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Patented Feb. 7, 1899.

E. H. CALLAWAY.
CONDUIT FOR WIRES OR CABLES.

(Application filed Dec. 24, 1897.)

(No Model.)

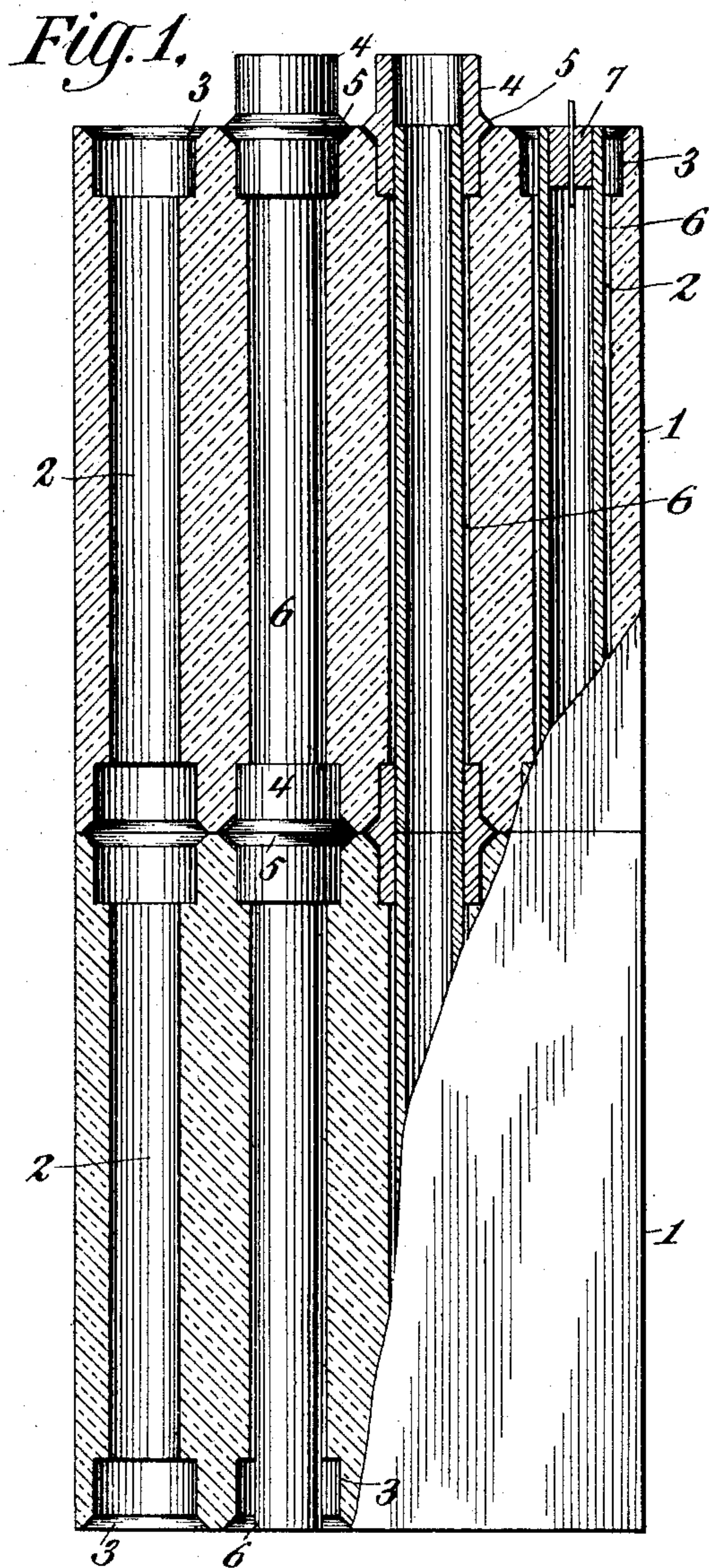


Fig. 3.

