(No Model.)

E. A. KITZMILLER.

Underground Telegraph Line.

No. 235,883. Patented Dec. 28, 1880.

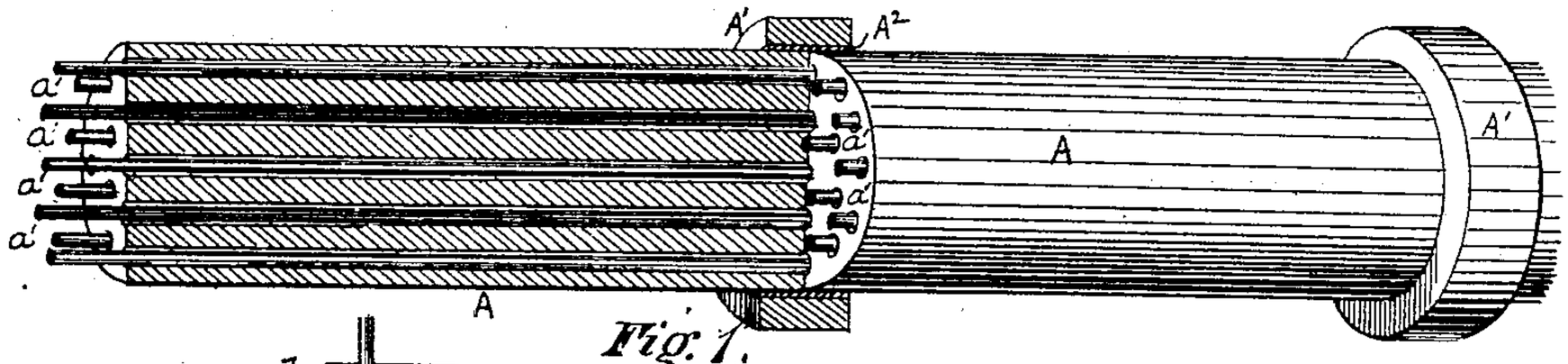

Fig. 1.

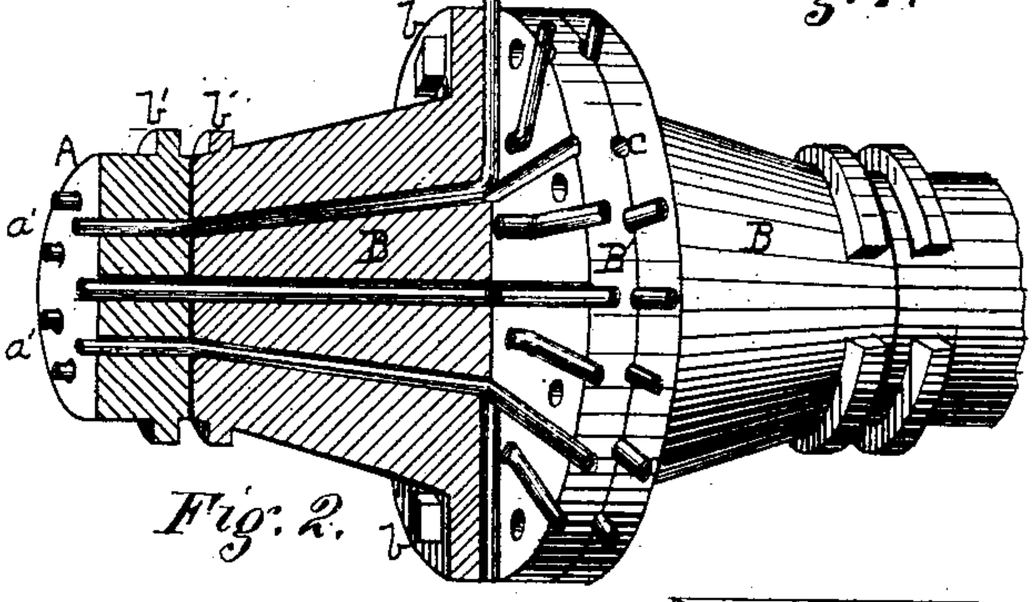

Fig. 2.

