

(No Model.)

W. W. JACQUES.
ELECTRIC CABLE.

No. 270,438.

Patented Jan. 9, 1883.

Fig. 1.

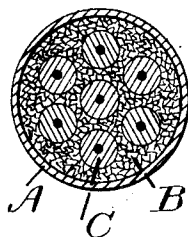


Fig. 2.

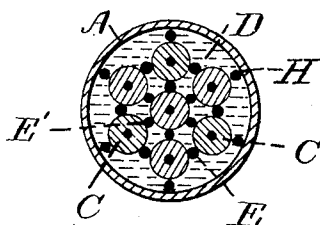
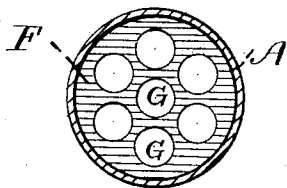


Fig. 3.



Attest.

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UNITED STATES PATENT OFFICE.

WILLIAM W. JACQUES, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE
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ELECTRIC CABLE.

SPECIFICATION forming part of Letters Patent No. 270,438, dated January 9, 1883.

Application filed September 24, 1881. (No model.)

To all whom it may concern:

Be it known that I, WM. W. JACQUES, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Electric Cables, of which the following is a specification.

My invention relates to electric cables of that class in which several independent conductors insulated from one another are included in a single cable, which may or may not be armored. Its objects are, first, the more effectual neutralization or prevention of induced or disturbing electrical currents, and, second, to provide a means for keeping the insulated conductors of a subaqueous cable separate from one another, which shall at the same time allow water to circulate freely between and around the conductors separated when the cable is laid.

In a former invention, for which I have obtained Letters Patent No. 239,506, and dated March 29, 1881, I have shown and described a cable devised and constructed for the prevention of induction. In the cable therein described insulated wires are drawn loosely into a pipe and the interstices between the insulated conductors are filled with a conducting liquid—such as salt-water—or a mobile solid, as metallic filings. I have also stated in the same specification that, in case the cable is to be used under water, the insulated conductors, suitably connected together, may be surrounded with a sheath of iron or other suitable material, arranged to allow the water to enter and completely surround each of the said conductors, so as to prevent any inductive action of one wire upon the others.

My present invention consists, then, in the use of specific modes of arranging the insulated conductors so that they may be kept separate from one another, and in either filling the spaces or interstices between the conductors so kept apart by spongy or fibrous material which, when the cable is laid, will be thoroughly permeated by the water, and will allow the insulated conductors to be completely surrounded by the said water, or in leaving the interstices or spaces unfilled and permitting the water to circulate freely and without any mediatorial appliance around the conductors.

By so constructing a cable inductive disturbances are totally eliminated, and each separate conductor is maintained free from interference from its neighboring conductors.

The drawings show cross-sections of three different forms of cable embodying my invention.

Figure 1 shows an armored cable comprising seven insulated conducting-wires embedded in and separated from one another by a mass or a conglomeration of layers of sponge. Fig. 2 shows a similar cable in which the space between the armor and the cable is left vacant and the several conductors are separated by large wires laid in between each conductor and its nearest neighboring conductor. Fig. 3 shows an alternative form of construction wherein the different conductors are maintained at a suitable distance apart by disks placed at short intervals. In each figure it will be observed that the same conception is illustrated and the same purpose is aimed at—namely, the proper separation of the insulated conductors by a method which shall not interfere with the free access of water thereto.

In the construction of such a subaqueous cable as shown in Fig. 1, I wind each conductor C, previously insulated by any of the well-known methods, loosely with untwisted hemp, asbestos having long fiber, or I cover each conductor with sponge or any spongy material, B, if preferred, binding these materials on each separate conductor loosely with fine wire, so that when the desired number of conductors are laid together each shall be separated from the other by a mass of material which, while possessing sufficient substance and solidity to keep the conductors apart, shall not be impervious to water, but shall be susceptible to rapid and perfect saturation therewith. The cable thus formed is then preferably covered with a protective armor of wire, A, laid on in such a manner as to allow the water to pass freely through it for the purpose of permeating the spongy material hereinbefore described.

The cable-section illustrated by Fig. 2 differs from the preceding, in that no material of a porous or spongy nature is employed to surround the conductors. In this case the con-

ductors C, insulated as before, are separated by large wires E E', laid in between them, which hold them apart so that they can be completely surrounded by water D as soon as submersion takes place. These wires may all be straight, or may be arranged spirally about the insulated conductors. Other large wires may be arranged between the insulated conductors and the armor A, and if found convenient the whole may be cabled together. It will be seen that the water D fills up all the intermediate spaces, flowing in between the interstices of the armor A. Another method is to arrange a series of pierced disks, F, Fig. 3, at short distances apart, and run the insulated conductors through them. This, while holding the conductors together, serves also to maintain them at the proper distance from one another.

I may in any of the hereinbefore-described methods of construction, after bunching the several conducting wires loosely together, leave them without other protection, or armor them with galvanized wire or other suitable material, or draw them into pipes. If I employ

pipes, they must be perforated, so that the water may be freely admitted.

I claim as of my invention—

1. An electric cable comprising an outer covering or armor having openings through which water can freely pass, and a series of insulated conductors separated and held apart throughout their entire length by means such as described, which will permit a free circulation of the water around and between the several conductors, substantially as set forth.

2. In an electric cable, a series of independent conductors insulated with water-proof material, said conductors being separated and held apart by means of a filling of spongy or fibrous material or the specified equivalent therefor, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 20th day of September, 1881.

W. W. JACQUES.

Witnesses:

GEO. WILLIS PIERCE,
J. H. CHEEVER.