

(No Model.)

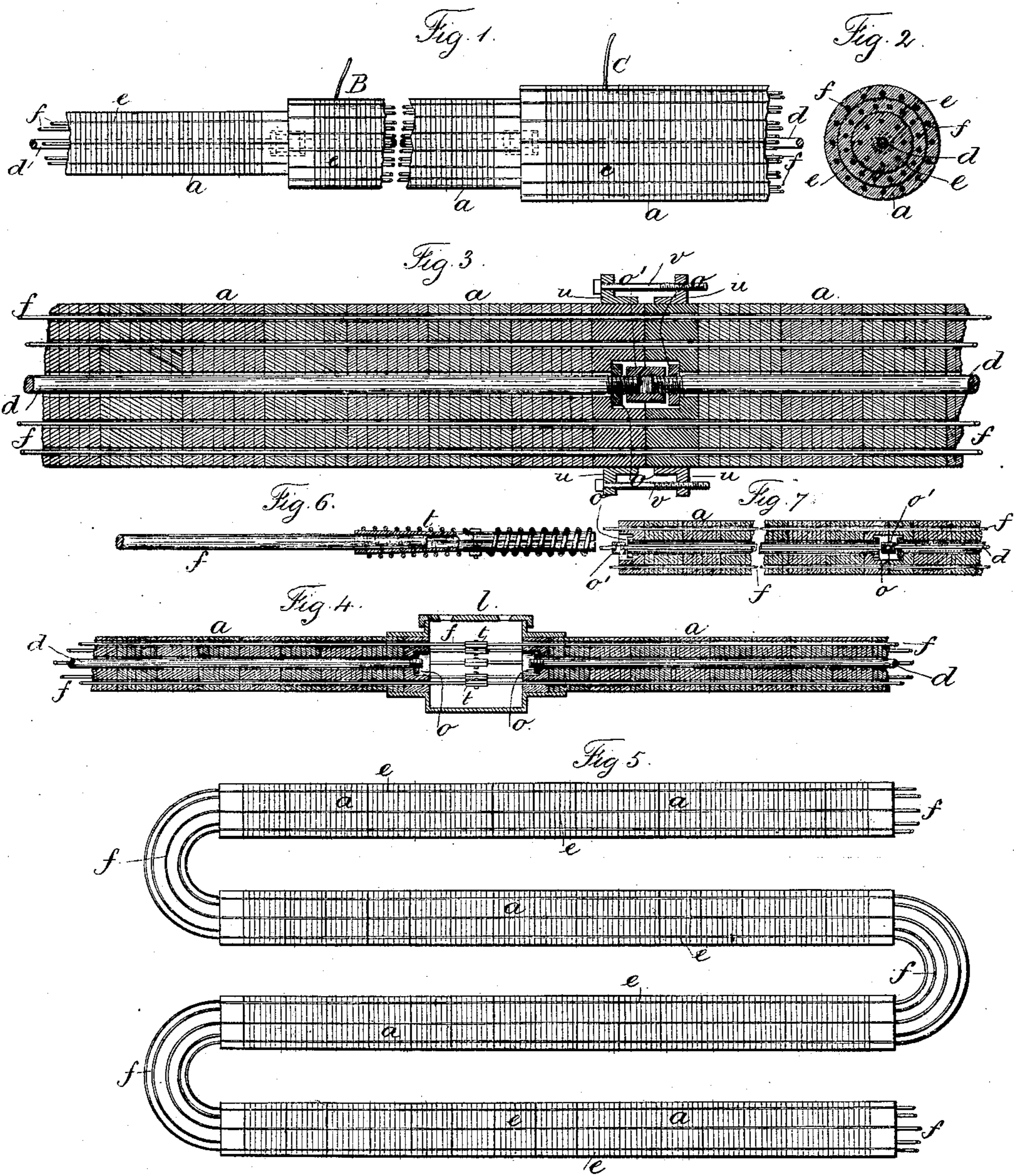
2 Sheets—Sheet 1.

G. S. EATON.

INSULATED ELECTRIC CONDUCTOR.

No. 280,153.

Patented June 26, 1883.



