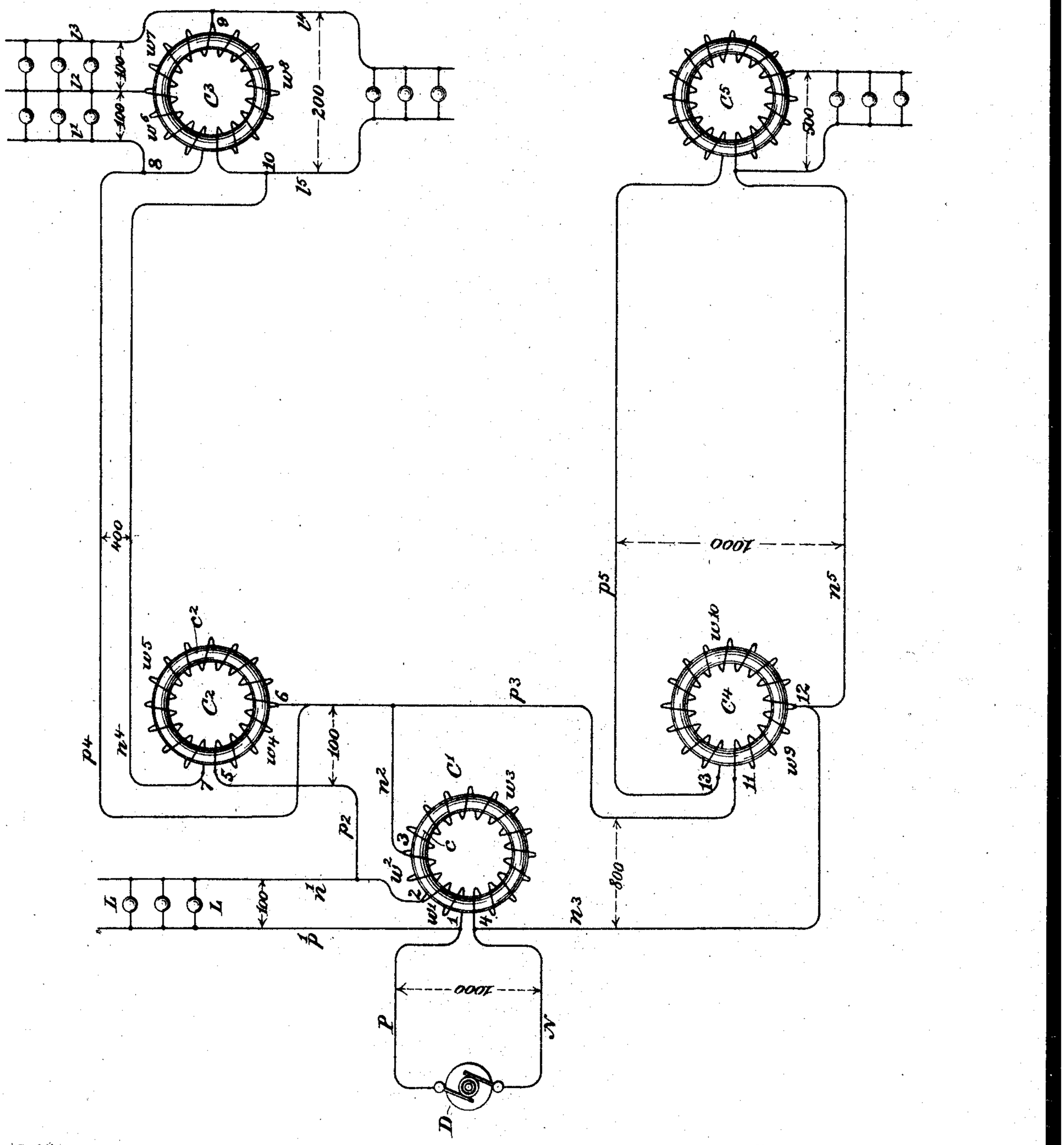
(No Model.)

W. STANLEY, Jr.

SYSTEM OF ELECTRICAL CONVERSION AND DISTRIBUTION.

No. 503,622. Patented Aug. 22, 1893.



Witnesses

Geo. W. Breck.
Eugene J. Reilly.

