

(No Model.)

S. Z. DE FERRANTI.

MEANS FOR DISTRIBUTING ELECTRIC ENERGY.

No. 389,795.

Patented Sept. 18, 1888.

Fig. 2.

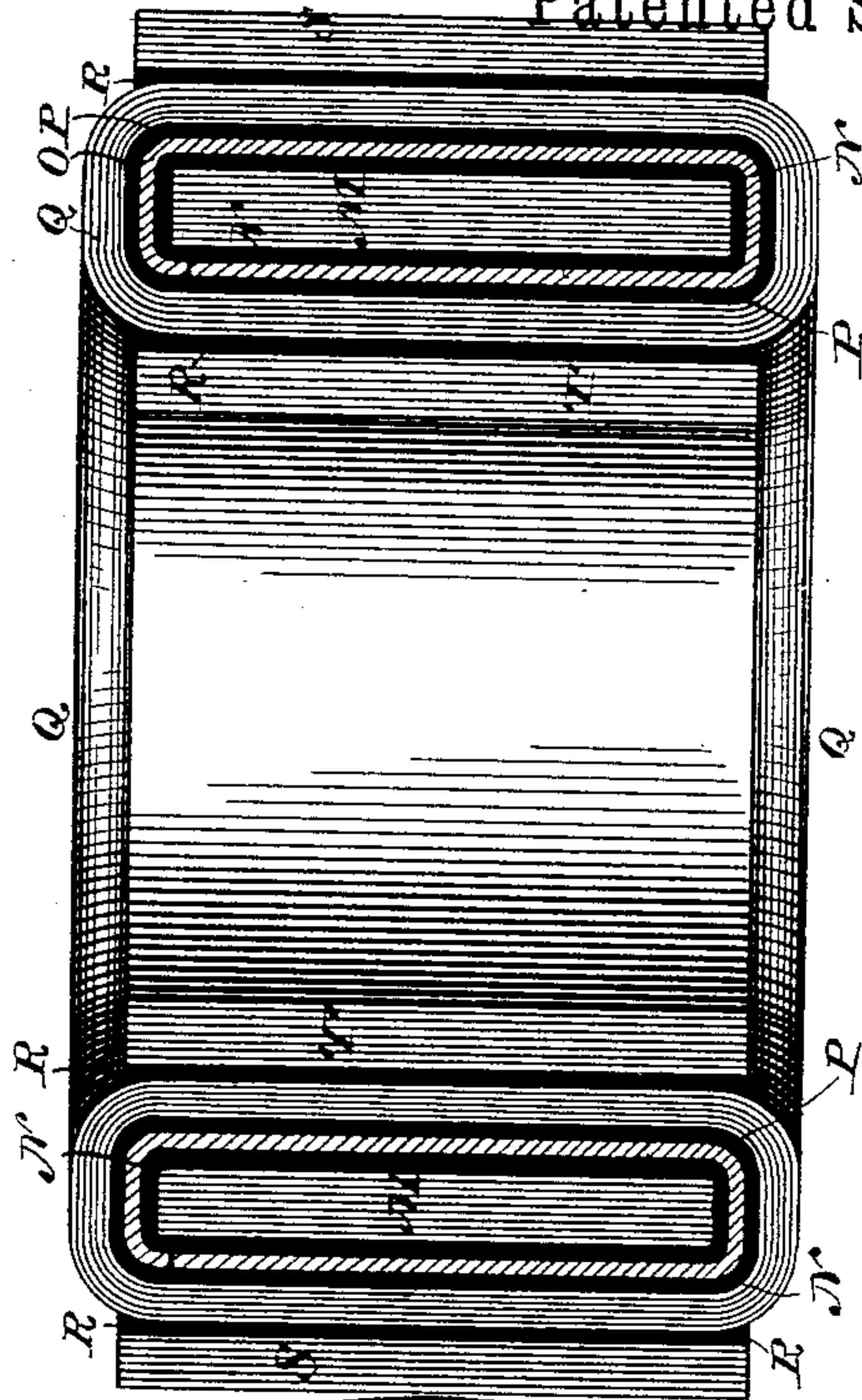
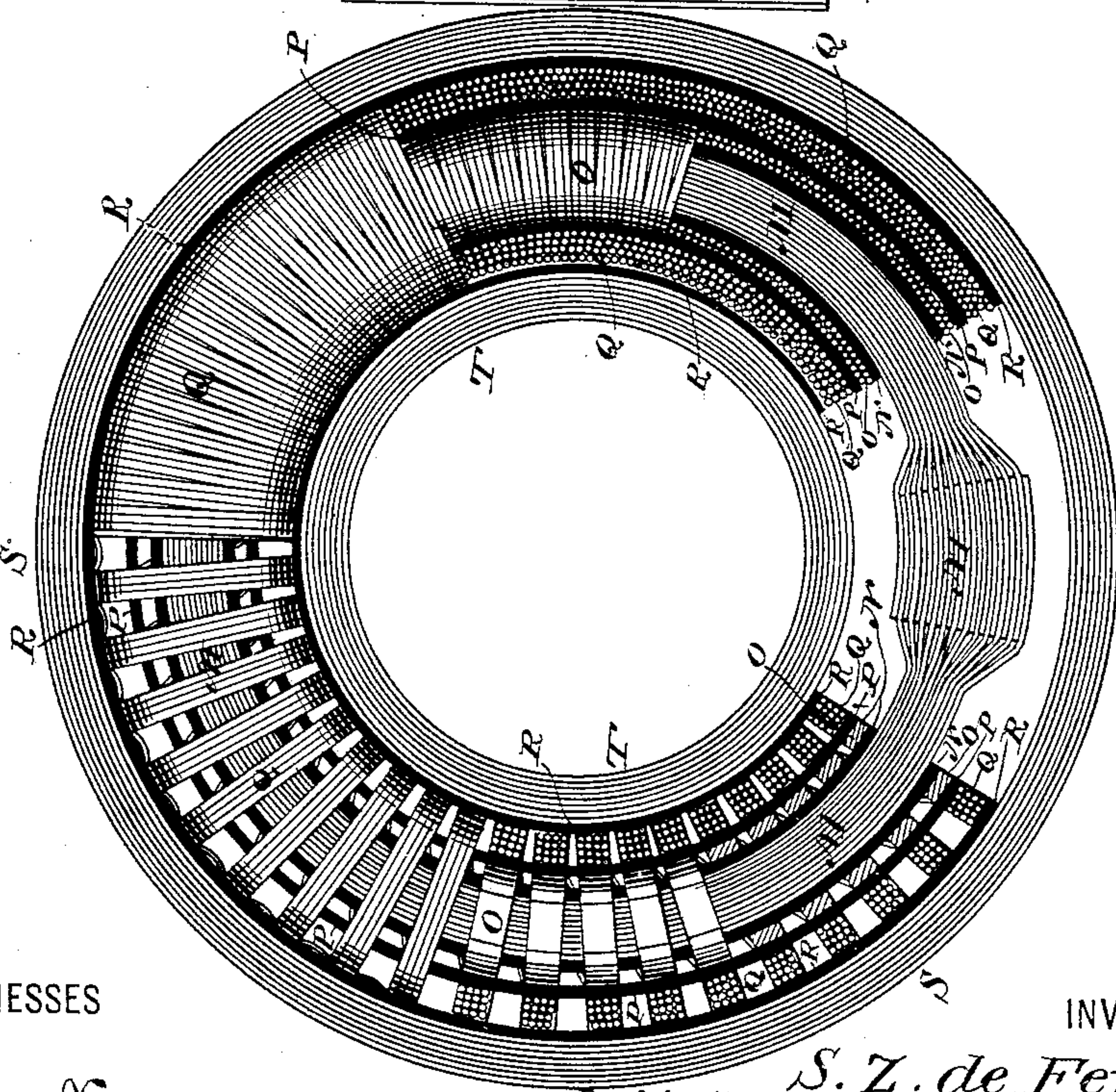


