(No Model.)

A. CAMPBELL.

UNDERGROUND CONDUIT FOR ELECTRIC CONDUCTORS.

No. 300,210. Patented June 10, 1884.

Fig: 1.

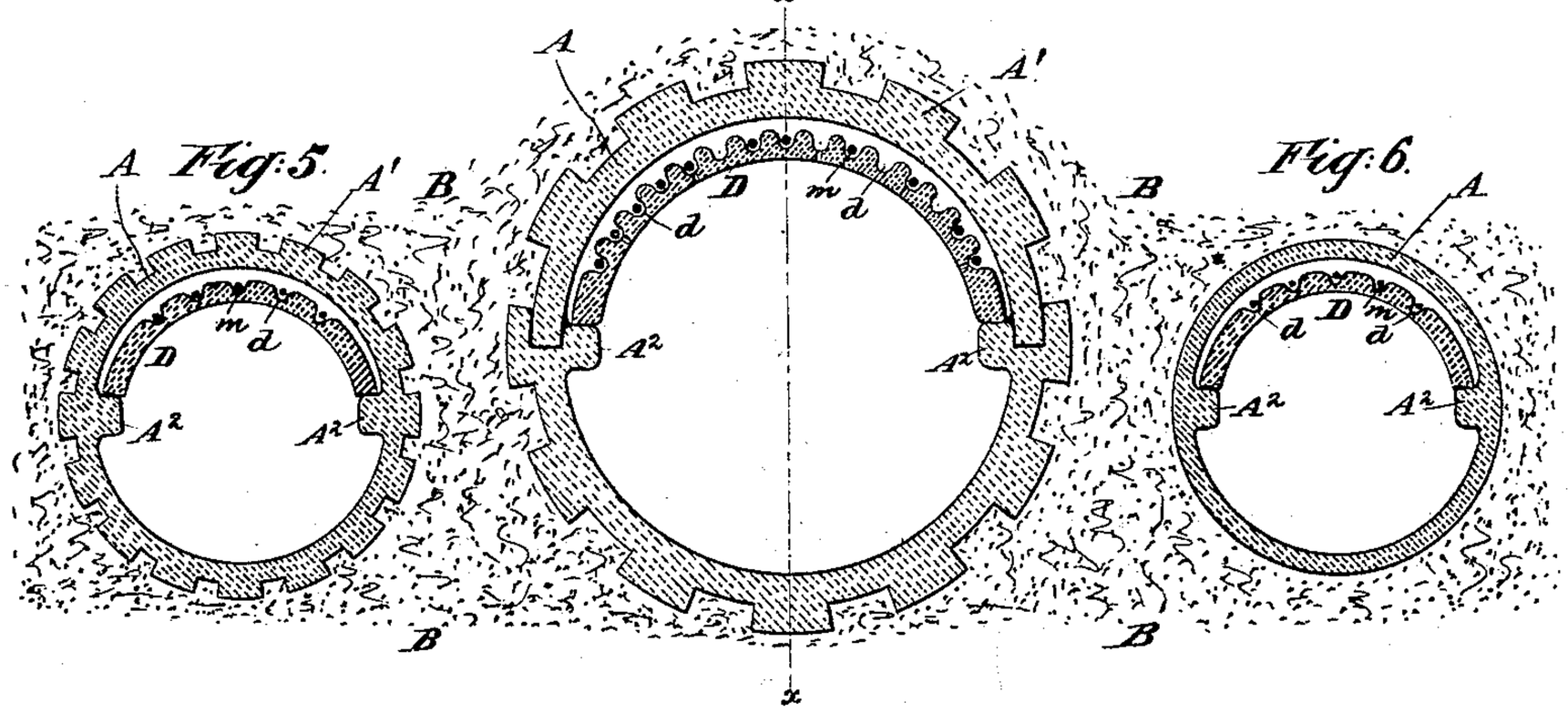


Fig: 5.

Fig: 6.

Fig: 2.

