

(No Model.)

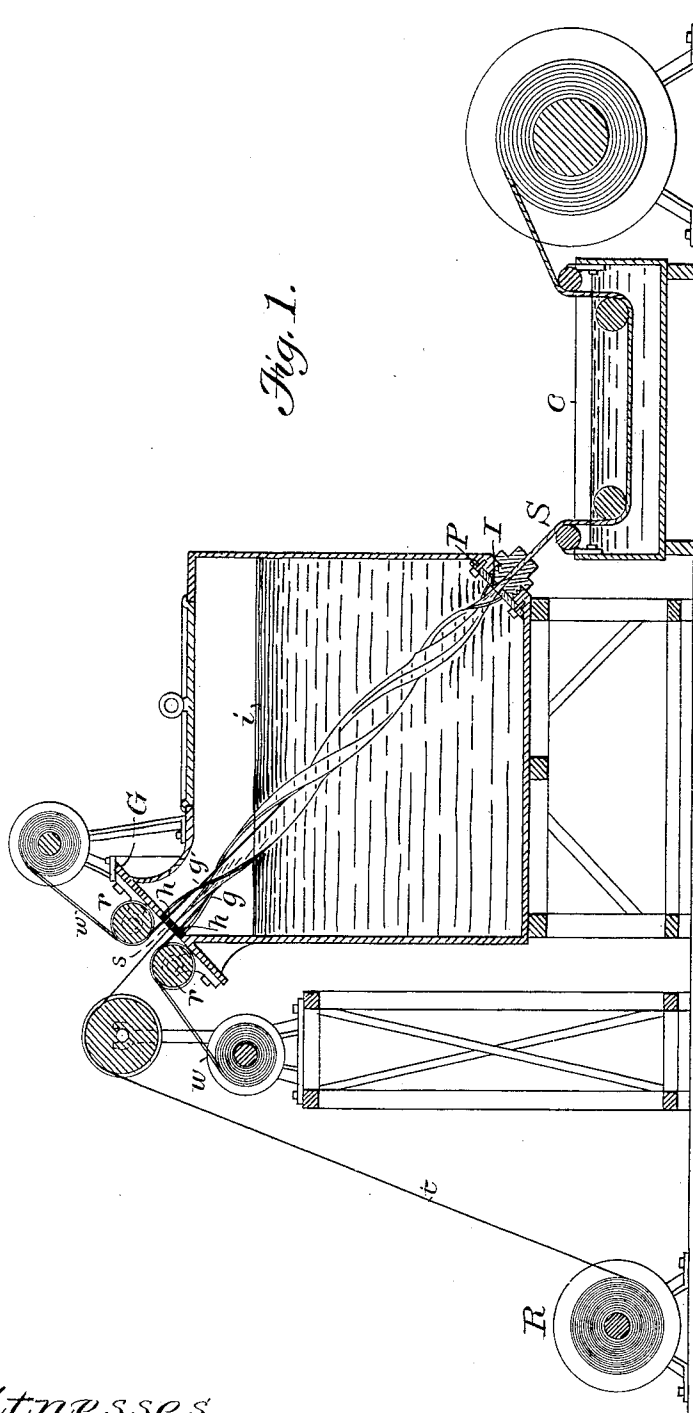
2 Sheets—Sheet 1.

H. R. MASON.

MANUFACTURE OF ELECTRICAL CONDUCTORS.

No. 334,450.

Patented Jan. 19, 1886.



Witnesses.
Geo. Willis Pierce
Wm. B. Vanzize

Inventor,
Howell R. Mason.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

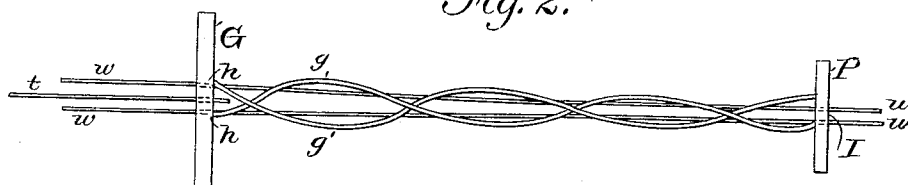


Fig. 3.