Witnesses:
J. Haib
Chas. H. Smith

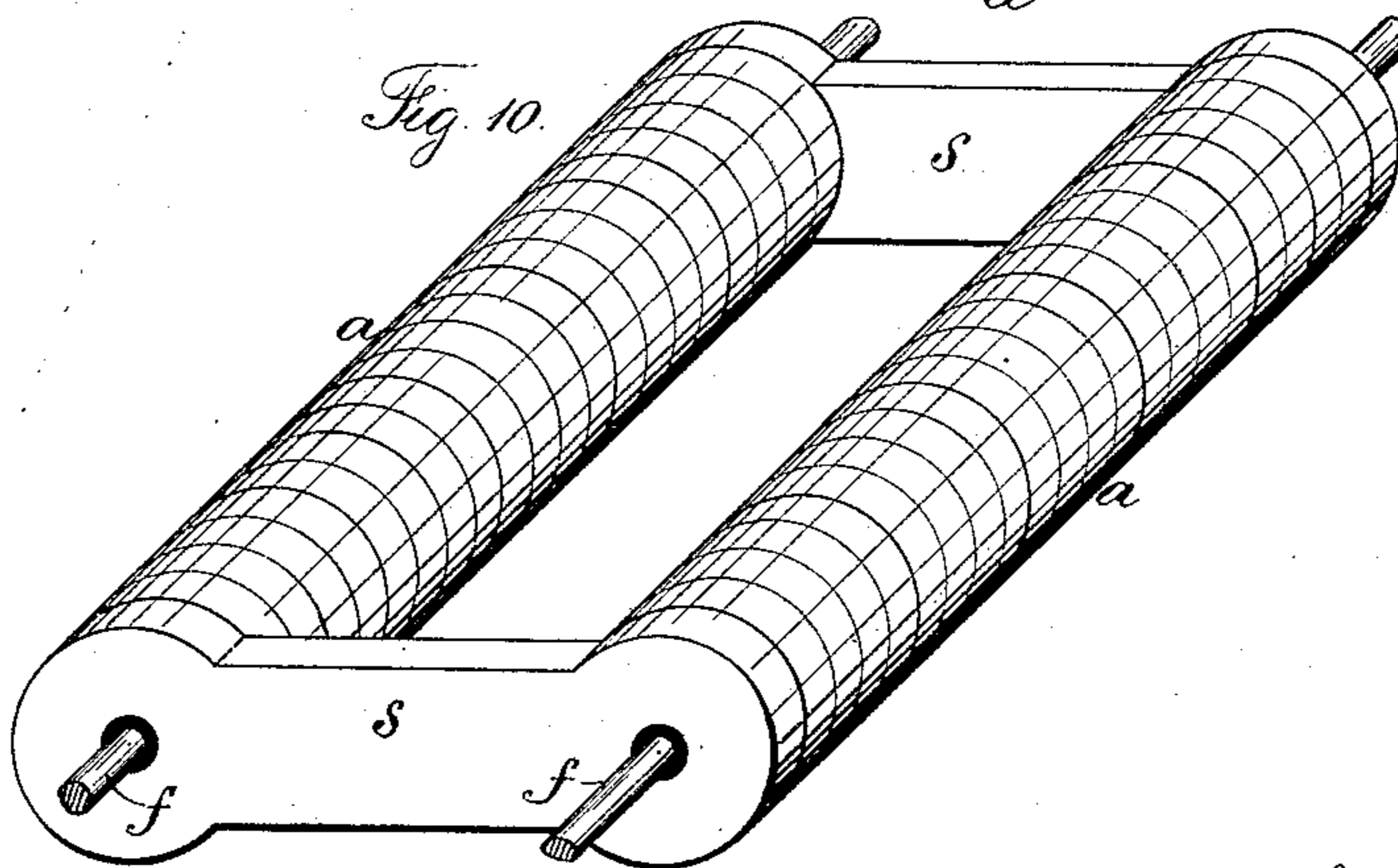
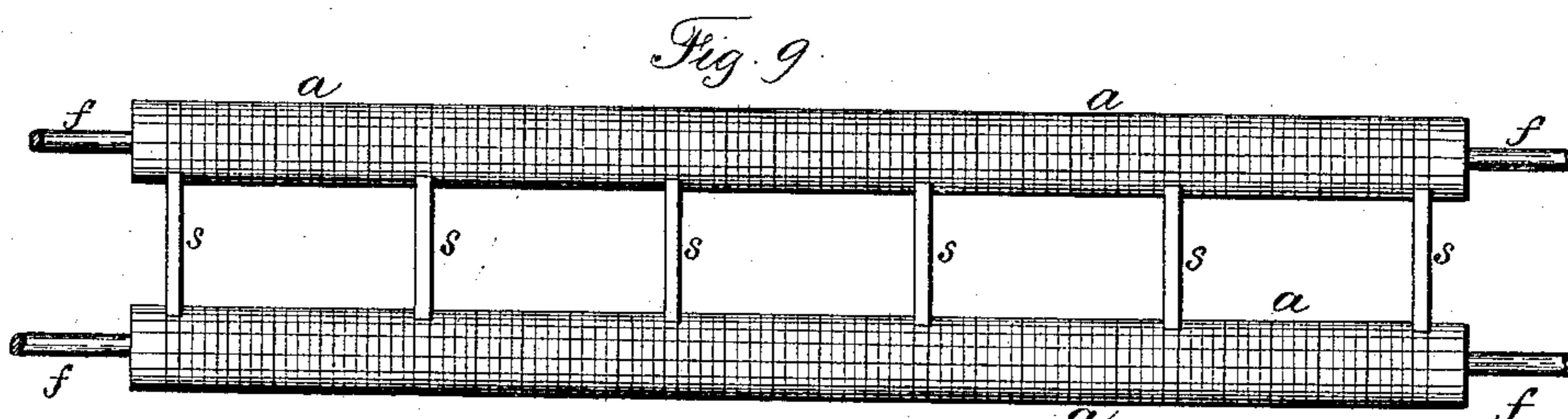
