(No Model.)

E. D. McCRACKEN.

ELECTRIC CONDUCTOR.

No. 304,539. Patented Sept. 2, 1884.

Fig. 1.

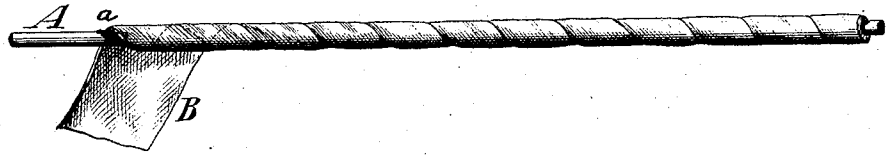
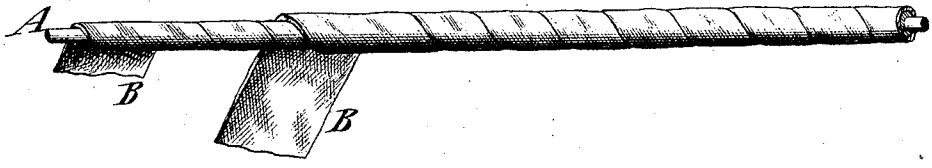


Fig. 2.



Witnesses:
Fred Haynes
Matthew Pollock

Inventor:
Edwin D. McCracken
by his Attorneys
Brown & Hall

N. PETERS. Photo-Lithographer. Washington, D. C.

UNITED STATES PATENT OFFICE.

EDWIN D. McCRACKEN, OF PATERSON, NEW JERSEY.

ELECTRIC CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 304,539, dated September 2, 1884.

Application filed February 27, 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 Electric Conductors, of which the following is a specification.

For all insulated electric conductors or wires it is desirable that the covering of insulating material should be as thin as is consistent with a perfect insulation, and this is particularly true of wire which is to be wound to form electro-magnets for electric lighting and other purposes where it is desirable that the magnets should be of small size as compared with the desired strength. I have discovered that thin Manila or other pure vegetable paper possesses in a high degree the qualities necessary for a perfect insulation, and that by its use can be obtained a perfect insulation with a less thickness of covering than is possible in any other way.

The invention consists in an electric wire having a covering consisting of a spirally-wound and lapping strip or strips of paper composed of pure vegetable fiber and applied in its unchanged fibrous condition to the wire, the paper forming of itself the insulating-covering for the wire.

The invention also consists in an electric wire having a covering consisting of a spirally-wound and lapping strip or strips of paper applied with a water-proof adhesive substance, consisting of a thin solution of india-rubber, the paper forming of itself the insulating-covering for the wire.

In the accompanying drawings, Figure 1 represents a piece of wire having an insulation which consists of a single spirally-wound strip of paper lapped upon itself about half the width of the strip, thus forming an insulation of two thicknesses of paper throughout; and Fig. 2 represents a piece of wire having an insulation which consists of two spirally-wound strips of paper laid one over the other, so as to break joints, and each strip lapped on itself about half its width. In the drawings the thickness of the paper strips is greatly exaggerated to show them more clearly.

In all the figures of the drawings, A designates the wire, which may be copper or iron; and B designates the strips of paper which form the insulation.

The paper which I prefer to use is very thin and tough Manila paper cut into strips of about three-fourths (¾) of an inch in width; but the paper may be made of any pure vegetable fiber, and is applied to the wire in its unchanged fibrous condition.

The adhesive substance which I prefer to use is a thin solution of india-rubber in any of its well-known solvents, this constituting a perfectly water-proof substance. In any case the adhesive substance is as thin as possible, so that the paper will not be separated materially from the wire or the layers of paper from each other. It is not designed that the adhesive substance shall constitute an insulation for the wire, but the paper of itself forms the insulating-covering.

In laying on the strip or strips of paper the thin water-proof adhesive material is preferably applied by a brush or other means to the inner side of the strip, and will then adhere to the wire and to the portion of the strip which is overlapped in winding spirally. When the water-proof adhesive substance is applied to the inner side of the strip, the outside of the insulation is not sticky during the process of manufacture.

In Fig. 1 the single strip, which constitutes the insulation, is wound spirally and lapped about half its width, thus producing an insulation consisting of two thicknesses of paper.

In Fig. 2 the insulation consists of two strips wound one over the other with a lap of about half the width, the second strip being laid so as to break joints with the first, thus giving an insulation of four thicknesses of paper. After the winding of the paper is completed, the insulating-covering of paper may or may not have paraffine or other waterproofing material applied to the exterior. The strips of paper to preserve them may be saturated with paraffine before winding. The paraffine may be applied to the strips of paper by immersing the bobbins on which the strips are wound in a bath of paraffine. An insulation of paper is very desirable, because it will not soon rot under ground, and because by using paper composed of pure vegetable fiber a perfect insulation can be produced with a less thickness of covering than can be obtained in any other way. A single strip of paper, giving two thicknesses throughout, will add but four one-thousandths

of an inch to the size of the wire. A water-proof adhesive substance consisting of a thin solution of india-rubber (shown at *a*) is also desirable, because by its use a certain amount of elasticity between the superposed layers of paper and between the paper and wire is obtained, and hence the insulating-covering of paper will not crack or break when the wire is bent.

I am aware that it has been proposed to cover a conductor with asbestus paper applied with adhesive substance; but such paper cannot be made unless very thick, and is objectionable not only because it would add greatly to the size of the wire, but because paper made from mineral fiber is so weak and rotten that it would not stand the tension necessary to lay it solidly on the wire to produce a close covering.

I am also aware that it has been proposed to apply paper as a covering to a wire, for the purpose of confining thereon a layer of insulating material, such as bitumen. This has been done, however, without any knowledge of the property of vegetable paper as an insulating material, and the size of the wire thus coated would be greatly increased.

I am also aware that it has been proposed to insulate a wire or wires by a formed tube of paper-pulp, the tube being made in sections, and the pulp being subjected to great pressure to form a dense and homogeneous tube, through which the wire is inserted after the tube is completed. Such a method of insulation adds many times to the thickness of the bare conductor, and no such intimate contact of the wire and pulp-tube or insulation as is desirable can be obtained. I do not desire to include in my invention the combination, with a metallic conductor, of a formed pipe of paper for an insulation therefor, and through which the naked wire is inserted.

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

1. An electric wire having a covering consisting of a spirally-wound and lapping strip or strips of paper composed of pure vegetable fiber, and applied in its unchanged fibrous condition to the wire, the paper forming of itself the insulating-covering for the wire, substantially as herein described.

2. An electric wire having a covering consisting of a spirally-wound and lapping strip or strips of paper, applied with a water-proof adhesive substance consisting of a thin solution of india-rubber, the paper forming of itself the insulating-covering for the wire, substantially as herein described.

E. D. McCRACKEN.

Witnesses:

BENJAMIN CARLEY,

FREDERIC B. CLOSE.