

(No Model.)

C. CUTTRISS.

PROCESS OF MANUFACTURING INSULATED CONDUCTORS.

No. 455,789.

Patented July 14, 1891.

Fig. 1

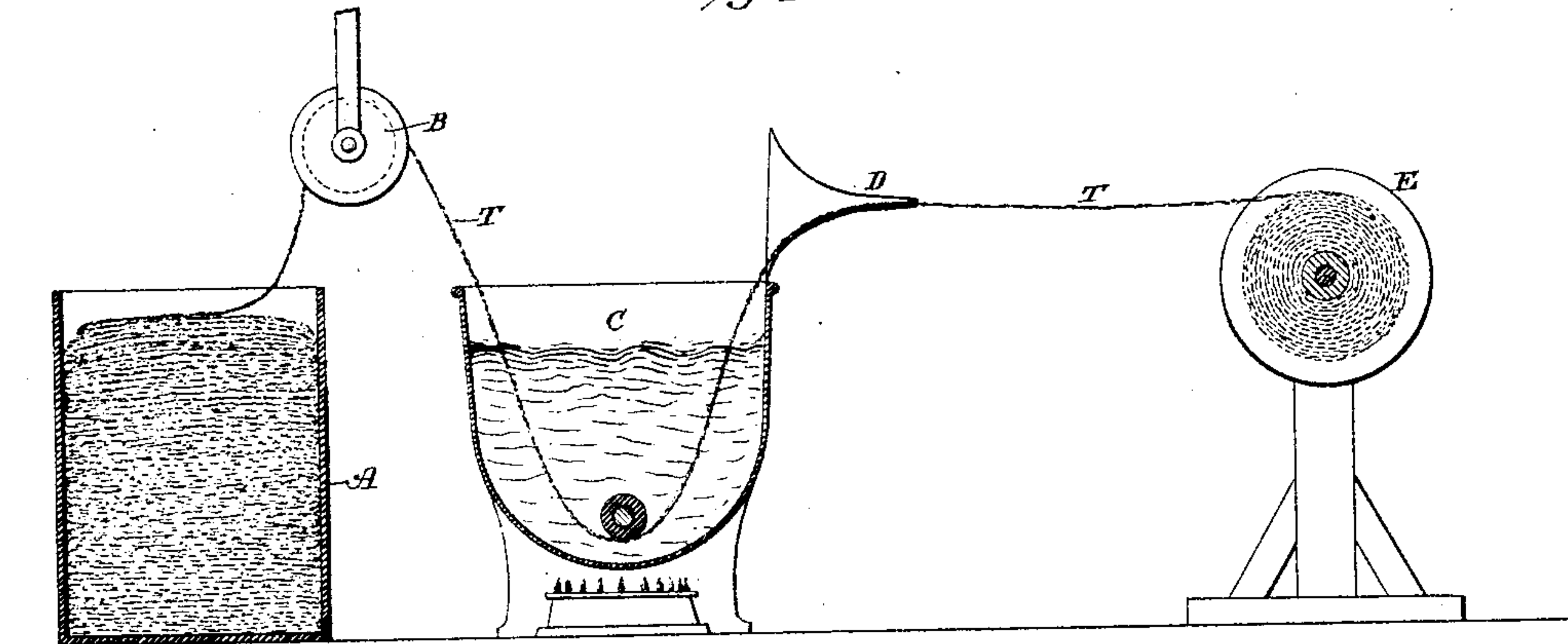


Fig. 2

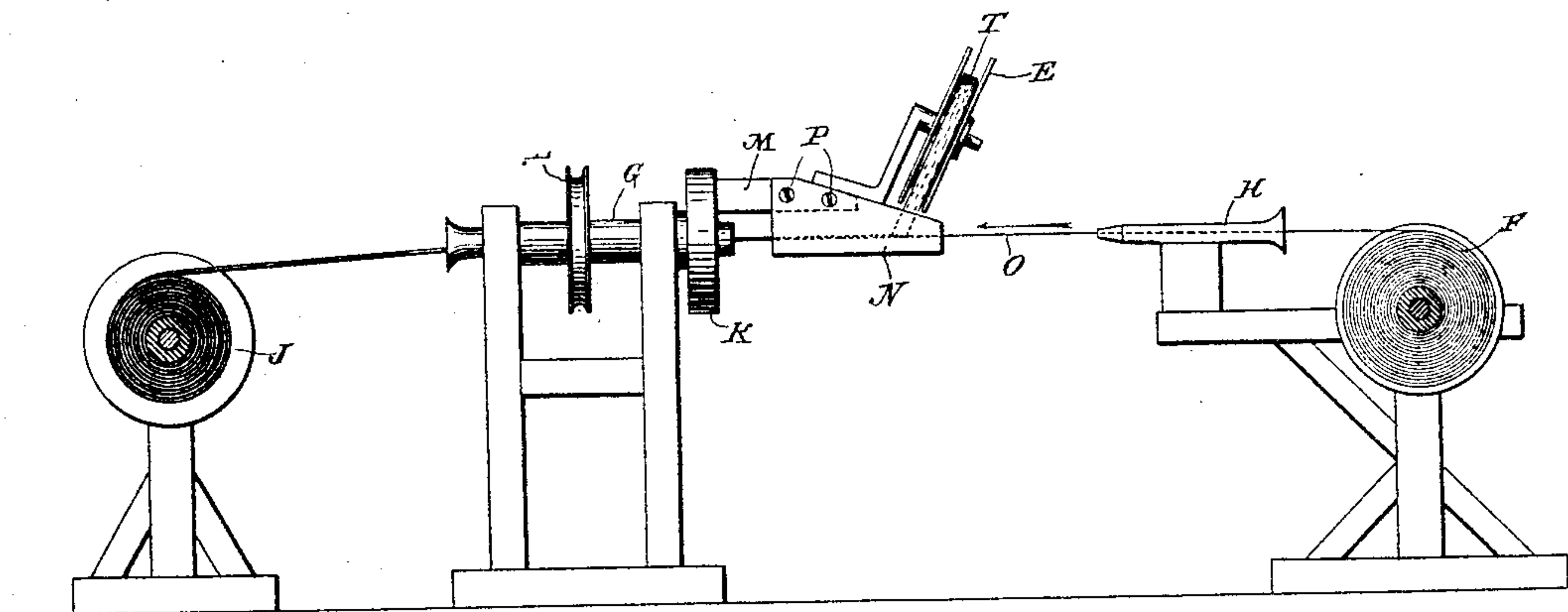
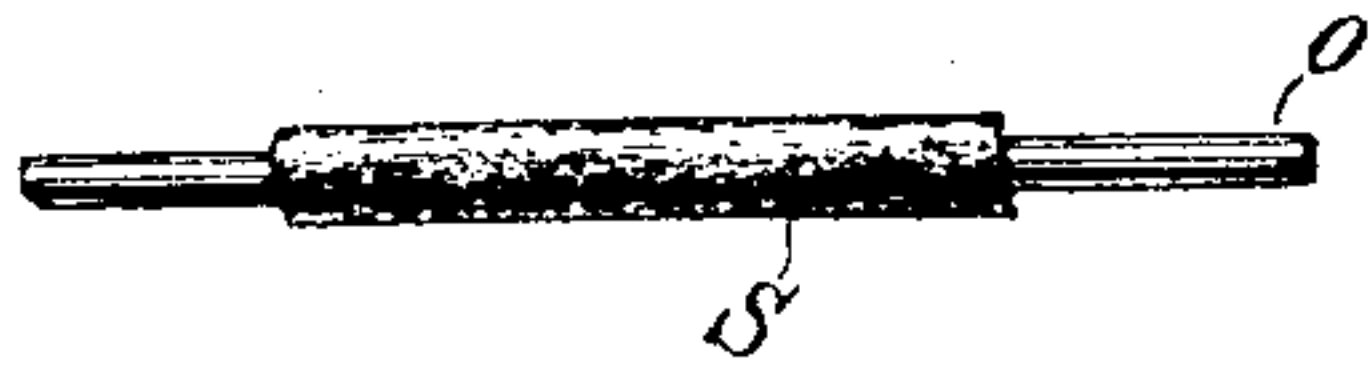


Fig. 3



Witnesses:

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UNITED STATES PATENT OFFICE.

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PROCESS OF MANUFACTURING INSULATED CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 455,789, dated July 14, 1891.

Application filed August 6, 1890. Serial No. 361,204. (No model.)

To all whom it may concern:

Be it known that I, CHARLES CUTTRISS, a subject of the Queen of England, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Processes for Manufacturing Insulated Conductors, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

The insulated conductor which I make in accordance with this invention, in its best and most practicable form, consists of a wire or metallic conductor surrounded by a jacket or sheathing of a material composed of loosely-laid fibers felted or matted together, in contradistinction on the one hand to the ordinary wrapped or woven jackets made up of separate and distinct strands, and on the other to those jackets or sheathings which are composed in part of fibers associated with an insulating material which serves as the binding agent to attach the fibers to the conductor or core.

My felted or compacted sheathing I coat or saturate with a fusible insulating compound to thoroughly protect the wire. The material which I prefer for the sheathing is cotton, and I may saturate or coat it with various compounds—such, for example, as a mixture of equal parts of shellac and carbolic acid, or with one of many of the well-known compounds of gum-copal, resin, and resin-oil, and the like.