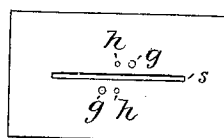


Fig. 4.

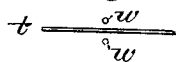


Fig. 5.



Fig. 6.



Fig. 7.



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UNITED STATES PATENT OFFICE.

HOWELL R. MASON, OF CHELSEA, ASSIGNOR TO THE AMERICAN BELL TELEPHONE COMPANY, OF BOSTON, MASSACHUSETTS.

MANUFACTURE OF ELECTRICAL CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 334,450, dated January 19, 1886.

Application filed May 15, 1884. Serial No. 131,624. (No model.)

To all whom it may concern:

Be it known that I, HOWELL R. MASON, of Chelsea, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in the Manufacture of Electrical Conductors, of which the following is a specification.

My invention relates to the art of insulating electrical conductors.

The object of my invention is to provide a new and simple method or process of simultaneously insulating, or wrapping, covering, and insulating, two electrical conductors.

The effects of dynamic induction are familiar to those skilled in the art. When two independent conductors are placed contiguously, the effect of a current or variation of current in one will be felt in the other to an extent dependent upon their proximity, and the disturbance caused in sensitive instruments thereby is a cause of serious trouble, as in the telephone. To obviate this annoyance it has been customary to use a complete metallic circuit, and to place the two sides or branches thereof in closer proximity to each other than to any other conductor is a feature of great importance in attaining practical success.

The beneficial results to be derived from the construction here referred to is set forth in the United States patent of A. G. Bell, No. 244,426, July 19, 1881, in connection with which my method of insulating will be found of great utility. To the end that two insulated conductors may be thus arranged, I have devised a method of preparing a double conductor or metallic circuit-conductor, which consists in wrapping or folding a tape of prepared cotton or other insulator round each and both of the two wires, thereby binding them together into one strand, the exterior being covered with a mass or thickness of cotton and insulating material greater than that separating the two conductors from each other, whereby their position with respect to each other will be closer than either one can possibly get to any other conductor.

My method or process consists in passing the two conductors and a strip of tape located between them through a guide-plate, whereby the two opposite edges of the tape are returned

in the same direction round each and both of the two conductors, between which it is placed, and before the tape is closed upon the conductors I pass the conductors and tape through an insulating material, whereby the bare wires and both sides of the tape become covered and the tape saturated, and by a continuous movement through the guide and a passage upon the opposite side of the insulating-liquid the tape is closed down upon the two conductors and the surplus insulating material removed. The tape is wound two or more times round the outside of the strand formed by the two conductors, as may be thought desirable, and the single thickness only of the insulator thus formed is interposed between the two conductors.

My invention further consists of means for carrying my method into operation.

If it be thought desirable to place more insulating material between the two conductors, two or more strips of tape may be used, thus the proportion between the part separating the two conductors and that covering the exterior will be maintained, and an insulation of any required thickness obtained. The quantity of insulation upon the outside of the strand is regulated by the width of the tape or strip of fabric used.

The accompanying drawings illustrate my method or process, and means for carrying said method or process into operation.

Figure 1 is a complete central cross-section of the apparatus employed. Figs. 2 and 3 are views illustrating the guide for wrapping the conductors with the necessary fabric or other insulating base. Figs. 4, 5, 6, and 7 represent different consecutive steps in the application of the fabric or body of insulating material.

In Fig. 1, R is a reel, upon which is wound an insulating body or fabric, as cotton cloth or tape *t*. If the conductors to be insulated are, say, 16 or 18 gage, the width of this strip may be about one inch wide. Reels containing the two conductors *w w* to be insulated are conveniently located in respect to reel R.