Fig. 1.



WITNESSES

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# UNITED STATES PATENT OFFICE.

SEBASTIAN ZIANI DE FERRANTI, OF LONDON, ENGLAND.

## MEANS FOR DISTRIBUTING ELECTRIC ENERGY.

SPECIFICATION forming part of Letters Patent No. 389,795, dated September 18, 1888.

Application filed April 17, 1888. Serial No. 270,957. (No model.) Patented in England December 9, 1885, No. 15,141, and 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, a subject of the Queen of Great Britain, residing at St. Benet Chambers, Fen-church Street, in the city of London, England, electrician, have invented certain new and useful Improved Means for Distributing Electric Energy, of which the following is a specification.

Letters Patent on this invention have been granted to me in the following countries: in Great Britain, No. 15,141, dated December 9, 1885, and No. 15,251, dated December 11, 1885; in France, No. 180,176, dated December 9, 1886; in Italy, No. 21,119, dated March 31, 1887, and in Belgium, No. 75,875, dated January 8, 1887.

My invention relates to what are known as "electrical converters," by means of which currents of one intensity may be converted into currents of a different intensity in all systems of distribution where such conversion is required—as, for instance, for electric lighting, motive power, &c.; and more especially my invention relates to systems in which dynamo-electric machines generating alternating currents of high intensity are employed and such currents converted into currents of lower intensity at or near the places where the lights are to be exhibited or the energy utilized.

In the accompanying drawings, Figure 1 is a plan, partly in section, of a converter in the form of a Gramme ring. The figure shows two forms—the one to the left and the other to the right of the figure. Fig. 2 is a transverse vertical section. I will describe first the arrangement shown on the left side of Fig. 1.

M is the central bundle of soft-iron strips or ribbons. These ribbons are insulated from each other by interposed layers of paper, or otherwise, and their ends are brought together in metallic contact. The core is thus formed of a bundle of iron strips, each forming a continuous magnetic circuit. Over this there is applied an insulation, N, consisting of a lapping of paper and shellac. Upon this the copper spiral O is wound. Outside the copper there is another insulating covering, P.

Q Q are rings or windings formed of insulated wire, and they are coupled together to form the primary or dynamo circuit.

R is an outer covering of insulated material

separating the rings Q from an outside jacket, S, formed of thin sheets of soft iron, either made into rings or simply wound upon the outside of the converter, so as to form a magnetic circuit outside the rings Q continuous from end to end of the winding. T is a similar hoop or hoops of soft iron within the rings Q, and there also forming a closed or partially-closed magnetic circuit.

The description already given applies to the arrangement on the left side of the figure. On the right side the primary and secondary wires are wound upon the ring as an ordinary Gramme ring is wound. The former arrangement, however, is preferable, because the construction is easier, and also because ventilation-spaces are left, which is a matter of much importance, though no claim is made herein to such an arrangement. The ends of the core-ribbons M are brought together after the coils or rings are upon them, and the two ends of each ribbon are placed in metallic contact, while by an insulation of paper each ring is separated from its neighbor. The part of the ring in which this overlapping takes place is preferably left unwound.

This invention is in some respects not necessarily limited to the core being made up of a bundle of strips, each forming an independent magnetic circuit, because, so far as I am aware, I am the first to use a core having its ends united to form a closed magnetic circuit in connection with one or more independent exterior magnetic circuits or rings or layers of iron, and I have accordingly claimed such matter in the third claim below recited.

The converters which I have described in this specification may be used not only for reducing from a high tension to a low, but also for increasing from a low tension to a high or simply for transferring energy from one circuit to another. I make these converters of all sizes, from a few ounces in weight for telephonic use and for other purposes where the amount of electrical energy to be converted is small up to a ton or more in weight, where the electrical energy to be converted is large. Beyond the latter dimensions it may perhaps be more convenient to employ several converters to supply the same main circuit.

I claim as my invention—

1. A converter in the form of a Gramme ring, consisting of a core made up of a bundle of strips or ribbons of iron insulated from each other, but each forming a closed magnetic circuit, superposed primary and secondary windings, and exterior rings or layers, S T, of soft iron.
2. A converter consisting of a core in the form of a loop or ring made up of a bundle of strips or ribbons of iron insulated from each other, but each forming a closed magnetic circuit, superposed primary and secondary windings, and an independent ring or layer of iron

arranged outside the windings, substantially as set forth.

3. A converter consisting of a core of iron having its ends united to form a closed magnetic circuit, superposed primary and secondary windings, and an independent ring or layer of iron arranged outside the windings.

In testimony whereof I have hereunto subscribed my name.

SEBASTIAN ZIANI DE FERRANTI.

Witnesses:

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