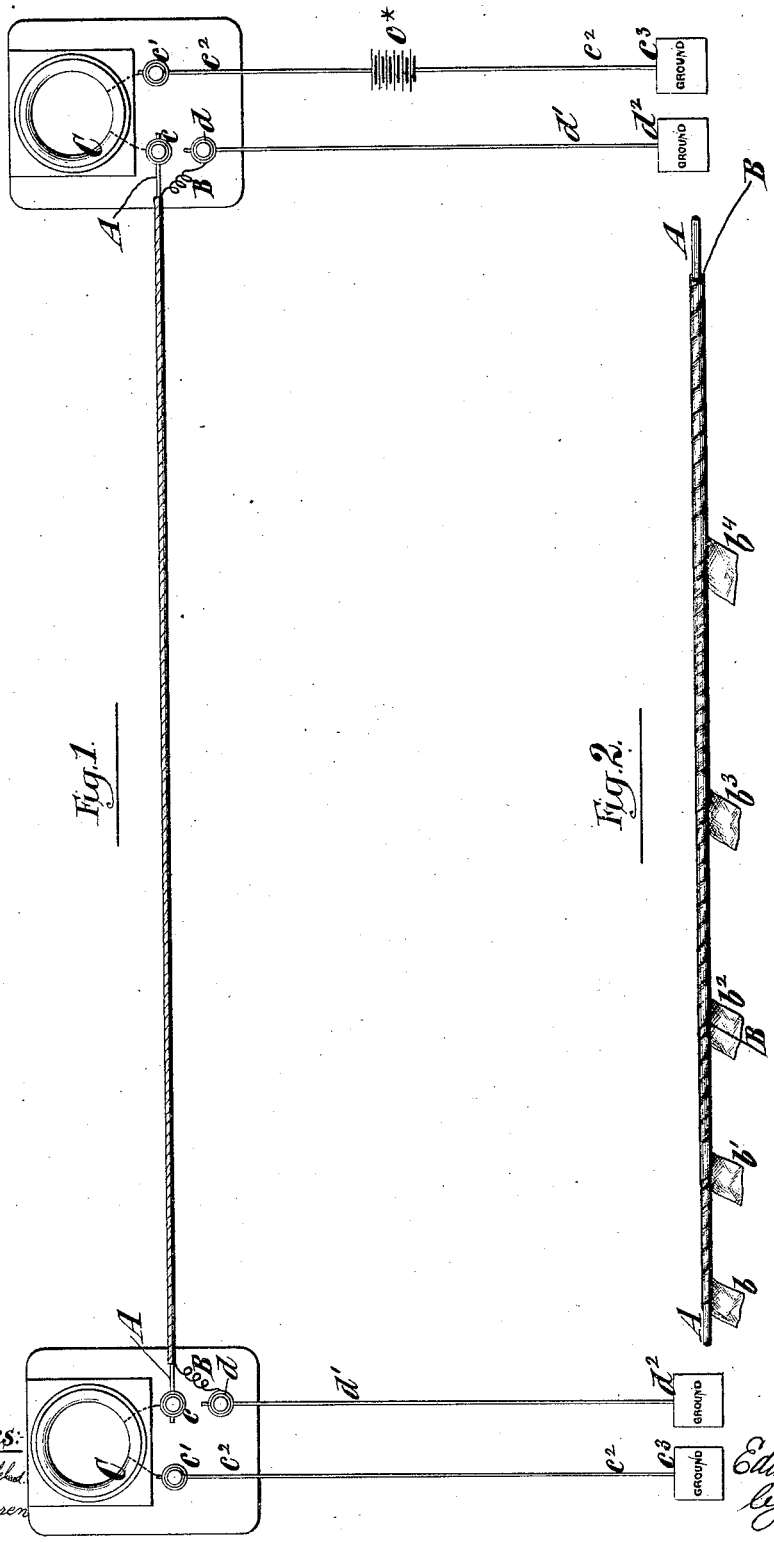
(No Model.)

E. D. McCRACKEN.

MEANS FOR CONTROLLING INDUCED CURRENTS IN ELECTRIC CONDUCTORS.

No. 304,540. Patented Sept. 2, 1884.



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UNITED STATES PATENT OFFICE.

EDWIN D. McCRACKEN, OF PATERSON, NEW JERSEY.

MEANS FOR CONTROLLING INDUCED CURRENTS IN ELECTRIC CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 304,540, dated September 2, 1884.

Application filed May 17, 1884. (No model.)

To all whom it may concern:

Be it known that I, EDWIN D. McCRACKEN, of Paterson, in the county of Passaic and State of New Jersey, have invented a new and useful Improvement in Means for Controlling Induced Currents in Electric Conductors, of which the following is a specification.