G is a guide-plate. (See Figs. 2 and 3.) In this plate is a slit, *s*, through which the tape *t* is passed. On opposite sides thereof are two

holes, *h h'*, through which the conductors *w w* are passed. This plate *G* is placed in close proximity to a vessel containing the insulating-liquid *i*—as paraffine or other material—
5 which, if necessary, should be maintained in a fluid state by heat.

P is a plate located upon the opposite side of the insulating material, and may be conveniently placed in the side of the vessel containing the insulating material. In plate *P* is
10 an eye or hole about the size of the complete strand to be formed by the two insulated conductors. Between plates *G* and *P* are located two wires or rods of considerable strength and
15 rigidity, *g g'*. Their points of connection with guide-plate *G* are respectively on opposite sides of the slit *s*, between the plates *G* and *P*. These two rods are in the form of a long spiral, the relative position of one alternating
20 with that of the other in respect to the plane of slit *s*. I have found one turn in two inches to be a satisfactory working arrangement for the spiral guide-rods.

In the preparation of the insulated conductors the insulating-tape and the two conductors are drawn along together through plate
25 *G* between the spirals.

Fig. 4 shows the appearance of the tape and conductors as they leave plate *G*. Fig. 5 shows
30 their position after receiving one turn, at which point they enter the liquid, which should be kept at the proper height for this purpose.

Fig. 6 shows the position of the conductors and insulating-tape at the second turn, and
35 Fig. 7 the appearance of the strand *S* as it leaves plate *P*, from which it passes into a cooling-trough, as *C*, and is then wound upon a reel, or is smoothed and polished, if so desired.
40

At the point of entering the insulating-liquid, Fig. 5, both the conductors and the wrapping fabric are exposed to the insulating-liquid, and as the strand is carried into the
45 position shown in Fig. 6 the tape is partially closed upon the conductors and insulating-liquid, and as it passes into and through hole or eye *I* in plate *P* the conductors and insulating material are compressed to remove the
50 surplus insulating-liquid and formed into one compact strand.

Reference to Figs. 4, 5, and 6 will show that the conductors are separated from each other by one thickness of the insulation thus formed,
55 and that the completed strand is covered on the outside by two or more thicknesses, according to the width of tape used.

I do not limit myself to a specific form of material as a basis for the insulating compound. I have found cotton tape to answer
60 the purpose well; but many fabrics may be substituted therefor, and the same is true as regards substitutes for paraffine, referred to herein as the insulating liquid or compound.

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

1. The method of insulating two electrical conductors herein set forth, which consists in simultaneously passing both conductors and
70 an insulating body through an insulating fluid or compound, and closing or wrapping the insulating body upon the conductors while immersed, thereby forming a single strand.

2. The method of insulating two electrical conductors and uniting them into a single
75 strand by inserting an insulating-strip between them and then winding the same two or more times around both conductors, substantially as described.

3. A double conductor comprising two
80 wires, constituting a metallic circuit and an insulating-strip, the latter separating the two former and having two or more thicknesses on the exterior of both conductors, substantially as described.
85

4. In an apparatus for insulating a pair of electrical conductors, the combination of the guide-plate containing openings for an insulating-strip and for the conductors, so arranged that the said strip passes between the
90 two conductors, and the guide rods or wires for wrapping the strip two or more times around both conductors, substantially as described.

5. An apparatus for insulating electrical
95 conductors, comprising, in combination, a guide-plate having openings for the passage of the conductors and of an insulating strip or tape, a vessel for containing insulating-liquid, through which vessel said conductors
100 and strip pass, means, as indicated, for folding or wrapping the strip around the conductors while passing through said vessel, and a plate containing a hole or eye for the passage of the conductors and their inclosing-
105 strip, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 7th day of May, 1884.

HOWELL R. MASON.

Witnesses:

WM. B. VANSIZE,
GEO. WILLIS PIERCE.