M. H ALBERGER.

Telegraphic-Conductor.

No. 211,681. Patented Jan. 28, 1879.

FIG. 1.

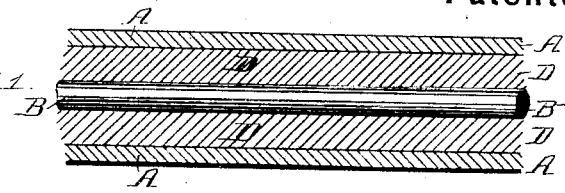


FIG. 2.

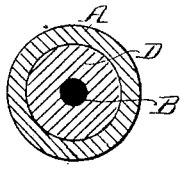


FIG. 3.

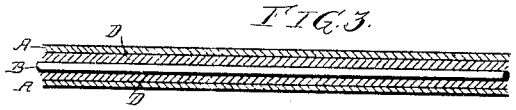


FIG. 4.

FIG. 5.

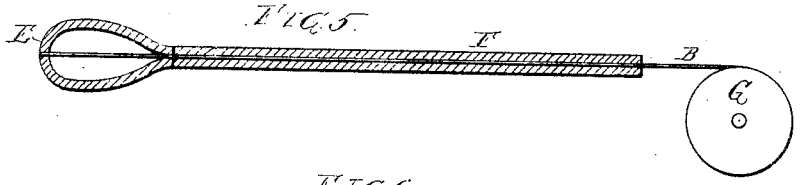


FIG. 6.

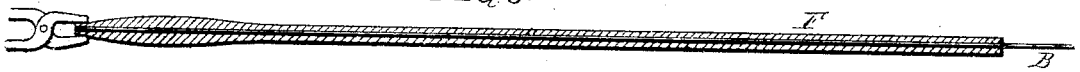


FIG. 7.

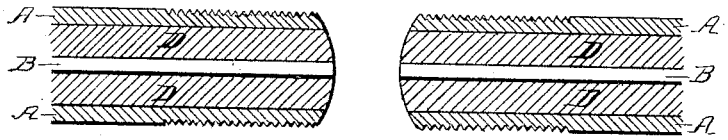


FIG. 8.

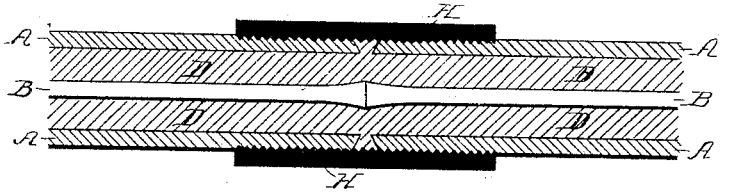


FIG. 9.

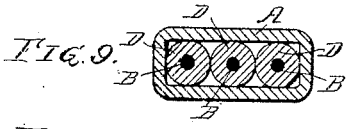
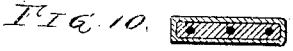


FIG. 10.



WITNESSES.

Henry Howson Jr.

Harry Smith

INVENTOR.

Morris H. Alberger-

by his Attorneys

Howson and Son

UNITED STATES PATENT OFFICE.

MORRIS H. ALBERGER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO SILAS W. PETTIT, OF SAME PLACE.

IMPROVEMENT IN TELEGRAPHIC CONDUCTORS.

Specification forming part of Letters Patent No. **211,681**, dated January 28, 1879; application filed November 4, 1878.

To all whom it may concern:

Be it known that I, MORRIS H. ALBERGER, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Telegraph-Cables, of which the following is a specification:

My invention relates to certain improvements in the manufacture of the telegraph-cable for which Letters Patent No. 201,477 were granted to me on the 19th day of March, 1878; and the objects of my invention are, first, to combine an outer tube of wrought-iron and a tube of vitreous material with a conducting-wire of superior wrought-iron or decarbonized steel, which enables me to subject the whole to such a heat that it can be reduced to a greater extent by rolling or drawing them if the conducting-wire is of copper; second, to obtain by a simple process a clothed wire for introduction into the exterior wrought-iron tube; third, to secure lengths of the cable together in such a manner as to insure perfect and permanent metallic contact of the wire of one length with that of another length and complete insulation at the junction of the two wires; and, fourth, to make a cable containing two or more wires embedded in vitreous material, which is inclosed in an outer cover of wrought-iron.

