C. E. CHINNOCK.

Electric Conductor.

No. 224,579. Patented Feb. 17, 1880.

Fig. 1.

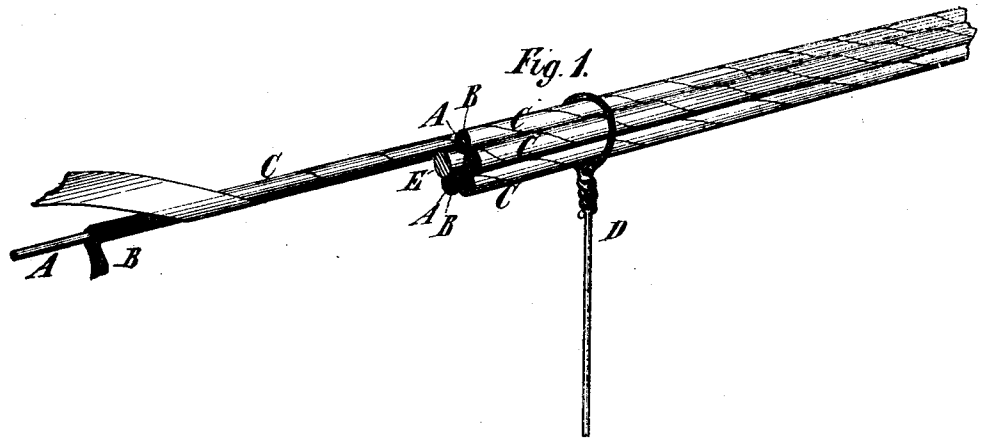


Fig. 2.

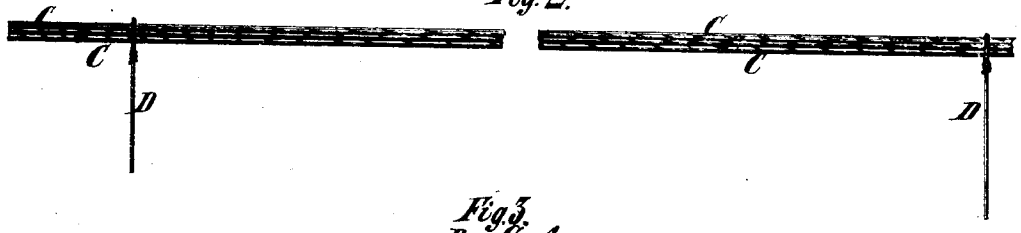


Fig. 3.

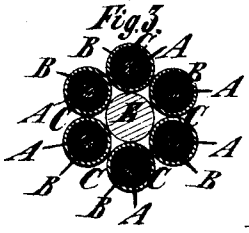
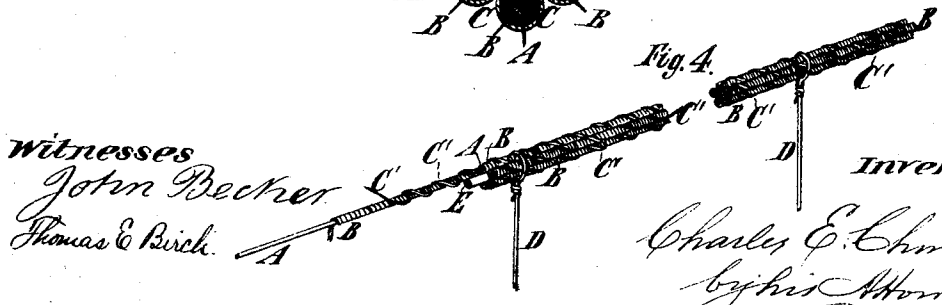


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES E. CHINNOCK, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO JOHN D. HARRISON, OF NEWARK, N. J.

ELECTRIC CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 224,579, dated February 17, 1880.

Application filed November 6, 1879.

To all whom it may concern:

Be it known that I, CHARLES E. CHINNOCK, of Brooklyn, in Kings county, and State of New York, have invented certain new and useful Improvements in Electrical Conductors for Telegraphic and Telephonic and similar Purposes, of which the following is a specification.

My improvements relate particularly to conductors of the kind known as "cables" and composed of a number of wires secured together in a group or bundle, and they are especially applicable to conductors of this kind which are employed in telephones.

The principal object of the improvements is to preclude the transmission of messages from one wire to another in its vicinity and their conveyance thence to any other than their desired destination. A general object of the improvements, however, is to carry off all currents caused by escape or induction from line electric currents, (I mean by this term electric currents designed to be transmitted through wires from one point to another,) and thereby obviate the transmission of messages to any but the proper destination.

To these ends my improvements consist in the combination of an electric line-conductor provided with an insulating-covering and an external electric conductor, and an uninsulated conducting-wire independent of said line-conductor, but in electrical communication with its external electric conductor and in communication with the ground, whereby electric currents caused by escape or induction from an outside source are carried off to the independent conductor and conducted thence to the ground at any suitable point or points.

