

(No Model.)

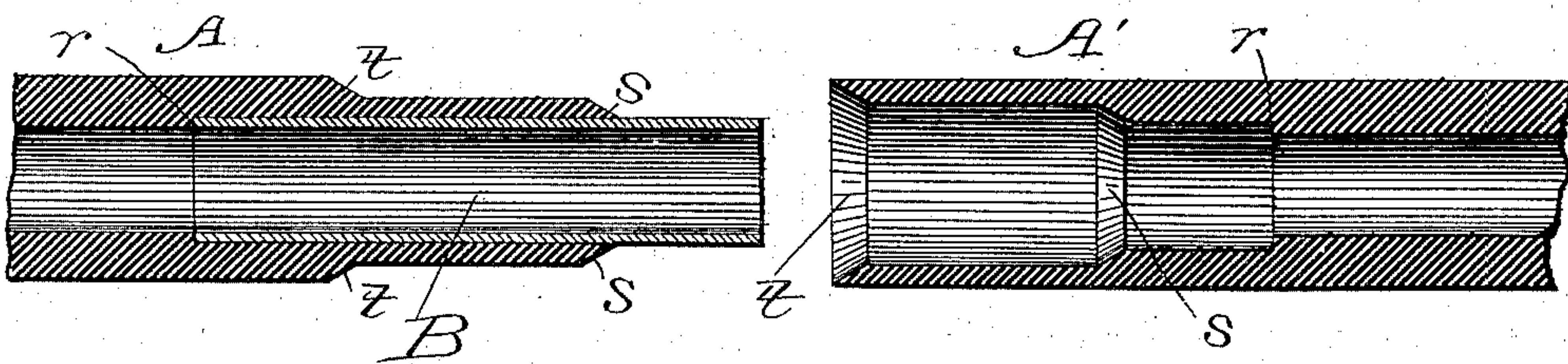
H. B. COBB.

INSULATING TUBE FOR ELECTRIC WIRES.

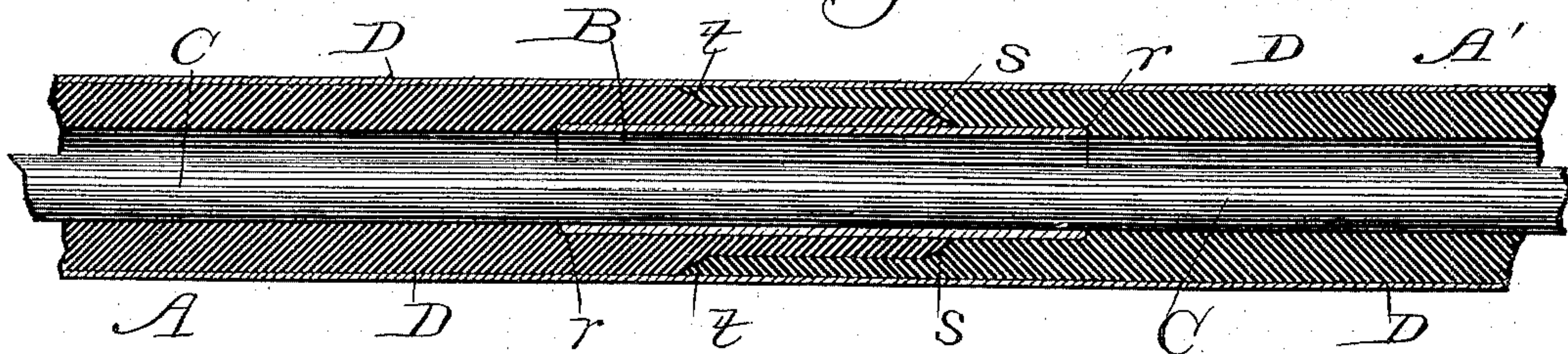
No. 330,873.

Patented Nov. 24, 1885.