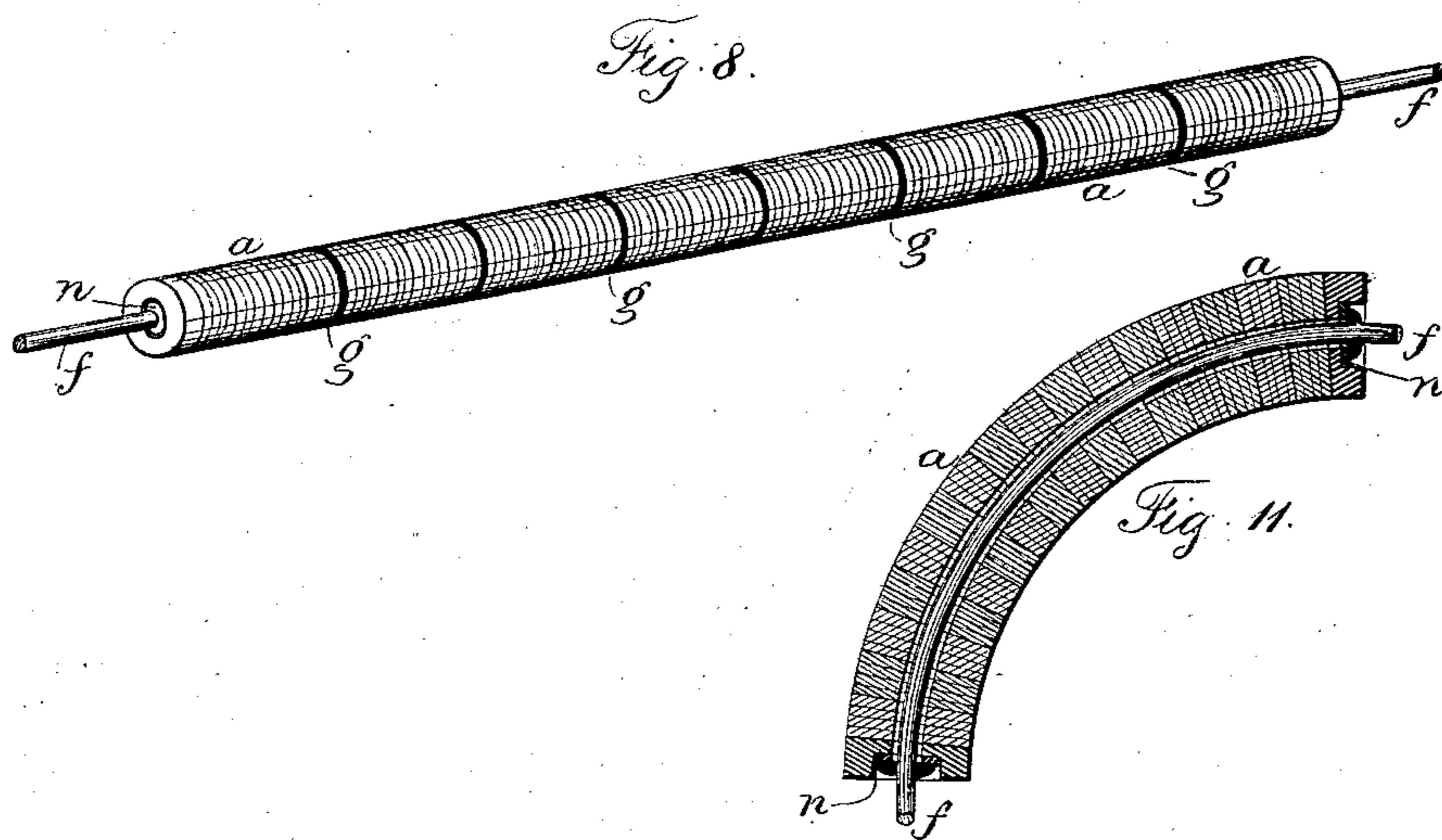
Inventor:
George S. Eaton
per Lemuel W. Perrell atty.

