(No Model.)

H. B. COBB.

UNDERGROUND SYSTEM FOR ELECTRIC WIRES.

No. 396,543. Patented Jan. 22, 1889.

Fig. 1.

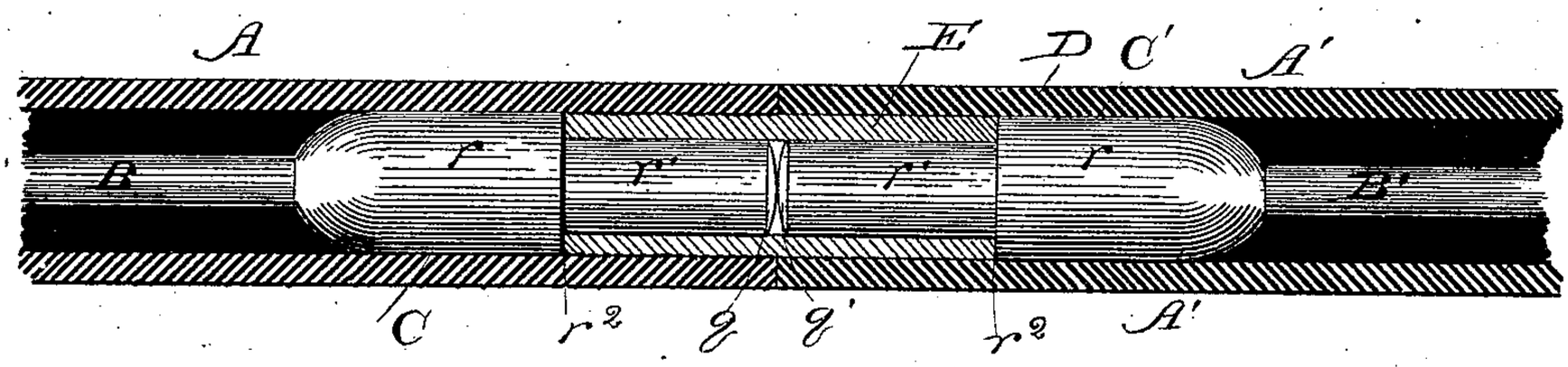


Fig. 2.

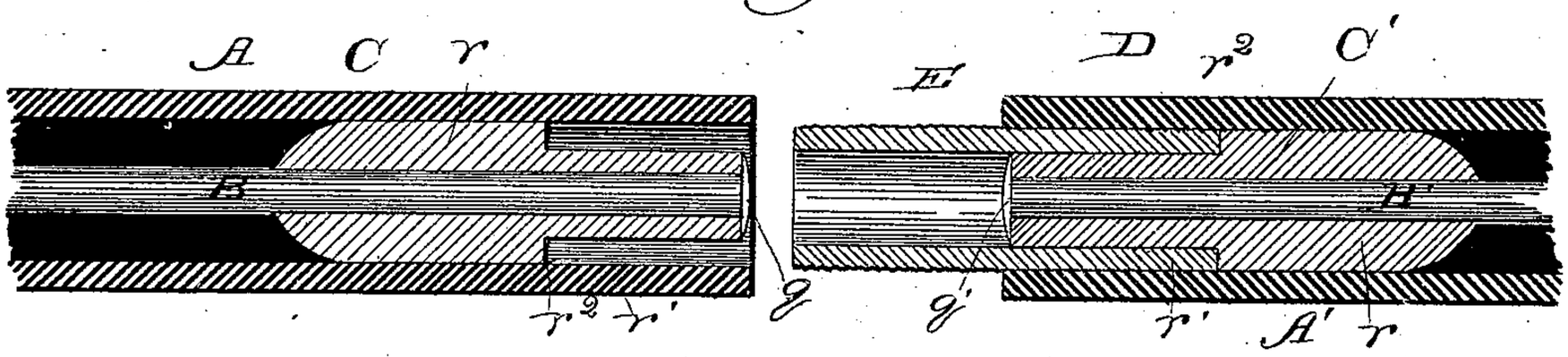


Fig. 3.