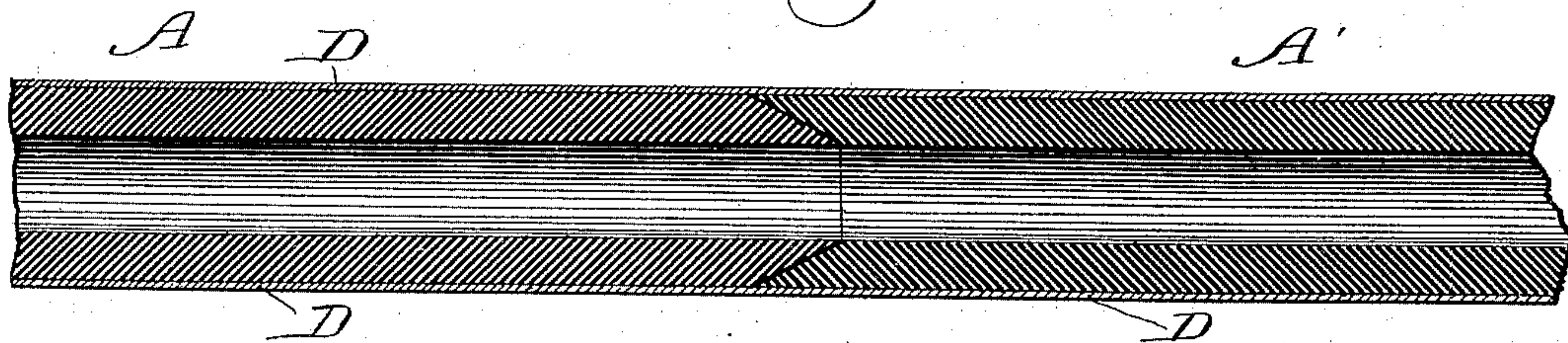
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

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## INSULATING-TUBE FOR ELECTRIC WIRES.

SPECIFICATION forming part of Letters Patent No. 330,873, dated November 24, 1885.

Application filed February 14, 1885. Serial No. 155,887. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY B. COBB, a citizen of the United States, residing at Wilmington, in the county of Newcastle and State of Delaware, have invented certain new and useful Improvements in Insulating-Tubes for Electric Wires; and I hereby declare the following to be a full, clear, and exact description of the same.

My present invention is in the nature of an improvement for use in the application of the improvement in a system of laying subterranean lines of electric wires, for which Letters Patent of the United States, No. 288,310, were granted to me November 13, 1883.

The object of the invention set forth in my aforesaid patent is stated therein to be to dispense with metallic tubes, which inclose insulating-tubes, as described in Letters Patent of the United States, No. 288,311, granted to me November 13, 1883, for a new and improved system of laying subterranean lines of electric wires by providing the insulating-tubes, through which separate wires are passed, with a close and permanent coating of metal.

To practice the system involving the improvements described and claimed in my patent first herein referred to, it becomes necessary to provide great lengths of the insulating-tubing for the incasement of electric wire, which is accomplished by uniting sections together until the desired length of tubing is produced.

Wherever sections of insulating-tube have heretofore been coated with metal and joined together, the metal coating has terminated at each end of the joint, as represented in my former patents referred to. To effect proper junction of these sections, whereby the joints connecting them shall be impervious to air and moisture, and whereby at the same time clumsiness in their construction may be avoided, are, particularly the first-named, all-important requirements, since, unless the inclosed wire is completely insulated, in the sense that complete insulation is understood to mean in the art, the system to which the present invention relates, as aforesaid, is rendered defective; and to construct joints sufficiently impervious has always been found a matter of great difficulty. This difficulty is completely overcome by my present invention, which con-

sists, broadly, in uniting the sections by a suitable joint, and providing the exterior with a coating of metal extending from section to section over the joint.

My invention consists, further, in the preferred construction of the joint shown in the first two figures of the accompanying drawings, in which—

Figure 1 is a longitudinal section of two broken sections of tubing formed of insulating material, one having inserted into one end a short metallic connecting-tube and constructed to form the male portion of a joint, while the other is constructed to afford, toward its end adjacent to the male portion of the joint upon the first-named section to receive the latter, a female portion narrower in diameter than the male portion and through which the short connecting-tube is inserted into the adjacent section of insulating-tubing; and Fig. 2 is a similar view representing the parts shown in Fig. 1 joined together by shrinking the female portion of the joint upon the male portion and having the exterior surfaces of the insulating-tubing and the line of their junction coated over with a continuous close covering of metal and incasing an electric wire. Fig. 3 of the drawings represents, in longitudinal section, a modified construction for the joint, which illustrates my broad invention in perhaps its simplest practicable form.