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UNITED STATES PATENT OFFICE.

GEORGE S. EATON, OF BROOKLYN, NEW YORK.

INSULATED ELECTRIC CONDUCTOR.

SPECIFICATION forming part of Letters Patent No. 280,153, dated June 26, 1883.

Application filed November 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. EATON, of Brooklyn, E. D., in the county of Kings and State of New York, have invented an Improvement in Insulated Electric Conductors, of which the following is a specification.

Electric conductors have been passed through holes in insulating disks or cylinders, and in some instances these have been introduced into metallic tubes.

My invention is made for connecting the insulating disks or cylinders in such a manner that they will be clamped together and rendered water-proof, but at the same time access can be had to the conductors for the purpose of making lateral connections.

In the drawings, Figure 1 is an elevation of the conductors and the insulating sections. Fig. 2 is an end view of the same. Fig. 3 is a longitudinal section, in larger size, of the ends of two sections. Fig. 4 shows the ends of two sections connected by a proof-box. Fig. 5 is an illustration of the manner of preparing the sections to be carted away. Fig. 6 shows the tubular connections of the wires in larger size. Fig. 7 shows another manner of connecting the segments and sections. Fig. 8 represents a single conductor insulated by my segments. Figs. 9 and 10 show two conductors insulated and tied together, so as to be kept at the proper distance apart; and Fig. 11 represents the conductor in a curved form.

I make use of disks or cylindrical segments *a*, of thick paper, straw-board, felt, wood, or similar material, perforated with numerous small holes for the passage of the electric conductors, and also with a larger central hole for a connecting-bolt, *d*. The segments are cut out by dies or punches, and they are thoroughly saturated with tar, asphalt, or similar material, either before or after being cut out.

I also form upon the edges of the segments longitudinal grooves or notches, as at *c*, in the lines passing through the outer range of conductors, so that it is apparent simply by inspection where the lines of conductors pass along through the segments. This greatly facilitates the selection of the wires for the lateral connections, because in laying down the conductors the sections can be perforated at

these longitudinal grooves for lateral branches to be taken off successively to the places where connections are required. In all instances the connections should be taken off from the outer circular range of conductors, so that when these have thus been all appropriated segments *a* of smaller size may be employed, as shown at B, Fig. 1, so that the wires of the second circular range will be near the surface, and can be provided with lateral or branch connections, as before described. In order to press these segments together and render them water-tight, I prefer to saturate the segments and coat their surfaces with tar or similar material. The segments are then threaded upon the wires and connected together by the central bolts or rods, *d*; and in doing this I prefer to pass the segments into a heated chamber in which the tarry materials become softened, so that when compressed by the action of suitable power the central bolts will hold the segments tightly together face to face, the tar being softened and spreading so as to fill all interstices between the segments.