They also consist in the combination, in an aerial cable, of a group or series of electric line-conductors severally provided with insulating-coverings and external electric conductors in contact with each other, and conductors extending from the said external electric conductors to the ground, whereby the several external electric conductors, being exposed, are easily connected to the ground and aggregate a large conductive surface of little resistance, over which electric currents induced by or escaping from the several line-conductors or any outside source may easily pass off.

They also consist in a group or series of electric line-conductors provided with insulating-coverings, and some or all provided with external electric conductors communicating with an uninsulated conducting-wire independent of them and connected to the ground, whereby a conductor of very little resistance and easily grounded is afforded for carrying off escaping and induced currents.

In the accompanying drawings, Figure 1 is a magnified perspective view of a cable embodying my improvements, one of the wires thereof being extended beyond the others and partially divested of its covering of insulating and casing of conducting material, the better to exhibit my improvement. Fig. 2 is a side view of the cable on a smaller scale. Fig. 3 is a transverse section of the cable on an enlarged scale; and Fig. 4 is a perspective view of a cable of modified form embodying my improvements.

Similar letters of reference designate corresponding parts in all the figures.

As here shown, the cable is especially adapted for aerial use.

A designates a number of line conductors or wires, provided with insulators B, here shown as consisting of coverings of insulating material, and also provided with external conductors, C, consisting of casings of electrical conducting material. The line conductors or wires may be of copper or any other suitable material. Their insulators may be of any suitable kind—such, for instance, as a woven material saturated or impregnated with paraffine and spirally wrapped around the wire; and their external conductors, C, may be of any suitable material—such, for example, as a strip of tin, lead, or other metallic foil spirally wound outside their insulators and incasing them—and form exposed external casings.

The wires A are to be so disposed relatively to each other that their external conductors, C, will be accessible for the attachment of a ground wire or wires, D, in electrical communication with them. These wires are so disposed that their external conductors are in contact and form the exterior of the cable comprising them, and when they are so disposed the ground-wire has only to be wrapped

and fastened around the cable in order to fulfill its functions.

A central wire or core, E, for stiffening and strengthening the cable, may be arranged inside the series or number of wires A, and such core-wire may be made of iron and galvanized. It is an independent uninsulated conducting-wire in electrical communication with the external conductors, C, and, with them, aggregates a conductive surface of little resistance, over which induced and escaping currents may pass to the ground. It may be extended to the ground, so as in some instances to accomplish measurably the objects herein sought of carrying off the escaping and induced currents, and it will perform this for each or any of the line-conductors.

The insulator B of each wire A serves to confine to it the line electric current transmitted through it as far as it is practicable so to do, and this will be the case even though such current be an induced current, as in a telephone. Any electric currents arising through escape from a line-current of a wire are conducted by the external conductors, C, of that wire off through the ground-wires D to the ground. Electric currents arising from induction from a line electric current, because of their excessive tension, pass through the insulator B of the wires in which they are induced into the external conductors, C, and are conducted thence, through the ground-wires D, to the ground. The ground-wires D may be connected with the external conductors, C, at any desirable intervals, and in all cases are to be so arranged that they will intercept induced or escaping currents and prevent them from reaching such parts of the cable as would cause the enunciation of a message carried by the line electric current or lines other than that constituting at the time the line electric wire or conductor.

In Fig. 4 I have shown a cable similar to that I have described, save that the wires A, instead of having their insulators B incased in external conductors, have wires C′ spirally wound around them, with their coils at a considerable distance apart, but still connecting with the ground-wires D.

The incasing external conductors may be preferable on account of their protecting the insulators from evaporation or wetting.

If desirable, only alternate wires A may be provided with the external conductors, C or C′, when all are arranged in contact with each other or with an independent conductor.

Thus, in a telephone, electric currents induced from the line electric currents, and heretofore the cause of great trouble when a number of wires are grouped together in a cable by transmitting messages where they are not desired to be sent, are conducted away, and the difficulty which formerly has been occasioned by them is avoided.

As my improvements provide for the use of telephone-wires in a cable without the above-referred-to objection in a practical manner and at a comparatively small expense, I am enabled with good results to lay or extend the wires in a very simple, cheap, and efficacious manner.

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

1. The combination of an electric line-conductor provided with an insulating-covering and an external electric conductor, and an uninsulated conducting-wire independent of said line-conductor, but in electrical communication with its external electric conductor and in communication with the ground, substantially as and for the purpose specified.

2. The combination, in an aerial cable, of a group or series of electric line-conductors severally provided with insulating-coverings and external electric conductors in contact with each other, and conductors extending from said external electric conductors to the ground, substantially as and for the purpose specified.

3. A group or series of electric line-conductors provided with insulating-coverings, and some or all provided with external electric conductors communicating with an uninsulated conducting-wire independent of them and connected to the ground, substantially as and for the purpose specified.

C. E. CHINNOCK.

Witnesses:
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