(No Model.)

H. B. COBB.

ELECTRIC CONDUCTOR.

No. 429,305. Patented June 3, 1890.

Fig. 2.

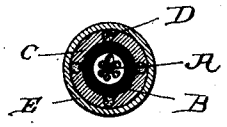


Fig. 1.

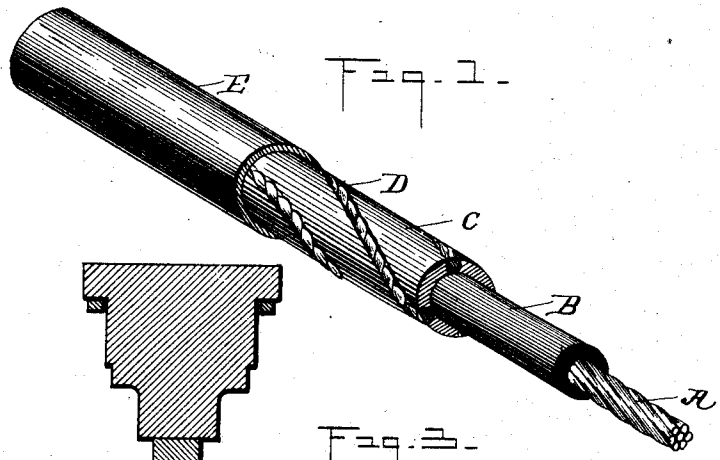
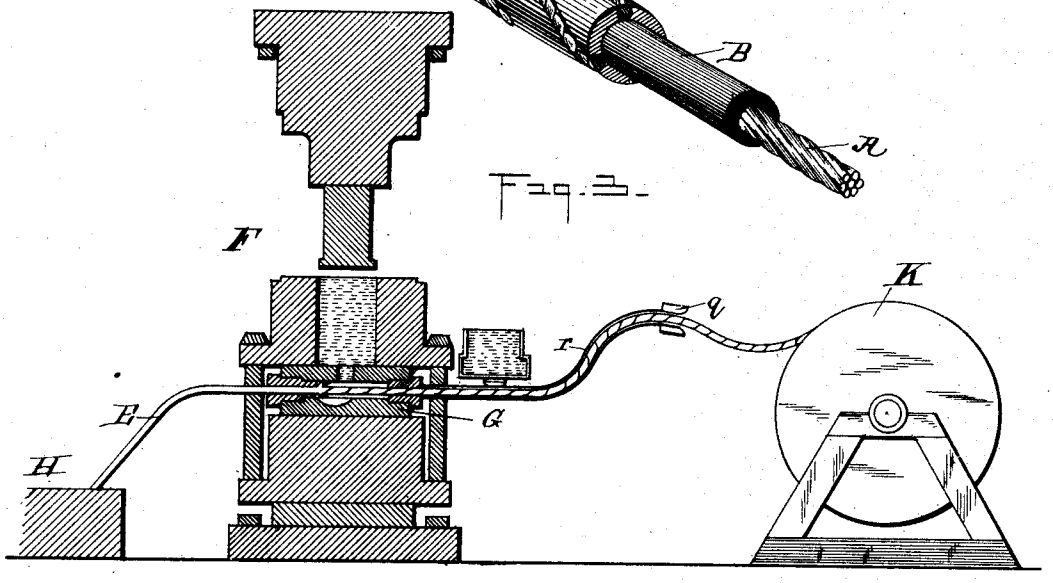


Fig. 3.



WITNESSES:

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HENRY B. COBB, OF WILMINGTON, DELAWARE, ASSIGNOR TO THE COBB VULCANITE WIRE COMPANY, OF DELAWARE.

ELECTRIC CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 429,305, dated June 3, 1890.

Application filed November 8, 1889. Serial No. 329,617. (No model.)

To all whom it may concern:

Be it known that I, HENRY B. COBB, a citizen of the United States, residing at Wilmington, in the county of New Castle and State of Delaware, have invented a new and useful Improvement in Electric Conductors and the Method of Manufacturing the Same, of which the following is a specification.

My invention relates particularly to conductors of the class employed in electric underground systems, and especially to the kind of conductors involving a metal-covered tube of hard insulating material inclosing the conducting-wire.

One object of my present improvement is to reduce to the minimum the tendency to condensation between the conducting-wire and its immediately inclosing insulation and the resulting tendency to static discharges, which perforate and thus injure the insulation, thereby to enable the conductor to carry a comparatively high voltage. This object I attain by my construction, which involves the separation of the metallic covering from the conducting-wire to a considerable extent without thereby increasing the thickness of the intervening hard insulation, which would entail proportionate expense in the manufacture and impair the desired degree of flexibility of the conductor.

A further object is to repair automatically any flaws that may exist originally in the hard insulating-tubing, and also that may, notwithstanding the reduced liability thereto, be produced by static discharges; and still further objects are to provide a generally improved construction of metal-covered insulated wire.