Inventor

Wm. Stanley Jr.

By his Attorneys

Pope Edgecomb & Perry

UNITED STATES PATENT OFFICE.

WILLIAM STANLEY, JR., OF GREAT BARRINGTON, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, OF PITTSBURG, PENNSYLVANIA.

SYSTEM OF ELECTRICAL CONVERSION AND DISTRIBUTION.

SPECIFICATION forming part of Letters Patent No. 503,622, dated August 22, 1893.

Application filed March 28, 1887. Serial No. 232,630. (No model.) Patented in England July 12, 1887, No. 9,745.

To all whom it may concern:

Be it known that I, WILLIAM STANLEY, Jr., a citizen of the United States, residing in Great Barrington, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Systems of Electrical Conversion and Distribution, (for which I have obtained Letters Patent in Great Britain, dated July 12, 1887, No. 9,745,) of which the following is a specification.

The invention relates to systems of electrical distribution, wherein alternating, undulatory, intermittent or pulsatory electric currents of any required potential, and derived from any convenient source, are transformed or converted, in whole or in part, into secondary currents having a different potential.

The invention comprises an improved organization of circuits and apparatus whereby the hereinbefore described operation is effected with greater economy and convenience than has heretofore been possible.

The general plan of the invention consists in the transmission of alternating, undulatory, intermittent or pulsatory currents, the potential of which is designed to be varied, through an inductorium of improved construction, consisting of a mass of iron or other magnetic metal situated in inductive relation to a continuous conductor, so constructed and arranged, that the whole or any required portion of such conductor may also be included in one or more secondary circuits. The current traversing said conductor serves to produce a magnetic field, and the magnetic changes thus produced in the field, in turn set up a counter-electromotive force and produce an induced current in the whole or any required portion of the same conductor.

In carrying out the invention, the conversion or change of potential in the current is effected as hereinafter described, by means of an inductorium in which a single continuous conductor performs the functions of both the independent primary and secondary conductors of the ordinary converter; that is to say, the inductorium as a whole produces the required result by reason of its self induction. Such an inductorium may properly be termed an auto-converter.

The accompanying drawing is a theoretical diagram illustrating an organization of circuits and apparatus embodying the invention.

Referring to the figure, D represents a suitable dynamo-electric generator or other convenient apparatus for producing alternating, undulatory, intermittent or pulsatory currents. Such currents are transmitted, in the present instance, through primary conductors or mains P and N, leading to the respective terminals 1 and 4 of a conductor 1, 2, 3, 4, which acts inductively upon a core of soft iron or equivalent magnetizable material *c*, which is made in the form of an endless ring so as to form a closed magnetic circuit. The conductor 1, 2, 3, 4, may with advantage be wound helically upon the iron ring *c* in the manner shown, but the particular disposition of such conductor with reference to the mass of iron *c*, is not material, so far as this invention is concerned, and may be varied as circumstances dictate. It is only necessary that the conductor and the iron should be situated within a common magnetic field, or in other words, that they should be placed in inductive relation to each other. The conductor and the mass of magnetizable material together constitute what is termed the auto-converter C′.

The conductor 1, 4, although continuous may be regarded as consisting of any required number of sections, from the dividing points between which, branches or conductors may be led off. For example the conductor 1, 4, is shown as divided into three sections w', w^2, w^3. At the intermediate points 1, 2, branches or conductors p' and n' are led off, and between these branches are placed electric lamps or other equivalent translating devices L, L, so as to form a closed secondary circuit. From the points 2, 3, including the section w^2, conductors p^2 n^2, are in like manner led off and these are connected through a portion of the coils of an auto-converter C^2 in a manner to be described, and they form thus a closed circuit. Other conductors p^3 and n^3 leading from the points 3, 4, include the section w^3 in a closed circuit.

