

T. L. REED.
Electric Conducting Cordage.

No. 151,157.

Patented May 19, 1874.

Fig. 1.



Fig. 2.

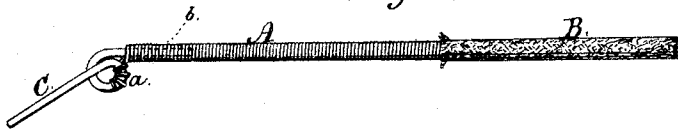


Fig. 3.

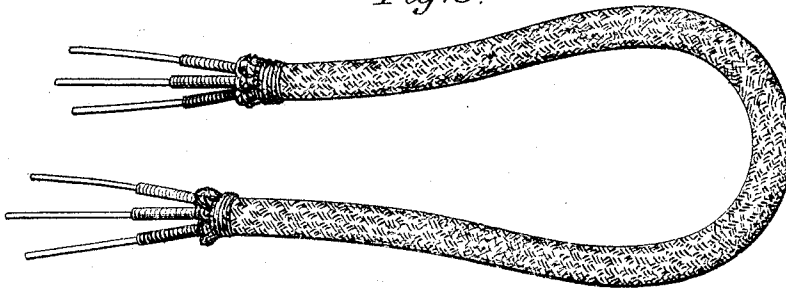


Fig. 4.

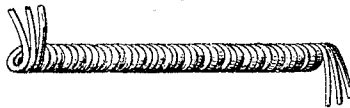
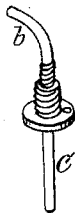


Fig. 5.



Witnesses.
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UNITED STATES PATENT OFFICE.

THOMAS L. REED, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF ONE-HALF HIS RIGHT TO EUGENE F. PHILLIPS, OF SAME PLACE.

IMPROVEMENT IN ELECTRIC CONDUCTING CORDAGE.

Specification forming part of Letters Patent No. **151,157**, dated May 19, 1874: application filed December 15, 1873.

To all whom it may concern:

Be it known that I, THOMAS L. REED, of the city and county of Providence, in the State of Rhode Island, have invented certain new and useful Improvements in Electric Cordage; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and accurate description thereof.

My improvements relate to that general class of electric cordage which is employed in connection with switch-boards of electro-magnetic telegraphic apparatus, but more particularly to such as is used in connection with electro-magnetic therapeutic apparatus. My invention consists in combining a metallic conducting-wire, which is closely coiled spirally with an insulating covering or jacket of fibrous or textile material, which is sufficiently non-elastic to admit of the undue extension of the coiled wire; and, also, in the combination therewith, of a solid terminal tip for operative connection with the electrical apparatus with which it is to be employed. The object of my invention is to produce insulated electric cordage, which, while possessing the requisite conducting powers, will be capable of being roughly handled, and bent or coiled in the smallest possible space without undue liability of injury thereto, and which will readily reassume its original or normal condition after having been bent or coiled, and also to so combine the terminal tips therewith that all longitudinal strain on the cordage, when connected with its apparatus, will be borne by the exterior insulating-jacket, and thereby practically prevent the coiled conductor from being unduly extended.

Referring to the drawing, Figure 1 represents a piece of my improved electric cordage with its terminal tips. Fig. 2 represents a short length of the cordage with the coiled conductor exposed with a terminal tip connected therewith. Fig. 3 represents a short piece of switch-board cordage, in which several separate conductors are embodied. Fig. 4 represents a portion of the compound coil within the cordage, shown in Fig. 3. Fig. 5 shows a terminal tip of slightly-different form.