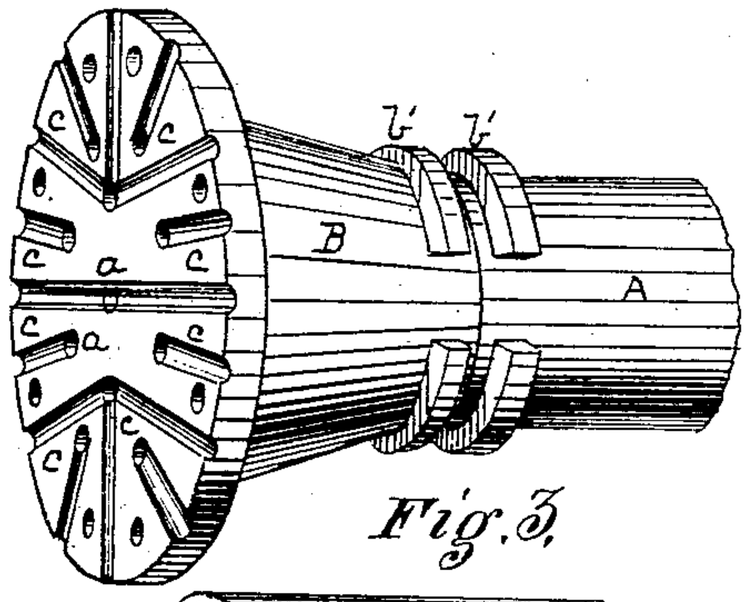

Fig. 3.

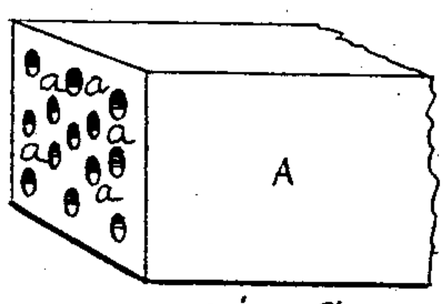

Fig. 8.

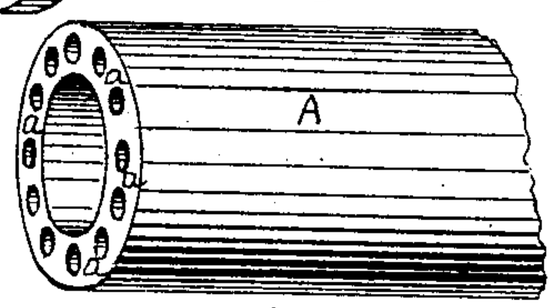

Fig. 9.

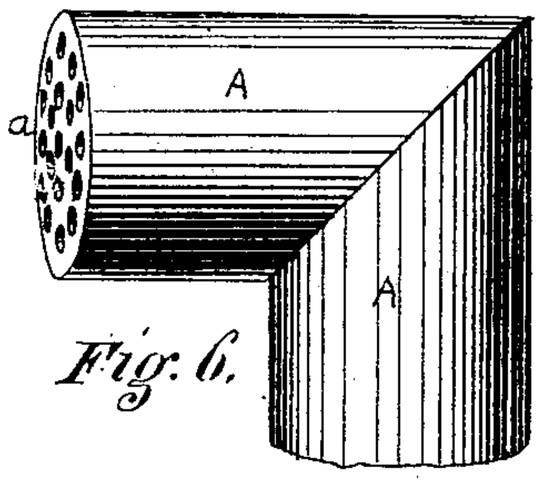

Fig. 6.

