(No Model.)

J. A. WETMORE.

INSULATED CONDUCTOR.

No. 415,262. Patented Nov. 19, 1889.

Fig. 1.

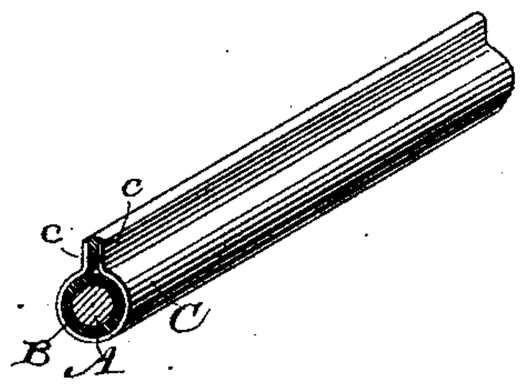


Fig. 2.

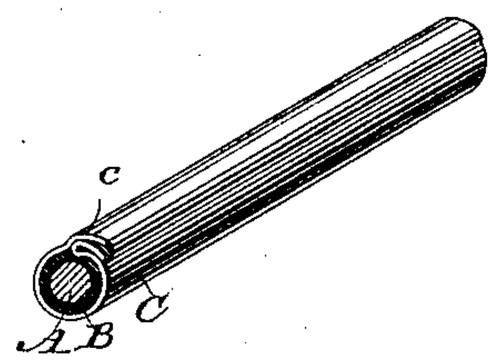


Fig. 6.

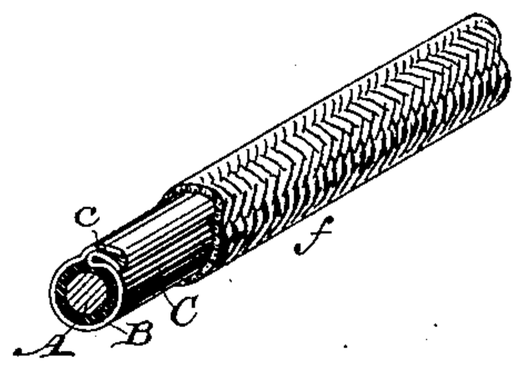


Fig. 3.

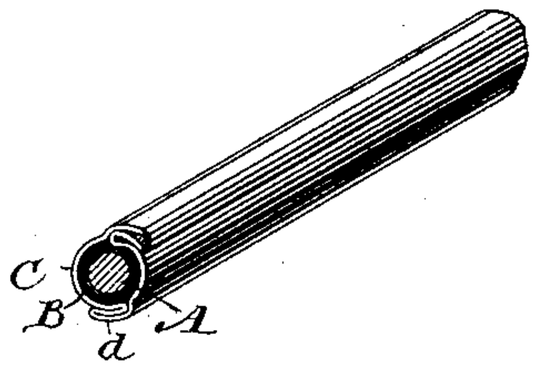


Fig. 4.

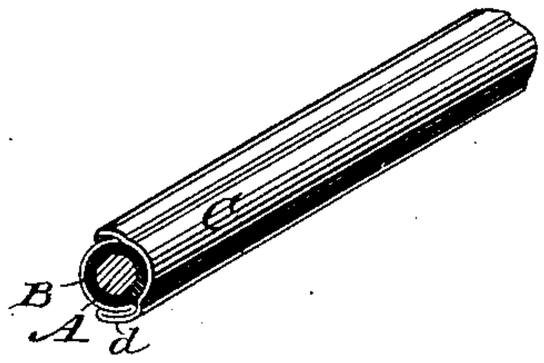


Fig. 5.

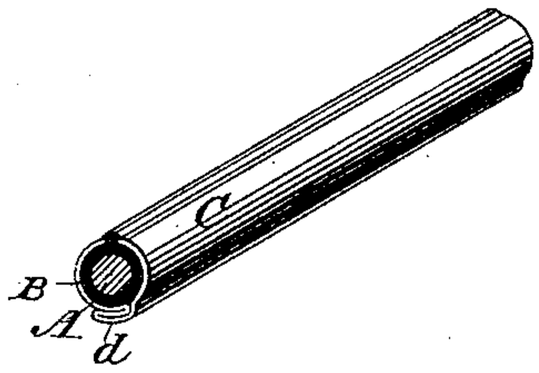


Fig. 8.

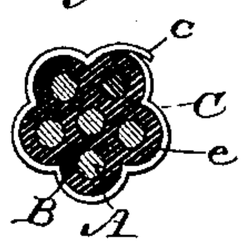
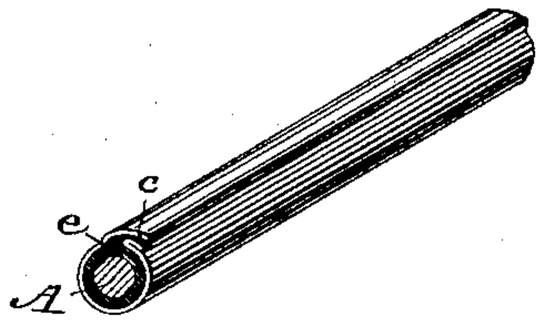


Fig. 7.



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UNITED STATES PATENT OFFICE.

JEAN A. WETMORE, OF NEW YORK, N. Y.

INSULATED CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 415,262, dated November 19, 1889.

Application filed May 14, 1889. Serial No. 310,688. (No model.)

To all whom it may concern:

Be it known that I, JEAN A. WETMORE, of New York, in the State of New York, have invented certain new and useful Improvements in Insulated Electrical Conductors, of which the following is a specification.