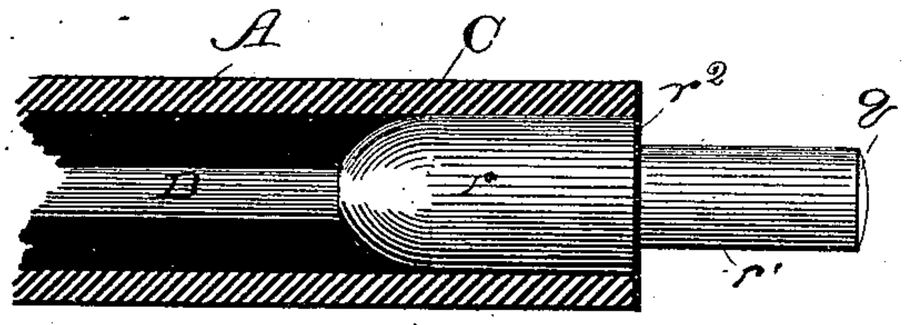


Fig. 4.

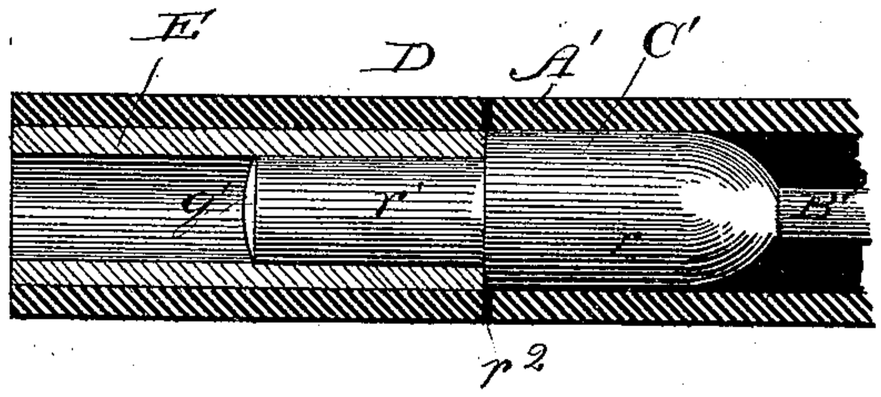
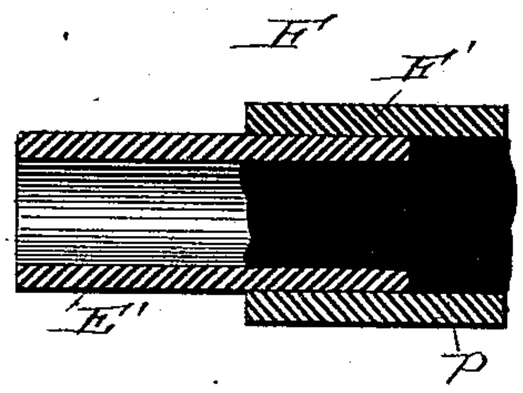
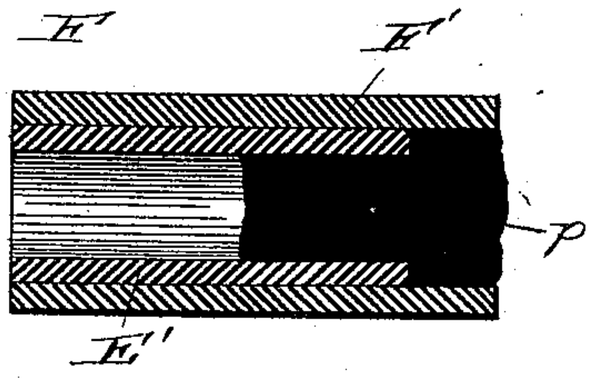


Fig. 5.





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UNITED STATES PATENT OFFICE.