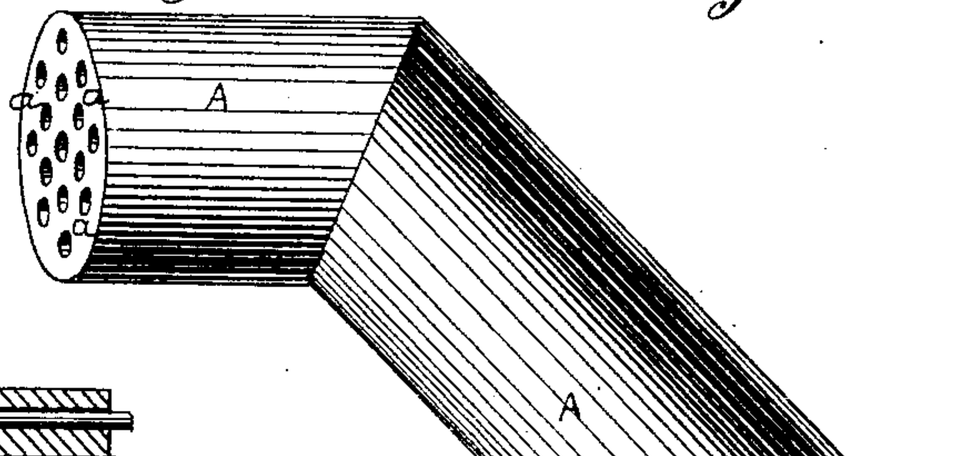

Fig. 7.

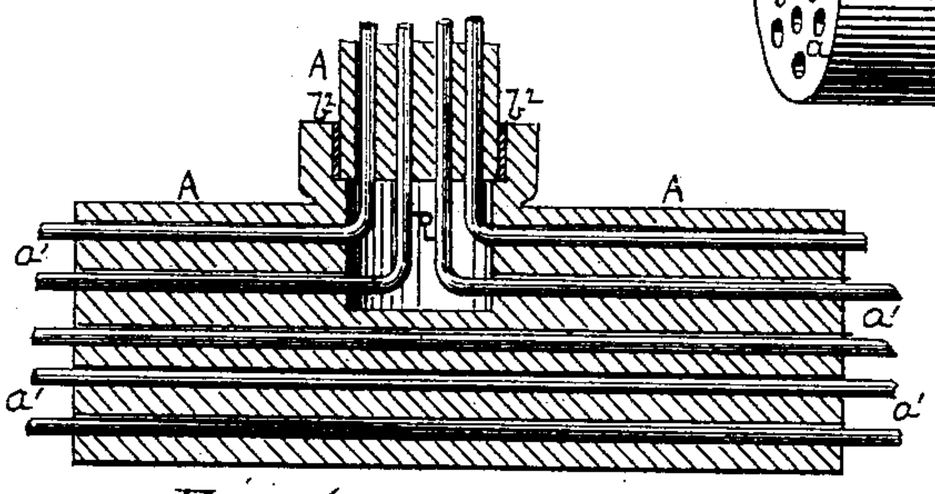

Fig. 4.

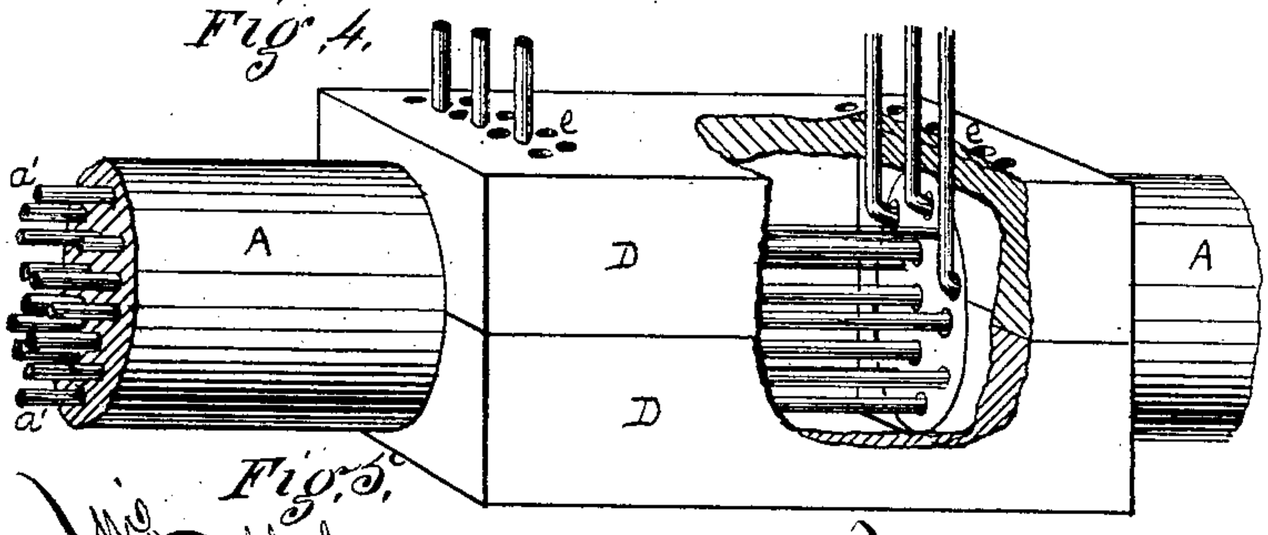

Fig. 5.