In the accompanying drawings, Figures 1 and 2 are sectional views of the telegraphic cable as it appears before it is reduced by rolling or drawing; Figs. 3 and 4, sectional views of the cable as it appears when reduced; Figs. 5 and 6, views illustrating the mode of clothing the wire with vitreous material; Figs. 7 and 8, views illustrating the mode of securing lengths of cable together; and Figs. 9 and 10, sectional views, showing the manner of making a flat cable containing two or more conducting-wires.

In carrying out the invention described in my former patent I found that in heating the outer tube of wrought-iron there was danger of melting the copper wire, and that when thus melted the copper penetrated through the vitreous material to the exterior tube of iron in reducing the cable by passing it between rolls; hence it became necessary to limit the heat so far as to render the labor of reduction by rolling or drawing tedious.

In my present improvement, I substitute for the copper conducting-wire originally used a wire of superior wrought-iron, or, what is still better, a wire of decarbonized steel. This wire B, Figs. 1 and 2, I introduce into a tube, D, of vitreous material, and the latter into a butt or lap welded tube, A, of wrought-iron. I then subject the whole to a welding heat, and while thus heated reduce it by passing it between rolls or otherwise. It may be reduced, for instance, to the extent shown in Figs. 3 and 4 without impairing the wire core B.

It is not essential in all cases that the outer casing of the cable should in the first instance be in the form of a tube. The tube of vitreous material, for instance, with its internal wire, may be inclosed in two semi-cylindrical strips or bent skelps of wrought-iron; or the tube may be surrounded by a billet of wrought-iron rods, reliance being placed upon rolling or drawing, while the skelps or rods are at a welding-heat, for a perfect union of the iron bars, and for their conversion into a perfect outer casing of the cable.

The following plan of combining the wire core with a glass tube, or rather of covering the wire with glass or other vitreous material, is preferred.

A glass-blower produces a bulb, E, Fig. 5, of glass or other vitreous material on the end of a pipe, F, in the usual manner. The wire from a neighboring reel, G, is then passed through the pipe F until its end reaches the outer end of the bulb, when an attendant, by a suitable instrument, seizes the end of the bulb as well as the end of the wire and draws both outward while the pipe is held stationary, and this is continued until a tube of vitreous material, inclosing and tightly embracing a wire core, is produced.

It will be understood that the vitreous material is at a proper heat at the commencement of the operation and retains heat sufficient to insure ductility until the conclusion of the operation.

The mode of uniting lengths of the cable together is illustrated in Figs. 7 and 8.

By an emery-wheel or other suitable device the adjoining ends of two lengths of the cable are rounded off, as shown in Fig. 7, so that the conducting-wire shall project slightly beyond the vitreous covering, and the latter beyond the outer tube; hence, in uniting the two lengths by an ordinary screw-coupling, H, the two ends are brought forcibly together, the ends of the wire cores being first compressed, then the ends of the vitreous coverings, which are crushed by the force applied, the pulverized material being compacted between the ends of the metal tubes and around the wires, where they meet each other, so that a positive and permanent metallic contact of the two wires and their effective insulation at the point of contact are assured.

In some cases it is advisable to make a cable with two or more conducting-wires, in which case it has been found necessary to flatten the tube, as shown in Fig. 9, and to introduce as many clothed wires as are required, and arrange them side by side, the whole being reduced by rolling or drawing until a compact cable, Fig. 10, is produced with wires embedded in vitreous material, and the latter enveloped by wrought-iron.

Different plans of uniting lengths of the flattened cable may be adopted.

I claim as my invention—

1. The mode described of making telegraph-cables—that is to say, inserting a wire of wrought-iron or decarbonized steel into a tube of vitreous material, enveloping the latter in wrought-iron, subjecting the whole to a welding-heat, and, finally, and while thus heated, reducing it by rolling or drawing, all substantially as described.

2. The mode described of clothing wire with vitreous material—that is to say, passing the wire into a pipe and into a bulb of vitreous material which has been formed on the end of the said pipe, then seizing both bulb and wire and drawing them outward from the pipe, all as described.

3. The mode described of uniting lengths of the cable—that is to say, by so grinding or otherwise forming the ends, which have to be united, that the wire core will project slightly beyond the vitreous covering, and the latter beyond the iron casing, then forcing the ends together by a screw-coupling or otherwise, all substantially as specified.

4. The mode described of making telegraph-cables having two or more wires—that is to say, placing the glass-covered wires side by side in a flattened wrought-iron tube, subjecting the whole to heat and to a process of reduction by rolling or drawing, all as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MORRIS H. ALBERGER.

Witnesses:

Mrs. NETTIE ALBERGER,

HARRY SMITH.