(No Model.)

J. D. BISHOP.

INSULATED ELECTRIC CONDUCTOR.

No. 449,400. Patented Mar. 31, 1891.

Fig. 1.

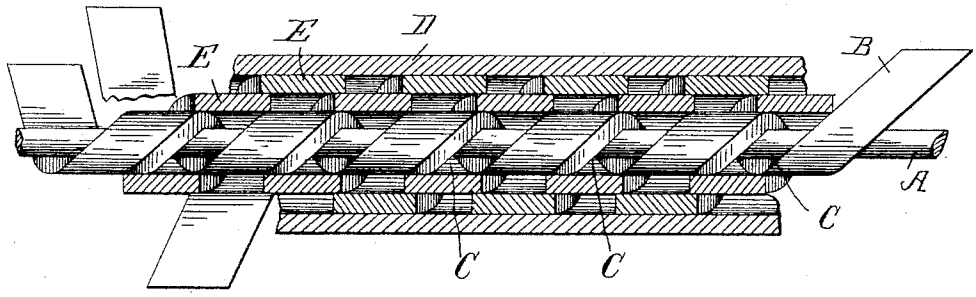


Fig. 2.

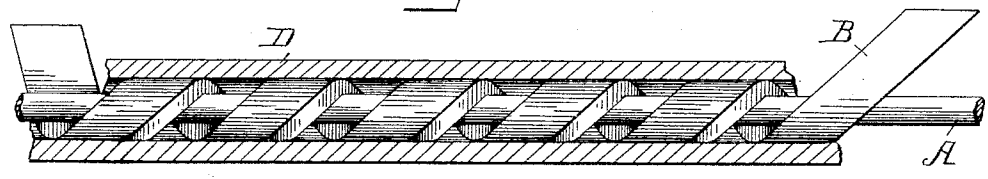


Fig. 3.

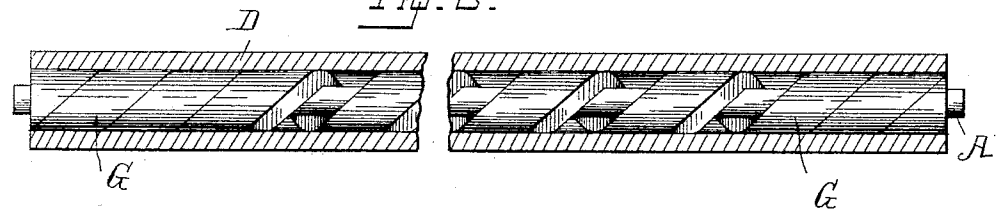
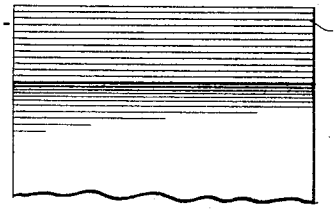


Fig. 4.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES D. BISHOP, OF BROOKLYN, NEW YORK.

INSULATED ELECTRIC CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 449,400, dated March 31, 1891.

Application filed September 22, 1890. Serial No. 365,722. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. BISHOP, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Insulated Electric Conductors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to insulating electric conductors.

Its object is to insure a high insulating power, low inductive capacity, cheapness of construction, and increased lightness and flexibility.

An ideal conductor or cable would be one in which the conductor was maintained throughout the whole length equidistant from the protective sheathing by a material offering a maximum electrical resistance and a minimum inductive capacity. Dry air possesses these qualities to a higher degree than any other known material and would be the ideal medium of separation of the conductor from the inclosing sheath or adjacent conductors, provided the conductor could be maintained throughout its length with an intervening layer or stratum of such air between it and its inclosing sheath. The nearer an insulated conductor approaches this form the greater will be its advantages in a high resisting power to leakage and a lower inductive capacity, and it will also be of materially-decreased weight, of increased flexibility, and diminished cost.

It is the object of my invention to surround the conductor as much as is practically possible with such a protective envelope of dry air, and yet maintain it in a fixed relation to its inclosing sheath.

The features of novelty of the invention will be hereinafter fully described in the specification, and definitely indicated in the appended claims.

