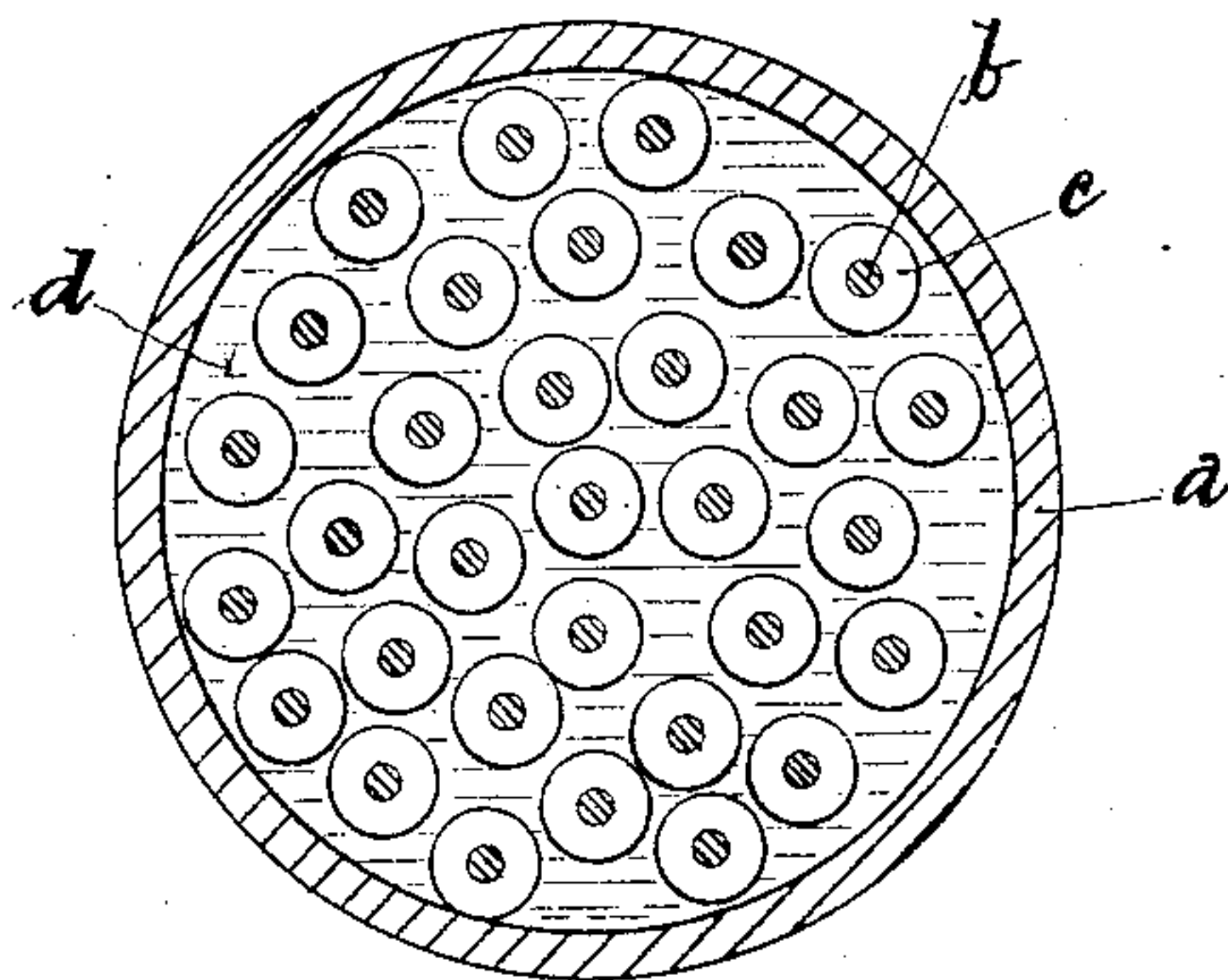


(No Model.)

W. W. JACQUES.
Electric Cable.

No. 239,506.

Patented March 29, 1881.



WITNESSES

Arthur Reynolds
L. F. Connor

INVENTOR

Wm. W. Jacques,
by Crosby Gregory,
Attys.