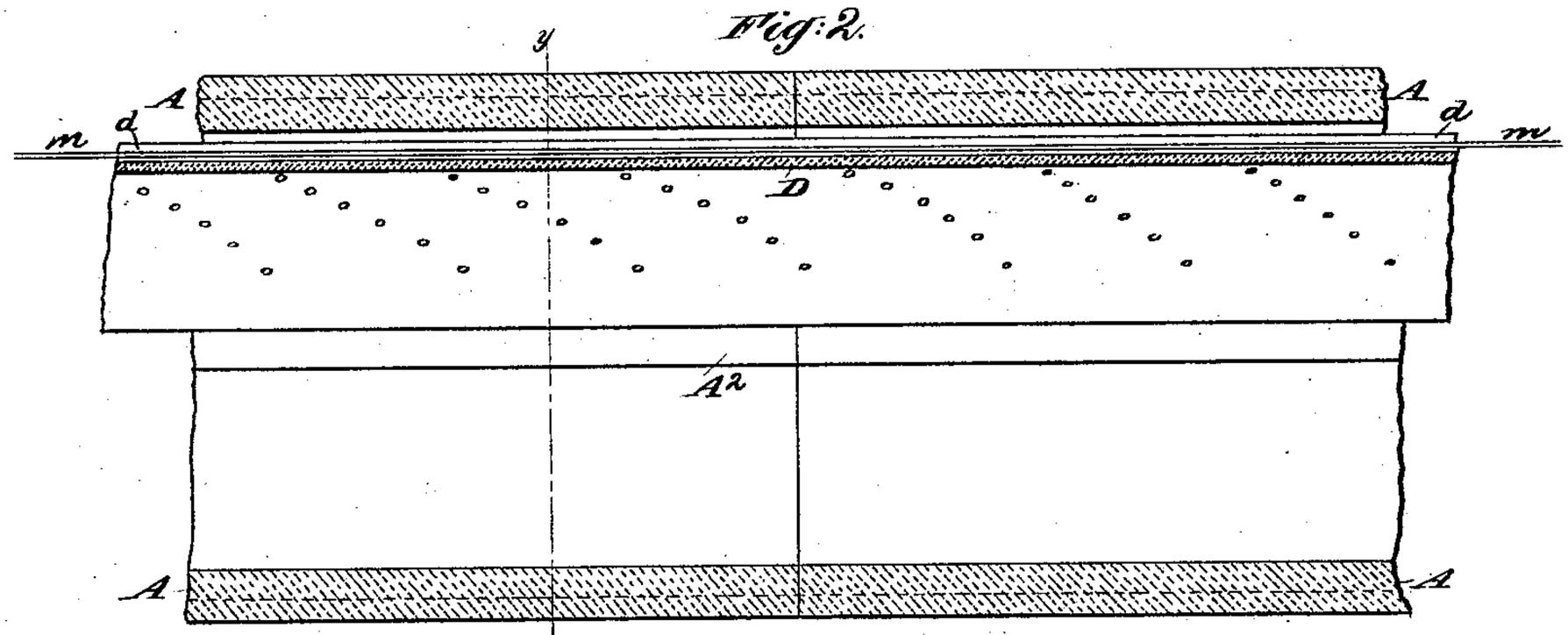


Fig: 3.