The central bolts are to be of any desired character, and I prefer and use end segments of paper, or other rigid non-conducting material, recessed to receive nuts *o o'*, that are screwed upon the ends of the bolts. Tubular nuts *o'*, that are long enough to receive the adjacent ends of the bolts, may be used, so as to connect one section to the next. In laying up these sections it is preferable to clamp the segments or disks together by the central bolts in the presence of heat, to cause the segments to adhere, as aforesaid, and in laying down the segments to screw them together in succession. In some instances the segments are clamped together by a tube, with nuts at the ends, as shown in Fig. 7, and then these are clamped together by bolts passing freely through them; or the sections may be connected by bands around them near the ends, as at *u*, Fig. 3, there being also clamping-bolts *v*, passing through lugs on the bands *u*, so as to draw the ends of the sections tightly together. The electric conductors are passed through the holes in the perforated segments as such segments are packed together, to form sections of suitable length for handling. In this case the

conductors will be sufficiently long for allowing a number of sections to be laid side by side, as illustrated in Fig. 5, and carted from the factory to the place where they are laid in the ground. When prepared in this manner, the sections are laid down successively and pressed up to place and bolted after the slack wires have been drawn up taut.

If desired, the holes in the segments may be of sufficient size for the passage of long needles or rods, by which the wires are threaded or drawn through the sections as they are laid down. In this case it is preferable to introduce one or more such needles or rods into the holes in each section as the segments are laid together, in order that the holes in the segments may all be in line, and thus there will be no hinderance to the passage of the needles and conductors through all the holes in the sections.

At suitable distances apart there are spaces left between one section and the next, and proving-boxes *l*, with movable caps, introduced at such places. This allows for the discovery of any imperfections, and for taking off lateral connections, if necessary, at such places; but I prefer to take the lateral connections from the outer range of conductors, as shown at B and C, Fig. 1, and heretofore described. I remark that after the wire has been reached by an incision or hole made in the segment, the wire may be drawn out or a branch connected thereto, and the parts insulated by melted tar or other suitable material. The proving-boxes allow for the repairs of injured or damaged wires, and as the holes through which the conductors pass are all in line, one wire can be drawn out and another drawn in at the same time, if there are any repairs necessary, the proving-boxes being sufficiently near each other to allow for this being done.

I employ split tubular connections *t* between the wires in the proving-box, such split tubes being of a size to receive into them the ends of the wires to be connected. One of these tubular connections is shown in larger size in Fig. 6. I prefer to surround the split tube with a helix, which aids in pressing the tube upon the conductor; but it allows the split tube to be sufficiently elastic for the end of the conductor to be inserted. The central bolts may be employed as return or ground circuit connections to the conductors. In some instances I introduce disks of soft rubber between the disks or segments of paper or other more rigid materials, or at suitable distances apart, as seen at *g*, so that these rubber disks will yield and allow the conductor to be rolled up for transportation. In this instance the central rod or wire will be comparatively small.

In Fig. 8 the aforesaid perforated segments

of insulated material are shown upon one wire or conductor. These segments are compressed together, as aforesaid, and then a disk or ring, *n*, is slipped over the wire and held by solder or other material, after which other segments are threaded upon the conductor and compressed and secured by another disk or ring. Each of these disks or rings is smaller than the exterior diameter of the segments, and the adjacent segments are recessed, so as to inclose the said rings *n*. In Fig. 11 the conductor is represented as made in the manner before described; but it is curved, the segments being thickest at the convex portions of the conductor.

In the use of large conductors for arc-lamps and electric lights, difficulty sometimes arises from the conductors approaching too closely and causing a spark to pass from one conductor to the next. To prevent this I employ the aforesaid segments of insulating material threaded upon such conductors *f*, but at intervals usually of several feet. I introduce segments that are connected by a web, *s*, so as to keep the conductors at uniform distances apart, each web, with the segments at its ends, being formed of one piece of insulating material.

I claim as my invention—

1. The combination, with the perforated segments of insulating material and the conductors threaded through the same, of central tie bolts or rods, for clamping the segments up into sections and for connecting one section to the other, substantially as set forth.

2. The sections of insulating material perforated in circular ranges for the passage of the electric conductors, and grooved or notched on the edges to indicate the positions of the conductors, as and for the purposes set forth.

3. The electric conductors, in combination with segments of insulating material perforated in circular ranges for the reception of the conductors, such segments being smaller in diameter for receiving the inner circular range of conductors where they continue beyond the outer circular range of conductors, substantially as specified.

4. The combination, with two or more conductors and the perforated segments of insulating material, of webs that connect one range of insulated conductors to the next, substantially as set forth.

5. The combination, with the conductors and the segments of insulating material, of intervening disks of rubber, substantially as set forth.

Signed by me this 22d day of November, A. D. 1882.

GEO. S. EATON.

Witnesses:

HAROLD SERRELL,
WILLIAM G. MOTT.