(No Model.) 2 Sheets—Sheet 1.

S. Z. DE FERRANTI.

DISTRIBUTION OF ELECTRICAL ENERGY.

No. 409,565. Patented Aug. 20, 1889.

Fig. 1.

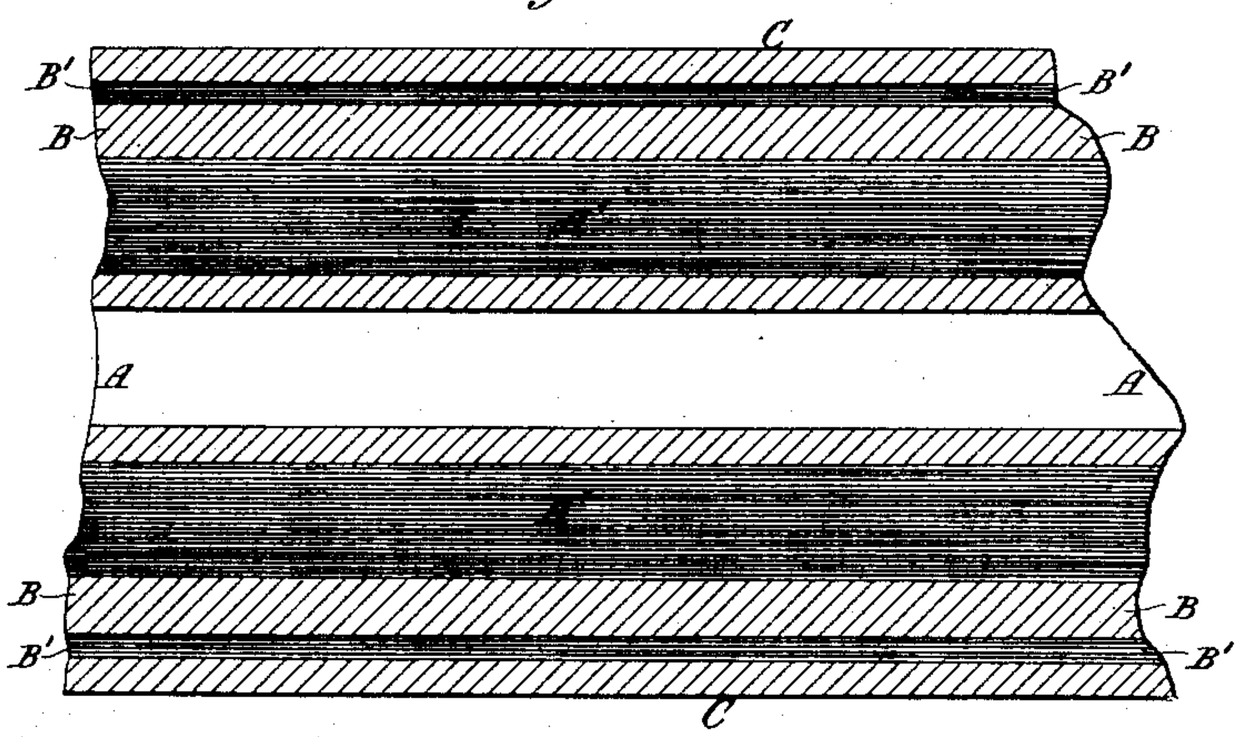
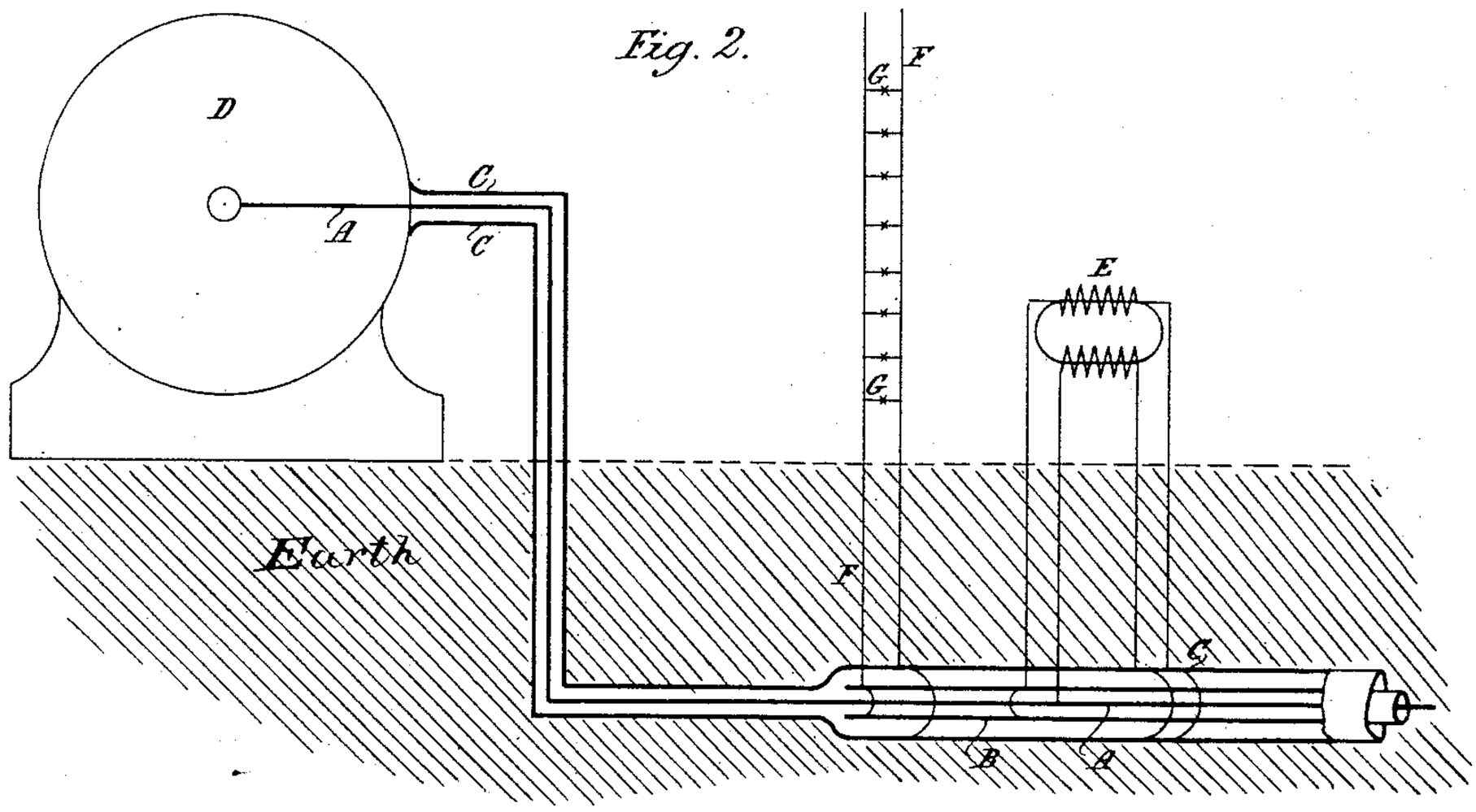