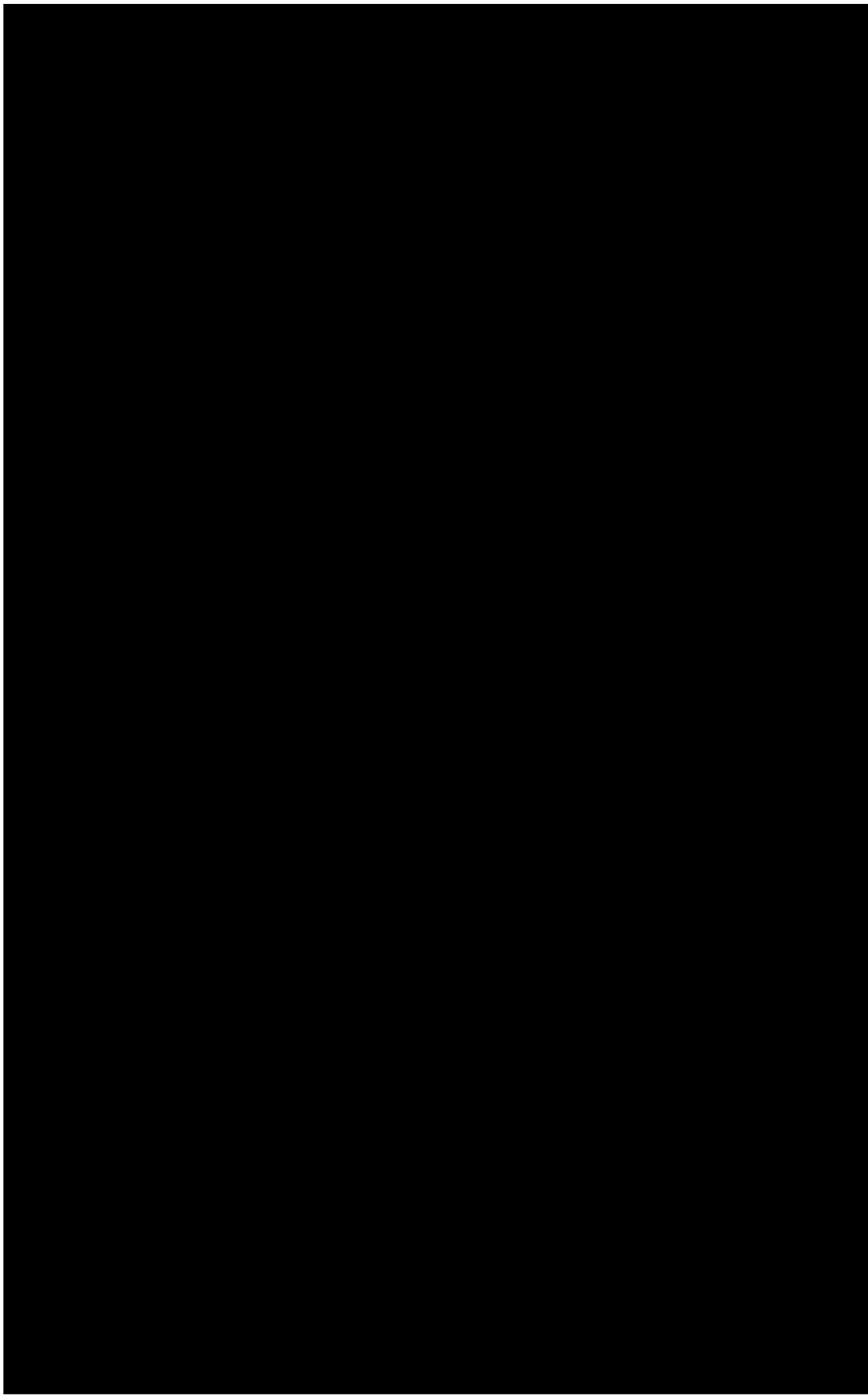
In carrying out my invention I apply an insulating material, preferably in strips, spirally around the conductor in such a manner that instead of overlapping on itself in successive convolutions, as is common in the art, air-spaces are established between the sides of the spiral by giving the thread of the spiral such a pitch that the edges of the strips cannot overlap, but will be separated by a wide space. These strips may be laid upon one another in the same plane to several thicknesses, so that the thread may be as deep as desired, and thus as great an air-space secured as the design of the cable requires. This result may be accomplished by giving to the conductor such a rate of feed with reference to the winding machinery that air-spaces of a desired width will be left between the sides of the spiral strip. When a sufficient thickness of a spirally-wound material has been produced, the protective envelope or sheath is applied to the conductor, which is then complete. The insulating material or ribbon which I prefer to use in winding the conductor is paper, both by reason of its lightness in weight, its cheapness, and its high insulating power.

In the accompanying drawings, which illustrate the invention, Figure 1 is a sectional view of a portion of a conductor or cable constructed in accordance with my invention. Fig. 2 is a sectional view of a portion of the conductor in which a single spiral band of insulating material is wound upon the conductor. Fig. 3 illustrates a method of closing the ends of the conductor, so as to prevent the entrance of moisture to the air-spiral; and Fig. 4 illustrates in enlarged view a series of strips piled to the desired thickness which hold the conductor in fixed relation to its inclosing protective sheath.

A is the conductor.

B is a series of superposed strips of insulating material, preferably paper, wound upon the conductor with a quick pitch, so as to leave at intervals in the length of the conductor wide spaces C C.

The sheath D may be applied directly to the conductor after being wound with the strip B, as shown in Fig. 2; or additional spirals of insulating material E F, reversely wound, may be applied before the conductor is inclosed in its sheath, as shown in Fig. 1. The ends of the conductor are finished by completely surrounding them with the insulating material, as shown at G. This result



Correction in Letters Patent No. 449,400.

It is hereby certified that in Letters Patent No. 449,400, granted March 31, 1891, upon the application of James D. Bishop, of Brooklyn, New York, for an improvement in "Insulated Electric Conductors," an error appears in the printed specification requiring correction, as follows: In line 3, page 1, the clause "citizen of the United States," should read *subject of the Queen of Great Britain;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 28th day of April, A. D. 1891.

[SEAL.]

CYRUS BUSSEY,
Assistant Secretary of the Interior.

Countersigned:

C. E. MITCHELL,
Commissioner of Patents.