Great difficulties are experienced in operating telephone and telegraph lines where numbers of electric conductors of the ordinary kinds are extended within comparatively short distances of each other by reason of induced currents of electricity. These currents are always of opposite polarity to the primary currents, and in ordinary lines the variations in the primary and induced currents, one and then the other being in excess, have the effect of changing the polarity of the line. This difficulty is also increased by reason of line-constructors usually having no care as to which pole of a battery they ground at the corresponding ends of each of two parallel lines.

The object of my invention is to provide a compound conductor—that is, a conductor comprising a primary conductor or wire and an induced current or secondary conductor or wire—whereby the induced currents may be more effectively controlled than heretofore, and the primary wire relieved of the effects of induction to a greater extent than has heretofore been possible.

The invention consists in a compound conductor comprising a primary conductor externally insulated, a spiral induction or secondary conductor, and a covering for the induction or secondary conductor, consisting of a spirally-wound and lapping strip or strips of pure vegetable paper, forming of itself an insulating-covering for the induction or secondary conductor.

The invention also consists in a compound electric conductor comprising a primary conductor, an insulation therefor composed of a spirally-wound and lapping strip or strips of pure vegetable paper, a spirally-wound induction or secondary conductor external to said insulation, and a spirally-wound strip or strips of pure vegetable paper applied outside the induction or secondary conductor, the paper forming of itself insulating-coverings for the primary and secondary conductors.

In the accompanying drawings, Figure 1 represents an electric conductor embodying my invention and an outline drawing of two telephone-instruments connected thereby; and Fig. 2 is a view on a larger scale representing the construction of the conductor more clearly.

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

I will first describe the conductor shown in Fig. 2.

A designates the primary conductor, which may be of copper or iron wire, and of any desired gage. The insulation of this primary conductor is effected by winding it spirally with pure vegetable paper, very thin and tough, and cut into strips of about three-fourths of an inch in width, more or less. The paper strips are wound with a lap of about half their width, and hence each produces a double thickness of paper on the wire. In winding the spiral strips I apply a suitable adhesive substance to the inner side of each strip, whereby it is caused to adhere to the wire and the lapping layers of paper; and when so applied the outer side of the conductor is smooth and free from stickiness during the process of manufacture. I have here represented the primary wire as having two spirally-wound strips of paper, b b', in the process of being applied thereto. Outside the thus insulated primary wire A is wound a spiral band or strip, b^2, of the same kind of paper as the strips b b', and beneath the strip b^2 is laid spirally a conductor, B, which may consist of a fine wire or a thin metallic band or ribbon. After the strip b^2, with the underlying induction-conductor B, has been laid on one or more strips of paper, b^3 b^4, similar to the strips described are wound spirally on outside the induction-conductor B, and secured by any suitable adhesive substance. For this purpose I may employ a solution of shellac in alcohol, or if it is desired to be waterproof, I make it of a thin solution of india-rubber in any of its well-known solvents. The paper, of very thin and tough vegetable fiber, is admirably adapted to form of itself a perfect insulating-covering, and even when a number

of strips are applied the total increase in size of the wire produced by the layers of paper in the aggregate will be very slight.

C C designate the two instruments connected by the primary conductor. The two ends of the primary conductor A are fastened in binding-posts *c* of the two instruments C C, which may be presumed to be telephones, and the current, after passing through each instrument at one or other end thereof, passes through a binding-post, *c'*, and thence through a conductor, c^2, to the ground c^3. In one of the conductors c^2 is a battery, c^4. The two ends of the induction-conductor B are connected close to and inside the instruments with binding-posts *d*, and then by wires *d'* with the ground d^2.

Now, from the above description, it will be clearly understood that the induction-conductor B has no connection with the ground at frequent points between the ends, but is only grounded just within or inside of the instruments C C, and therefore the length of induction-conductor is much greater than the length of the primary conductor, (as much as one-half greater in some cases.) This increased length of induction-conductor offers no material obstacle to the induced current; but it does offer a very material obstacle to any escape of the primary current through said induction-conductor, and none of the primary current can therefore be lost, even though the wire be greatly overcharged with electricity. Inasmuch as the points for grounding the ends of the induction-conductor B are just inside or within the instruments C C, the induced current will not pass through the instruments, but will be grounded and thus got rid of.

By my invention I am enabled to produce a properly-insulated compound conductor, in which the size of the primary wire is increased no more than it would be by any of the ordinary forms of insulation.

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

1. The compound electric conductor consisting of a primary conductor externally insulated, a spiral induction or secondary conductor, and a covering for said induction or secondary conductor, consisting of a spirally-wound and lapping strip or strips of pure vegetable paper, forming of itself an insulating-covering for the induction or secondary conductor, substantially as and for the purpose herein described.

2. The compound electric conductor consisting of a primary conductor, an insulation therefor, composed of a spirally-wound and lapping strip or strips of pure vegetable paper, a spirally-wound induction or secondary conductor external to the said insulation, and a spirally-wound strip or strips of pure vegetable paper applied outside said induction or secondary conductor, the paper forming of itself insulating-coverings for the primary and secondary conductors, substantially as and for the purpose herein described.

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