

# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN INSULATING AND FINISHING COMPOUNDS FOR CONDUCTING-WIRES

Specification forming part of Letters Patent No. **144,794**, dated November 18, 1873; application filed October 29, 1872.

*To all whom it may concern:*

Be it known that we, THOMAS L. REED and EUGENE F. PHILLIPS, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Telegraphic Office-Wire, and a Compound for Treating the same.

Our invention consists in a novel insulating compound, especially adapted for the manufacture of improved office-wire; and we do hereby declare that the following specification is a clear and true description thereof, and the method of applying the same.

In the way of description, we will assume that a piece of ordinary wire has already been covered with a braided fabric in the usual manner, with one or more layers, each or all of which have been properly charged with any of the well-known insulating compounds or solutions, which has been properly dried, and is ready for receiving our finishing process, by one of the methods which in practice we have adopted.

A braiding-machine of ordinary construction is provided with yarn or twine which has been previously charged with the hot compound hereafter described, and the braiding process is completed as heretofore conducted.

The compound which we have found best suited to the purpose is composed of, say, two parts Canada balsam; one part solid paraffine of commerce; one part bees-wax of standard quality. This compound is well mixed and applied to the yarn while hot.

The Canada balsam possesses no very marked desirable characteristics over several of the more common pine gums and resins; and we are aware that approximate results will be attained if the ordinary pine resins be used instead of the balsam in the same combination. The bees-wax may be crude or clarified; the purer it is, however, the better it is suited for the purpose, on account of its increased hardness and solidity. We are aware that the proportions named can be varied, and approximate results attained.

As it is sometimes desirable to have variously-colored wires for the ordinary purposes of distinction where many are used, and also to render them more attractive to the eye when used in hotels, brokers' offices, merchants' pri-

vate offices, &c, we add to the said compound coloring matter in suitable quantities to afford the depth and shade of color desired. As instances, white lead may be employed to bring the compound up to as near white as may be desired; such a compound can be toned by the addition of red lead, ocher, chrome, Chinese or Prussian blue, to produce any desired color, or shade of any color.

After the braiding has been completed, the surface of the fabric is subjected to the action of "slickers," or smoothing-tools having a proper surface, and as it cools a gentle friction develops a continuous lustrous coating on the surface of the fabric, composed of the compound which exudes from the interstices of the yarn. While still soft, and during the slicking process, bronzing-powder may be applied in a manner well known, and thus impart to the exterior of the compound conductor the appearance of a massive metallic wire.

Another style of wire or conductor may be made by incasing the metallic wire within numerous longitudinal strands or threads, which are firmly united to each other and to the wire by a thread laid or wound spirally on the outside and tightly sewed. The longitudinal strands may be applied with the compound already charged, or the compound may be subsequently applied. If charged with the compound before being laid, a sufficient quantity of it will be left upon the surface, or exude from the interstices, to afford the desirable exterior coating. After having been covered with the textile matter, the compound may be applied by drawing the covered wire through the melted mixture, and thence through a clearing-plate having a funnel-shaped aperture of proper diameter. Desirable friction from contact with any smooth hard substance can be applied by many well-known mechanical devices adapted to similar service.

The combination of "flocks" or other disintegrated fibrous matter with a compound substantially of the character referred to can be employed with satisfactory results as an exterior coating, for it will, with gentle friction, develop a fine superficial finish, and possess a desirable degree of hardness and tenacity. The method of applying the compound, or its equivalent, can be extensively varied, without



materially affecting the result. It will only be necessary that a proper unity exists between the fabric or textile matter and the compound, and that a sufficient quantity of the latter remains thereon to completely constitute an exterior covering. A perfect insulation can be effected by the use of the compound, when an exterior finish is not desirable, applied after the manner of any of the well-known gums or mixtures.

We are aware that telegraphic wires and cables have heretofore been made with an inclosing fabric of braid or wound threads and yarns in great variety; that such yarns, not only prior but subsequent to the braiding or winding processes, have been treated or charged with solutions of paraffine and other soluble insulating matter; also, that cables and wires for telegraphic purposes have been superficially coated with gums and gummy compounds which belong to the class generally known as vulcanizable. When applied in mass, such cables and wires have sometimes been vulcanized; when applied in solution, they have been generally simply dried, after the evaporation of the volatile solvents.

By combining with the paraffine the resinous gums and wax, substantially as set forth, the compound is rendered much tougher and harder than either the paraffine or wax would otherwise be, and it remains unchanged at a higher degree of temperature than either the paraffine or wax could resist if the heat were applied thereto separately. The wire which is dressed with paraffine alone is of a greasy dull aspect,

and the paraffine is liable to crackle or rub off on being touched, and to catch and retain dust and dirt. On the other hand, if soluble gums, &c., be applied in solution, they are liable to be unevenly distributed, and, while drying, accumulate more in some places than in others. This latter is especially the case, and incident to the use of the non-volatile solvents, and the gums which they will hold in solution. Should volatile solvents be employed, the drying is more rapid, but the coating is not so flexible, and is the more liable to crack and scale. These peculiarities render wire treated with our novel compound readily distinguishable from wires prepared as heretofore.

We are not aware that prior to our invention any telegraph office-wire or other telegraphic conductors were ever finished with an exterior surface possessing the several combined characteristics of wires or conductors treated with a compound of the character herein described; and

We therefore claim as new, to be secured to us by Letters Patent—

The compound composed of Canada balsam, or equivalent gum, paraffine, and bees-wax, with or without coloring pigment, for insulating, and for giving to telegraphic conducting-wires a finished exterior, substantially as described.

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Witnesses:

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