

No. 615,349.

Patented Dec. 6, 1898.

S. D. FIELD.
ELECTRIC CABLE CONDUCTOR.

(Application filed Dec. 24, 1897.)

(No Model.)

Fig. 1.

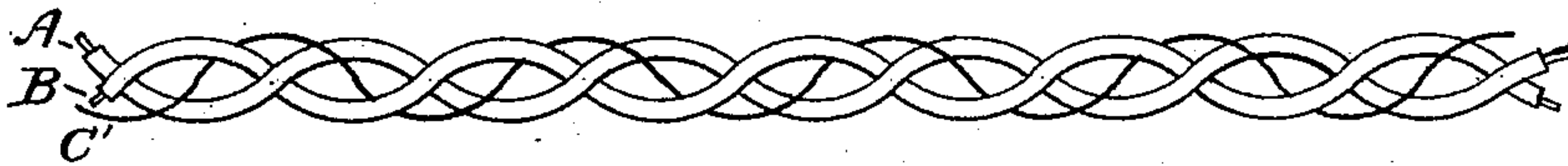


Fig. 2.

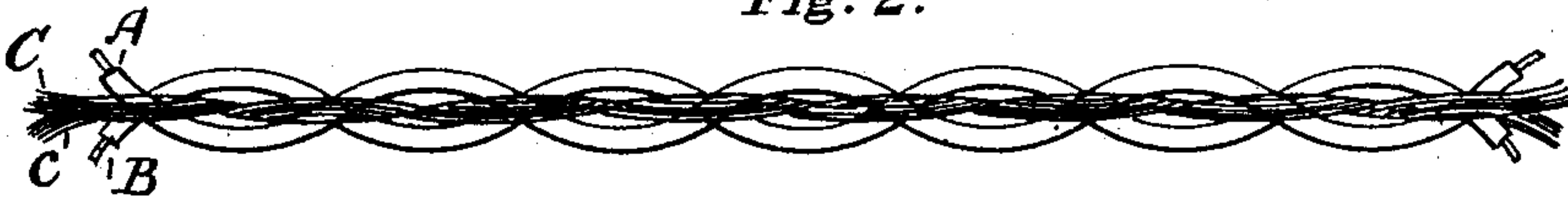


Fig. 3.

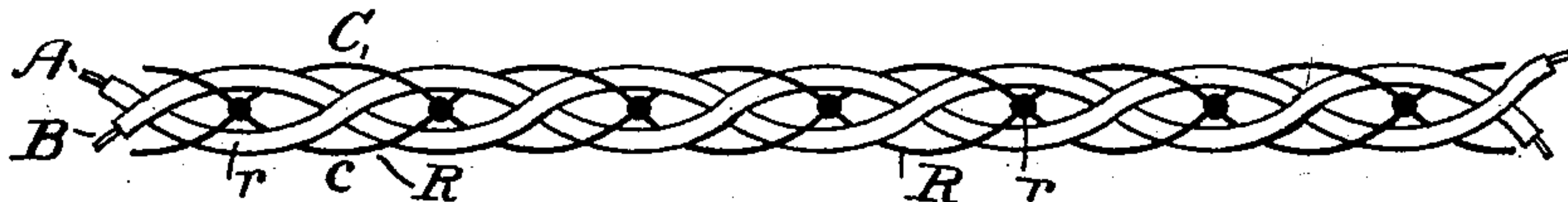


Fig. 4.



Fig. 5.