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UNITED STATES PATENT OFFICE.

EDWARD A. KITZMILLER, OF WILKINS TOWNSHIP, ALLEGHENY COUNTY, PENNSYLVANIA.

UNDERGROUND-TELEGRAPH LINE.

SPECIFICATION forming part of Letters Patent No. 235,883, dated December 28, 1880.

Application filed April 21, 1880. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. KITZMILLER, of Wilkins township, Pittsburg P. O., county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Laying and Insulating Electric Wires; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 shows in perspective, partly in section, two consecutive lengths of perforated insulating-sections for laying and insulating underground-telegraph wires, and with the wires in place. Figs. 2 and 3 illustrate a construction of joint suitable for use where it is desired to take out one or more wires at intermediate or local stations. Figs. 4 and 5 illustrate the manner of combining the sections in other joint or switch connections. Figs. 6 and 7 illustrate how the sections may be arranged in turning corners or changing directions; and Figs. 8 and 9 show modified forms of sections.

My invention relates to a system of underground telegraphy wherein the wires, in any desired number, (two, three, or more,) are independently insulated, both as regards each other and also as regards ordinary external agencies, by passing such wires through separate and independent perforations made longitudinally through a block, cylinder, or section of earthenware, stoneware, or other poor conducting material which is in a plastic state at some preliminary stage of its manufacture, and such as may be perforated while in such plastic state in such manner as to preserve or retain its perforated condition during the operation or process which imparts to it the desired degree of solidity. In connection with such system of laying wires, I employ grooved or perforated blocks, boxes, or branching sections at the joints of the main-line sections, wherever it may be desired to run in or out a line-wire or several such wires, such grooves or perforations being at right angles, or substantially so, to the general direction of the main-line wire or wires.

In making the main-line sections referred to I use, by preference, such material as ordinarily is employed in making earthen or stone ware or pipe, preferring also to use material which will give a comparatively solid product, or one close in texture and free from porosity. Such sections are represented at A, and they may be made of any desired shape, as cylindrical, (which is the preferable shape,) or rectangular, Fig. 8, or of pipe form, Fig. 9. Longitudinally through the otherwise solid part of each section I make, in any of the ways known to the art, a series of independent perforations, *a*, corresponding in number and relative arrangement in each section to the number and desired relative arrangement of the wires *a'* to be employed. The length of the sections may be varied at pleasure, the only maximum limit being that imposed by the plasticity of the material employed. These sections, after being properly solidified and, if desired, vitrified, either internally or externally, or both, are slipped successively onto the wires, and brought up end to end, as in Fig. 1, and jointed together by means of a coupling-ring, A', and cement A^2, or in any of the ways in common use for jointing together ordinary pipe. The manner of making the joint is not material, provided only it be sufficiently strong and be such as to secure a good insulation. If desired, a thin layer of cement may be interposed between the ends of the sections before they are pressed up together end to end. Such sections, with the wires therein, may be laid underground in the ordinary manner of laying water and gas pipe. When well made, they are practically indestructible, and will give a sufficiently good insulation for practical purposes for telegraph, telephone, and electric-signal wires, especially for comparatively short distances, and this latter is the principal use for which a system of underground telegraphy is at present chiefly desired. The first cost is comparatively little and the work of laying requires little or no skilled labor.

For changing direction or turning corners,

the ends of the sections may be beveled or made slanting to any desired angle, and abutting together in the manner illustrated in Figs. 6 and 7, and the joints may be covered and secured as above.

In order to illustrate how this system of apparatus may be employed where intermediate connections have to be made with local stations, which is the principal object of my invention, I have shown different constructions of joints in Figs. 2 to 5.