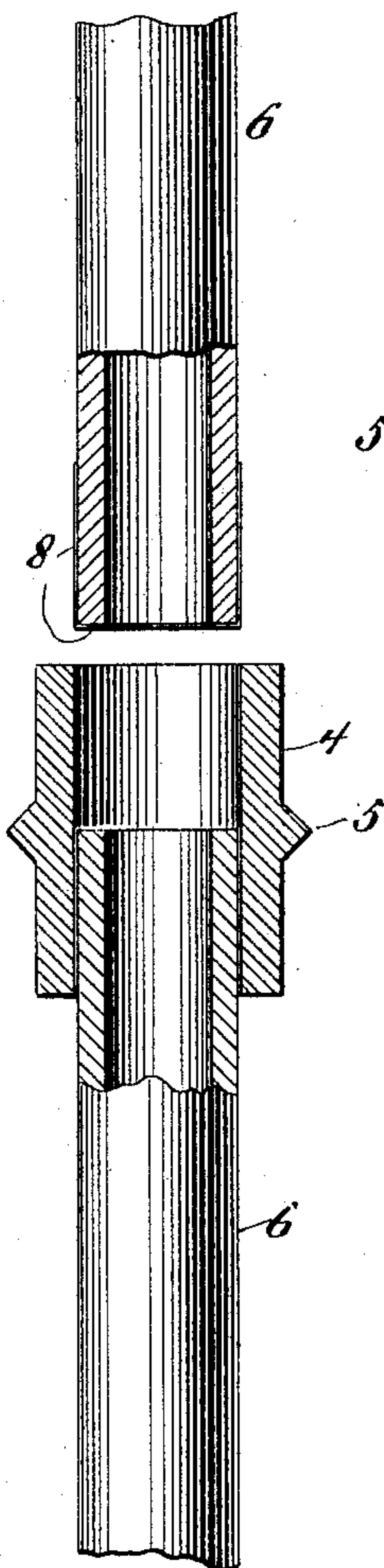


Fig. 4.

