

No. 640,363.

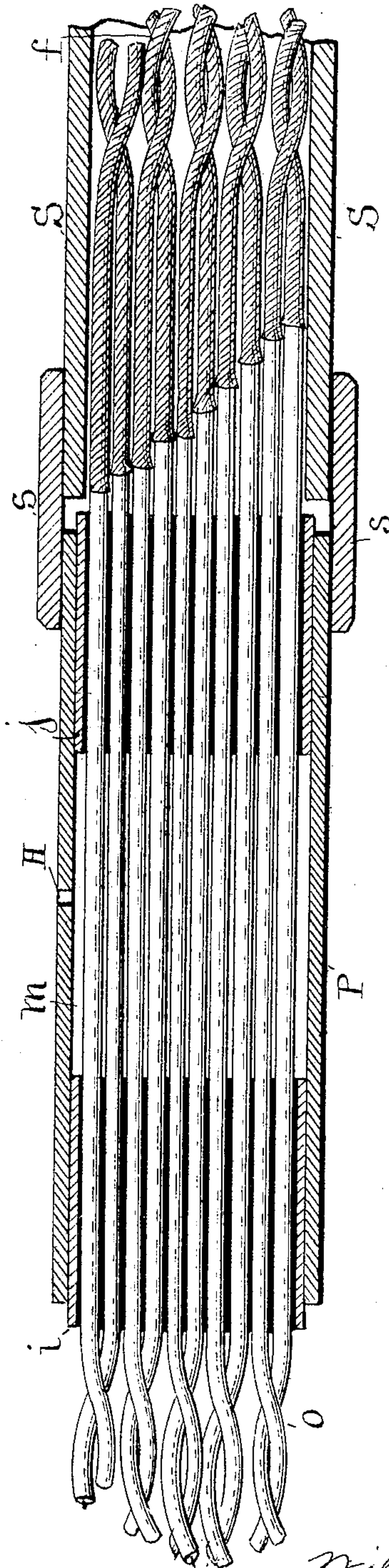
Patented Jan. 2, 1900.

W. L. CANDEE.

TERMINAL FOR ELECTRIC CABLES.

(Application filed Feb. 16, 1899. Renewed Nov. 10, 1899.)

(No Model.)



WITNESSES:

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TERMINAL FOR ELECTRIC CABLES.

SPECIFICATION forming part of Letters Patent No. 640,363, dated January 2, 1900.

Application filed February 16, 1899. Renewed November 10, 1899. Serial No. 736,537. (No model.)

To all whom it may concern:

Be it known that I, WILLARD L. CANDEE, of the city of New York, (Brooklyn,) county of Kings, State of New York, have invented
5 certain new and useful Improvements in Terminals for Electric Cables, of which the following is a specification.

My invention relates to cables composed of a number of electric conductors individually
10 insulated from one another by a braid of fibrous substance or by a wrapping of paper or other like material, constituting an insulating material possessing strong features of merit, but susceptible to attack or injury from
15 moist air. A series of such insulated conductors are usually incased air-tight in an impermeable sheath or tube, such as lead pipe. The insulation is thoroughly dried and there is a continually-varying degree of pressure
20 within the tube or pipe as compared with atmospheric pressure. In the process of transporting and of laying such cables in position great care must be exercised to prevent the exposure of the ends of the cable to air and
25 moisture, which is readily taken up by the fibrous covering and will follow along the conductors by capillary action, aided by variations with respect to atmospheric pressure. The result of this is to impair or destroy the
30 insulation to a greater or less extent, according to the amount of moisture absorbed. Where this occurs, it is a source of trouble and expense, frequently necessitating cutting out and replacing defective portions. To
35 avoid this difficulty in a measure and to supply a portable terminal, it has been proposed to cover the end of the cable with a metallic cap; but this is serviceable only during transportation, since the cap must be removed
40 when the cable is laid to expose the ends of the several wires to be united, as to an adjacent section. During this latter operation the ends of the wires are necessarily exposed, and if the ground be moist or if the atmosphere is charged with moisture, the damage
45 will be as great as if no metallic cap had been employed.

The present invention is an improvement upon the cable-terminal shown and described
50 in United States Letters Patent No. 428,745, dated May 27, 1890, granted to me, where the invention consists in surrounding the several

wires of the cable for a certain distance from the end of the section with a waterproof substance or compound, so as to fill the interior
55 of the protecting sheath or casing, the waterproof material acting as a plug or dam to prevent the passage of air and moisture.