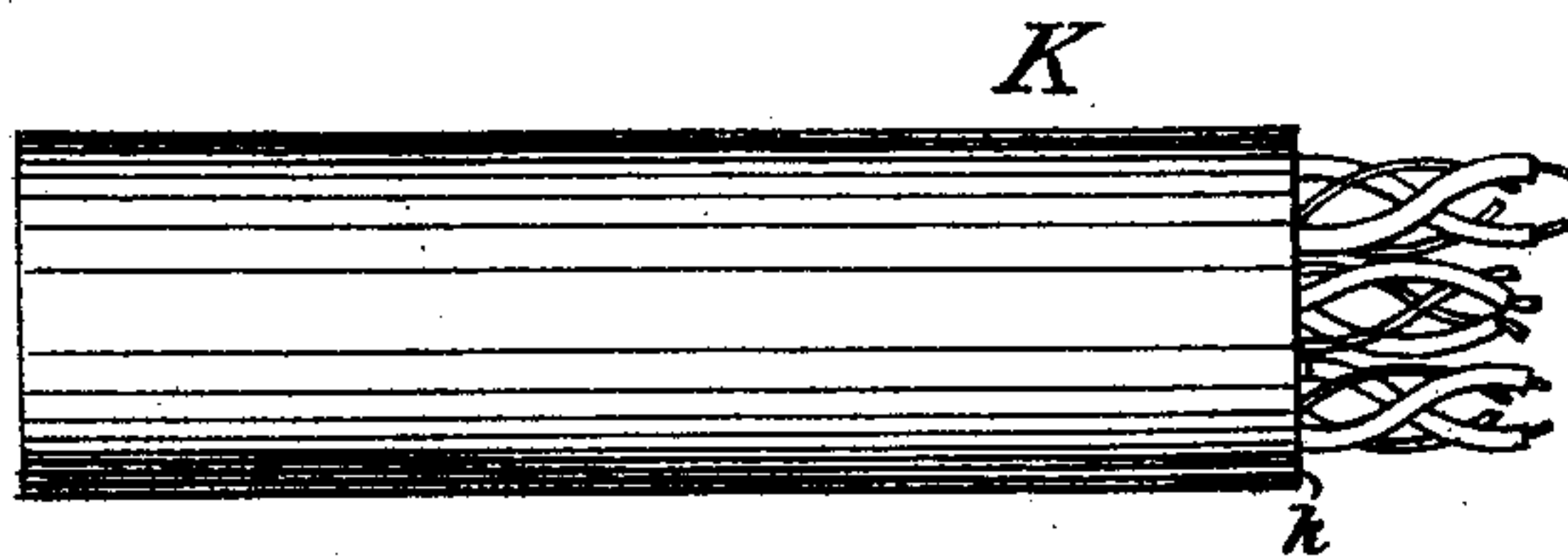
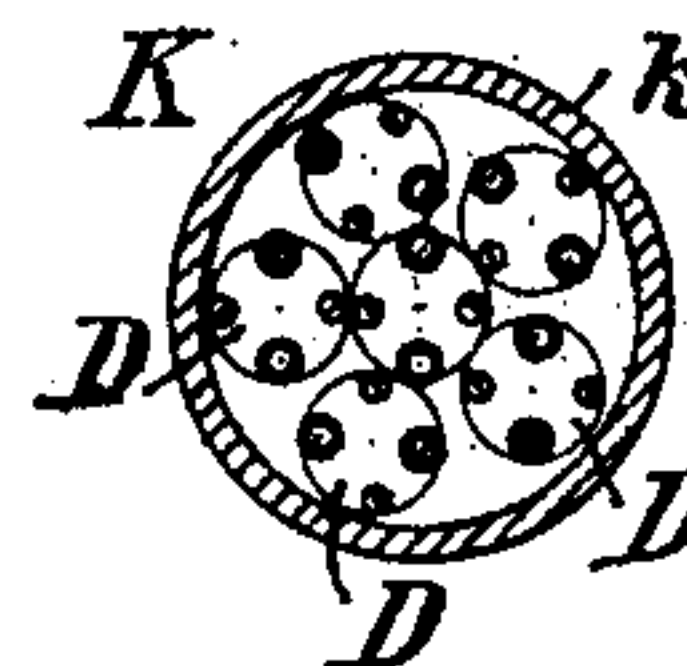


Fig. 6.



Attest.

Inventor,

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Stephen Dudley Field

UNITED STATES PATENT OFFICE.

STEPHEN DUDLEY FIELD, OF STOCKBRIDGE, MASSACHUSETTS, ASSIGNOR
TO THE AMERICAN BELL TELEPHONE COMPANY, OF BOSTON, MASSACHUSETTS.

ELECTRIC-CABLE CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 615,349, dated December 6, 1898.

Application filed December 24, 1897. Serial No. 663,370. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN DUDLEY FIELD, residing at Stockbridge, in the county of Berkshire and State of Massachusetts, have
5 invented certain Improvements in Electric-Cable Conductors, of which the following is a specification.

My invention relates to electric-cable conductors, and particularly to those of that class
10 which are employed in and arranged and adapted for the conduction of rapidly-varying current impulses—such, for example, as are concerned in the operation of the electric speaking-telephone. Its object is to facilitate
15 the passage of such rapidly-varying current impulses without distortion and generally to produce the signals or reproduce the message at the receiving-station with maximum volume and distinctness and without distortion.
20 In pursuance of this object the invention consists in a cable-conductor formed by combining the insulated wire or wires of the electrical circuit with one or more soft-iron companion wires or rods, the said circuit-wires of
25 each circuit being interbraided, interwoven, or interlaced with its accompanying iron wire, wires, or strands. I have experimentally found that by employing cable-conductors thus constructed and arranged the retarding and
30 and distorting effects of electrostatic induction are largely, if not wholly, remedied—an advantageous result which, keeping in mind the well-known fact frequently made available in practice that the adverse effects of
35 either self-induction or electrostatic induction in a circuit may be compensated by arranging organizations adapted to introduce the other to an appropriate extent, I attribute to the magnetic changes of the iron wire
40 caused by the varying electromagnetic condition of the electric-circuit conductors and to the reactive influence exercised by such magnetic change upon the said circuit-conductors, the currents conducted thereby, and
45 the tendency to static charge and subsequent discharge found therein.