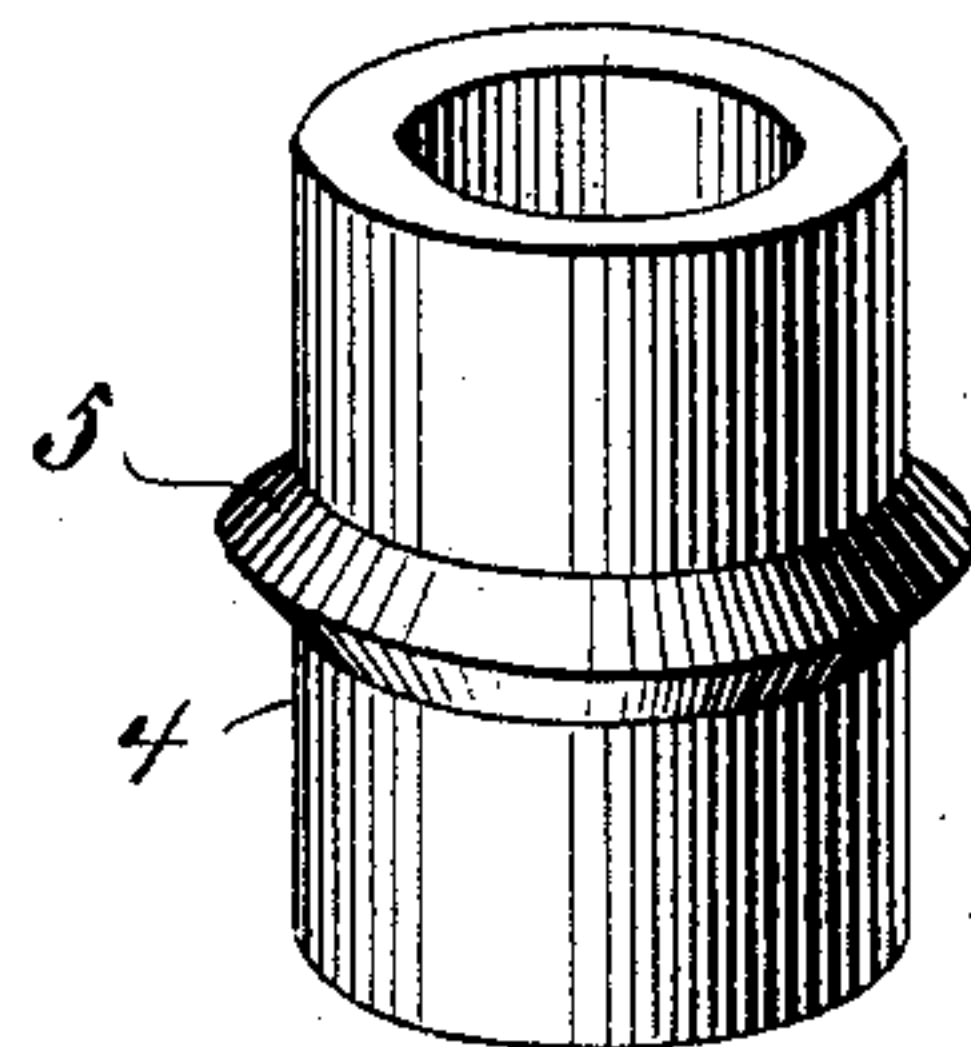


Fig. 5.

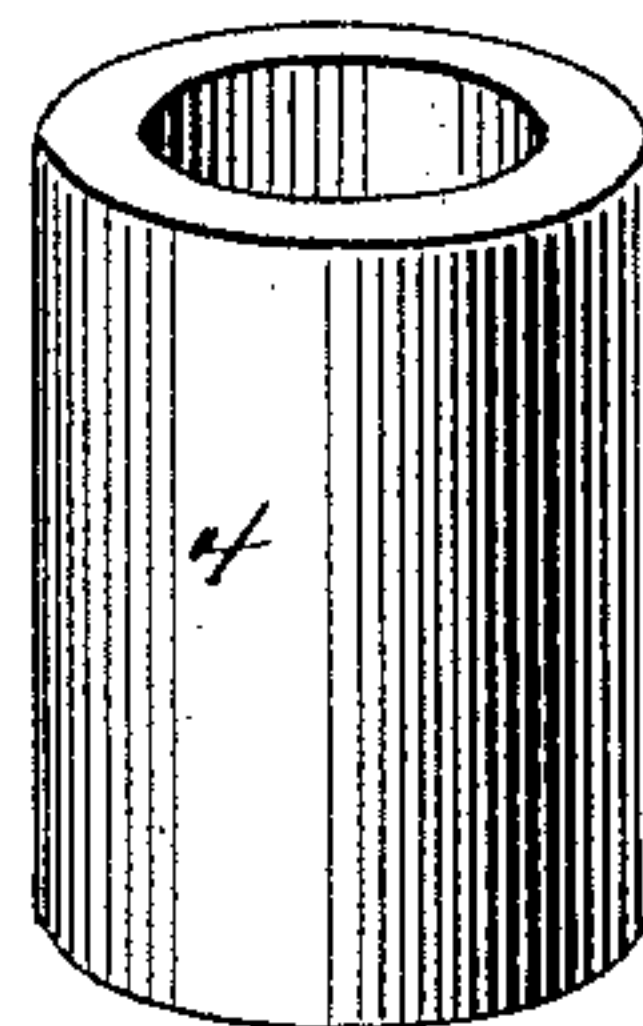
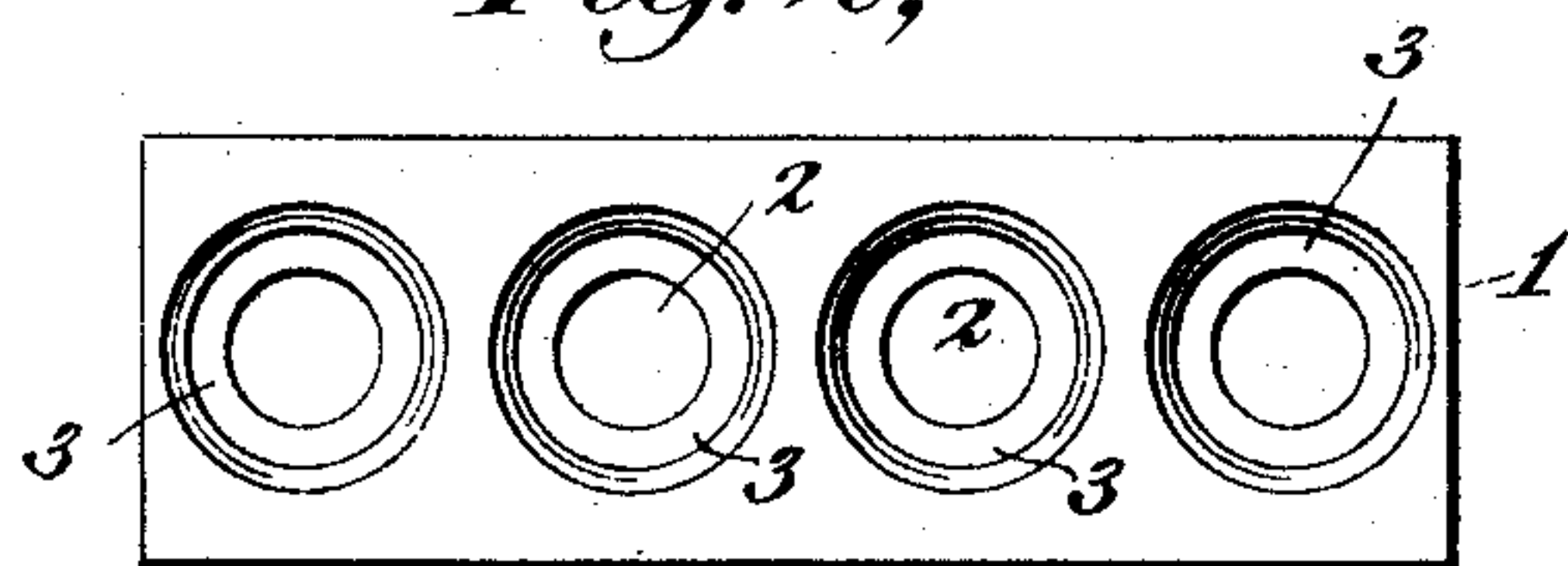


