

C. E. WILSON.
ELECTRIC CABLE.
APPLICATION FILED APR. 8, 1903.

FIG. I.

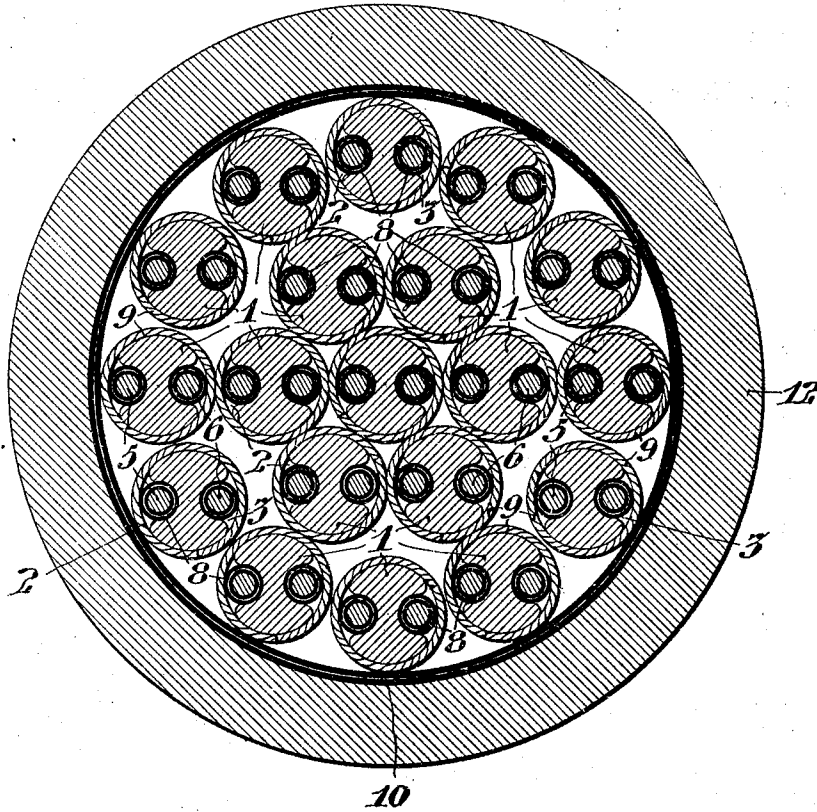


FIG. II.

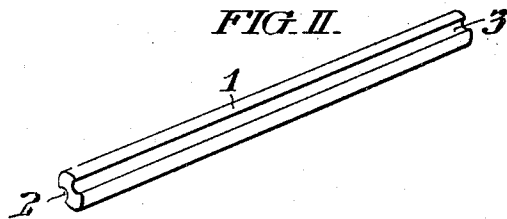
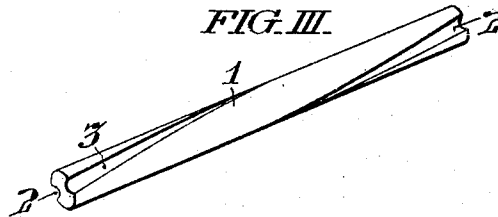


FIG. III.



WITNESSES:

Arthur E. Paige
James H. Bell

INVENTOR:

Charles E. Wilson
by his Attorneys
Tracy & Rupp

UNITED STATES PATENT OFFICE.

CHARLES E. WILSON, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC CABLE.

No. 796,100.

Specification of Letters Patent.

Patented Aug. 1, 1905.

Application filed April 8, 1903. Serial No. 151,688.

To all whom it may concern:

Be it known that I, CHARLES E. WILSON, a citizen of the United States, residing at No. 1010 South Forty-sixth street, in the city of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Cables, of which the following is a specification, reference being had to the accompanying drawings.

It is the object of my invention to increase the efficiency of an electrical cable to transmit wave-currents—as, for example, voice-currents ordinarily used in telephony. Efforts have been made to accomplish this result in long telephone-lines by placing induction-coils at intervals along the line of a conductor, thus interposing a fixed amount of inductance, and in doing this the induction-coils have been placed at recurring intervals, having relation to the approximate wave lengths to be transmitted. I find that this end may be more satisfactorily accomplished by the means which I will describe, which consist briefly in associating with a line-wire a magnetically-permeable medium, such as soft iron, throughout its length. I believe that this produces the desired result by augmenting the inductance of the line throughout its length; but other reasons may also account for the effect produced. Thus I find that the association of a piece of soft iron with the line conductor in the relation to it which I am about to describe appreciably decreases its electrostatic capacity. I may here suggest that mechanically it is preferable that any means for producing inductance or the like in a line conductor should be substantially evenly distributed and equally active along the length of the line instead of being placed at intervals therealong. In submarine-work the production of a cable having induction-coils interposed at intervals is exceedingly difficult, if not impossible. In land conductors great difficulty is experienced from the effects of lightning when induction-coils are interspersed at intervals along the line. It will therefore be understood that the object of my invention is to construct a line conductor having the means of inductance distributed along its length, whereby the impairment of transmission by wave distortion is minimized.

