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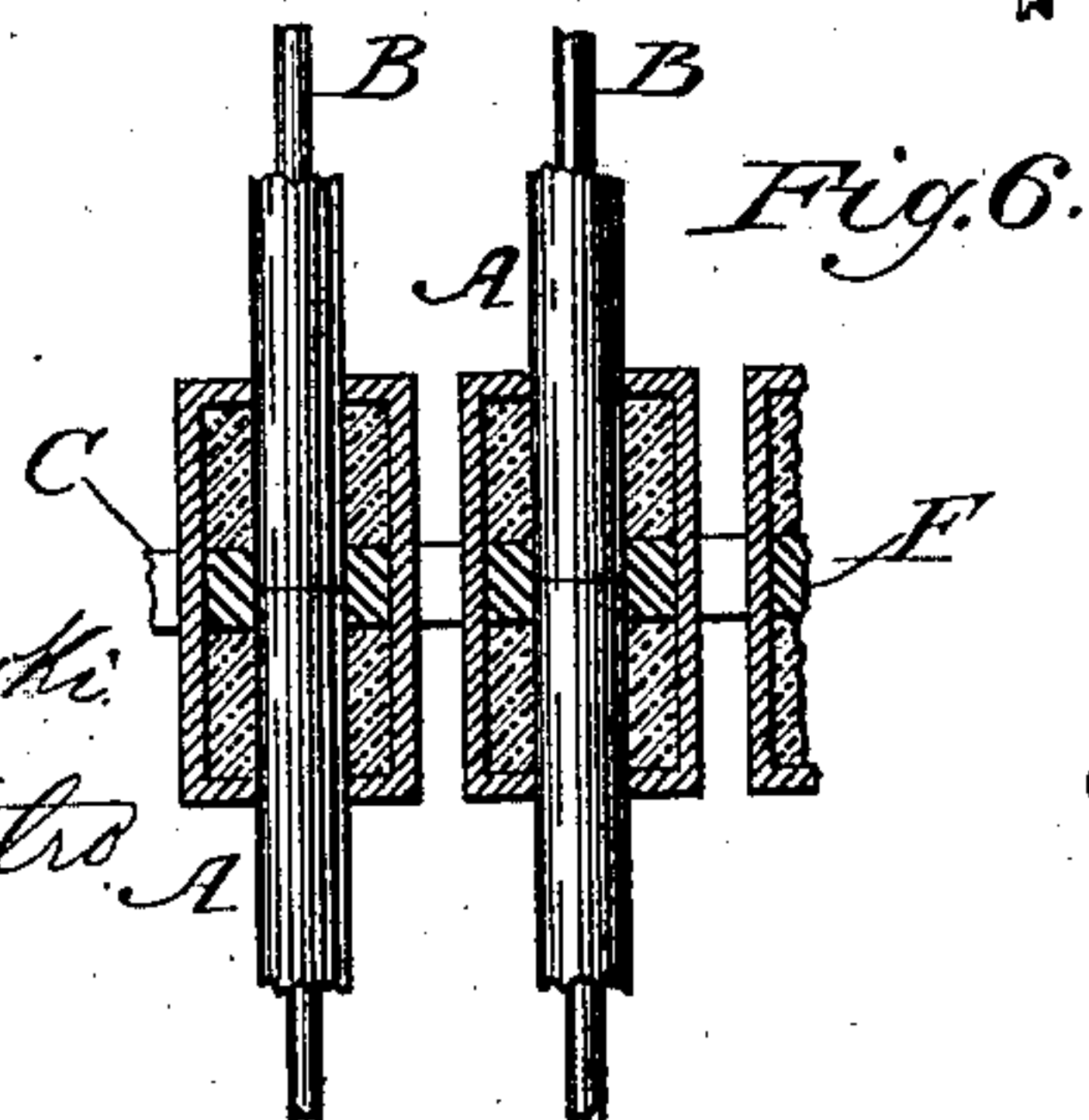
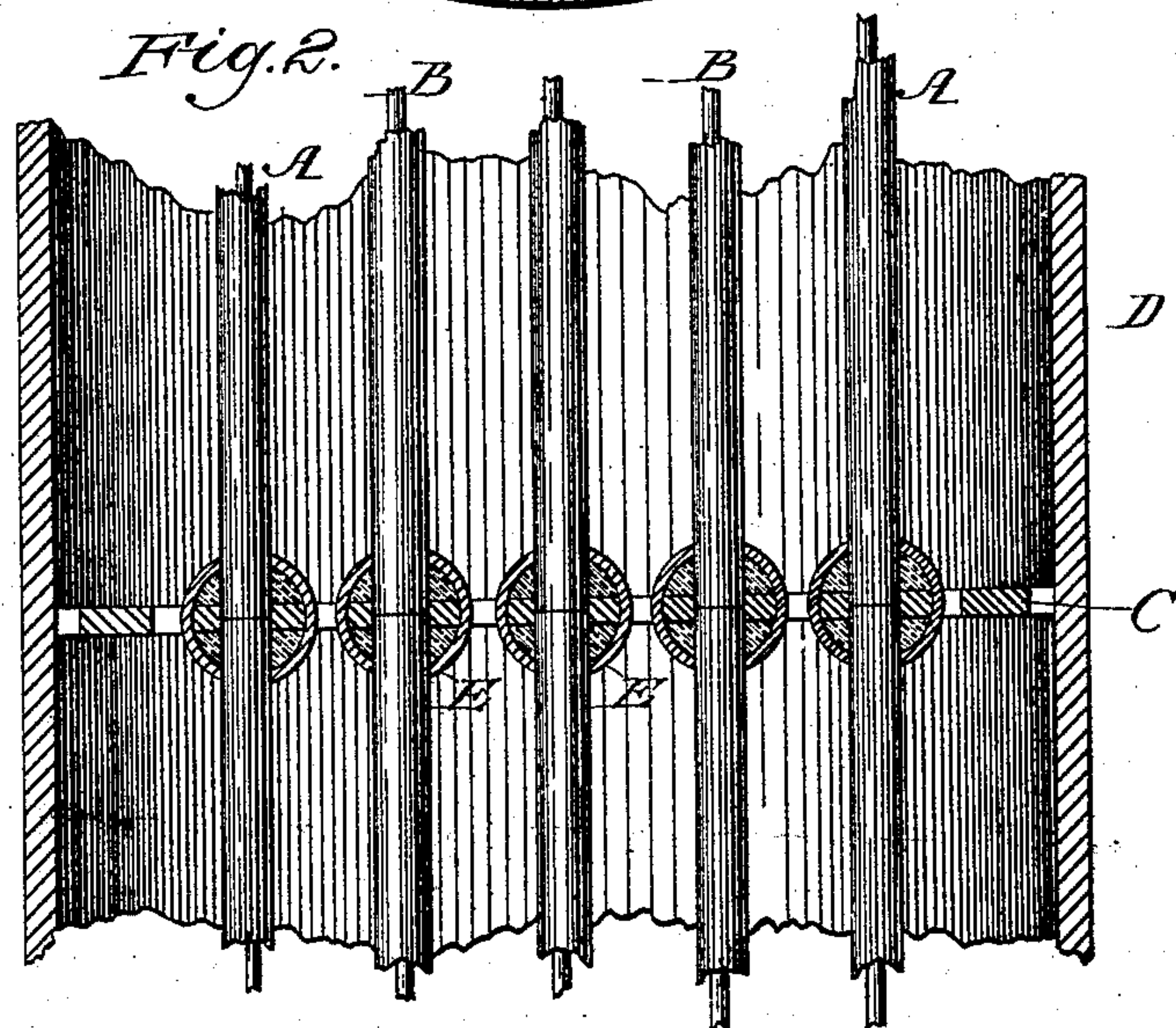