Fig. 2.



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CONDUIT FOR WIRES OR CABLES.

SPECIFICATION forming part of Letters Patent No. 618,837, dated February 7, 1899.

Application filed December 24, 1897. Serial No. 663,296. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. CALLAWAY, a citizen of the United States, residing in New York, (Rosebank,) in the county of Richmond and State of New York, have invented a new and useful Improvement in Conduits for Electric Wires or Cables, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, which form a part thereof.

My improvement relates to conduits or subways adapted to receive and to hold and protect electric wires or cables.

The object of my invention is to provide a conduit made in sections the different parts of which can be easily and economically manufactured and readily put together, which will afford ample support and protection to the wires, which will give a substantially perfect insulation at comparatively small cost, which can be conveniently and quickly handled and constructed, and which will nevertheless make the wires easily accessible for renewals or repairs.

My invention consists, first, in the combination, in an electrical conduit, of perforated sections of burnt clay or other suitable material—such as asphalt, rubber, or glass—having countersunk recesses around the ends of the perforations and connecting-sleeves made of glass or other suitable insulating material and equal in number to the perforations, these sleeves being adapted to fit into the countersunk recesses of adjacent sections and to thereby unite said sections, and separate or removable inner sections of tubes made of insulating material and adapted to project into the connecting-sleeves and to meet end to end, whereby the parts can be easily made and readily fitted together and a strong and durable conduit formed which will afford a high degree of protection and insulation to the wires.

My invention also consists, broadly, in the combination, with the perforated conduit-sections, of inner sections of tubes made of insulating material and smaller in diameter than the perforations and means for supporting the inner tubes in a central position in the perforations, whereby a film or wall of air is formed between the inner tubes and the walls of the perforations, which serves to in-

sulate the inner tubes and at the same time to protect them from moisture.