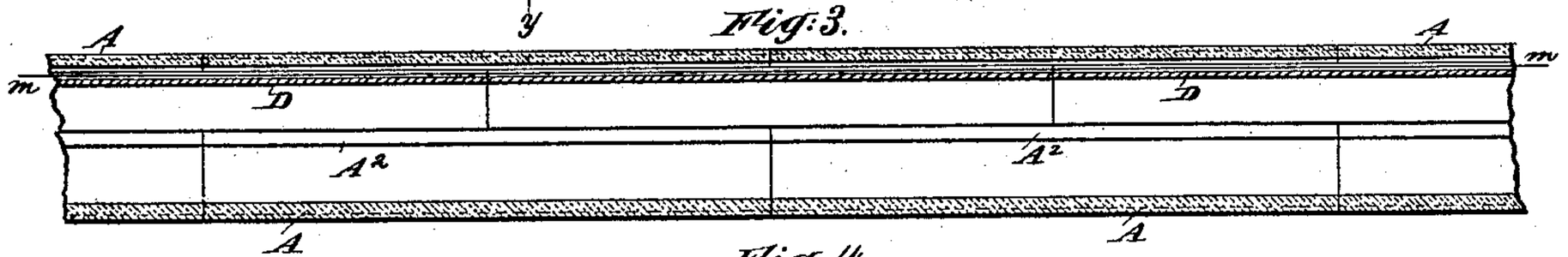
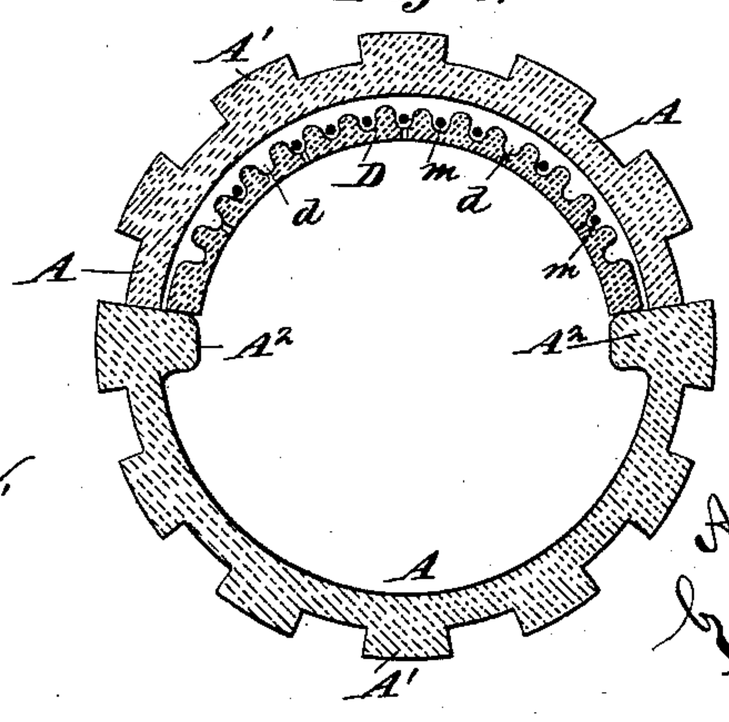


Fig: 4.



WITNESSES:

Charles R. Searle.
J. E. Renwee.

INVENTOR:

Augustine Campbell
by his attorney
Thomas D. Watson

UNITED STATES PATENT OFFICE.

AUGUSTINE CAMPBELL, OF METUCHEN, NEW JERSEY.

UNDERGROUND CONDUIT FOR ELECTRIC CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 300,210, dated June 10, 1884.

Application filed March 13, 1884. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTINE CAMPBELL, of Metuchen, Middlesex county, in the State of New Jersey, have invented certain new and useful Improvements in Underground Conduits for Electric Conductors, of which the following is a specification.

I employ tubes of burnt clay or analogous material in short lengths, with an internal piece which performs the several functions of holding the wires up and apart and of locking the sections, so as to keep them approximately in line.

I will proceed to describe what I consider the best means of carrying out the invention.

The exterior portion of my improved conduit may be as shown in the patent to me dated October 21, 1879, No. 220,749, and may be similarly embedded in concrete or analogous material, which will firmly support it and exclude water. These main portions are formed with longitudinal ribs or inwardly-projecting ridges—one on each side of each section, at about the mid-height. I provide a series of pieces of baked clay or analogous durable and non-conducting material, each of a length about equal to that of one of the sections of exterior tubing, and of dimensions suitable to lie in the upper half of the main tubes, resting upon the internal ridges of the latter. The upper faces of the internal pieces are grooved longitudinally to receive the wires.

The accompanying drawings form a part of this specification.

Figure 1 is a cross-section of the invention as applied in the manufacture of large pipes supporting a considerable number of wires or other electrical conductors. Fig. 2 is a longitudinal section of the same. Fig. 3 is a longitudinal section on a smaller scale, showing the arrangement of the parts for breaking joints. The remaining figures show modifications. Fig. 4 shows the two parts of the main or outer pipe resting one upon the other without being locked into each other at all. It will be understood that the reception of the lower edges of the upper part into the groove in the lower, as shown in Fig. 1, may be modified within wide limits. Fig. 4 shows that feature as entirely omitted. Fig. 5 is a cross-section showing the construction when made of small size. The exterior pipe is in one piece. Fig. 6 is a cross-section showing another modification in the form.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

A is the main body of the exterior, and A′ a series of longitudinal ridges of dovetail section, which aid in engaging the pipe firmly with the surrounding material.

