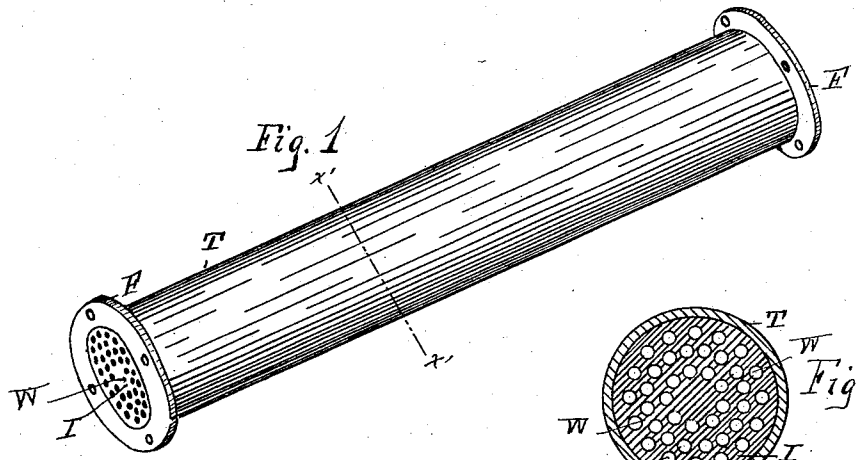
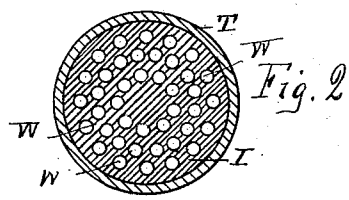
(No Model.)

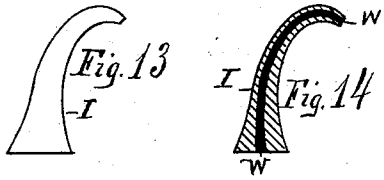
R. F. SILLIMAN.

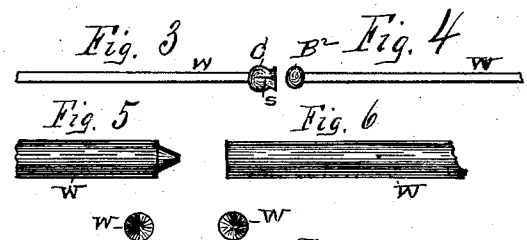
UNDERGROUND CABLE FOR TELEGRAPH WIRES.

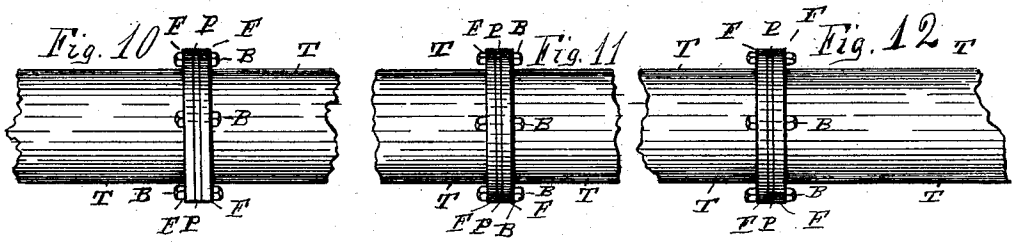
No. 366,263. Patented July 12, 1887.

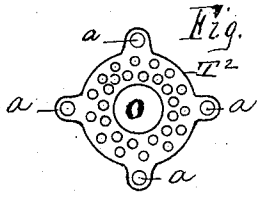












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UNITED STATES PATENT OFFICE.

ROBERT F. SILLIMAN, OF TROY, NEW YORK.

UNDERGROUND CABLE FOR TELEGRAPH-WIRES.

SPECIFICATION forming part of Letters Patent No. 366,263, dated July 12, 1887.

Application filed June 19, 1886. Serial No. 205,600. (No model.)

To all whom it may concern:

Be it known that I, ROBERT F. SILLIMAN, of the city of Troy, county of Rensselaer, and State of New York, have invented a new and useful Improvement in Underground Cables for Telegraph-Wires, of which the following is a specification.

My invention relates to a composition of material and an applied means for insulating and inclosing a series of telegraph-wires that form an underground cable.

My invention has for its object a perfect and permanent insulation of the wires, their arrangement within an inclosure by which they are perfectly protected from moisture, and their adaptation as thus arranged to be taken out in sections for repairs should the latter become necessary.

Accompanying this specification to form a part of it there is a sheet of drawings, containing fourteen figures illustrating my invention, with the same designation of its parts by letter-reference used in all of them.

Of these illustrations, Figure 1 is a perspective of a connecting-length of my improved telegraph-cable. Fig. 2 is a cross-section of the same taken on the line x' x' of Fig. 1. Fig. 3 shows one of the cable-wires and coupler end adapted to connect with the coupler end of the wire shown at Fig. 4. Figs. 5 and 6 show a modification of the coupler ends of the wires. Figs. 7 and 8 indicate the coupler ends of the wires shown in the modification illustrated at Figs. 5 and 6. Fig. 9 illustrates the form of a templet-plate used to set the wires. Figs. 10, 11, and 12 designate broken-out lengths of the cable. Fig. 13 shows a wire coated with my improved insulating means; and Fig. 14 shows a section of wire and coating illustrated at Fig. 13.