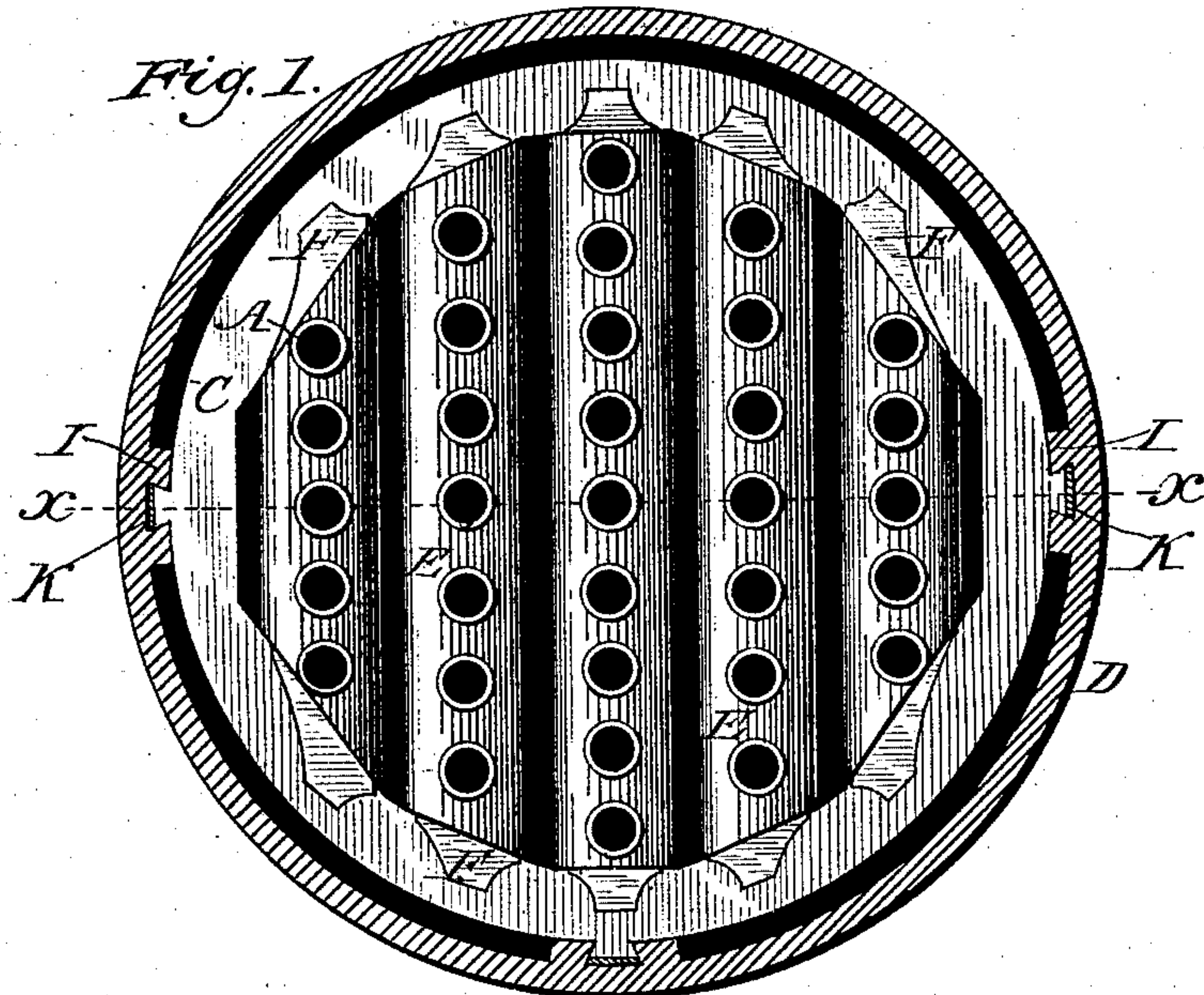
2 Sheets—Sheet 1.