In Figs. 2 and 3 I have shown means for carrying out or in, or both out and in, a considerable number of wires. In this construction I introduce between two sections, A A, at a point on the line in convenient proximity to the local station, two perforated section-blocks, B B, each of the form of the frustum of a cone if the sections A are cylindrical, or of the frustum of a pyramid if the sections are rectangular. The perforations at the smaller end of B come in line with the perforations of the contiguous section A; but they diverge at the larger end of B to such extent as may be necessary, in order that a series of grooves, *c*, may be made in the larger end face of B, such grooves being sufficient in number to take out or in the desired number of wires without crossing or intersecting each other, and each groove extending from a perforation to the periphery of B. If but a small number of wires—say one, two, or even three or four, more or less—are to be taken out or run in, the grooves may be made in the abutting ends of the sections A, especially if the latter be perforated but for a few wires, and the construction shown in Figs. 2 and 3 is particularly designed for use where the perforations in the sections A are comparatively close together and somewhat numerous and several wires are to be taken out or run in at the intermediate station; and where the wires are to be both taken out and carried back in, I prefer to use an interposed block, B′, having grooves on its opposite faces corresponding to those made in the adjacent faces of the section-blocks B. In these figures I have also illustrated other joint-connections which may be used here or on the sections A, as a bolted flange-joint, as at *b*, or a bayonet-joint, the rings of which are shown at *b′*. In this construction some of the wires, if so desired, may be carried directly through the block B′, perforations being made for such purpose in line with the corresponding perforations in the blocks B.

In Fig. 4 I have shown a mode of making local connections at intermediate stations where but a small number of wires are to be taken out. In this case a recess, R, is made in the side of one or in the abutting ends of two of the sections A, of such size and depth as to intercept the proper perforations. Then the wires leading to and from the local station may be carried to the surface of the ground through a branch or side section or sections, A, Fig. 4, constructed as already described. In this construction a bowl-and-socket cemented joint, b^2, may be advantageously employed.

Another local-station joint, adapted to be used with the sections A, is shown in Fig. 5, where an end of each section enters a hollow earthenware or stone box, D, made preferably in halves or parts for convenience of access. A portion of the wires may pass directly through the box from one section A to the next, and other wires to the desired number may be taken out and in through perforations *e* made in the box-lid, or in any side thereof. The branching wires may in this case, as in Fig. 4, be carried to the surface of the ground through branching sections, or they may be led to and through a tapering section-block, such as is represented at B, Fig. 3, but properly shaped and perforated for the purpose. But in any of the cases suggested other modes of insulation may be applied to the branching wires.

It will also be within my invention to make the perforations large enough to take in rubber-coated wire, or wire otherwise coated with a thin insulating coating.

It is an important advantage in the use of my present improvement that the wires do not have to be cut up into comparatively short lengths and afterward twisted together at their ends, as in the case where the wires have to be embedded in a plastic material during the process of making the latter.

With my invention wires of any length may be run through the proper number of sections, so that no more wire joints need necessarily occur than in the ordinary putting up of wires on poles, as at present practiced.

It will be observed that in all the joints described for the branching lines or for running wires in or out I provide grooved or perforated stone or earthenware insulating conductors, in which, without materially breaking the continuity of the insulation, I secure the same benefits at the joint and on the branches as in the main line, and that the grooves provided for this purpose in the interposed blocks of Figs. 2 and 3 and the perforations in the sections and box of Figs. 4 and 5 are all at right angles, or substantially so, to the main-line wire, and by virtue of such arrangement of means of connection the advantages referred to are secured in all by substantially like means. And I believe this to be a material improvement in the art, since it has been found difficult, in connection with such a system of wire-laying, to get good, easily-applied insulated branching joints except at considerable expense, and with great difficulty in making repairs, as well as in the first laying.

I claim herein as my invention—

1. In combination with sections A A, the radially-grooved block-sections B B′, substantially as set forth.

2. In a system of perforated stone or earthenware wire-insulating sections, radial grooves made in the ends of the sections and in the body of the same at points of branching or intersection, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my hand.

EDWARD A. KITZMILLER.

Witnesses:
R. H. WHITTLESEY,
C. L. PARKER.