HENRY B. COBB, OF WILMINGTON, DELAWARE.

UNDERGROUND SYSTEM OF ELECTRIC WIRES.

SPECIFICATION forming part of Letters Patent No. 396,543, dated January 22, 1889.

Application filed April 19, 1888. Serial No. 271,165. (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 New Castle and State of Delaware, have invented a new and useful Improvement in Underground Systems of Electric Wires, of which the following is a specification.

My invention relates to an improved construction of joint for use particularly at the man-holes or vaults in underground systems of electric wires for connecting or coupling conducting-wires.

My object is to provide a form of joint between the main wires and coupling-wires connecting them which shall produce the necessary metallic contact between the wires and at the same time afford the requisite insulation and imperviousness at the joints.

To this end my invention consists in the general construction of my improvement; and it also consists in details of construction and combinations of parts, all as hereinafter more fully set forth.

In the drawings, in which the devices are shown considerably enlarged beyond natural size, Figure 1 shows a longitudinal section of a portion of a main wire and one end of a coupling-wire, both of my improved construction, to form my joint. Fig. 2 shows the parts illustrated in Fig. 1 as separated. Fig. 3 is a similar view to that presented in Fig. 2 and representing a modified construction, and Figs. 4 and 5 are respectively longitudinal sectional views of caps to be applied to the ends of main wires like that shown in Figs. 1 and 2 or that shown in Fig. 3 when not in use.

The term "wire" used throughout this specification includes the insulation upon the conducting-wire. The insulating substance may comprise any suitable material for the purpose, though I prefer to use vulcanized-rubber tubing, and the drawings represent conducting-wires inclosed within such tubing.

A is a vulcanized-rubber tube containing a main conducting-wire, B, and having a metal ferrule, C, comprising a body portion, r, of a size to fit snugly within the tube, and a cylindrical portion, r', producing a shoulder, r^2, between the two parts r and r'. The ferrule C is forced into the end of the tube at its enlarged part around the conducting-wire B until the end of the part r' is flush with the end of the insulating-tube, when solder, q, is applied to the extremity to fasten the conducting-wire and ferrule together.

D is the coupling-wire, comprising a section of vulcanized-rubber tubing, A′, containing a section of conducting-wire, B′, and having a metal ferrule, C′, constructed exactly like the metal ferrule C, as shown, and which is forced into the end of the tube A′ at its enlarged part around the conducting-wire B′ until the end of the part r' is flush with the end of the insulating-tube of the coupling, when solder, q', is applied to the extremity to fasten the conducting-wire B′ and ferrule C′ together. A metal thimble, E, is forced into the tubing A′ around the reduced portion of the ferrule r' therein. If desired, the thimble may be threaded on its external surface, as shown.

One end only of the coupler D is illustrated in the drawings; but the opposite end is of identical construction therewith, so that it will be understood, without requiring further illustration, that the coupler D comprises an insulating-tube containing a section of conducting-wire and having a ferrule, C′, at each end.

To understand the application to which my improvement is especially adaptable, it is to be borne in mind that the main wires in underground conduits project at their extremities provided with ferrules C into the vaults or man-holes, or into boxes on the walls of the same. To couple two such wires together in the man-hole or vault from one conduit to another, it is but necessary to slip the thimbles E, extending from each end of the coupler D, over the ends of the conducting-wires B and reduced portions of the ferrules to be connected and into the ends of the tubes A; and before a thimble E is forced to abut against a shoulder, r^2, a suitable cement (not shown) is applied upon the thimble between the adjacent ends of the wire and coupling when such ends are forced together. The substance known as "Chatterton's compound" is a very desirable one for cementing the joint, as it does not become hard and brittle, while it is impervious to moisture and gas, is yielding, and does not

offer great resistance to the separation of the joints when desired. It will readily be seen that the coupling affords perfect metal contacts and connections between the wires coupled by it, and that when the thimbles are threaded, as described, and forced into the tubing while the latter is warm they will in cooling shrink upon the thimble and make the joint tight.

