

No. 677,375.

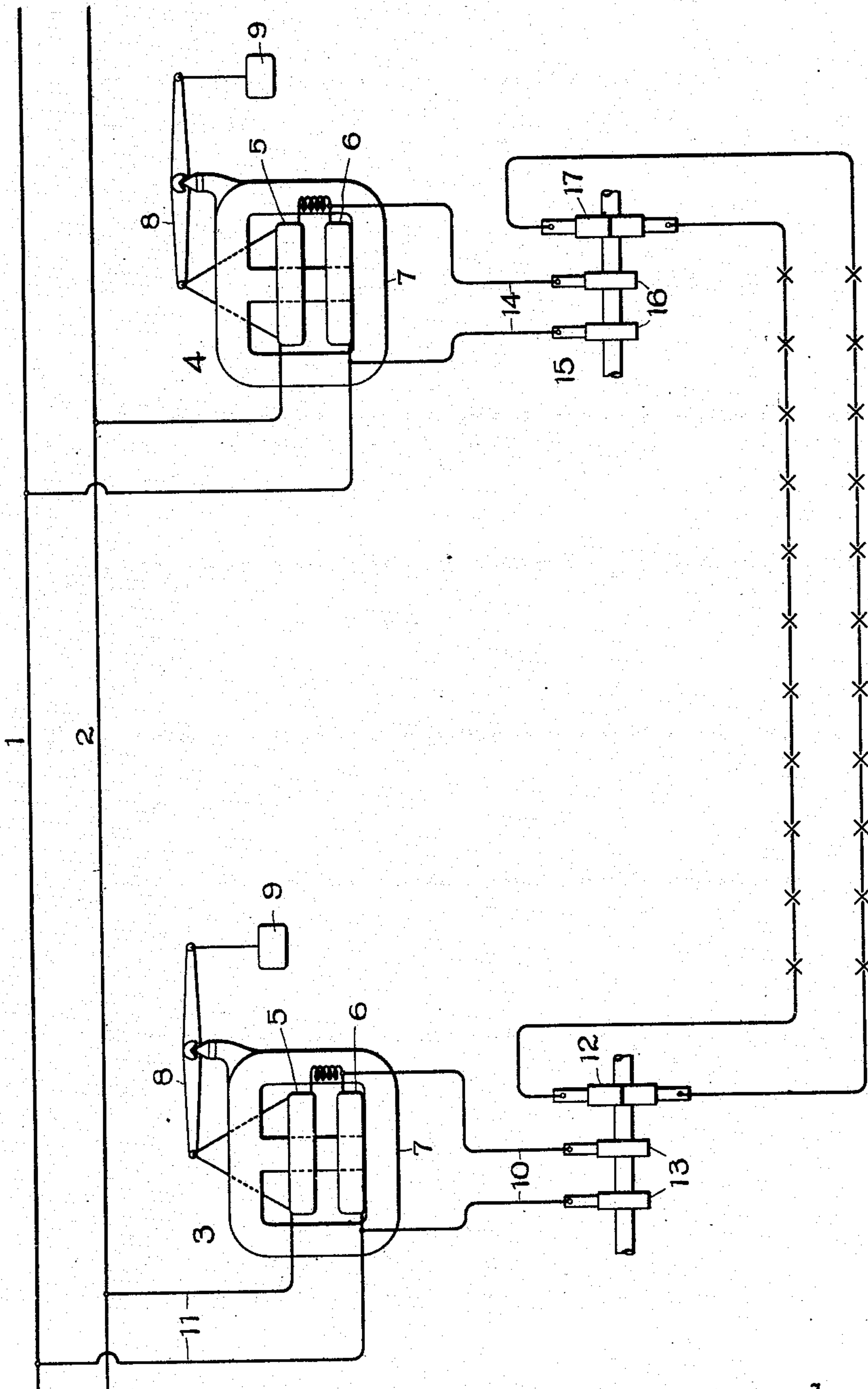
Patented July 2, 1901.

E. W. RICE, JR.

SYSTEM OF ELECTRICAL DISTRIBUTION.

(Application filed May 24, 1900.)

(No Model.)



Witnesses:

Lewis P. Abell.
Alexander S. Lamb.

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UNITED STATES PATENT OFFICE.

EDWIN W. RICE, JR., OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE
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SYSTEM OF ELECTRICAL DISTRIBUTION.

