

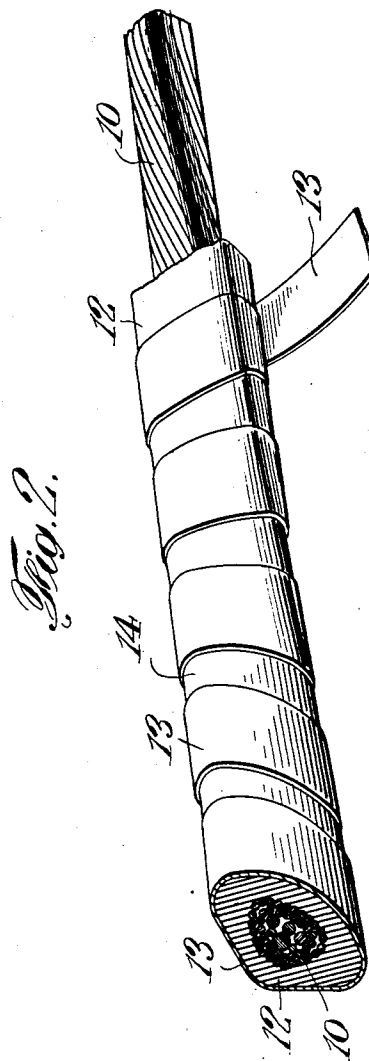
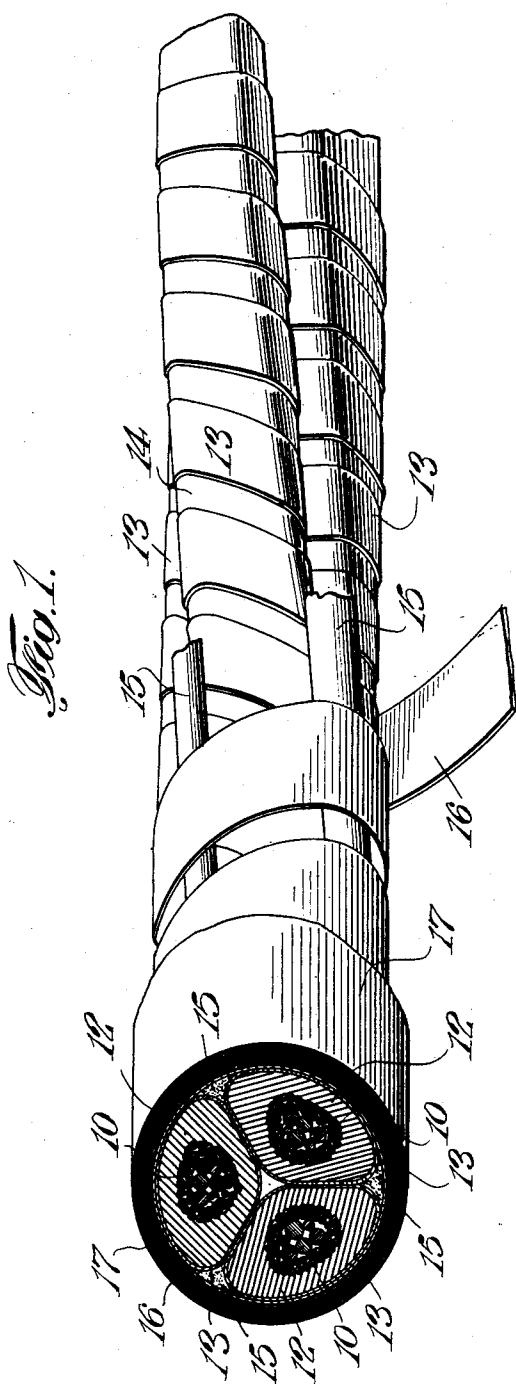
May 22, 1934.

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1,959,526

MULTICONDUCTOR SHIELDED CABLE

Filed May 19, 1928



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UNITED STATES PATENT OFFICE

1,959,526

MULTICONDUCTOR SHIELDED CABLE

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Application May 19, 1928, Serial No. 278,962

4 Claims. (Cl. 117—59)

This invention relates to electric cables. More specifically it relates to electric cables of the shielded multiple conductor type, and still more specifically it relates to electric cables of the shielded multiple-sector-conductor type.

In constructing cables of the multiple-conductor type it is convenient and economical to make each conductor (which commonly is made up of a group of helically twisted metallic wires or strands) of sector shape in cross-section so that when assembled the various sectors make up a substantially circular cross-section. Each such conductor (commonly consisting, as stated, of a group of helically twisted metallic wires or strands) must be insulated from the others and from the shields and sheath, the latter commonly made of lead, finally applied as the outer member or envelope of the cable.

In assembling the conductors; i. e., twisting them together, somewhat after the fashion of making ordinary rope, each conductor must twist about its own axis besides twisting with respect to the other conductors around the axis of the cable. This twisting of the conductors with respect to each other was and is effected to impart certain desirable characteristics to the cable, such as flexibility, etc. But the twisting, during assembly, of each conductor about its own longitudinal axis was decidedly objectionable in that it caused injury to the previously applied insulation around each conductor thereby destroying or at least reducing the efficiency of the cable. The advantage of this invention is that this twisting of the insulated conductor on its own axis is avoided.

Other objects and advantages will become apparent to those skilled in the art upon reading the following description of what I now consider a preferred physical embodiment of the invention. It will be understood, of course, that the invention may assume other forms in accordance with the extent to which the various advantages are desired and as determined by the particular class of service to which the cable is to be put, the availability of materials of various kinds, and other similar factors; without departing from the scope of the invention as defined in appended claims.