The object of my present improvement is to more perfectly secure the result sought to
60 be attained by the improvement described in said Letters Patent and to provide against longitudinal movement of the cabled conductors within the pipe or protecting-sheath.

My improved cable-terminal consists of a
65 length or section of cable composed of a series of conductors covered with a form of insulating material of a fibrous nature—like cotton, paper, or similar material—having strong features of merit, but susceptible to
70 attack by air or moisture—that is to say, damp air or water may follow along through the insulation or between the insulation and the conductors. I combine a terminal section with this cable composed of a series of
75 conductors coated with an insulating material not susceptible to the described form of attack—such as okonite, rubber, gutta-percha, or similar materials. The two sections are electrically united at a point inside
80 the impervious sheathing of the cable, which is usually lead pipe. At a point on the section of okonite or similarly insulated conductors I place two fixed sections of impervious insulating material, which may be of the
85 same nature as the insulating material of the conductors. These sections are fixed in position and project from the surfaces of the insulated conductors, uniting the coating of these separate conductors together and, in effect,
90 constituting two impervious dams separated by a space of a few inches. This space I inclose with a section of impervious material, like a section of lead pipe. There is an opening or aperture in this pipe-section, and I fill
95 the inclosed space by pouring in molten metal, such as lead, having a comparatively low melting-point until the space is completely filled. The molten metal will adhere to the interior of the pipe-section and to the
100 surfaces of the insulated conductors, holding them fixed against longitudinal displacement. The described metal section, with the two dams or sections of insulating material, con-

stitutes a solid impervious section which cannot be longitudinally displaced.

The accompanying drawing illustrates my invention.

5 *f* shows a series of cabled conductors of any length covered with fibrous, paper, or similar insulation.

S is a sheath or cover of lead pipe.

10 *o* is a short section of cable consisting of a series of conductors coated with okonite, rubber, gutta-percha, or similar material.

15 *i* and *j* are fixed sections of insulating material, preferably of rubber, okonite, or gutta-percha, projecting from the surface of the insulated conductors *o*, filling the space between the surfaces of such conductors. These sections are located on the section of cable *o*. They are from three to six inches apart and are united upon the exterior by a section of 20 impervious material, like a section of lead pipe *P*, the opposite ends of which make impervious junctions with insulating-sections *i* and *j*, respectively.

25 *H* is a hole or aperture in the wall of the pipe-section *P*. Through this hole or opening a molten metal *m*, having a comparatively low melting-point, like lead or a composition or alloy of metals having a low melting-point, is run into the space until it is 30 filled. The molten metal as it cools will adhere to the interior surface of the pipe-section *P*, and as it fills the interstices between the cabled conductors longitudinal displacement of the pipe-section with respect to the 35 conductors *o* is prevented, while the passage of air and moisture is rendered impossible by the presence of the described section of metal together with the insulating-sections *i* and *j*. The space between the pipe-section *P* and 40 the sheathing *S* is covered by a section of pipe *s*, united at its ends to the pipe-section *S* and *P* by a wipe-joint or some equivalent therefor.

I have shown only ten insulated conductors 45 in the cable; but I may employ any number.

It will be seen that in a cable having a ter-

minal constructed as shown and described it will be impossible for moisture to gain access to the fibrous or similar covering on the conductors *f*, so as to impair the insulation or 50 change the electrical condition, even when the end or terminal is exposed, and the insulated conductors cannot be longitudinally displaced within the sheathing.

What I claim, and desire to secure by Letters Patent, is—

1. A section of cable composed of a series of conductors covered with a form of insulating material susceptible to attack by air or moisture combined with a terminal section of 60 cable composed of a series of conductors coated with an insulating material less susceptible to attack by air or moisture, an electrical connection between respective conductors of the two sections, two separated sections of insulating material located upon the 65 last-named section of conductors and projecting from the insulated surface thereof, an impermeable shell or casing united to said insulating-sections, respectively, and a section 70 of metal having a low melting-point filling the space between said insulating-sections, substantially as described.

2. A section of cable composed of a series of conductors covered with a fibrous, paper 75 or similar form of insulation, a terminal section of cable therefor composed of a series of conductors coated with okonite, rubber or similar form of impervious insulation, electrical junctions between the conductors of the 80 two sections, respectively, two sections of insulating material fixed at adjacent separated points on the surface of the impervious insulating material, an impervious pipe-section joined to said insulating-sections to form an 85 inclosure and a section of metal having a low melting-point filling said inclosed space, substantially as described.

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Witnesses:

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