J. F. MARTIN.

INSULATOR FOR UNDERGROUND ELECTRIC CONDUCTORS.

No. 286,944.

Patented Oct. 16, 1883.



Witnesses.

The Lurandomski.

Wm. R. Oushumetro.

Inventor

John F. Martin.

By *Geo. G. Elliott*

Atty.

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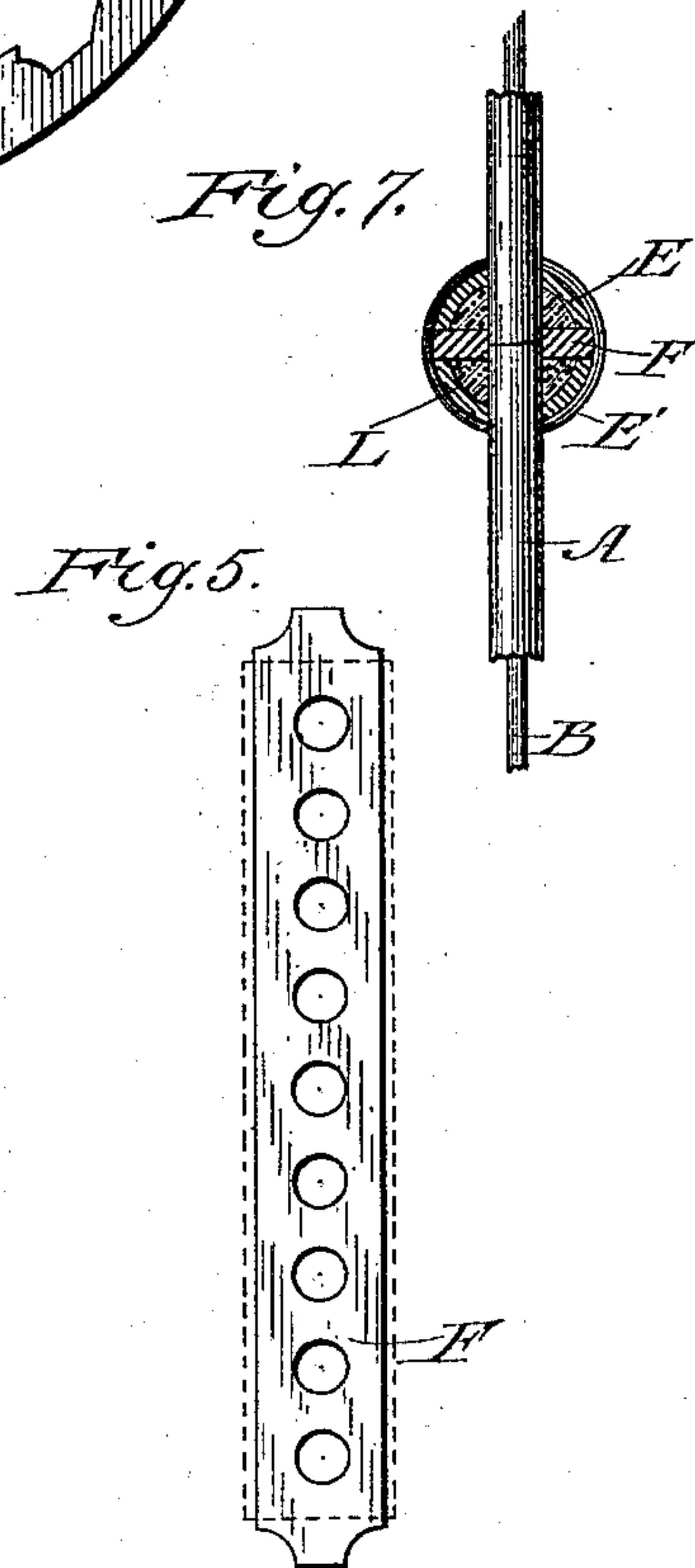