My invention also consists in making the interior diameter of the connecting-sleeve less than the diameter of the perforation in the conduit-section, as a result of which the diameter of the inner tube is also less than the diameter of the perforation and an air-space is formed between the inner tube and the wall of the perforation. In this case the inner sections of tubes are supported by the connecting-sleeves.

My invention also consists in plugging the ends of the inner tubes, so as to hermetically seal those tubes. In the most complete form of my invention I also exhaust the inner tube of air before sealing it.

My invention also consists in certain other features of construction and combinations of parts hereinafter described and claimed.

My invention is fully illustrated in the accompanying drawings, in which—

Figure 1 shows two of the conduit-sections connected together according to my invention and shown partly in section. Fig. 2 is an end view of one of the perforated sections. Fig. 3 shows the adjoining ends of two of the inner tubes partly in section and the method of joining them by the connecting-sleeves. Fig. 4 is a perspective view of my preferred form of connecting-sleeve, and Fig. 5 is a view of a second form of sleeve.

Similar numbers denote similar parts in the different figures.

Referring to the drawings, 1 represents the conduit-section. In the best form of my invention this section is made of burnt clay or some other suitable non-conducting material. It is provided with longitudinal perforations 2 2, the number of which can be varied according to the special requirements of each case. Around the ends of the perforations are countersunk recesses 3 3, adapted to receive the ends of the connecting-sleeves. I prefer to bevel the wall of the recess at its outer end, as shown.

4 is a connecting-sleeve which is made of glass or some other suitable insulating material and which is adapted to fit into the countersunk recesses 3 3 of any two adjacent conduit-sections and to thereby unite the sections and to make a continuous straight pas-

sage through the whole conduit. Two forms of sleeve are shown in the drawings. In the form illustrated in Fig. 4 the sleeve is provided with a triangular-shaped bead or projection 5 at its center. When this kind of sleeve is employed, the outer end or edge of the countersunk recess 3 is beveled, as already described, so as to form a space or cavity to receive the triangular-shaped bead of the sleeve, as clearly shown in Fig. 1. The space formed by the beveled edges is made a little larger than the bead, so to leave a space of, say, about one-sixteenth of an inch between the beveled surface and the surface of the bead, the purpose of this construction being to provide a space to receive the cement with which the parts are fastened together. A second form of sleeve is shown in Fig. 5. This is similar to the one already described except that it has no central bead. When this variety of connecting-sleeve is used, the edges of the countersunk recess need not be beveled, although, if preferred, the beveled edges can still be retained and the cavity formed thereby can be completely filled with cement. I prefer to use the beaded sleeve in the manner already described.

When my complete invention is employed, I make the interior diameter of the connecting-sleeve somewhat less than the diameter of the perforation in the conduit-section, as shown in Fig. 1, for the purpose of forming a film or wall of air between the walls of the perforations and the inner tubes.

6 6 are inner tubes constructed in sections. They are made of glass or some other suitable insulating material and of such an exterior diameter as to project or fit into the ends of the connecting-sleeves. They are also made of such a length as to meet at their ends, so as to form a continuous or unbroken tube through which the electric wires or cables can be passed and in which they can be held and protected.

When the connecting-sleeve is made of a smaller interior diameter than the perforation through the conduit-section, the inner tube 6 is necessarily smaller in its outer diameter than the perforation in the section. As a result of this the interior tube is held in a central position out of contact with the inner surface of the perforation, so that an air-film or wall-cushion is formed between this inner tube and the conduit-section. This provides an additional means of insulation and also prevents moisture from reaching the inside of the tube. In the form shown in the drawings the sections of inner tubing are made of the same length as the conduit-sections and are separate and removable portions of the conduit.