Referring to the drawing which illustrates what I now consider a preferred physical embodiment of my invention:

Fig. 1 is a perspective view, partly broken away, of a section of the cable.

Fig. 2 is a similar view but illustrating only a

single one of the conductors and as it appears prior to assembly into the cable.

The three conductors 10 are each constructed of a number of metallic wires or strands which are helically twisted longitudinally. This twisting may be effected during or after assembly of the individual wires making up each conductor. Each conductor 10 is then caused to assume the configuration and shape that it will have when it is ultimately assembled in the cable. In short, each conductor is pre-twisted. Each such pre-twisted conductor 10 is then provided with insulation as by wrapping, winding or otherwise applying one or more layers 12 of paper or other insulating material around the conductor. This solid insulating material and other similar insulating material, hereinafter referred to, is ordinarily impregnated with insulating fluid, such as oil, at a suitable stage or at suitable stages in the process. After the insulation has been applied to each conductor 10, there is applied to it a conducting shield. This shield is conveniently constructed by wrapping or winding a continuous conducting band or tape 13, preferably of copper, although other materials such as metal coated paper strip may be employed, upon the insulation of each conductor 10.

While in many cases, perhaps the majority of cases, the turns of metal tape 13 may lap, in some cases it is of advantage to space the turns as indicated at 14.

Each conductor 10 now appears as shown in that part of Fig. 2 which is not broken away. It will be noted that this conductor is pre-twisted, i. e., it has the configuration and shape that it will finally have when assembled in the cable. It will be noted further that, there being a total of three conductors 10, each conductor is in the shape of a 120° sector in cross-section. Obviously, if there were two conductors 10 each would be in the shape of a 180° sector in cross-section, if there were four conductors 10 each would be in the shape of a 90° sector in cross-section, and so on.

The conductors 10 are now assembled (see Fig. 1) and by virtue of the pre-twisting as set forth above, twisting of the insulation and shields on their conductors 10, and consequent injury thereto, are avoided and prevented.

In assembling, the conductors may be twisted together with a slightly longer or shorter helical pitch than the pitch of the axial twist, coincidence of the initial conductor twist and the final cable twist being obtained by suitably shifting the angular position of the individual insulated

conductors during cabling when and as required. During assembly, if desired, fillers or laterals of insulating material 15 may be incorporated.

Preferably a continuous conducting band, ribbon, or tape, 16, of steel or other suitable material, is wrapped or wound around the assemblage of conductors 10 (as shown in Fig. 1) and the fillers 15 if the latter have been incorporated.

The cable is completed by applying the sheath 17 thereto which may be the usual lead sheath applied in the usual way.

By virtue of its construction, including the conducting shields 13, the cable is highly efficient. The shields so distribute the lines of static stress as greatly to reduce the likelihood of break-down under the applied potentials. Damaging differences of potential between different parts of any layer of paper 12, which would otherwise exist, are prevented and avoided.

In accordance with the provisions of the patent statutes, I have herein described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus disclosed is only illustrative and that the invention can be carried out by other means. Also, while it is designed to use the various features and elements in the combinations and relations described, some of these may be altered and others omitted and some of the features of each modification may be embodied in the others without interfering with the more general results outlined, and the invention extends to such use.

What I claim is:

1. The method of making a multi-conductor twisted and shielded cable comprising, causing each conductor to assume before the application of insulation substantially the shape and configuration that it will ultimately have when assembled in the cable, applying insulation to the individual conductors, electrostatically shielding each insulated conductor, and assembling the conductors to form a cable of twisted form without subjecting the insulation to substantial torsion about the individual axis of the conductor which it surrounds.

2. The method of making a multi-conductor twisted and shielded cable comprising, assembling a plurality of groups of conducting wires

to form a plurality of separate conductors each of sector-shaped cross-section adapted when assembled to form a substantially circular combined cross-section, causing each conductor before the application of insulation to assume substantially the shape and configuration that it will ultimately have when assembled in the cable, applying insulation to each separate conductor, electrostatically shielding each insulated conductor, and assembling the conductors to form a cable of twisted form without subjecting the insulation to substantial torsion with respect to the conductor which it surrounds.

3. The method of making a multi-conductor twisted and shielded cable comprising causing each conductor to assume before the application of insulation substantially the shape and configuration that it will ultimately have when assembled in the cable, applying insulation to the individual conductors, electrostatically shielding each insulated conductor, assembling the conductors to form a cable of twisted form, in which the conductors are twisted together with approximately the same helical pitch as the pitch of the axial twist, without subjecting the insulation to substantial torsion about the individual axis of the conductor which it surrounds; coincidence of the initial conductor twist and the final cable twist being obtained by twisting or untwisting the individual insulated conductors locally during cabling.

4. The method of making a multi-conductor twisted and shielded cable comprising causing each conductor to assume before the application of insulation substantially the shape and configuration that it will ultimately have when assembled in the cable, applying insulation to the individual conductors, electrostatically shielding each insulated conductor, assembling the conductors to form a cable of twisted form, in which the conductors are twisted together with a helical pitch slightly different from the pitch of the axial twist, without subjecting the insulation to substantial torsion about the individual axis of the conductor which it surrounds; coincidence of the initial conductor twist and the final cable twist being obtained by twisting or untwisting the individual insulated conductors locally during cabling.

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