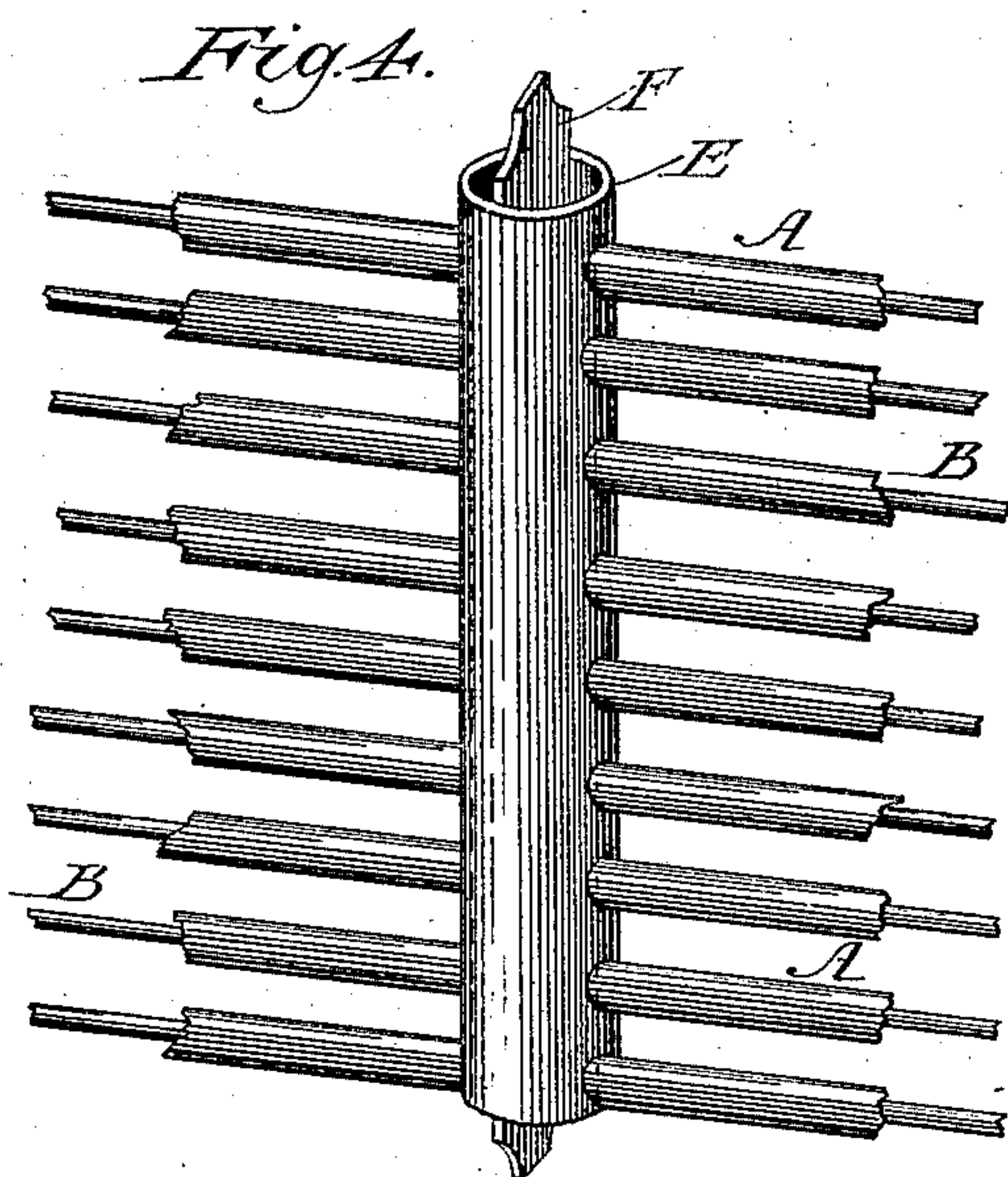
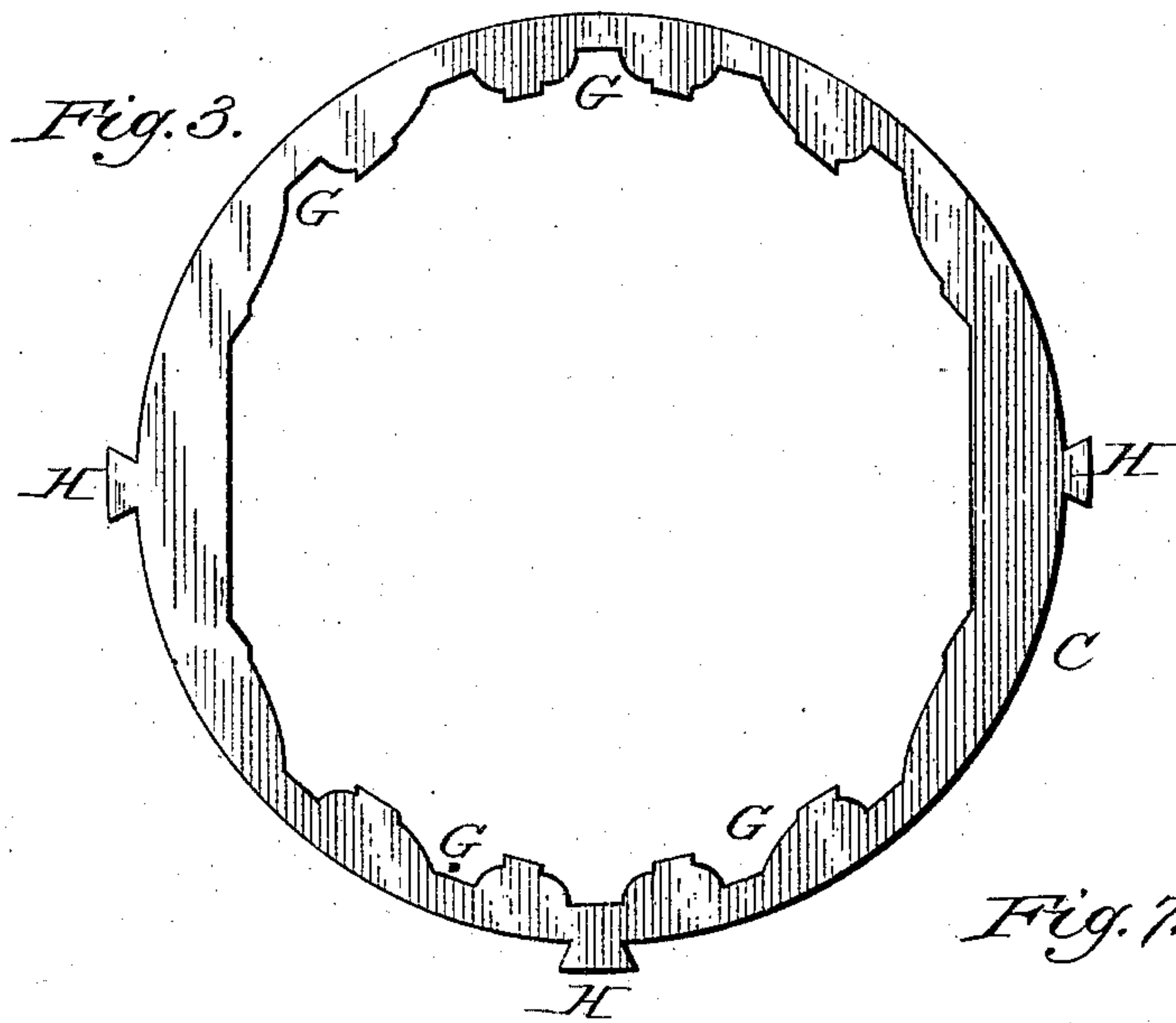
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UNITED STATES PATENT OFFICE.