In the drawings which accompany this specification, Figure 1 represents a section
50 of a twisted metallic-circuit cable-conductor with which a single iron wire is interbraided.

Fig. 2 represents a preferred form of metallic circuit-conductor provided with associate iron wires in accordance with the principles of my invention. Fig. 3 is a simple modification of Fig. 2. Fig. 4 represents a cable-
55 conductor whose electric-circuit wires and iron compensating wires are all intertwisted together; and Figs. 5 and 6 are respectively longitudinal and cross-sectional views of a multicircuit-cable containing circuit-con-
60 ductors in pairs, each pair being, as described herein, associated with its own system of iron wires.

In Fig. 1, A and B represent the two insulated copper conductors of a metallic circuit
65 as a telephone-circuit and are twisted together to form an inductively neutral metallic circuit in the usual way. C is an uncovered soft-iron wire, preferably tinned or bright, interbraided with the said twisted
70 electric wires, so as to form a braided cord of three strands.

Fig. 3 represents a form of my cable-conductor which employs two insulated copper
75 metallic circuit-wires A and B and two bare iron wires C and c. Such a form may be considered as a braid of four members, in which there is a constant succession of iron rings R, united at the points r, through which the insulated copper conductors are threaded.
80 Fig. 2 illustrates a highly practical plan for carrying out this idea and shows the two insulated copper circuit-wires A and B as before, but in this instance associated with two strands of iron wire C and c, each composed
85 of a number of small wires and reciprocally interbraided with the copper wires A B.

In Fig. 4 I show a construction of two insulated copper wires A B, forming the conducting-wires of a metallic circuit, associated,
90 as in Fig. 4, with two iron wires C c, but instead of forming a braid the four wires are twisted into a rope or cord.

A number of such compound cable-conductors of any preferred form, such as that of
95 Fig. 2, may of course be formed into a multicircuit-cable. In Figs. 6 and 7 I have indicated such a cable. K is the cable as a whole, L its inclosing sheath or tube, and D D
100 its compound circuit-conductors, each com-

prising a braid or twist formed of two insulated copper conducting-wires and two strands of iron wire interlaced, interbraided, or intertwisted therewith.

5 Although I have shown Fig. 4 as a special twisted form of cable-conductor in contradistinction to such forms as are braided, I consider braids and twists to be certainly as far as my invention is concerned equivalent and
10 interchangeable forms.

In the several figures no attempt has been made to indicate any particular size or relative proportion of the several wires or to show any symmetry of form, and it will be understood by those skilled in the art that the wires
15 and strands, as shown in the said figures, are shown as being but loosely associated merely to indicate the structural features with greater clearness than would otherwise be possible.

20 I am aware, of course, that heretofore and prior to my invention insulated copper conducting-wires have been inclosed in iron tubes or iron sheaths, screens, or envelops, and also that such iron envelops have been
25 both longitudinally slitted and divided into short longitudinal sections, and I do not claim conductors of such form or character; but

I do claim as my invention, for which I desire Letters Patent—

30 1. A cable-conductor, composed of the insulated wire or wires of an electrical circuit, and one or more iron companion wires or rods not included in such circuit, the said insulated wires and iron wires being interbraided,
35 or interlaced, substantially as specified herein.

2. In an electric-cable conductor, the combination substantially as described, of the two insulated wires of a metallic circuit, and
40 one or more continuous iron wires interbraided or interlaced therewith.

3. In a compound cable-conductor, the combination of two insulated copper wires of a

metallic circuit, interbraided or interlaced with two iron wires, in such manner as to thread the said insulated copper wires through
45 a series or succession of magnetic rings or magnetic circuits each formed of two adjacent crossings of the said iron wires; substantially as described.

4. In an electric-cable conductor the combination of the two insulated conducting-wires of a metallic circuit, with two strands of iron, each strand comprising a number of
50 small iron wires, the said strands of iron being interbraided or interwoven with and between the said insulated conductors, in such manner as to afford a constant succession of short magnetic circuits, through which the
55 said insulated conductors are threaded; substantially as specified.

5. The combination of two insulated copper electric conductors twisted together to form an inductively neutral metallic circuit, and two strands of iron wire interlaced therewith, the whole being so arranged that each
60 loop of the two wires of either class encircles a crossing of those of the other class; substantially as shown herein.

6. An electric cable formed of a number of compound conductors, each composed of two
70 insulated copper electric conductors twisted together to constitute a section of an inductively neutral metallic circuit, combined with two iron wires or strands interlaced or forming a braid therewith; substantially as and
75 for the purposes specified.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 21st day of December, 1897.

STEPHEN DUDLEY FIELD.

Witnesses:

GEO. WILLIS PIERCE,
FRANK C. LOCKWOOD.