B is a bed of concrete, in which the sections A are laid.

A^2 A^2 are internal longitudinal ridges. They may, like the external ridges, A′, be cheaply made in one with the main body A of the tube by employing a die having a suitable form, taking care to have the surfaces well lubricated with moisture. The tube A, with its several ridges A′ and A^2, may be formed in two pieces; but for ordinary sizes I prefer that each section or length shall be made as a complete tube in one piece. (See Figs. 5 and 6.)

D D, &c., are the internal pieces. They may be formed, like the main parts A, by forcing properly-tempered clay through a die of the required form. A cross-section of each piece D is nearly half of a hollow cylinder, with the exterior grooved longitudinally. The longitudinal grooves are marked *d*. Care should be taken to locate the grooves accurately, so that when a series of the internal pieces are applied together end to end, resting on their several supporting-ridges A^2, a series of electric wires, cables, or other simple or compound electric conductors, *m*, extended along in the several grooves *d*, will require little or no bending in crossing the joints between the several internal pieces.

In applying the parts together care should be taken to make the internal sections, D, break joints with the external sections, A—that is to say, each internal piece, D, will extend across the joint between two adjacent exterior pieces, A. The two internal pieces will abut together within and at or about the mid-length of one of the external pieces, A. Each of the internal pieces, D, is perforated at several points, to allow any water which shall find access through the external pipe and fall upon the internal pieces to be readily discharged down through. The whole lower portion of the interior of the main pipe A is clear. This allows any water which shall enter the

pipe to flow along to certain low points provided, in each of which there should be a cesspool (not represented) adapted to receive and retain mud, while the clear water may flow over a high point to a sewer or other convenient drain. The cesspools should be covered to prevent the ingress of water from the street and to allow the solid matter to be removed at intervals. These points will involve no difficulty. The internal pieces, D, perform two important functions. They hold the wires up and apart, and allow the main body of the structure to be partially filled with water or earthy matter, or both combined. They also strongly brace the external sections, holding them with their ends coincident and approximately in line.

At intervals, which may be denoted on a map or otherwise, I employ two external sections, each in two pieces, so that on removing the upper portions access may be gained to the interior pieces, and commencing at that point any length of line may be opened, and on effecting the required repairs the parts may be relaid to this point and the whole again properly covered.

Modifications may be made in the forms and proportions within wide limits. I can increase the dimensions or diameter of the tube A relatively to its length. I can omit the external ridges, A′. The electric conductors *m* may be coated with an insulating material or otherwise equipped to increase their insulation and prevent induction. Such coating may also be water-proof and aid greatly to prevent loss of effect from small leaks or even from the reception through cracks or joints of considerable quantities of water. I can omit the exterior concrete, B. Instead of making the parts A^2 as internal ridges, I can make the entire lower portion of the pipe of smaller diameter. It is sufficient that the parts A^2 present a shoulder to adequately support the inner pieces, D *d*. The whole or any desired portions of the internal parts may be glazed.

I claim as my invention—

1. In combination with the sections A, having internal ridges, A^2, the semi-cylindrical pieces D, adapted to support the electrical conductors *m* and leave a clear space below for the passage of water, as herein specified.

2. In combination with the sections A, having internal ridges, A^2, the pieces D, having longitudinal grooves *d*, adapted to support and insulate the electrical conductors *m*, as and for the purposes set forth.

3. In combination with the sections A, having internal ridges, A^2, the perforated pieces D, having longitudinal grooves *d*, adapted to support and insulate the conductors *m*, and to allow the passage of water, &c., to the space below, as herein specified.

4. The combination of the sections A, having internal ridges, A^2, with the pieces D, arranged to overlap the joints of the sections to strengthen the same, as set forth.

In testimony whereof I have hereunto set my hand, at New York city, New York, this 11th day of March, 1884, in the presence of two subscribing witnesses.

AUGUSTINE CAMPBELL.

Witnesses:

WM. C. DEY,

M. F. BOYLE.