My invention relates to that class of cables or conductors in which an insulated conductor or assemblage of conductors is covered with an exterior metal sheath to protect the insulation. In my improved cable I use for the sheath a metal which is less liable to oxidize or deteriorate than those in common use when laid underground or in subways, and I preferably make the metal relatively thin, as it is intended to protect the insulation from chemical decomposition and disintegration rather than from mechanical injury. I may, if desired, inclose the metal sheath within a wrapping or cover of some suitable material to protect it from mechanical injury. Preferably the metal sheath is applied in the form of a ribbon, and preferably longitudinally, and the invention is in part limited to a sheath applied in that way, though the metal strip may be applied spirally and manipulated or treated in the same manner as the longitudinal strip, as hereinafter described.

In my improved insulated conductor the metal sheath, being of light ductile metal, is formed with a slack portion or plait, running lengthwise of the conductor or lengthwise of the ribbon, to permit expansion of the sheath as the wire or cable is bent in handling.

In the accompanying drawings, Figure 1 is a perspective view showing a single central conductor, a coating of insulating material, and the metal sheath with its soldered edges projecting radially therefrom; Fig. 2, a view of the same conductor with the projecting edges of the metal sheath turned down and conformed to the surface of the sheath; Fig. 3, a view showing the edges of the metal sheath joined as in Fig. 1 and a longitudinal plait in the sheath on the opposite side; Fig. 4, a similar view showing the edges of the sheath merely overlapping and soldered and a longitudinal plait formed in the sheath on the opposite side of the wire; Fig. 5, a similar view showing the edges of the metal sheath abutted and soldered. Fig. 6 shows a conductor in which the thin metal sheath is covered for protection from mechanical injury. Fig. 7 illustrates a conductor in which the insulating material is applied in the same manner as the longitudinal strip, the abutting edges of the insulating material being indicated by the rib just under the longitudinal joint of the sheath, which may be formed as shown in Fig. 2. Fig. 8 shows a cable with the insulation conforming to the outer wires, so as to give a fluted or ribbed surface, over which is the thin sheet-metal sheath.

A indicates the conductor, surrounded by insulating material B, and C shows the metal sheath—such, for instance, as tin—which has been rolled quite thin, and thereby rendered very ductile. It is wider than is necessary to completely envelop the insulated conductor, and it is closely conformed to and envelops the insulation. The surplusage *c* projects radially from the conductor in the form of flanges lapping and abutting against each other. At their edges, or thereabout, they may be soldered or otherwise united, and may then be turned down to conform to the circular contour of the cable, as shown in Fig. 2. This form of sheath affords a means for lateral expansion of the thin metal when the cable is bent or twisted.

In Fig. 4 I have shown the edges of the metal ribbon overlapped and soldered or otherwise secured. In this case I form a longitudinal plait *d* in the body of the ribbon, for the purpose described; or, as shown in Fig. 3, I may form the joint of the sheath as in Fig. 2, and also provide the plait *d;* or, as indicated in Fig. 5, the edges of the metal sheath may be abutted and soldered.

In manufacturing some kinds of insulated conductors—such, for instance, as the "okonite"—the insulating material is applied in the form of a longitudinal strip, its edges being abutted and pinched together, so that in the finished conductor there is a longitudinal rib in the insulation. In Fig. 7, *e* indicates such a rib, occurring at the sheath-joint *c*, and it may be assumed in this case that the insulation and metal ribbon have been applied at the same time. Of course the longitudinal rib *e* might be located at another point and the metal ribbon applied after the insulation, or more than one such rib in the insulation might be provided. The insula-

tion, being of an elastic character, yields and permits the metal sheath to expand or give in the bending of the conductor.

In Fig. 8 a cable is shown having a number of ribs or projections *e* in the insulation. The thin metal sheath may be conformed to the ribbed surface of the insulation, and consequently when the cable is bent the sheath will expand, the thin metal rising from the depressions between the ribs. Over the metal sheath, which is relatively thin and of the character described, I preferably place a protecting cover or wrapping *f*, Fig. 6, of any suitable character, to protect the metal from mechanical injury. For this purpose an ordinary fibrous covering will answer.

In all the views the joint soldering and plait have been exaggerated to increase the clearness of the drawings.

In practice there will be practically no unevenness or projections on the exterior surface of the sheath.

I claim as my invention—

1. The combination, with an insulated conductor, of an enveloping-sheath applied in the form of a ribbon having its edges united to form a longitudinal slack portion.

2. The combination, with an insulated conductor, of an enveloping metallic sheath applied in the form of a ribbon having its faces near the edges *c* lapping and abutting, the lapping edges being bent or turned down to conform to the exterior of the sheath.

3. The combination, with an insulated conductor having a longitudinal ridge *e* formed on the insulating material, of an enveloping-sheath applied in the form of a strip or ribbon having its faces near the edges lapping and abutting, the lapping edges being turned down to conform to the exterior of the sheath.

4. The combination, with an insulated conductor, of an enveloping metallic sheath having a plait or slack portion *d*, substantially as and for the purpose specified.

5. The combination, with an insulated conductor, of an enveloping metallic sheath applied in the form of a ribbon and having its edges *c* extending from the body of the sheath, soldered together and turned down upon the body of the sheath.

6. The combination, with an insulated conductor, of an enveloping metallic sheath having lapping edges secured together, and a longitudinal plait or slack portion, for the purpose specified.

7. A conductor or conductors, the longitudinally-ribbed covering or mass of insulating material inclosing the same, and the metallic sheath applied around the longitudinally-ribbed mass of insulating material and conformed thereto, said sheath forming an annular envelope, substantially as set forth.

In testimony whereof I have hereunto subscribed my name.

JEAN A. WETMORE.

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