SPECIFICATION forming part of Letters Patent No. 677,375, dated July 2, 1901.

Application filed May 24, 1900. Serial No. 17,781. (No model.)

To all whom it may concern:

Be it known that I, EDWIN W. RICE, Jr., a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Systems of Electrical Distribution, (Case No. 1,196,) of which the following is a specification.

My invention relates to constant-current systems of electrical distribution, and more particularly to those making use of alternating currents, and comprises certain improvements whereby the apparatus for producing constant current may be cheapened in construction and improved in efficiency. The apparatus which I have thus devised for use in this relation I may term a "constant-current compensator," since it includes relatively movable coils in shunt relation to the primary circuit and a shunt connection to the translating devices or consumption-circuit.

Another feature of my invention consists in the combination of a plurality of constant-current transforming devices with a circuit carrying rectified current derived from these transforming devices.

The details and mode of operation of my invention will be set forth more at length in the following description, which is to be taken in connection with the accompanying drawing, while the points of novelty of the same will be particularly pointed out in the claims appended hereto.

In the drawing, 1 2 indicate constant-potential mains supplied with alternating current of any suitable frequency. Fed from these mains are two constant-current compensators devised by me, one of the compensators being indicated at 3 and the other at 4. Each compensator consists of relatively movable coils 5 6, arranged in the same manner as the coils of the ordinary constant-current transformer or reactive coil and situated in the same manner in inductive relation to a suitable core of subdivided magnetic material 7. The coils 5 6 are connected in series with each other, and in the arrangement shown one of the coils 6 is fixed with respect to its core, while the other is partially counterbalanced by means of a

connection with a pivoted lever 8, from one end of which is suspended a counterbalancing-weight 9.

The constant-current circuit of one of the compensators is indicated by the leads 10, which may be shunted about a number of turns of the coils 5 6, either greater or less than the number included between the connections of the primary leads 11. In this instance, the compensator being of the step-down variety, the leads 10 of the consumption-circuit are shunted about a single coil 6, while the primary or supply circuit is connected across both of the coils 5 and 6. By thus arranging the supply-circuit and consumption-circuit it will be seen that a portion of the winding of the compensator will be common to both circuits. Since the currents in the supply-circuit and consumption-circuit flow through this portion of the winding in opposite directions, the resultant current is equal to their difference, by reason of which the compensator affords a cheap and efficient means for changing a constant-potential current into a constant current having any desired maximum electromotive force either greater or less than that of the supply-circuit. The leads 10 in this instance are shown as extending through a rectifying apparatus consisting of a rectifying-commutator 12 and collector-rings 13, mounted upon a shaft driven synchronously with the rate of alternations—as, for example, by means of a synchronous motor or other suitable device. (Not shown.) The leads 14 are in a similar manner connected to the constant-current compensator 4 and transmit current to another rectifying apparatus 15, consisting, as before, of a suitably-driven shaft carrying collector-rings 16 and a rectifying-commutator 17.

In the arrangement shown the rectifying-commutators are connected in series with each other in such manner that the current from one rectifier passes through the other, translating devices being, however, so included in this circuit that current passing out of one rectifier must first pass through a greater or less number of these translating

devices before reaching the other rectifier. By this arrangement the maximum difference of potential between any two points on the rectifier-circuit is reduced, as will readily be
5 understood.

Although I have shown my invention as applied to a single-phase alternating-current system, it will be understood that its use is not limited to this relation only, but may be
10 used in connection with multiphase systems as well. Moreover, although I have indicated in the drawing a constant-current compensator producing an electromotive force on the constant-current circuit of smaller maxi-
15 mum value than on the primary or impressed circuit, it will be understood that it is quite within my invention to construct a constant-current compensator having the opposite relation of electromotive forces, this arrange-
20 ment having been already alluded to above.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of a plurality of constant-current circuits, a rectifier in each circuit, and a circuit including said rectifiers in
25 series.

2. The combination of a plurality of constant-current circuits, a rectifier in each circuit and a series circuit including translating devices arranged alternately with said
30 rectifiers.

3. A plurality of constant-current compensators and a single circuit fed with rectified current derived from said compensators.

In witness whereof I have hereunto set my
hand this 22d day of May, 1900.

EDWIN W. RICE, JR.

Witnesses:

BENJAMIN B. HULL,
MABEL H. EMERSON.