A and A' are broken sections of tubing composed of insulating material, preferably in the form of hard rubber. As shown, the part A is reduced toward one extremity to provide the shoulder *t*, preferably beveled, as shown, and the bevel *s* at its extreme end. The part A' is formed toward its extremity adjacent to that of the section A just described, to coincide internally with the shape of the reduced portion of the part A and receive the latter, affording to it a close fit by making the female portion narrower in diameter than the part which enters it, and heating the part A' to expand it, and thereby permit the insertion into it of the male portion and allowing it to shrink thereon by cooling. The opposite extremity of each section A is formed like the extremity described of the section A', and that of each section A' corresponds in construction with the described extremity of the section A.



B is a connecting-tube, preferably formed of very thin metal, and having an internal diameter equal, or nearly so, to that of the sections A and A'. The latter may be drilled out toward their extremities to the required depth and width to permit the connecting-tube B to be received into and fit snugly within them in joining them together and abut at each extremity, when the sections are adjusted together, against shoulders *r* provided in the drilling out, whereby the inner surface of the connecting-tube shall be flush with that of the insulating-tubes, and the edges thus afford no obstruction in introducing the wire.

The incasement of the electric wire C is preferably accomplished by stringing the sections of insulating-tubing and connecting-tube upon it and adjusting the parts together in the manner described previously, if desired, coating the exteriors of the male portion of the joint and projecting portion of the connecting-tube with a suitable cement that will not absorb moisture. When a length of tubing not too great to permit ready manipulation shall have been thus formed, a close metallic coating, D, is provided, preferably by electro-deposition, to extend over the external surface afforded by the connected sections of tubing and the lines of their junction. The essential features of this joint are the interior tube, B, and the exterior metallic coating, D, which, it will be seen, would prove effective, even if the ends of the sections of insulating-tubes were not inserted one within the other, but simply met. The construction represented in the drawings, however, is the one preferred.

The modification represented in the third figure of the drawings shows a way, by far simpler than the one hereinbefore described, of joining sections of the insulating-tubing, by omitting the connecting-tube B, one end of section A being externally beveled and the coated, if desired, with a suitable cement, and the adjacent end of the section A' being internally beveled to receive the latter and produce thereof a snug fit, and coating with metal from section to section over the joint, all in the man-

ner hereinbefore described. This construction, however, owing mainly to the omission of the connecting-tube B, does not give the strength afforded by the construction of joint hereinbefore referred to as that constituting the preferred construction, and is therefore not so desirable as the latter. The two constructions, however, are generic, owing to the fact that sections are joined together and provided with a coating of metal continued over the joint, and the same would be true whatever of many possible forms of joint might be employed, provided the metal covering be continued over it.

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

1. Sections of insulating-tubing connected together at their ends and provided with a close and permanent covering of metal formed upon the exteriors of the sections of tubing and continued from section to section over the joints, substantially as described.

2. In combination with sections of insulating-tubing fitting one within the other at their ends, an internal tube, B, of tenacious material extending into both tubes, having its inner surface flush with the inner surface of the tubes which it enters, substantially as described.

3. In combination with sections of insulating-tubing fitted together at their ends, an internal tube, B, of tenacious material extending into both tubes, and a close covering of metal upon the exterior of the united sections and extending from one section to another over the joint, substantially as described.

4. In combination with sections of insulating-tube A and A', inserted one into the other at their ends, an internal connecting-tube, B, of tenacious material entering both sections, and a close and permanent covering of metal upon the exterior of the sections continued over the joint from one section to another, substantially as described.

HENRY B. COBB.

In presence of—

WM. H. DYRENFORTH,  
A. L. STANFORD.