Fig. 2.



Witnesses
Edward C. Davidson
M. J. Kelley.

S. Z. de Ferranti
Inventor.
By his attorneys
Baldwin, Davidson & Wright

(No Model.) 2 Sheets—Sheet 2.

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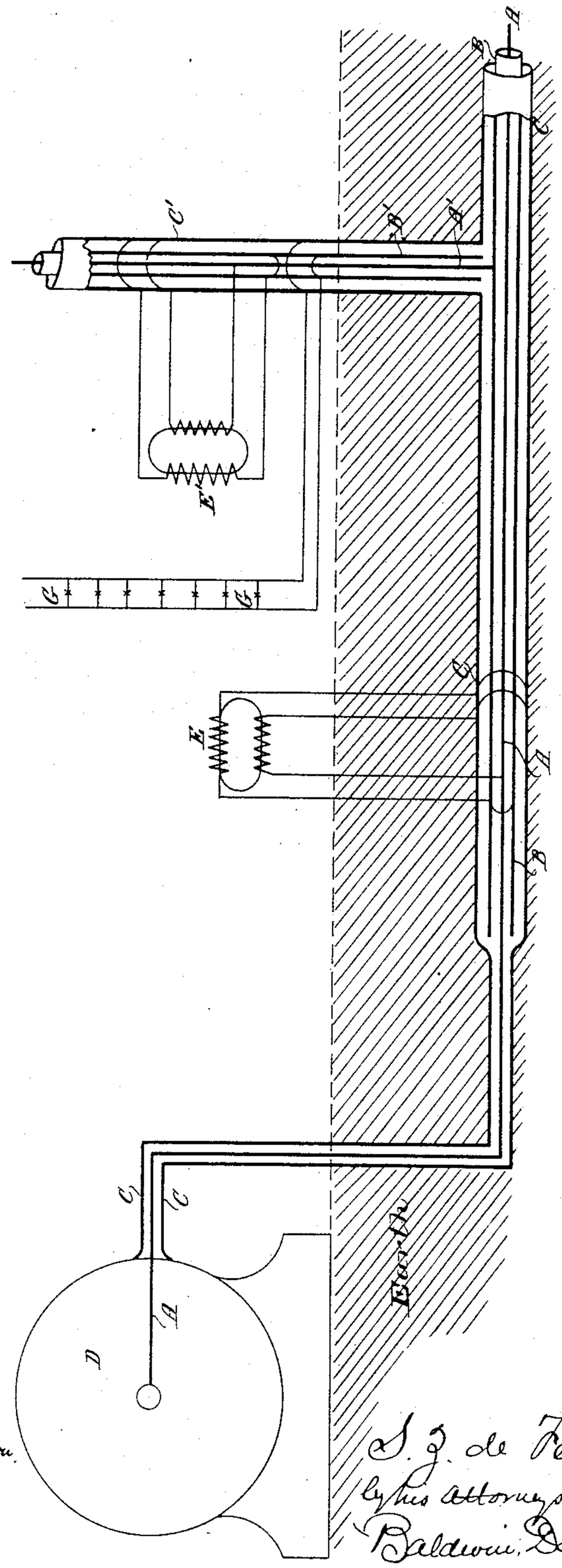

Fig. 3.