It will be evident that with such an organization of apparatus as has been described, if it is assumed that the generator at D is trans-

mitting a current through the conductors P and N having a potential of say one thousand volts, such current will traverse the entire length of the conductor 1, 2, 3, 4, of the auto-converter, and each pulsation or alternation will produce a certain amount of energy in the magnetic field surrounding the core *c*. These magnetic changes or pulsations in turn set up a counter-electromotive force, which will in like manner be uniformly distributed throughout the length of the conductor 1, 2, 3, 4. The value of this electromotive force in any one of the sections w', w^2 or w^3, will however depend upon the number of convolutions in each section. Hence, disregarding the loss in conversion, which is usually small, there will be developed in the conductor 1, 2, 3, 4, a counter-electromotive force equal to the potential existing between the terminals 1 and 4, due to the electromotive force of the generator D. If this difference of potential be assumed as before to be one thousand volts, then the counter-difference of potential developed between the same terminals will also be one thousand volts, and if it be assumed that the section w' and the section w^2 each comprises one-tenth of the whole coil, then there will be delivered upon the conductors p', n', a current of one hundred volts, and likewise there will be delivered to the circuit formed by the conductors p^2, n^2, a current of one hundred volts. The direction of the current in the portion of the conductor w' lying between the points 1 and 2 will necessarily be opposite to that of the direct current from the generator D. This is also true of any portion of the conductor 1, 4, when supplying current to a secondary circuit in the manner described. The current upon the conductors p^3, n^3, being the difference between the two hundred volts and the one thousand volts, would be eight hundred volts. In this manner the current may be conveniently subdivided in any required proportions. If now it is desired to vary the potential upon any one or more of the circuits, a second or auxiliary auto-converter C^2 may be employed. This consists in like manner, of a core c^2 surrounded by a coil 5, 6, 7, which is divided into sections w^4, w^5. The conductors p^2, n^2, lead to the points 5, 6, at the respective terminals of the section w^4, while the intermediate point 6, and the point 7, at the other terminal of the entire coil, are connected with conductors p^4, n^4. If now the section w^4 be considered as one fifth of the entire coil, then the current delivered at the terminal of the section w^5, will be four times the potential of that delivered to the section w^4, that is to say, four hundred volts. Where the current is to be transmitted to a long distance, the increased potential which is thus imparted to it renders it possible to employ a much smaller conductor and thus the cost of the plant is diminished.

At a distant point the conductors are connected with the terminals of a coil 8, 9, 10, of the auto-converter C^3, similar to the device C'. This coil is divided into sections w^6, w^7, w^8. From these sections, conductors 11, 12, 13, 14, 15, are led, and these receive a difference of potential dependent upon the lengths of the different sections.

There is shown at C^4 another converting device connected with, or applied to, the conductors p^3, n^3. This is supplied with a difference of potential of eight hundred volts. The coil 11, 12, 13, of the auto-converter C^4, comprises two sections w^9 and w^{10}. The section w^{10} has its respective terminals 12, 13, connected with the conductors p^5, n^5, while a section w^9 has its respective terminals connected with the conductors p^3, n^3. The length of this section may be so porportioned to the entire length of the coil, that the potential of the current will be varied to any required extent, as for instance, in the present case it is raised from eight hundred volts to one thousand volts. Such current is transmitted over the conductors p^5, n^5, to an auto-converter C^5, designed, in this instance, to reduce the potential to say five hundred volts, in the manner described with refererence to the auto-converter C^3.

It is evident that the system may be extended to any desired length, and that the conversions may be variously modified to meet the requirements. The initial step of conversion through the device C' may be omitted in individual cases.

I claim as my invention—

1. In a system of electrical conversion and distribution, an auto-converter, a feeding circuit including more or less of the coils of said auto-converter, and two or more derived circuits, having their terminals connected across more or less of the coils of said auto-converter, substantially as described.

2. In a system of electrical conversion and distribution, an auto-converter and a feeding circuit including more or less of the coils of said auto-converter; in combination with a second auto-converter having some of its coils in multiple arc with some of the coils of the first auto-converter, and a translating circuit fed by the remaining coils of said second auto-converter, substantially as described.

3. In a system of electrical conversion and distribution, an auto-converter, and a feeding circuit containing all the coils of said auto-converter; in combination with a second auto-converter, having less than half its coils in multiple arc with a portion of the coils of said first auto-converter, and a translating circuit fed by the remaining coils of said second auto-converter, substantially as described.

In testimony whereof I have hereunto subscribed my name this 11th day of March, A. D. 1887.

WILLIAM STANLEY, JR.

Witnesses:
CLARKSON A. COLLINS,
A. CHALKLEY COLLINS.