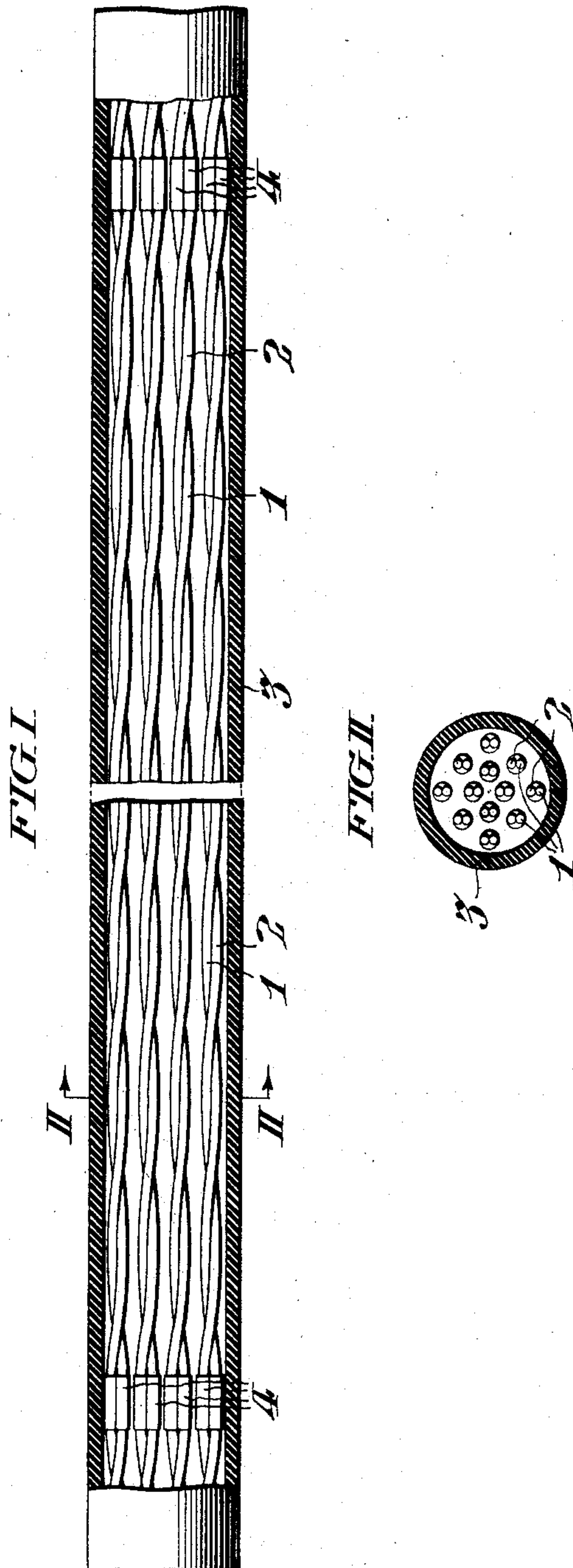


No. 886,566.

PATENTED MAY 5, 1908.

C. E. WILSON.  
ELECTRIC CABLE.

APPLICATION FILED JULY 13, 1905.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

CHARLES E. WILSON, OF PHILADELPHIA, PENNSYLVANIA.

## ELECTRIC CABLE.

No. 886,566.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed July 13, 1905. Serial No. 269,443.

*To all whom it may concern:*

Be it known that I, CHARLES E. WILSON, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Electric Cables, whereof the following is a specification, reference being had to the accompanying drawings.

It is the object of my invention to increase the efficiency of electric cables 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 inductance coils at intervals along the line of the conductor, thus interposing a fixed amount of inductance, at recurring intervals having relation to the approximate wave lengths to be transmitted. I have found that this end may be more satisfactorily accomplished by the means which I will describe, which consists briefly in making the conductor of successive lengths of electrically conductive materials which differ in their magnetic permeability, as for example successive lengths of iron and copper wire. In the case of a metallic telephone circuit, I employ paired conductors of such differing materials (say iron and copper) with reversal of the material at intervals having relation to the approximate wave lengths to be transmitted.

In the accompanying drawings, Figure I, is a diagrammatic longitudinal partial section, with a central portion broken away, of a cable illustrating my invention. Fig. II, is a cross section of the same, taken on the line II, II, in Fig. I.

The cable which I have shown is made up of twelve similar pairs, each pair being composed of a copper wire 1, and an iron wire 2, twisted together after the ordinary practice of telephone cable construction. Each wire is separately wrapped in a suitable way to insure its insulation. The iron and copper wires may be of the same diameter. Thus I find that for telephonic purposes a satisfactory cable embodying my invention may be constructed by employing a copper-iron pair, each of which consists of No. 19 B. & S. gage double wrapped paper insulated wire. The cable shown in the drawings consists of twelve pairs of wire of this construction, the pairs being illustrated as unduly separated for the purpose of clearness of illustration. The pairs should be wrapped in reverse layers (not shown in the drawings), and the en-

tire cable provided with an insulating covering 3.

For the purpose of carrying out my invention a reversal of the material is made in each pair at intervals having relation to the average wave lengths to be transmitted. For this purpose the iron-copper pair is cut at the proper place and the ends reversed and spliced together, that is to say, the copper wire is spliced to the iron wire and vice versa. At the points of splicing, the wires may be covered by paper sleeves 4, for insulating purposes.

It will be understood that the intervals at which this splicing is performed for the purpose of reversal of the material, are recurrent along the length of each pair. The length of the intervals may vary much according to circumstances. I have found that for the purpose of ordinary telephonic voice currents, a reversal at recurring intervals of about 500 feet, produces satisfactory results.

A result of my construction is to create within the cable, the required inductance, with an accompanying increase in the facility with which the cable transmits the current for long distances.

It is of course much preferable mechanically that any means for producing inductance 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 inductance coils interposed at intervals is exceedingly difficult if not impossible. In terrestrial conductors great difficulty is experienced from the effects of lightning when inductance coils are interspersed at intervals along the line.

In my invention the line conductor is provided with the required means of inductance distributed along its length and thereby impairment of transmission by wave distortion is minimized.

Having thus described my invention, I claim:—

1. In an electrical cable, a plurality of wires each composed of successive lengths of electrically conductive materials differing in their magnetic permeability, with alternation of said materials in opposed portions of associated wires, said wires being twisted together.

2. In an electrical cable, an electrical con-



ductor composed of alternating lengths of electrically conductive materials differing in their magnetic permeability, said alternations having relation to the approximate  
5 wave lengths of the currents to be transmitted.

3. In an electrical cable, a pair of line wires forming a complete electrical circuit, of which one wire is composed of materials differing in their magnetic permeability from  
10 the other wire, with reversal of said materials at recurring intervals along the length of the cable, said pair of wires being twisted together.

15 4. In an electrical cable, a pair of line wires forming a complete electrical circuit, of which one wire is composed of materials differing in their magnetic permeability from the other wire with reversal of said materials

at intervals recurring along the length of the cable in definite relation to the approximate wave lengths of the currents to be transmitted, said pair of wires being twisted together. 20

5. In an electrical cable, a pair of line wires energized by current opposite in direction and composed one wire of copper and one wire of iron, with reversal of the material at intervals having relation to the wave lengths of the currents to be transmitted, said pair of wires being twisted together. 25 30

In witness whereof, I have hereunto signed my name, at Philadelphia, Pennsylvania, this 11th day of July 1905.

CHARLES E. WILSON.

Witnesses:

JAMES H. BELL,  
E. L. FULLERTON.