As hereinafter described my improvements comprise the combination, with a pair of metallic wires arranged to conduct currents in

respectively opposite directions, of a magnetizable core-wire interposed between the line-wires in such relation thereto as to have magnetic poles at right angles to the direction of the line and coextensive therewith.

In the accompanying drawings, Figure 1 is a cross-sectional view of a cable comprising a plurality of pairs of lines arranged in accordance with my invention. Fig. 2 is a perspective view of a core-wire having straight channels. Fig. 3 is a perspective view showing a core-wire having spiral channels.

In said figures, 1 is the core-wire, preferably made of soft iron and provided with longitudinal channels 2 3 upon its opposite sides to receive the respective line-wires 5 6, designed to transmit currents in respectively opposite directions. Each of said wires 5 6 is provided with a dielectric covering 8, and each pair with its core 1 is inclosed by a dielectric covering 9, conveniently consisting of tightly-wrapped cord.

The nineteen pairs of wires comprised in the cable shown in Fig. 1 are inclosed by a dielectric covering 10, conveniently formed of reverse layers of paper, and the latter is inclosed in the metallic sheath 12, conveniently formed of lead.

As shown in Fig. 2, the channels 2 3 in the opposite sides of the core-wire 1 are parallel with the axis of the latter. However, I find it convenient to twist the core-wire 1, as indicated in Fig. 3, so that the channels 2 3 make a complete revolution with respect to the axis of the wire in each extent of the latter equal to approximately twenty times its diameter.

Although I prefer to employ soft iron as the medium to enhance the inductance of the circuit and to arrange the same between two copper line-wires characterized by currents opposed in direction, it is to be understood that I do not desire to limit myself to such material or arrangement, as it is obvious that distributed inductive effects in a line-wire may be produced in accordance with my invention by material which is less magnetically permeable than soft iron and without the immediate presence of a second line-wire. Likewise it is to be understood that I do not desire to limit myself to the particular proportions or cross-sectional shape of the core which I have shown, as a circuit may be tuned for different frequencies of vibration by variation in the relative arrangement or cross-sectional area of the core. Likewise my invention is

applicable to multiconductor-cables used in multiphase electrical transmission.

Having thus described my invention, I claim—

1. In a telephone-cable, the combination with a plurality of line-wires energized by currents opposite in direction; of a core of magnetizable material embraced by said wires and manifesting magnetic poles, of opposite polarity at its opposite sides, at right angles to the direction of and coextensive with its length; and, means insulating said wires from said core, substantially as set forth.

2. In an electric cable, the combination with a line-wire, of a magnetically-permeable medium associated therewith, having poles of opposite polarity at its opposite sides, coextensive with its length and at right angles to the direction of the length of the line; whereby the self-induction of the line is augmented throughout its length, substantially as set forth.

3. In an electric cable, the combination with a pair of line-wires; of a magnetically-permeable core-wire parallel with and disposed between said line-wires; said core having poles of opposite polarity at its opposite sides, at

right angles to the direction of the length of the line, substantially as set forth.

4. In an electric cable, the combination with a pair of line-wires; of a dielectric covering for each of said wires; and, a magnetically-permeable core parallel with and disposed between said line-wires; said core having longitudinal channels in which said wires are laid, and having poles of opposite polarity at its opposite sides, at right angles to the direction of the length of the line, substantially as set forth.

5. In an electric cable, the combination with a plurality of line-wires; of a magnetizable core-wire, disposed between and parallel with said line-wires; said core manifesting magnetic poles of opposite polarity at its opposite sides, at right angles to and extending spirally in the direction of its length, substantially as set forth.

In testimony whereof I have signed my name to this specification, this 3d day of April, 1903, in the presence of two subscribing witnesses.

CHARLES E. WILSON.

Witnesses:

JAMES H. BELL,

C. BRADFORD FRALEY.