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UNITED STATES PATENT OFFICE.

SEBASTIAN ZIANI DE FERRANTI, OF HAMPSTEAD, COUNTY OF MIDDLESEX, ENGLAND.

DISTRIBUTION OF ELECTRICAL ENERGY.

SPECIFICATION forming part of Letters Patent No. 409,565, dated August 20, 1889.

Application filed February 19, 1889. Serial No. 300,457. (No model.) Patented in England December 11, 1885, No. 15,251; in France December 9, 1886, No. 180,176; in Belgium January 8, 1887, No. 75,875, and in Italy March 31, 1887, No. 21,119.

To all whom it may concern:

Be it known that I, SEBASTIAN ZIANI DE FERRANTI, electrician, a subject of the Queen of Great Britain, residing at 120 Fellows Road, Hampstead, in the county of Middlesex, England, have invented certain new and useful Improvements in the Distribution of Electrical Energy, (for part of which invention I have received Letters Patent in Great Britain, No. 15,251, dated December 11, 1885; in France, No. 180,176, dated December 9, 1886; in Belgium, No. 75,875, dated January 8, 1887, and in Italy, No. 21,119, dated March 31, 1887,) of which the following is a specification.

The object of my invention is to enable currents of very high tension to be used with safety in the distribution of electrical energy. It often occurs, especially in the electric lighting of towns, that streets along which the high-tension main is led require to be lighted and to have for this purpose current drawn off from it at various distances apart along its length. It also often occurs that branch streets have to be lighted which are of such length that it is not sufficient to lead low-tension mains along them and only supply these mains with current at one of their ends; but it is necessary that the high-tension main should also be carried along the street and the low-tension main be fed from it at intervals. To allow of this being done with safety, I employ three concentric conductors insulated from one another—the innermost one for conveying current of high tension, the intermediate one supplied with current of lesser tension through converters from the high-tension conductor, and the outer one, which is buried in the earth or otherwise kept at the same potential as the earth, serving as a return-conductor to both.

The drawings annexed show the above improvement.

Figure 1 is a longitudinal section of a portion of the threefold conductor. Fig. 2 is a diagram view showing the low-tension conductor supplied with current through converters from the innermost high-tension conductor and circuits of lamps fed with current from the intermediate low-tension conductor. Fig. 3 is a similar diagram view showing the conductor which is supplied with current through converters supplying current to the innermost conductor of another branch threefold conductor and a second set of converters to again reduce the current and supply it to the low-tension conductor of the branch, to be from it supplied to lamp-circuits.

In Fig. 1, A is the central tubular conductor for current of high tension; A′, insulating material by which it is surrounded. B is the conductor for the lower-tension current; B′, insulating material by which it is surrounded, and C is the outermost conductor which is to serve as a return-conductor for both conductors A and B.

In Fig. 2, D is a dynamo-electric machine producing current of high tension, and with the conductor A leading from one of its poles or terminals and the outer conductor C leading from the frame of the machine which forms the other pole or terminal. The threefold conductor need only be used at the places where current is to be distributed. The intermediate length of conductor between the dynamo and the places where the current is to be distributed may be a twofold conductor, as shown. E E are converters, each with one terminal of its primary winding coupled to the innermost conductor A and its other terminal to the outer conductor C, while one terminal of the secondary winding is also coupled to the conductor C and the other terminal to the low-tension conductor B. F F are branch circuits feeding current to lamps G, one conductor being coupled to the conductor B and the other to the conductor C.

In Fig. 3 the branch conductor fed with current from the converters is shown as the innermost conductor A′ of a branch threefold conductor, and the primary windings of other converters E′ E′ coupled to it and to the outermost conductor C′, while from the low-tension conductor B′ of the branches current is supplied to branch circuits feeding lamps G, the return-conductors of the lamp-circuits being coupled to the conductor C′, and this to the conductor C.

What I claim is—

1. The three concentric conductors, the innermost fed with high-tension current, the

converter supplied with current from the high-tension conductor feeding the intermediate conductor with low-tension current, and the outer conductor serving as a return-conductor to both the high and low tension mains.

2. The combination of a dynamo-electric machine producing current of high tension, three concentric conductors, the inner one coupled to one pole of the dynamo, the outer one to the other pole of the dynamo and to earth, a converter with its primary coupled to the innermost and outer conductors and its secondary to the outer and intermediate conductors, and branch circuits from the intermediate conductor to the outer conductor.

3. The combination of a dynamo-electric machine producing current of high tension, three concentric conductors, the inner one coupled to one pole of the dynamo, the outer one to the other pole and to earth, a converter with its primary coupled to the innermost and outer conductors and its secondary to the outer and intermediate conductors, a branch conductor led off from the intermediate conductor and passing away through two other conductors concentric with but insulated from it, a second converter with its primary coupled to the innermost and outer conductors of this branch and its secondary to the outer and intermediate conductors, and branch circuits from the intermediate to the outer conductor.

SEBASTIAN ZIANI DE FERRANTI.

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