

A. A. KNUDSON & F. L. KANE.
Insulating Compound.

No. 230,878.

Patented Aug. 10, 1880.

Fig: 1.



Fig: 2.



Witnesses;

Wm R Roberts
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Inventors,

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By their Attorney,

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UNITED STATES PATENT OFFICE.

ADOLPHUS A. KNUDSON AND FREDERICK L. KANE, OF BROOKLYN, NEW YORK, SAID KANE ASSIGNOR TO JOHN R. KANE, OF SAME PLACE.

INSULATING COMPOUND.

SPECIFICATION forming part of Letters Patent No. 230,878, dated August 10, 1880.

Application filed November 23, 1879.

To all whom it may concern:

Be it known that we, ADOLPHUS A. KNUDSON and FREDERICK L. KANE, both of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Insulating Electrical Conductors, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

Our invention relates to an insulating-coating for enveloping and protecting electrical conductors, more especially such conductors as are designed for telegraphic purposes, and are therefore required, in some instances, to be suspended in the air, and in other cases to be buried in the earth or submerged in water.

The invention consists in applying to such conductors a covering of fibrous material which is saturated with a compound composed of native bitumen or asphaltum, having paraffine-oil or residuum of petroleum or candle-tar mixed therewith, which not only forms a more efficient, durable, and permanent insulating material than any which has heretofore been employed for similar purposes, but which can be prepared at a much smaller cost.

The principal requisites in a material which is to be applied in this manner to the fibrous coating of a telegraphic conductor are as follows: First, it must be a non-conductor of electricity and a repellant of moisture; second, it must be tenacious and flexible to a considerable degree, even at a low temperature, so as to admit of the conductor being bent or twisted without injury to its covering; and, third, it must not be capable of softening or volatilizing under continued exposure to any temperature which is liable to occur from the action of the sun's rays when the wire is placed in an exposed position, as upon the roof of a house.

The materials which have hitherto been employed for the purpose of insulating telegraphic conductors are composed in part of volatile ingredients, and after having been exposed for a time to the influence of the atmosphere or the rays of the sun, these volatile substances evaporate, and the compound becomes brittle and liable to crack. The cracks thus formed admit and retain moisture, which

has the effect of greatly impairing the insulation of the conductor, and finally of destroying it altogether.

In order to obviate these objections we employ for the purpose of saturating the coating of the conductor a substance which contains no volatile ingredients whatever—such a substance, for example, as native bitumen, or asphaltum, by preference. As native bitumen, however, when used alone for this purpose, is somewhat too hard and brittle, and would consequently be liable to crack when exposed to the action of the elements, we soften it, and at the same time render it tenacious and durable, by incorporating with it a suitable non-volatile or non-drying liquid material, such as paraffine-oil, petroleum-tar, or candle-tar. These three are residual products obtained by the distillation of petroleum and candle stock, respectively; and since it requires a very high temperature to effect this distillation, the residuums are of such a nature that they do not thereafter undergo any change from the influence of the atmosphere when exposed thereto.

The proportion in which we prefer to mix the native bitumen and paraffine-oil, candle-tar, or residuum of petroleum together depends on the nature or character of the bitumen and the place in which the insulated conductor is designed to be used. A very suitable compound for ordinary purposes may be made of sixty-five (65) parts Trinidad asphaltum mixed with fourteen (14) parts of petroleum-tar; but this proportion may be considerably varied, according to circumstances, as hereinbefore stated.

In order to prepare an insulated conductor we take a suitable wire, of copper or other metal, and cover the same with a continuous coating of clean dry fibrous material, such as hemp or manila, which may be spun, woven, or braided, or applied in any other convenient manner, as shown in Figure 1 of the accompanying drawings. This process of covering the wire is well understood, and therefore need not be herein particularly described. The wire thus prepared is then saturated or coated with the compound hereinbefore described, preferably passing the wire through a quantity of material which is kept in a liquid condition

by the application of heat. If desired, a second, or even a third, coating of the fibrous material may be applied, and each successively saturated in the same manner. A conductor thus prepared is ready for use, it being provided with a flexible water-proof and non-conducting covering, which is practically indestructible by means of ordinary atmospheric agencies, and may therefore be suspended in the air or laid under the surface of the earth, or submerged in water, notwithstanding which the conducting-wire will be effectively insulated from all surrounding substances or media of whatever nature.

15 In cases in which it is required to join the end of two separate conductors insulated in the manner above described, we remove the entire coating for a short distance at the end of each wire, and splice or join the ends in the usual manner. The joint is then protected and insulated by being wrapped with narrow strips of loosely-woven cloth or tape which have been previously saturated with the compound in the manner already described,

25 the mode of such application to a joint being shown in Fig. 2.

In preparing our insulating compound a certain portion of resin might be substituted for an equivalent portion of the native bitumen or asphaltum.

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We claim as our invention—

1. An electrical conductor insulated by a covering of fibrous material which is coated or saturated, or both, with a water-proof flexible adhesive compound composed of Trinidad or other natural asphaltum mixed with paraffine-oil, petroleum-residuum, candle-tar, or other non drying and softening material, substantially as specified.

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2. An insulating compound for coating telegraphic conductors, consisting of native bitumen or asphaltum mixed with paraffine-oil, petroleum-residuum, or candle-tar, substantially as specified.

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In testimony whereof we have hereunto subscribed our names.

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ADOLPHUS A. KNUDSON.
FREDERICK L. KANE.

Witnesses:

WILL FRAZER,
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