UNITED STATES PATENT OFFICE.

WILLIAM W. JACQUES, OF BOSTON, MASSACHUSETTS.

ELECTRIC CABLE.

SPECIFICATION forming part of Letters Patent No. 239,506, dated March 29, 1881.

Application filed February 8, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. JACQUES, of Boston, county of Suffolk, State of Massachusetts, have invented Improvements in Electric Cables, of which the following description, in connection with the accompanying drawing, 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, or inclosed in a pipe or protecting covering; and it has for its object to prevent the electric impulses or currents passing over one of the said conductors from producing currents in the other conductors by induction.

In cables of this class the separate conductors have usually been embedded in a mass of insulating material, separating them electrically from one another, but leaving them exposed to the effects produced by induction from one to another, since in this arrangement the adjacent lines form the nearest body of conducting material upon which the currents in a given line can expend their energy.

I have discovered that by inclosing each wire in an independent covering of insulating material, and by surrounding the said covering with a mass of conducting material which is so introduced into the cable as to entirely fill the interstices between the independent insulated conductors, the energy of the electric currents in any one of the said conductors will be expended upon the surrounding mass of conducting material instead of upon the adjacent wires, since the said surrounding mass, although it may be of lower specific conductivity, has a much greater conducting area, and is nearer to each one of the wires than the nearest of its neighboring wires.

My invention consists in filling the spaces between the insulated coatings of a series of independent insulating-conductors with a mass of conducting material, which may be liquid, or consist of evenly-divided and mobile material, such as metal filings or other granular or pulverized conducting material, which may be readily introduced around and between the conductor when inclosed in protecting-tubes, as when laid under ground.

The drawing shows a cross-section of a ca-

ble embodying my invention, which in this instance consists of an underground line of electrical communication containing several independent conductors inclosed in a protecting pipe or tube.

In this construction a line of piping, *a*, is laid under ground, and the independent electrical conductors *b*, each covered with a coating of insulating material, *c*, are bound together to enable them to be all drawn into the pipes *a* at once, and while being so drawn in the fastenings which bound them together are removed, so that the said conductors lie loosely in the pipes, as shown, when they are ready for use. In order to prevent, in accordance with my invention, the induction effects between different insulated conductors *b c*, when thus drawn into the pipe, it is filled with a conducting-liquid, *d*, which may be acidulated water or a strong saline solution or any other liquid of suitable conducting power which will not injure the insulating covering *c* of the wires or the inner surface of the inclosing-tube.

In some instances the cable may be provided with a covering, *a*, of lead tubing or other suitable material in the process of manufacture, in which case the surrounding conducting material *d* need not be liquid, but may consist of metal filings or any other conducting material, which may be made to fill the spaces between the insulating covering *c* of the wires *b*.

In case the cable is to be used under water, the insulated conductors *b c*, suitably collected together, may be surrounded with a sheathing of iron-wire 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.

Solid conductive material may be employed, instead of the liquid *d*, to occupy the space between the insulated conductors *b c*, such material being made to fill the interstices in the process of making the cable, or being introduced into the pipe or inclosing-case *a* in a molten or mobile condition and allowed to solidify therein.

The insulating material *c* and conducting material *d* should be chosen in reference to one another, so that the action of one on the

other may not be injurious. The conducting material *d* in the interstices between the insulated conductors *c* *d* will form a single conductor, which should be connected with the
5 ground from point to point, in order to afford a free passage for the currents induced therein.

I claim—

1. An electric cable comprising an inclosing-tube, and within said tube a series of insulated conductors and conducting material, arranged as described, the said conducting material surrounding insulated conductors and filling the space between them, as set forth.
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2. In an electric cable, a series of independent insulated conductors and an inclosing-tube therefor, combined with mobile or liquid con-
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ducting material within the said inclosing-tube, filling the interstices between the said insulating-conductors, substantially as and for the purpose described. 20

3. In an electric cable, the independent insulated conductors surrounded by mobile or liquid conducting material, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 25

WM. W. JACQUES.

Witnesses:

JOS. P. LIVERMORE,
L. F. CONNOR.