The several parts of the mechanism thus illustrated are designated by letter-reference, and the function of the parts is described as follows:

The letter T designates a tube in which the wires and insulating material are placed. These tubes or pipes are made with end flanges, F, for connecting the sections by bolts B, and the letters P designate a ring of packing placed between the flanges of each section.

The letters W designate the wires, of which there is a series for each section. These wires of each section, at one end of each, are threaded to receive a coupler-cup, C, that is made with a slit, *s*, so that it can be spread apart to receive and close around the boss end B^2 of the connecting-wire of another section. Each wire of the series has upon one end a split coupler-cup, C, and at the other end a boss or knob, B^2, and the coupler ends of the wires are all arranged at one end of the tube or pipe T and the boss or knob ends of the wires of the series at the opposite ends of the tube, and so arranged that when the tube-lengths containing wires thus constructed are brought together for connection the boss ends will come coincidently in line with the coupler-cups of the adjacent section.

For insulating the wires within the connecting-tube lengths, I employ the following material: Powdered mica, which is made into a pasty or thick liquid form by caustic potassa or caustic soda, and to apply this material to the wires within the tube T the following means are employed: The wires, under sufficient tensile strain to keep them straight, are arranged within templet-plates T^2, with one of the latter for a uniform gage, as to the interior arrangement of the wires, connected with the flanges F of each end of the pipe or tube T by means of the pins entering bolt-holes of the flanges and the registering and corresponding apertures, *a*, of the templet-plates, while the wires of each connecting-length of the cable are thus placed, so that they are properly separated within the tube and at each end of the latter arranged in parallel coincidence by means of said templet-plates thereat. Then through the opening O, made in the templet-plate T^2 of that one of them which is at the top of the latter, with the tube standing on its end, and the opening in the lower templet-plate being closed, the insulating material before described is poured in. When this composition has become set, each section of the tube T is dried and then inserted in a furnace, where it is heated to a red heat, so as to cause a union of the alkali and the natural silicates. After the sections have been thus baked in a furnace the bosses and split coupler-cups are screwed onto the opposite threaded ends of the wires, as before described, (the templet-plates hav-

ing been removed,) and by the register made by the holes in the flanges F the boss end of each wire is brought coincidently in line with the coupler-cup end of the wire of the adjoining tube-length, in which condition the wires of any two sections are connected. To allow for the projection of the boss and coupler ends of the wires beyond the insulation I, the packing P is arranged between the flanges, so that when the latter are connected by the bolts the connection of the wires will be insured, and to prevent moisture from entering the front space between the tube-sections pitch or other material may be externally applied to the packing and flange-joints.

Where it is desired to insulate wires forming a part of electrical apparatus, the wires are coated with the same mixture that is applied to insulate the wires arranged in the tube sections, and when dry the wires thus coated are subjected to a red heat, by which the insulating material is fused onto the wire, as shown at Figs. 13 and 14. The material which I employ to insulate the wires of an electrical circuit may be applied to coat the wires of other forms of underground cables, where it is composed of substantially the same material and combined by the same or equivalent agencies.

The cable thus arranged and containing the wires insulated by the material, substantially as described, is durable and easily taken up in parts and put in place, and where lateral branches are required the wires may pass out between the flange ends of the tube-sections by a wire of the series connecting with one within a gas-pipe insulated by the same means employed to the series of them within the cable-tube.

If desired, the cable may be laid in the ground or within an outer conduit of drain-pipe or metal.

In Figs. 5, 6, 7, and 8 of the drawings I have shown a modified construction of the socket and boss connection of the ends of the conductors. Instead of a cap to take the boss I have formed one end with a socket, and the other end formed to set within a corresponding socket in the conductors of the next adjacent section.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A means for insulating wires, consisting of a coating of powdered mica that is mixed with caustic potash or soda, and applied to the wires in a plastic state, and when dried subjected to the action of heat, substantially in the manner set forth.

2. The combination of an outer casing or tube having flanged ends, an insulating mass within the outer casing, and conductors arranged in the insulating mass, and having one end formed to take and hold the end of a conductor in the next section of tubing, and the other end formed to set within the formed end of the conductors, substantially as described, and for the purpose stated.

3. The combination of an outer casing or tube having flanged ends, an insulating mass within the outer casing, and conductors arranged within the insulating mass and formed at one end with a split cup and at the other end with a boss, substantially as described, and for the purpose stated.

4. The combination of an outer casing or tube formed with end flanges, an insulating mass within the casing, consisting of powdered mica and caustic potash, and conductors arranged in the insulating mass and formed at one end with a split cup and at the other with a boss, substantially as described, and for the purpose stated.

5. The sectional conductor herein described, consisting of a conducting-body formed at one end with a split cup and at the other end with a boss, for the purpose stated.

Signed at Troy, New York, this 15th day of June, 1886, and in the presence of the two witnesses, whose names were by them hereto written.

ROBERT F. SILLIMAN.

Witnesses:
CHARLES S. BRINTNALL,
W. E. HAGAN.