

(No Model.)

E. J. HOUSTON.

WEATHER PROTECTING COVERING FOR ELECTRICAL CONDUCTORS.

No. 527,556.

Patented Oct. 16, 1894.

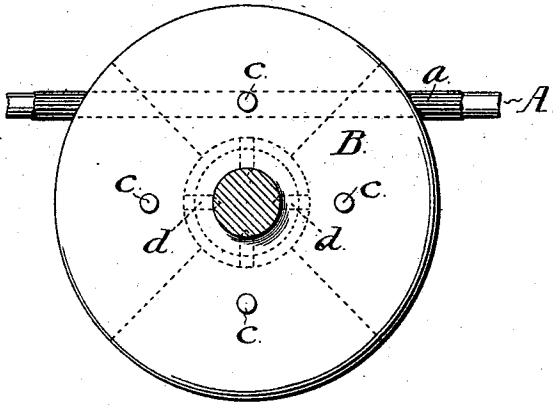


FIG. 2.

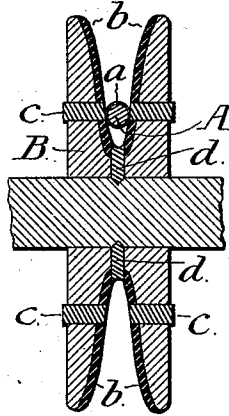


FIG. 1.

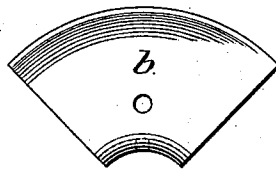


FIG. 3.

WITNESSES:

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UNITED STATES PATENT OFFICE.

EDWIN J. HOUSTON, OF PHILADELPHIA, PENNSYLVANIA.

WEATHER PROTECTING COVERING FOR ELECTRICAL CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 527,556, dated October 16, 1894.

Application filed November 17, 1891. Serial No. 412,116. (No model.)

To all whom it may concern:

Be it known that I, EDWIN J. HOUSTON, of the city of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Weather Protecting Coverings for Electrical Conductors, whereof the following is a specification, reference being had to the accompanying drawings.

My invention is especially valuable for exposed conductors which are usually employed in connection with electric railways operated by a contact system, such as, for instance, over-head, surface or under-ground wires, with which contact is maintained by trolleys, sleds, plows or other similar devices. It is, however, more broadly applicable, and may be used for telegraph, telephone and similar wires also. In the case of electric railways the contact surfaces of the conducting wire and of the contact device used in combination therewith, being necessarily bare, are exposed to the corrosive action of the atmosphere and will, by temporary disuse, or even in the course of ordinary use, become coated with a layer of substantially non-conducting oxide, which interferes with the taking off of the current from the conductor.

The primary object of the present invention is to provide a protecting covering for said surfaces which shall be itself unchangeable by atmospheric influences and which, while protecting the surfaces against oxidation, shall not appreciably increase the resistance at the points of contact.

To these ends my invention consists in coating the otherwise bare copper surface of the wire with a thin adhesive layer of graphite or other form of carbon analogous to graphite in the particulars desirable for the purposes of my invention, and further, in combining with a wire, thus protected, a similarly protected contact roller, or other analogous contact device.

In the accompanying drawings Figure 1 represents a vertical section through a conducting wire and a preferred construction of trolley roller, the entire surface of the wire and contact surface of the roller being coated in accordance with my invention. Fig. 2 represents a side view of the same, and Fig. 3 represents a side view of one of the segments which form the coating of the trolley.

In said drawings A represents the wire, and a, the coating which is combined therewith.