JOHN F. MARTIN, OF CHICAGO, ILLINOIS.

INSULATOR FOR UNDERGROUND ELECTRIC CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 286,944, dated October 16, 1883.

Application filed March 12, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. MARTIN, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Insulators for Underground Electric Conductors, of which the following is a specification.

This invention relates to means for supporting tubular insulators for electric conductors within underground conduits, the object being to provide improved insulating-supports and means for coupling the insulating-tubes, whereby more perfect insulation of the conductors shall be attained and the sections of tubing be firmly coupled together so as to form continuous lines of tubular non-conductors; also, to provide novel and efficient means for holding the said insulating-supports in position within the conduit-pipe; and, further, to dispose the tubes and their insulating-supports so that the tubes shall be held apart and in parallel lines, and passages left for the free circulation of air through the conduit and around the tubes and their supports.

To such ends my invention consists in the devices hereinafter described, and illustrated in the annexed drawings, in which—

Figure 1 is a section taken transversely through a conduit-pipe, with the devices for insulating and supporting the wires within the pipe shown in elevation. Fig. 2 is a section taken on the line *x x*, Fig. 1. Fig. 3 represents a frame for supporting the insulating devices within the pipe. Fig. 4 is a perspective view of a series of tubular insulators passing through one of the insulating-supports. Fig. 5 is a detail representing a portion of one of the supports shown in Fig. 4. Fig. 6 is a cross-section through insulating-supports of a somewhat different conformation from the supports shown in several of the preceding figures. Fig. 7 is a cross-section through a modified construction of insulating-support.

Referring by letter to the several figures of the drawings, in which like letters indicate like parts, A denotes the tubular insulators which it is proposed to support within a conduit, and B refers to the wires which are carried

through the said insulating-tubes. It is proposed to employ one tube for each wire, and to make the said tubes of paper or of any suitable material or materials, either with or without paper, as may be preferred. While these tubes will of themselves constitute insulators for the wires, it is desirable to provide means for further insulation and for supporting the tubular insulators separately from each other within the conduit-pipe, also to provide for the ready introduction of the tubular insulators into the conduit, and for both maintaining said tubes in parallel lines and allowing currents of air induced through the conduit to have a free circulation around the tubes and their supports, so as to keep the same dry, and thereby prevent such induction as might take place by reason of moisture upon the tubes and their supports. To such end I provide at intervals within the conduit a set of insulating-supports, that are held in place by means of a circular frame, C, adapted to fit within the conduit-pipe D, as hereinafter described.

In order to form the supports shown in Figs. 1, 2, and 4, I provide a set of tubular casings, E, composed of paper, with or without some additional insulating material, and within each one of these tubular casings I fit a paper partition-piece, F, which divides the interior of the casing into two chambers. Holes are formed transversely through the casings and their partitions, either before or after the said parts are thus fitted together, so that a set of the tubular insulators A can be passed through each insulating-support, as illustrated. The pieces F are made somewhat longer than the casings in which they are fitted, and project out from the ends of the casing. These projecting ends of the pieces F are adapted to fit in notches or mortises G, formed in the circular frame C, whereby a set of these supports, made as hereinafter described, can be secured within the frame, side by side, in the same or substantially the same plane. The frame C, which is preferably made of paper, is adapted to be secured within the conduit-pipe, and is provided upon its periphery with lugs or dovetail projections H, which are designed to fit in grooves formed longitudinally in longitudi-

