 is a perspective view of the helically wound covering partly opened to reveal the details of its construction, and

Fig. 3 is a view in longitudinal section on a greatly enlarged scale through one of the conductors taken on line 3-3 of Fig. 1, showing the structure of the helically wound covering in position thereon.

In general, the construction involves a pair of metal conductors 10 and 11 covered by rubber 12 in turn enclosed by braid or equivalent insulat-

ing covering 13 and 14 respectively, of discriminating appearance. Illustratively, the braid covering 13 of conductor 10 is white or tan while the braid 14 on the companion conductor has one or more black threads 15 to distinguish the polarity thereof. Each of the conductors has helically wound thereabout a paper covering 16 which will be more fully described hereinafter. The two or more conductors within their respective paper coverings 16, together with an interposed tear strip 17 of jute or equivalent material, are enclosed in a flexible insulating braided sheath 18. The assembled entity is then impregnated in pitch, usually applied by submersion successively in three tanks of molten impregnating material, first an asphaltum base pitch, then a stearin base pitch and finally a paraffin base pitch, the latter serving primarily as a lubricant to facilitate bending of the cable without breakage or cracking of the paper covering, the pitch covering in its entirety being substantially fire resistant and rodent repellent.

The helically wound cover 16 of the individual conductors is preferably made of a ribbon of paper 19 which is longitudinally folded over at 20, 21, 22 and 23 in the same direction, with the extreme lateral edge 24 of the ribbon protruding well beyond the multi-ply or flattened spiral portion 25 thus formed. The paper covering when applied is of uniform thickness greater than that of the flat strip but less than double that of the strip prior to application thereof. In the illustrative embodiment shown, the insulating strip thus folded will be of five-ply thickness as at 25 and the protruding web 26 of width substantially equal to the multi-ply portion is of single ply.

In winding the paper ribbon about the conductor, each turn of the five ply portion 25 will be lapped or superposed over the single ply web 26 protruding from the previous turn. Thus, there will be six plies of paper upon the conductor when completely covered by the paper strip, said six plies comprising the base or foundation made up of the abutting webs 26 or single ply material, over each of which is superposed the five ply portion 25 of the succeeding turn.

After the sheath 18 has been braided about the individual conductors thus paper covered, with the interposed tear strip 17, the impregnation previously set forth is performed. The sheath 18 being pervious to pitch, the latter readily enters and impregnates one or more of the outer layers of the paper ribbon 19, which appear black in the completed cable, but the pitch can-

not penetrate to the inner plies of the paper covering nor to the foundation web 26. The braided insulation 13, 14 about the individual conductors is thus thoroughly protected against access of pitch thereto and the markings that distinguish polarity are not obliterated.

The pitch also impregnates the tear strip 17, the flexibility of which is thereby enhanced, to facilitate slitting in installing the cable.

The electrical cable, as fabricated according to my invention will withstand the most severe conditions of use. In a standard test according to which the cable is tightly wound about a mandrel of only 1 1/4 inches in diameter and submerged in water for twenty-four hours, its weight through absorption of moisture will have increased by less than three per cent so that its performance in this respect is better than 300 per cent as compared with the standards set by boards of underwriters. The insulating properties of the cable are quite superior by reason of the lapping relation of the paper, affording but a very circuitous path for leakage currents, and this even where, in the actual installation, the conductors are sharply bent, for even in a sharp bend, the free edge of the web 26 will never be exposed from under the multi-ply turn 25 of paper wound thereover.

Yet the helically wound paper sheath will flex readily in bending the wires, since it is of uniform thickness throughout and the lubrication properties imparted by the pitch facilitates such flexure.

The pitch being of character to be rodent repellent, the advantage is attained that even were the outer sheath 18 injured, for exposure of the insulated conductors therein, the presence of the pitch on the paper would act for the purpose.

It is, of course, understood that while the helical paper winding has been shown as of five plies, a lesser or greater number of plies could be used to advantage, and that the plies could be formed zig-zag or accordion fashion, instead of continuously wound as shown, and other equivalents will readily suggest themselves to those skilled in the art.

As many changes could be made in the above construction and method and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An electrical cable comprising an insulated conductor having a covering strip thereabout, the latter comprising a plurality of plies with a lateral web of single ply protruding therebeyond, said covering being helically wound about said conductor, and each turn thereof embracing the web of the preceding turn, a pitch pervious sheath about said covered insulated conductor,

and pitch penetrating said sheath and coating the outer surface of the spirally wound strip.

2. An electrical cable comprising a pair of insulated conductors, each having insulation covering of discriminating appearance to distinguish the polarity thereof, each of said conductors having a covering strip thereabout, each of said covering strips comprising plurality of plies with a lateral web of single ply protruding therebeyond, each of said covering strips being helically wound about the corresponding conductor with each turn thereof embracing the web of the preceding turn, a pitch pervious sheath about said covered insulated conductors and pitch penetrating said sheath and coating the outer surfaces of the helically wound strips.

3. An electric cable of the type comprising a pair of electrical conductors covered with insulation of discriminating appearance to distinguish polarity, a helically wound insulating band about each individual insulated conductor, and a pitch pervious sheath about said insulation covered conductors, each of said helical bands comprising a ribbon of paper longitudinally folded into a flattened spiral of multi-ply construction with a protruding longitudinal web, said ribbons being lap wound about the respective conductors with each turn thereof embracing the web of the preceding turn, and pitch impregnating the sheath and coating the outer turns of the spirally wound paper coverings and free from contact with the discriminating coverings of the respective conductors.

4. An electric cable of the type comprising a pair of electrical conductors covered with insulation of discriminating appearance to distinguish polarity, a helically wound insulating band about each individual insulated conductor, a tear strip of jute and a pitch pervious sheath about said insulation covered conductors and said tear strip, each of said helical bands comprising a ribbon of paper longitudinally folded in a flattened spiral of multi-ply construction with a protruding longitudinal web, said bands being lap wound about the respective conductors with each turn thereof embracing the web of the preceding turn, and pitch impregnating the sheath and coating the outer turns of the spirally wound paper coverings and said jute tear strip and free from contact with the discriminating coverings of the respective conductors.

5. The method of producing a fabric sheathed electric cable with conductors having insulated coverings of discriminating appearance to distinguish polarity, which consists in winding a paper band of multiple ply and having a protruding web about the respective conductors with each turn embracing the web of the preceding turn enclosing the conductors thus covered in a pitch pervious sheath and impregnating the assembly with pitch whereby the latter will penetrate the sheath and coat the exposed surface of the paper covering and will be kept free from contact with respect to the insulation covering the respective wires.

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