The electric cordage represented in Figs. 1 and 2 is particularly intended for therapeutic apparatus. The conductor A is preferably to be a copper wire of suitable size and closely coiled. If after being coiled it should be found to be objectionably hard it should be fully softened by annealing. The insulating-jacket B is braided or woven in well-known machines adapted to the purpose, and may be composed of silken threads closely laid, which affords a neat appearance, and is a good insulating medium. In braiding care should be taken not to unduly extend the coil, and also to lay the braid as closely thereon as may be practicable. The terminal tips C can be economically made of solid wire, having a diameter equal to the interior of the coiled conductor, and a single eye forming a shoulder, as at *a*, by means of a simple flat coil in the wire, as shown in Figs. 1 and 2. Another form is shown in Fig. 5. However formed, the neck *b* is inserted into the interior of the coil up to the shoulder, and it is so curved as to prevent any square bend of the coil at the end of the tip. With the tips shown in Figs. 1 and 2, the end of the coiled wire is extended spirally around the tip at the eye *a*, as shown, whereby a complete electric connection therewith is attained. The jacket is firmly secured at the end to the tip independently of the coiled conductor, so that any undue longitudinal strain on the cord will be wholly borne by the jacket and the tip. When connected with the tip shown in Fig. 5, the coil is entered by the neck *b*, and an exterior screw-thread at the base of the neck enters and engages with the coils of the wire, the end of which is passed through a hole in the tip and completely secured by a few additional coils on the shank. The jacket is then pressed over the corrugated neck of the tip, and securely tied thereto by silken threads. In each of these instances shown, the longitudinal strain on the cord is wholly borne by the jacket, and hence the inclosed coil cannot by any possible means become unduly extended or injured.

The switch-board cordage, represented in Figs. 3 and 4, is made in the same manner, although preferably with somewhat heavier wire, and, being subjected to a different usage, will

preferably be insulated with a cotton or linen jacket, and the finishing and insulating material described in Letters Patent issued to me on the 18th day of November, 1873.

It is frequently desirable that switch-board electric cordage should contain several different conducting-wires. This article will be made by massing side by side the several wires which have previously been insulated by suitable jacketings.

In order to readily recognize the respective ends of each wire without the necessity of testing, jackets with a distinctive color will be employed on each wire. The projecting insulated ends of these wires are knotted together, and the exterior jacket, which is common to them all, is drawn tightly over the knot, and the several threads united by transverse ties, so that, as described in connection with the tips, all longitudinal strain will be borne by the jacket. In the therapeutic cordage, with the single uninsulated wire in coil, a continuous connection will be afforded from coil to coil, at all points where they are in close contact.

In referring to the jacket as being practically non-elastic, I do not wish it to be understood that a braided tubular fabric will not stretch when strained, but that when closely surrounding the coil, which prevents its collapsing, it is practically non-extensible by reason of the interior support received from the coil, and that by being slightly stretched it will closely embrace the coil, and be thereby prevented from undue objectionable extension.

I am well aware that heavy submarine telegraphic cables have been made with interior coils of round and flattened metallic conductors, both with and without a core; but such

an article is wholly unfit for use as electric cordage, and has never to my knowledge been incased in a tubular braided or woven jacket. I am also well aware that electric cordage has heretofore been made by inclosing a number of fine electric uninsulated conductors in mass with a braided or woven jacket; but such cordage, when bent, cannot reassume its straight condition, and from frequent bendings the strands of wire become broken, as by such frequent direct bending the metal becomes hardened and brittle. I am also still further aware that electric cordage has also been made by winding the metallic conductor around a central corded core in an extended or open spiral line, and covering the same with strands of fibrous matter laid longitudinally, and securely bound by exterior strands laid spirally; and also that cord and wire of that character have been incased in a braided jacket. I therefore disclaim all cordage so constructed; but

Having described my invention, I claim as new, to be secured by Letters Patent—

1. Electric cordage for switch-boards, and electrical therapeutic apparatus composed of a metallic conductor closely coiled with a tubular interior, and embraced or inclosed in and by an insulating-jacket of braided or woven fibrous material, substantially as described.

2. The combination, with a spirally-coiled metallic conductor, of a terminal tip, which is provided with a neck for entering the tubular interior of the coil and a shoulder for connection therewith, substantially as described.

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Witnesses:

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