nal ribs I, that are provided upon the interior surface of the conduit-pipe. Two or more of these frames C will in practice be connected together by strips or bars K, in a manner similar to that in which supports for the tubular insulators for electric wires are connected, as shown in another application which I have made for Letters Patent. After the tubular insulators have been passed through two or more sets of the supports herein shown, the space within the outer casings or tubular portions of the supports which are not occupied by the insulating-tubes A and the partition-pieces F are filled with any suitable insulating compound or cement, introduced at the end of the casing, whereby the insulating tubes A will then be supported by practically solid insulators. The filling L of insulating material within the tubular casings F serves not only to afford more perfect insulation for the wires, but also holds the casings and their inclosed partition strips rigidly together, and moreover holds the insulating tubes A firmly within their supports. In this way the ends of the sections of the insulating-tubes A can be fitted within their supports, so as to meet within the same, as in Fig. 2, whereby the said tubes will be effectually coupled together after the cement has been filled into the tubular casings E, since portions of the tubes A will thereby be embedded in the cement.

If desired, the partition strips or pieces F can be cut in any convenient way from a paper disk, so as to leave the circular frame C after the pieces have been cut and removed therefrom, or, if preferred, the frame and partition-pieces adapted to be fitted therein can be formed separately.

The ends of the pieces F can be secured in the dovetails or other notches in the circular frame, and can be further held in connection with such frame by glue or other fastening devices. If desired, however, the frame can be composed of two separate thicknesses or rings, between which the ends of the pieces F will be placed, and the two rings then secured together by glue or other suitable means. In such case the grooves or mortises for receiving the ends of the pieces F will be joined in one or both of the rings, so that the latter can be fitted closely together.

In Fig. 5 one of the strips F is shown with the tubular casing represented in dotted lines.

The casings E thus far described are made in the form of cylindrical tubes; but it will be evident that these tubular casings can be made of other forms than cylindrical in cross-section.

In Fig. 6 I have shown the casings made rectangular in cross-section, whereby, while spaces sufficient for the free circulation of air can be left between the casings, a large quantity of the insulating compound can be filled into each casing.

In Fig. 7 the casing is composed of two half-

cylinders, between which the longitudinal partition F is interposed, and the whole then incased by a wrapper, E', of paper or other suitable insulating material. This wrapper might, however, be dispensed with and the two half-cylinders held in the first instance upon the partition-piece by means of cords or bands, since the insulating compound subsequently introduced into the casing thus formed will adhere to the walls thereof, and thereby hold the parts firmly together.

The insulating-supports for the tubes in which the conductors are laid are shown arranged vertically within the conduit-pipe. They can, however, be arranged horizontally within the same, if desired, or at any other preferred angle.

In conclusion, I may observe that whenever asphaltum can be used in constructing these insulating devices the employment of such will be found serviceable and attended with good results, as said material is very durable and a good insulator.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. As a means for supporting tubular insulators for electric conductors within a conduit-pipe, a set of perforated insulating-supports secured within a circular frame, which is adapted to be fitted within the conduit-pipe, substantially as described.

2. The combination, with the tubular insulators for electrical conductors, of the paper casings fitted within a frame and containing some insulating compound, substantially as described.

3. The insulating perforated supports for tubular insulators, each composed of a casing of paper or analogous material, with an inclosed partition-piece having its ends extended beyond the ends of the casing and fitted within a frame, substantially as described.

4. The combination, with the tubular insulators for electric conductors, of the casings E, each inclosing a body of cement divided by a longitudinal partition, and a circular frame in which the casings are supported so as to leave openings between the casings, substantially as described.

5. The combination, with two or more paper frames e, provided upon their peripheries with lugs, and connected together by longitudinal strips, of the tubular insulators A and the insulating-supports through which the tubular insulators pass, the said supports consisting of casings provided with an inclosed body of some insulating compound, and means for holding the casing within the circular frame, substantially as described.

JOHN F. MARTIN.

Witnesses:

W. W. ELLIOTT,
JNO. G. ELLIOTT.