When main wires are not in use, (it being the common practice to introduce numerous wires into the conduits when the latter are laid, extending from one man-hole or vault to another, and use them only as occasion requires,) they may be protected at their projecting extremities by caps F, Fig. 4, comprising metal thimbles E′, inserted part way into short sections of insulating-tubes F′, which may be provided with a suitable filling—such as paraffine, *p*—in the head portion, as shown. These caps thoroughly protect the ends of the wires from the access of deleterious matter—such as dirt, moisture, and the like.

The modification shown in Fig. 3 differs from the construction shown in Figs. 1 and 2 only in slight details of construction, the effect being the same in each. Thus the ferrule C is driven into the tubing A sufficiently far only to cause the shoulder r^2 to be flush with the end of the tubing, whereby the reduced portion r' extends beyond the same, and the construction of the ends of the coupler D is accordingly changed by driving the ferrule C′ farther into the tubing A′, to enable the thimble inserted around the reduced portion r' to be flush at its extremity with the end of the tubing A′. For this modified construction of the ends of the main wires the form of cap shown in Fig. 5 is required, wherein the thimble E′ lies entirely within the section of insulating-tubing F′.

I do not limit myself to the particular construction of cap shown and described, since a cap of any suitable form and of any material will answer the purpose.

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

1. The combination of an insulated electric conducting-wire, B, a metal ferrule, C, surrounding the wire B near its end, an insulated conducting-wire, B′, having a metal ferrule, C′, surrounding it near its end, and a metal thimble, E, substantially as and for the purpose set forth.

2. The combination of an electric conducting-wire, B, inclosed within an insulating-tube, A, a metal ferrule, C, surrounding the wire B near its end in the insulating-tube, a conducting-wire, B′, inclosed within an insulating-tube, A′, having a metal ferrule, C′, surrounding the wire B′ near its end in the insulating-tube, and a metal thimble, E, substantially as and for the purpose set forth.

3. In an underground system of electric wires having an insulated conductor extending into a man-hole, vault, or the like, the combination, with the said conductor, of a removable and adjustable cap, F, to cover its end, substantially as and for the purpose set forth.

4. The combination of an electric conducting-wire, B, a metal ferrule, C, in a tube, A, of insulating material and surrounding the wire B near its end, and a cap, F, substantially as and for the purpose set forth.

5. The combination of an insulated electric conducting-wire, B, a metal ferrule, C, surrounding the wire B near its end, and a cap, F, comprising a section of insulating-tube, F′, having a thimble, E′, and containing a filling, *p*, substantially as and for the purpose set forth.

6. The combination of an electric conducting-wire, B, inclosed within an insulating-tube, A, a metal ferrule, C, having an enlarged portion, r, a reduced portion, r', and shoulder r^2, and surrounding the wire B near its end in the insulating-tube and secured to the said wire, a coupler, D, comprising a conducting-wire, B′, inclosed within an insulating-tube, A′, metal ferrules C′, surrounding the wire B′ near each end in the insulating-tube, secured to the said wire and formed like the ferrule C, and a metal thimble, E, substantially as and for the purpose set forth.

7. The combination of an electric conducting-wire, B, inclosed within an insulating-tube, A, a metal ferrule, C, having an enlarged portion, r, a reduced portion, r', and shoulder r^2, and inserted around the wire B into the insulating-tube to cause its extremity to be flush with that of the said insulating-tube, a coupler, D, comprising a conducting-wire, B′, inclosed within an insulating-tube, A′, metal ferrules C′, formed like the ferrule C and inserted around the wire B′ into opposite ends of the insulating-tube to cause their extremities to be flush with those of the said insulating-tube, and metal thimbles E, inserted around the reduced portions of the ferrules C into the opposite ends of the tubing A′ and extending beyond the latter, substantially as and for the purpose set forth.

HENRY B. COBB.

In presence of—
JAS. B. THOMAS,
I. F. BETTS.