In the accompanying drawings, Figure 1 is a view in perspective of my improved conductor having sections of different parts removed to display the parts they envelop; Fig. 2, an end view of the same; and Fig. 3 a view in the nature of a diagram, illustrative of the manner of procedure in manufacturing the conductor.

The conductor comprises a wire A, enveloped in insulating material B, which must be hard in the sense that it shall resist impression and consequent attenuation by the weight of the inclosed wire, and is preferably in the form of a hard-rubber tube. The tube B is wound spirally throughout with cords D, (cotton,) previously soaked in an insulating substance, (melted paraffine,) and which thus serve to center the subsequently-applied coverings of insulating material C and metal E—an important matter, since thereby these coverings are equidistant from the wire throughout. The insulating-coating C, which fills the space between the external metal (preferably lead) covering E, is of the nature of so-called "soft" insulation, meaning thereby a substance that is readily reducible to a fluid condition, as by heating it, and hardens with exposure, paraffine being the substance which I prefer to employ.

To manufacture my improved conductor I proceed as follows, employing a lead-press F, Fig. 3, that shown being of well-known construction, and therefore not requiring to be illustrated and explained in detail. From one side of the die-chamber G of the press a curved guide-tube *r* is extended, communicating with the chamber at a point coincident with the die it contains. The tube *r* should be provided at its outer extremity with an enlargement *q* in the form of a button surrounding it. At the opposite side of the press, adjacent to the outlet-opening from the lead-chamber, is a trough H, through which cold water is caused to flow. Supported on the guide-tube *r* is a cup communicating controllably through its bottom with the interior of the guide-tube, and which contains the charge of the soft insulating substance (paraffine) in a molten or fluid condition. A reel K, having wire A inclosed in its insulation B, which is wound spirally with the cord D, is stationed in desired proximity to the lead-press. One end of the coil on the reel is passed into the end of the tube *r*, and through the latter into the lead-chamber, the supply of paraffine in the cup being permitted to run into the tube, and thus around the inserted conductor, which is drawn through the lead-chamber and emerges therefrom coated equally throughout with the paraffine, which coating is covered by an armor of lead of equal thickness throughout, the two applications being thus produced in a single operation. As the product emerges

from the press, it is lead into the trough and therein cooled with water, being thence guided to a reel, (not shown,) upon which it is wound. The operation of the procedure thus described, whereby the result set forth is obtained, is, as it appears, that the lead covering on the tubing B is first formed in the usual manner of operation of a lead-press, which draws through it the material being metal-coated, and as the metal covering is formed the paraffine flows (from the elevated supply in the cup) into it, being the more effectually impelled by the drawing action of the spirally-wound cords. When the product emerges from the press and is cooled, the paraffine becomes set by hardening. A conductor thus constructed possesses insulating qualities in a very high degree, and has the metal covering E so far removed from the wire, and by means of a comparatively inexpensive medium (paraffine) for increasing the thickness of its insulation, that liability to static discharges is greatly diminished. Should the tubing B originally contain any flaws, (perforations,) they will be filled by the paraffine in the passage of the insulated wire to the lead-press.

In the use of the conductor any perforation in the tubing B produced by static discharges will immediately be filled by the soft insulation C, which, being melted by the heat of the discharge, will flow into the perforation. Thus the injury is repaired practically as soon as it occurs, and automatically, and the conductor is thereby rendered the more durable. Furthermore, the desired normal degree of flexibility of the product is not impaired.

A very good conductor is afforded without the paraffine or any insulation but air and the cord D between the tube B and metal E, and I desire to include such construction as within my invention.

I do not herein make claim to the method of procedure above described, it being my intention to secure protection in my preferred method by a separate patent for which I am about to make application.

What I claim as new, and desire to secure by Letters Patent, is—

1. A metal-coated insulated conductor, comprising wire A, inclosed in the hard-rubber tube B, the latter inclosed in a molded covering E of metal, and an intervening soft insulating material C, presenting a continuous filling between the tube B and covering E, substantially as described.

2. A metal-coated insulated conductor, comprising wire A, inclosed in the hard-rubber tube B, wound spirally with cord D and inclosed in a molded covering E of metal, and an intervening soft insulating material C, presenting a continuous filling between the tube B and covering E, substantially as described.

3. A metal-coated insulated conductor, comprising wire A in hard-rubber tubing B, inclosed in a molded covering E of lead, and an intervening continuous filling of paraffine C between the lead and the hard-rubber tube, substantially as described.

4. A metal-coated insulated conductor, comprising wire A in hard-rubber tubing B, wound spirally with cord D and inclosed in a molded covering E of lead, and an intervening continuous filling of paraffine C between the lead and the hard-rubber tube, substantially as described.

5. A metal-coated insulated conductor, comprising wire A in hard-rubber tubing B, wound spirally with cord D and inclosed in a molded covering E of lead, substantially as described.

In witness whereof I have hereunto subscribed my name in the presence of two witnesses.

HENRY B. COBB.

Witnesses:
DOUGLAS DYRENFORTH,
BRUCE S. ELLIOTT.