7 is a suitable plug for hermetically sealing the end of the interior tube. The wire or cable passes through this plug. The plug can be made by wrapping the end of the wire with fibrous material coated with asphaltum or by wrapping it with rubber or other suit-

able non-conducting material and filling in cement around this material, so as to form an air or liquid tight plug, or the plug could be provided on its outside with a screw-thread, and thus adapted to be screwed into a thread formed on the inner surface of the tube 6 at its outer end.

The conduit is constructed from the parts already described in the following manner: A section is first placed in position. Then one of the inner tubes is prepared for insertion in the conduit by coating it for about one and a half inches on each end of the outer surface with liquid-glass cement and by also coating the end surface of the tube in the same manner. Any suitable kind of cement can be used. In Fig. 3 I have represented at 8 the manner and place of application of this cement. This tube 6, thus prepared, is then slipped into place through the perforation in the conduit-section. The coupling-sleeve is next inserted in the countersunk recess, being slipped over the end of the inner tube 6. The cement previously applied to the inner tube firmly unites the end of the tube with the connecting-sleeve and forms thereby an air and liquid tight joint. The sections of inner tubing, after being first properly coated with cement, as already explained, are then inserted into the second section of conduit and this second section is applied to the first, the projecting ends of the connecting-sleeves fitting into countersunk recesses in the end of the second section and at the same time slipping over the ends of the interior tubes in the second section. In this way the ends of the two conduit-sections are caused to meet around the connecting-sleeves, and the ends of the interior tubes are also brought into contact, the interior tubes being firmly united by the cement previously applied to their end surfaces. Before the second section is forced into place against the first section the recesses formed at the end of these sections by the beveled edge are filled with hydraulic cement in suitable quantity to fill the recess which is formed at this point when the two sections are brought together. When the two sections are pressed together, the hydraulic cement is thereby compressed and forms a tight solid joint between the two. The other sections of the conduit are laid in a similar manner.

It will be understood that each perforation is provided with interior tubes and connecting-sleeves in the manner already explained. In Fig. 1 the first perforation at the left is represented as being without any interior tubes or connecting-sleeves, the purpose being to show the form of perforation with its countersunk recesses and cavities formed by the beveled edges. The second perforation from the left is represented as having been provided with interior tubes and connecting-sleeves. The same is true of the third perforation from the left. In the last two cases the interior tubes and the sleeves are shown in section. After the wiring has been inserted through

the interior tubing the ends of this tube are hermetically sealed, when my entire invention is used, by means of any suitable plug, such as 7, through which the wire passes. In some cases I also exhaust the interior tube of air after the wire has been passed through it and before it is sealed.

My improved conduit is made up of parts which can be easily and economically manufactured and which can be handled and manipulated without any special danger of breakage. These parts are manufactured of such size and dimensions as to be readily applied to one another, and they can be readily and quickly put together. The work of constructing a conduit from them can be carried on expeditiously and without the necessity of employing skilled labor.

A very thorough insulation is provided for the wires or cables, so that it is unnecessary to wrap these wires with any insulating material. The conduit-sections themselves are preferably made of insulating material, such as burnt clay. The interior tubes are also made of insulating material, and in the best form of my invention an air space or film is formed between these interior tubes and the conduit-section, which adds greatly to the completeness and perfection of the insulation. Moreover, if any moisture works its way through the material of the conduit-section this air-space operates to prevent the moisture from coming into contact with the inner tube and working its way into the interior of that tube. A very strong and durable and effective joint is secured at the point of union of the sections and inner tubes.

By exhausting the air and hermetically sealing the inner tubes the introduction of moisture into these tubes is prevented. If these tubes were open, currents of air would pass through them, which would carry more or less moisture that would have a harmful effect upon the wire or the cable. This is prevented by hermetically sealing the tubes and exhausting them. In some cases it may not be necessary to exhaust the tubes, as the hermetical sealing of the tubes alone may be found to be sufficient for the prevention of such air-currents. Even where the inner tube is full of air if the tube is sealed there is little chance of air-currents being produced.

