

No. 714,119.

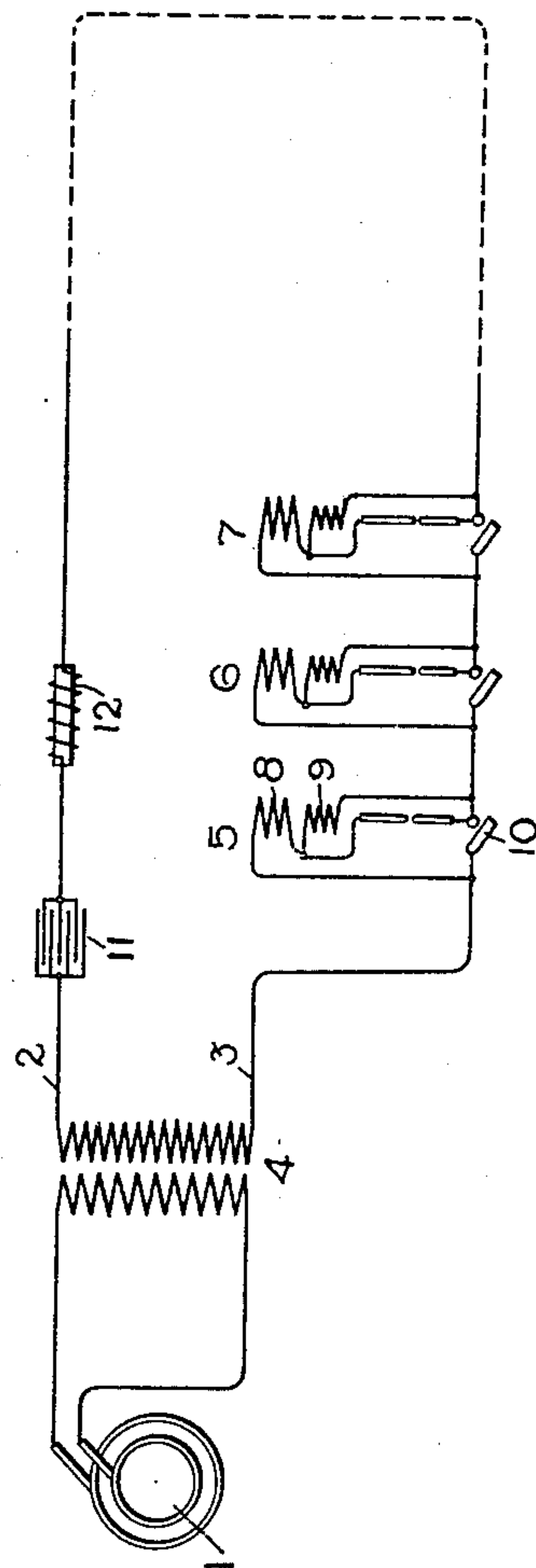
Patented Nov. 18, 1902.

M. O. TROY.

SYSTEM OF ELECTRICAL DISTRIBUTION.

(Application filed May 31, 1902.)

(No Model.)



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## SYSTEM OF ELECTRICAL DISTRIBUTION.

SPECIFICATION forming part of Letters Patent No. 714,119, dated November 18, 1902.

Original application filed December 19, 1901, Serial No. 86,473. Divided and this application filed May 31, 1902. Serial No. 109,597. (No model.)

*to all whom it may concern:*

Be it known that I, MATTHEW O. TROY, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have  
5 invented certain new and useful Improvements in Systems of Electrical Distribution, (Case No. 2,929, a division of my application, Serial No. 86,473, filed December 19, 1901,) of which the following is a specification.

10 My present invention relates more especially to an arrangement or arrangements whereby a circuit carrying a variable load may be supplied automatically with substantially constant current derived from a constant-potential source and comprises means  
15 for reducing or eliminating the objectionable effects of higher harmonics upon the regulating action of the system.

Generally speaking, my invention consists  
20 in connecting in circuit with the translating devices a reactance of different sign from the reactance present in the translating devices themselves. When therefore translating devices are cut into circuit, their resistance  
25 tends to increase the total impedance, while their reactance by counterbalancing a corresponding portion of the permanently-included reactance of opposite sign serves to maintain the resulting impedance of the circuit substantially constant. If translating  
30 devices are cut out of circuit, the reduction in impedance which would otherwise take place is similarly prevented by the fact that a portion of the permanently-connected impedance is no longer balanced in its effect  
35 by the reactance of the translating devices thus cut out. The circuit being of substantially constant impedance regardless of load therefore carries a substantially constant  
40 current.

