J. A. KENNEDY.

CONDUIT FOR ELECTRICAL CONDUCTORS.

APPLICATION FILED FEB. 24, 1917.

1,253,046. Patented Jan. 8, 1918.

FIG. 1.

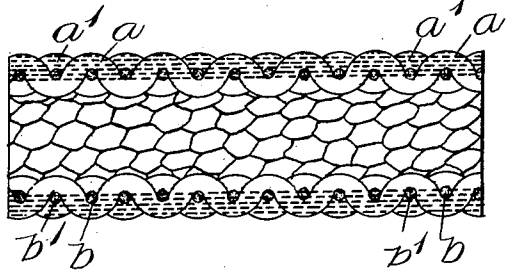
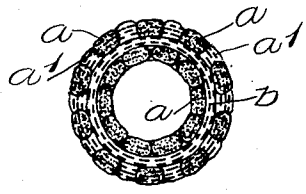


FIG. 2.



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CONDUIT FOR ELECTRICAL CONDUCTORS.

1,253,046. Specification of Letters Patent. Patented Jan. 8, 1918.

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To all whom it may concern:

Be it known that I, JOSEPH A. KENNEDY, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in Conduits for Electrical Conductors, of which the following is a specification.

The present invention relates to articles of the class known as conduits for electrical conductors, and more particularly to the flexible type of such class of articles. Conduits of the sort indicated are employed in connection with the installation of the wires of electric circuits to guard such wires from mechanical injury and protect them also from flame and moisture. Such conduits, when used in connection with the wiring of buildings must be not only resistant to flame and moisture but must also be sufficiently resistant to collapse, that is, have radial strength sufficient to preserve the tubular form of the conduit and prevent closing of its bore when the conduit is bent on a curve of prescribed radius.

The conduit which forms the subject matter of my present invention is a seamless woven tube having longitudinal warp members and one or more weft members extending continuously around and along the tube. This woven tube is in itself insufficiently rigid or resistant to collapse to fulfil the requirements of a conduit for electric wires, but it is made thus stiff, and at the same time made resistant to water and fire by impregnation and coating with certain compounds which are liquefiable by heat and are solid and relatively hard at ordinary temperatures.

In the drawings wherein I have shown an embodiment of my invention,

Figure 1 is a longitudinal section of my improved conduit and

Fig. 2 is a cross section of said conduit.

The same reference characters indicate the same parts in all the figures.

In said drawings a, a' represent the warp strands and b, b' the weft strands. Two or more weft strands are used, but there may be only one if desired. Said weft strands extend in the direction and form common in tubular seamless woven fabrics, and the warp strands extend longitudinally but at the same time are bent back and forth alternately outside and inside of the adjacent turns of the weft strand or strands, also in the manner usual in tubular weaving. A material and important feature to be noted is that the warp strands are considerably greater in size or weight than the weft strands. The purpose of this feature will be later explained.

The warp strands necessarily, and the weft strands preferably, are made of material which is highly absorbent in order to soak up and contain the impregnating material which I use to stiffen the tube and also to give it either fire-resisting or water-resisting properties. The material which best serves this purpose of absorbing the compound is cotton, wherefore I make the warp strands of cotton as loosely twisted as it may be consistent with the requirement of a prescribed tensile strength, and the weft strands are also preferably of the same material and also absorbent, although other material may be used for these strands if desired.

The essential feature is that the wall of the tube, warp strands or both warp and weft strands, should contain a sufficient mass of absorbent fibrous material to soak up and retain enough compound to give to the finished tube the required degree of stiffness or radial strength.

To secure the latter effect the woven tube is treated with a composition or compound which is solid when at the ordinary temperatures and is liquefiable by heat, the preferred mode of treatment being to immerse the tube in a bath of this hot molten compound, and retain it in the bath long enough for the compound to penetrate by absorption among the fibers to the desired extent. When the compound hardens upon cooling after removal of the tube from the bath, it gives the required radial or lateral strength. I have indicated the compound in Fig. 1 of the drawings by broken horizontal lines. This compound penetrates into the strands, around and among the component fibers thereof, and also enters the spaces between adjacent warp strands, between adjacent weft strands, and between warp strands and weft strands, forming a substantially solid and continuous body of compound extending into, between, and around the absorbent strands of the tubular fabric.

I may, if desired, apply additional compound in the form of a coating upon the already impregnated tube.

I do not restrict my invention to any specific compound or compounds for impregnating and coating my woven tubular conduit. Many such compounds have been used for fireproofing and waterproofing and stiffening conduits for electrical conductors, including among others asphalt, bichromate of potash, borax, cement, clay, fusible metal, glue, oxidized oil, paraffin, rubber, shellac, soluble glass, tar, tungstate of soda, zinc oxid, etc., and I may use any one or more of the above-named compounds.

I do not claim as my invention the use of stiffening water-resistant and fire-resistant compounds in combination with a woven tube, nor do I claim as my invention any novelty in the impregnating or coating compound in itself. My invention resides in the combination in a conduit for electrical purposes of absorbent warps which are materially larger in size than the weft strands of the conduit, with an impregnating compound which enters the warp strands and bonds the same to one another and to the wefts in a manner such as to give the required radial strength to the tube.

The advantage of the large warps, that is the relatively greater size or weight of the warps as compared to the wefts, is that such warps are brought together in close contact on the inside of the tube, and where adjacent warps cross one another in passing respectively over and under the same turn of the weft, they are forcibly crowded together. Thereby reinforcement is afforded by the material of the interior of the tube to assist the impregnating compound in resisting collapse by pressure applied laterally against the exterior of the tube. A further advantage is that the relatively great bulk of the absorbent warps allows them to take up a large amount of compound. These warp strands constitute skeletons as it were for the body of compound which passes among the fibers of the strands. In proportion as these strands are thick or bulky, just to that extent a greater amount of the compound can be taken up, and the compound of course stiffens the tube substantially in proportion to the thickness of the body thereof. A further advantage of this construction is that the greater compression of warps in the interior of the tube retards the absorption of the compound by these portions of the warps, and thus acts to prevent entrance of the compound through the wall into the bore of the tube. While, of course, it is essential that the wall of the tube should be sufficiently impregnated to be made stiff, it is equally important that the compound should not actually penetrate into the bore of the conduit, for if it should do so the bore would be more or less stopped up. The prevention of this stopping-up effect is the useful feature last referred to.

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

1. A conduit for electrical conductors comprising a seamless woven tube having longitudinal absorbent warp strands of greater bulk than the weft strand or strands, in combination with a compound impregnating said warp strands and having stiffness.

2. A conduit for electrical conductors comprising a single walled woven tube the warp strands of which are bulkier than the weft strand or strands, and a mass of relatively hard material capable of being liquefied by heat, impregnating and embedding said warp strands.

3. A conduit for electrical conductors comprising a single walled seamless woven tube having warp and weft strands, the warp strands being absorptive and of relatively great size as compared with the weft strand or strands, and a body of relatively hard liquefiable material penetrating said warp strands in the outer part of the wall of the tube and bonding the strands together.

4. A conduit for electrical conductors comprising a single walled seamless woven tube having warp and weft strands, the warp strands being of soft, loosely twisted cotton and of greater size than the weft strand or strands, and a stiffening material filling the pores of said warp strands in the outer portion of the wall of the tube and occupying the interstices between the strands, bonding such strands together.

In testimony whereof I have affixed my signature.

JOSEPH A. KENNEDY.