In carrying out my invention I proceed as follows: I obtain cotton in the condition in which it leaves the carding-engine—that is to say, in the state of a delicate flat narrow strip or ribbon called a “sliver,” which by a coiler has been coiled down into a can with its convolutions continuously crossing each other, so that when the sliver is removed its parts do not adhere together. This sliver I pass through boiling water and then draw it through a constricted nozzle or die, whereby its fibers are slightly compacted and matted and its tenacity considerably increased. While in this condition it is wound spirally around a wire, and by rubbing-plates, or other means suitable for the purpose, it is compressed or packed,

whereby it becomes to a greater or less extent, determined by adjustment of the said devices, felted or matted around the wire. The wire thus covered is saturated or covered with a suitable insulating compound. I prefer to wind it on a spool or bobbin, and while the cotton is still moist to immerse the spool in a bath of the insulating compound, which is maintained at a high temperature until the air and moisture are driven out from the cotton sheathing and the latter fully saturated with the compound. A sheathing made in this way and saturated with a compound composed, for example, of gum copal or shellac and carbolic acid, or resin and resin-oil, will insulate and protect a wire very perfectly, will be flexible, dense, and durable, and is hard and horn-like in character, without tendency to unravel or fray.

So far as I am aware, the chief features of novelty and utility in the above, in addition to those residing in the finished product, are as follows: first, applying to a conductor the loose fibers of cotton or similar material and matting or felting the same about the conductor to form a sheathing or jacket therefor; second, saturating this sheathing with an insulating compound; third, applying the compound to the fibrous sheathing or jacket while moist and by the heat of said compound expelling the air and moisture from the sheathing. The advantages of this last-named feature seem to be important, and the effect of more perfect insulation secured in this way is probably due to the conversion of the moisture in the interstices of the sheathing and pores of the fibers into steam, which, expanding, opens up the pores of the sheathing to the admission of the fluid-insulator.

In carrying out this invention, I may make use of many devices well known in the art of insulating and covering wires. In illustration of the several successive steps of the process, however, I have shown in the annexed drawings conventional forms of apparatus, by reference to which I shall now follow the details of the manufacture.

Figure 1 shows the apparatus for moistening and strengthening the cotton sliver. Fig. 100

2 is the apparatus for associating the sliver and the wire, and Fig. 3 is a view of a short length of the insulated wire.

A represents a can filled with cotton in the condition of a sliver. The sliver T is carried in any suitable manner, as by a revolving pulley or drum B, from the can A to a vessel C containing boiling water. After emerging from the boiling water, by which the sliver is thoroughly soaked, it is drawn through a nozzle D, by means of which it is slightly compacted, whereby it acquires the requisite tenacity for its subsequent application to the wire. It is then wound on reels E.

The wire to be insulated is carried by a spool or bobbin F, and is drawn off through a guide H and the hollow shaft G, carrying the winding mechanism, and after receiving the sheathing or jacket of cotton it is wound on a reel J.

The winding and felting devices are herein shown as consisting of a suitable head K on the shaft G, which is revolved by a pulley L. From the head K extends an arm M, carrying two rubbing-plates N, which embrace the wire O. The arm M also carries a spindle, upon which the reels E may be placed, the spindle or axis being inclined to the wire, in order that as the reel is revolved by the head K the sliver will be wound spirally on the wire.

The space between the wire and the plates N may be regulated by the screws P or otherwise, so that the degree of compression of the cotton sheathing after it is applied to the wire may be varied according to need. The plates may be made flexible or slightly wider apart at the point at which the cotton sliver passes between them to the wire, and in other well-understood ways their adjustment and their effect upon the sheathing may be varied. The cotton-covered wire in suitable lengths is wound upon the reel J, which is then removed, and while the cotton is still moist it is plunged in a bath of very hot insulating material until the bubbles cease to rise. The wire is then cooled, finished, or further treated in any well-known or desirable manner. The finished sheathing is designated by S in Fig. 3.

I do not limit myself herein to the employment of the specific materials named, though

they possess special and distinct advantages in themselves, nor do I confine myself to the particular apparatus described; but

What I claim is—

1. The improvement in the art of insulating electric conductors, which consists in applying to or winding on a conductor the loose fibers of a material such as cotton and compacting the same to form a felted or matted sheathing, as set forth.

2. The improvement in the art of insulating electric conductors, which consists in applying to a conductor an unwoven fibrous material, then compacting the same to felt or mat the fibers, and then saturating or coating the said material with a fusible insulating compound.

3. The method of insulating electric conductors, which consists in forming a sheathing around a conductor by compacting or felting loose fibers of a material such as cotton applied to the conductor and immersing the same while the sheathing is moist in a hot fusible insulating material, as set forth.

4. The method or process of insulating electric conductors, which consists in winding a sliver of cotton around the conductor and then compressing and compacting the same to felt or mat the fibers, as described.

5. The method or process of insulating electric conductors, which consists in winding a sliver of cotton spirally around the conductor, compacting and compressing the same to mat or felt the fibers, and saturating the sheathing thus formed with a fusible insulating material, as described.

6. The method or process of insulating electric conductors, which consists in boiling a sliver of cotton, winding the same spirally on the conductor, compacting the cotton to felt or mat its fibers, and immersing it while moist in a bath of fusible insulating material, as set forth.

7. An electrical conducting-wire, in combination with a compacted or felted sheathing of cotton fibers saturated or coated with a fusible insulating compound, as described.

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Witnesses:

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