The novel features which I believe characterize my invention I have set forth with particularity in the appended claims. For a description, however, of one embodiment of my  
45 invention and of its mode of operation reference is to be had to the following specification, taken in connection with the accompanying drawings.

A source of constant-potential alternating

current is indicated at 1, and mains 2 3 extend 50 therefrom. If desired, a transformer 4 may be interposed between the source and the supply-mains. Connected across these mains is a circuit in which in accordance with my invention a substantially constant current 55 is to be maintained. This circuit is shown as supplying current to a series of arc-lamps 5 6 7, &c. These lamps are represented as of the differential type—that is, each one is provided with a series coil, such as 8, for 60 striking the arc and a shunt-coil, such as 9, for opposing the action of the series coil and thereby regulating the length of the arc. Short-circuiting switches, such as 10, serve to cut the lamps into or out of circuit, as de- 65 sired.

In series with the constant-current circuit I permanently connect a condenser 11 or other device having the effect of capacity. Such devices are well known in the art and 70 require no description here. The capacity of the condenser may be chosen so that when all the lamps or other translating devices are out of circuit current of the required value will flow. When now one of the lamps is cut 75 into circuit by opening its short-circuiting switch, the inductance of the lamp balances a portion of the reactance of the condenser. The total impedance of the lamp and the condenser therefore remains approximately the 80 same as in the impedance of the condenser alone. Further increase in the number of lamps in circuit has a substantially similar effect. The result is the maintenance of a nearly constant current regardless of the 85 number of lamps or other translating devices in circuit.

It may be found in practice that the regulating-condenser has the effect of accentuating the higher harmonics in the current supplied, thereby seriously interfering with the regulating action of the system. In such cases the condenser may be considered as offering more or less opposition to the passage of waves of the fundamental frequency and 95 but little opposition to the passage of waves of higher frequency. To obviate this defect, I insert in series with the constant-current



circuit an inductance-coil 12 or other device possessing self-induction. In order that the inductance-coil 12 which is inserted in the constant-current circuit for the purpose of  
 5 suppressing or reducing higher harmonics may not have the effect of impairing the regulation of the system, I increase the amount of regulating-condenser 11 sufficiently to balance the lagging component of current due  
 10 to the inductance-coil. The system as thus arranged is substantially free from the magnified harmonics and regulates for approximately constant current in the manner already described.

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

1. The combination of a source of constant-potential current, a consumption-circuit connected thereto, translating devices possessing  
 20 inductance adapted to be connected in series in said circuit or cut out of said circuit, a device possessing the effect of capacity connected permanently in said circuit, and means in said circuit for suppressing harmonics.

25 2. The combination of a source of constant-potential current, a series circuit supplied thereby, translating devices possessing reactance of one sign adapted to be cut into or out of said circuit, a device possessing reactance  
 30 of the opposite sign connected permanently in said circuit, and means in said circuit for suppressing harmonics.

3. The combination of constant-potential leads, a series circuit connected to said leads,  
 35 a device possessing the effect of capacity connected in said circuit, devices possessing the effects of inductance and resistance adapted to be cut into or out of said circuit, and a de-

vice possessing inductance permanently connected in said circuit. 40

4. The combination of a source of alternating current of constant potential, a series circuit fed thereby, arc-lamps in said circuit, a device possessing capacity in said circuit, and  
 45 a device possessing inductance in series in said circuit.

5. The combination of a series circuit including translating devices possessing inductance, means for impressing on said circuit an  
 50 alternating electromotive force of substantially constant value, means for maintaining a constant current in said circuit consisting of a device in said circuit having a sufficiently large capacity effect to cause a leading current to flow in said circuit, and means for  
 55 suppressing harmonics in said circuit.

6. The combination of a series circuit containing translating devices possessing inductance, means for impressing on said circuit an alternating electromotive force of substan-  
 60 tially constant potential, means in said circuit for suppressing harmonics, and a condenser connected in said circuit and of such value that as the number of translating devices is varied the increase or decrease in the  
 65 net reactance of the circuit approximately balances the decrease or increase of resistance, whereby the total impedance remains substantially constant.

In witness whereof I have hereunto set my  
 70 hand this 27th day of May, 1902.

MATTHEW O. TROY.

Witnesses:

DUGALD MCK. MCKILLOP,  
 JOHN J. WALKER.