I prefer to apply this coating by some one of the following methods, viz: Where graphite or plumbago is used the surface of the wire should be preferably slightly roughened and the graphite or plumbago, in a finely powdered state, pressed thereon and rubbed so as to cause it to adhere in the form of a bright, shining coating; or the graphite or plumbago may be mechanically suspended in some readily vaporized liquid and applied to the wire by means of a brush, the liquid vehicle being subsequently dried out and the deposit upon the wire consolidated by gentle friction; or a coating substantially equivalent to that produced by the use of graphite or plumbago may be applied by covering the surface of the wire with a carbonizable oil and subjecting it to the action of heat sufficient for carbonization, afterward rubbing the coating if necessary; or the coating may be deposited upon the surface of the conductor by the action of an electric current, a convenient mode of effecting such deposit being substantially as follows: The roll or reel of wire which is to receive the coating is placed on a suitable support so that it can be readily unwound and drawn through a bath of rhigolene, cymogene, naphtha or other liquid hydro-carbon. Electrodes in circuit with a proper source of electricity are applied to a portion of the wire which is immersed in the hydro-carbon bath, an inch or two apart and in such manner as to obtain a good electric contact, while permitting the wire to be drawn through slowly. Under these circumstances that portion of the wire which lies in the bath between the electrodes is raised to electrical incandescence and a coating of carbon resulting from the decomposition of the hydro-carbon liquid is deposited on the wire in the form of a firmly adhering coating resembling graphite. I sometimes use this coating of carbon without further treatment, but in order to give the same a greater flexibility and to make the deposit resemble as nearly as possible true graphite, it may be desirable to expose the coated wire heated to a high temperature in a chamber containing nitrogen or some similar inert gas. Any of these methods may be employed with satisfactory results, and I do

not limit my claim by reference to the method of application of the carbonaceous material, it being only essential that the coating should be so closely adhesive as to be substantially
5 integral with the surface of the conductor.

The protected trolley wheel or traveling conductor is preferably constructed as shown in the drawings, where B represents a metallic wheel having a deep circumferential groove.
10 Segmental graphite plates, *b*, fit snugly within the circumferential groove of the wheel and are secured by means of lateral pins *c*, and radial pins *d*.

Preferably four graphite segments are used,
15 and when thus applied they constitute a complete facing for the circumferential groove, in electrical contact throughout with the mass of metal of the wheel and adapted to run beneath or upon the conducting wire. Obviously, the entire wheel itself might be made of graphite or of any of the artificial compounds containing graphite in sufficient quantity to form a conductor of low electric resistance. In such case an excess of graphite
25 is preferably placed in that region where the contact is to occur. As in these cases, the wheel may be constructed in the ordinary and well known form used for that purpose. I do not deem it necessary to show the same
30 in the drawings or to describe it in detail.

A primary feature of utility in the combination, with the graphite coated wire, of a contact device having a graphite surface, lies in the fact that the rubbing or sliding action
35 of the contact device against the wire tends to preserve the integrity of the graphite coating upon the wire itself and also maintains it in a polished condition, so that the lubricating properties of the graphite for avoidance
40 of friction are utilized in the highest degree.

Although I have described my invention as especially valuable in conductors for electric railways, its permanency, cheapness and ease of application render it adaptable for use in
45 other exposed conductors, such as telegraph, telephone or other wires, where protection alone is desired.

I have used the term graphite in the fore-

going specification as indicative of the general type of carbon desirable for my invention, but it must be understood that I do not limit my claim to the natural variety of carbon, which is known technically in the arts as graphite, but I mean to include any equivalent form of carbon, or carbon compounds,
55 having substantially the qualities indicated as necessary in the foregoing description.

I am aware that it is not new to insert a metallic strip within a rigid mass of carbon, and I am also aware that it is not new to construct
60 contact devices of carbon, or to insert a mass of carbon in a metallic seat forming part of a contact device. These instances of the use of carbon are entirely foreign to that contemplated by my invention.
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The covering of a conducting wire or strip by a mass of carbon of substantial body, would of course occasion a corresponding increase of resistance, if contact is to be made with an external object. My invention contemplates
70 a mere coating, enveloping the conductor, without material increase of resistance when a contact piece is presented thereto. Hence I wish it to be understood that I do not claim broadly the use of carbon in combination with
75 inclosed or adjacent material. Nor do I claim the use of a carbon contact device, save in the combination hereinafter set forth.

Having thus described my invention, I claim—
8c

1. As an improvement in electrical conductors, the combination of a contact wire with a thin, pliable, continuous, adhesive, permanent, weather-protecting coating of carbon substantially integral therewith.
85

2. The combination with a conductor having a thin, pliable, continuous, adhesive, permanent, weather-protecting coating of carbon, substantially integral therewith, of a contact device having a contact surface of
90 substantially the same material as said coating, as and for the purposes set forth.

EDWIN J. HOUSTON.

Witnesses:

JAMES H. BELL,

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