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

1. In a conduit for electric wires or cables, the combination of perforated sections of suitable non-conducting material, having a countersunk recess around the end of each perforation, a connecting-sleeve made of insulating material adapted to fit into the countersunk recesses of two adjacent sections and to thereby unite said sections so that the ends of said sections will come into contact with each other, and removable inner sections of tubes made of insulating material and of such diameter as to project into the connecting-

sleeve and of such length as to meet at their ends, substantially as set forth.

2. In a conduit for electric wires or cables, the combination of perforated sections of suitable material, having a countersunk recess around the end of each perforation, a connecting-sleeve made of insulating material adapted to fit into the countersunk recesses of two adjacent sections and to thereby unite said sections, the interior diameter of the sleeve being less than the diameter of the perforation in the conduit-section, and inner sections of tubes made of insulating material and of such diameter as to project into the connecting-sleeve and to be supported thereby and of such length as to meet at their ends, substantially as set forth.

3. In a conduit for electric wires or cables, the combination of perforated sections of suitable material, having a countersunk recess around the end of each perforation, a connecting-sleeve made of insulating material adapted to fit into the countersunk recesses of two adjacent sections and to thereby unite said sections so that the ends of said sections will come into contact with each other, and removable inner sections of tubes made of insulating material and of such diameter as to project into the connecting-sleeve and of substantially the same length as the conduit-sections so as to meet end to end, substantially as set forth.

4. In a conduit for electric wires or cables, the combination of perforated sections of suitable material, having a countersunk recess around the end of each perforation, a connecting-sleeve made of insulating material adapted to fit into the countersunk recesses of two adjacent sections and to thereby unite said sections, the interior diameter of the sleeve being less than the diameter of the perforation in the conduit-section, and inner sections of tubes made of insulating material and of such diameter as to project into the connecting-sleeve and of the same length as the conduit-sections so as to meet end to end, substantially as set forth.

5. In a conduit for electric wires or cables, the combination of sections made of suitable material, and provided with longitudinal perforations, inner sections of tubes of insulating material smaller in diameter than the perforations and means for supporting the inner tubes in a central position in the perforations so as to form a film or wall of air between the tubes and the walls of the perforations, substantially as set forth.

6. In a conduit for electric wires or cables, the combination of sections of baked clay or similar insulating material provided with longitudinal perforations having countersunk recesses around their ends, connecting-sleeves of insulating material extending into and fitting the countersunk recesses of adjacent sections and thereby uniting said sections, inner sections of tubes of insulating material

projecting into the connecting-sleeves and having their ends cemented together, and hermetical plugs at the ends of the inner tubing, substantially as set forth.

5 7. In a conduit for electric wires or cables, the combination of sections of baked clay or similar insulating material provided with longitudinal perforations having countersunk
10 recesses around their ends, connecting-sleeves of insulating material extending into and fitting the countersunk recesses of adjacent sections and thereby uniting said sections, the interior diameter of the sleeves being less
15 than the diameter of the perforations, inner sections of tubes of insulating material projecting into the connecting-sleeves and supported thereby and having their ends cemented together, and hermetical plugs at the
20 ends of the inner tubing, substantially as set forth.

8. In a conduit for electric wires or cables, the combination of sections of baked clay or similar insulating material provided with longitudinal perforations having countersunk
25 recesses around their ends, connecting-sleeves

of insulating material extending into and fitting the countersunk recesses of adjacent sections and thereby uniting said sections, inner sections of tubes of insulating material
30 projecting into the connecting-sleeves and having their ends cemented together, and hermetical plugs at the ends of the inner tubing, the inner tubing being exhausted of air, substantially as set forth.

9. The combination of the conduit-sections
35 of baked clay or similar material 1, 1, having the perforations 2, 2, and the countersunk recesses 3, 3, the connecting-sleeves 4, 4, of glass or similar material, and the inner sections of
40 tubes 6, 6, constructed, combined and arranged so that the ends of said sections will come into contact with each other as and for the purposes set forth.

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

EDWARD H. CALLAWAY.

Witnesses:

GEORGE L. STRONG,
EDWIN SEGER.