

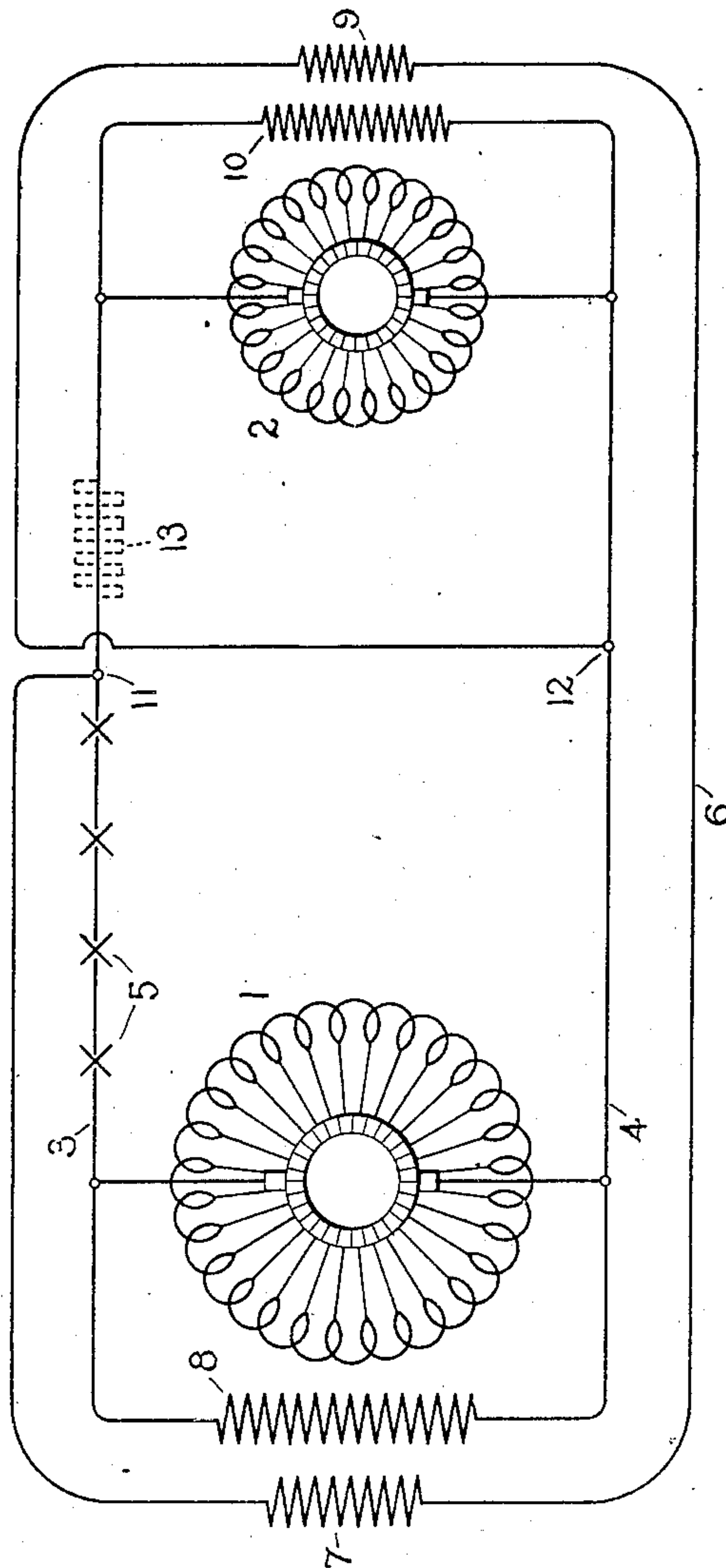
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F. H. JEANNIN.
SYSTEM OF DYNAMO ELECTRIC MACHINES.

APPLICATION FILED OCT. 28, 1901.

NO MODEL.



Witnesses.

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UNITED STATES PATENT OFFICE.

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SYSTEM OF DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 728,579, dated May 19, 1903.

Application filed October 28, 1901. Serial No. 80,178. (No model.)

To all whom it may concern:

Be it known that I, FRANK H. JEANNIN, 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 Dynamo-Electric Machines, of which the following is a specification.

My present invention relates more especially to a means for producing constant current, the novel features of which are set forth with particularity in the appended claims. It will be evident, however, that my invention, at least as to certain of its features, is not limited to application in the particular relation hereinafter described, and illustrated in the accompanying drawing.

In the drawing is represented an arrangement of dynamo-electric machines whereby their resultant action gives rise to a constant current which may be utilized for supplying arc-lamps or other constant-current translating devices. The particular arrangement shown comprises as its main features a main generating-machine similar in construction to an ordinary shunt-wound dynamo and a regulating-machine also of similar construction, but of comparatively small size. These machines are connected in series with each other and are regulated by means of regulating-windings supplied from a circuit connected across the leads joining the two machines. In one of these leads are connected the constant-current translating devices.

Referring in detail to the drawing, the main machine is indicated at 1 and the regulating-machine at 2. Each machine is provided with an armature-winding and a commutator, upon which bear commutator-brushes. Unlike terminals of the machine are connected together, so as to join the machines in series with each other, these connections being formed by the leads 3 4. In series with one of the leads—as, for example, the lead 3—translating devices 5 may be connected. Across the leads 3 4 is connected the regulating-circuit 6, including in series a regulating-winding 7, acting in conjunction with the shunt-winding 8 of the machine 1, and also a regulating-winding 9, coöperating with the shunt-winding 10

of the regulating-machine 2. One terminal of this regulating-circuit is connected at a point 11 in the lead 3, between which point and the main machine 1 is the consumption-circuit of the system. The other terminal of the regulating-circuit is connected, as at 12, to the other lead 4.

In explaining the operation of the system above described let it be supposed that all the translating devices 5 are cut out of circuit. Under these conditions the electromotive forces of the machines 1 and 2 combine to produce a flow of current through the machines and their connecting-leads 3 4. The circuits are so adjusted under these conditions as to produce zero difference of potential across the terminals 11 12 of the regulating-circuit 6. To produce this adjustment various factors, of course, may be changed. The principle of the adjustment, however, is that the electromotive force of the machine 1 should bear the same relation to the resistance of its circuit between the points 11 and 12 as the electromotive force of the machine 2 bears to the resistance of its circuit between the same points 11 and 12. If the resistance of the circuit of the regulating-machine should require to be varied, this may of course be done by resistance in series, as indicated by dotted lines at 13.

With the adjustment of the circuits as described above it is evident that the electromotive force of each machine is consumed in the circuit of said machine between the points 11 and 12, the difference of potential between these points being therefore zero, as already mentioned. Suppose now a lamp to be turned on in the consumption-circuit 5. Under these circumstances the resistance of this branch of the circuit is increased, thereby causing a difference of potential to arise between the terminals of the regulating-circuit 6. Current then flows in the regulating-winding 7 of the machine 1, thereby raising the electromotive force of the machine until its electromotive force again bears the same proportion to the resistance of its circuit between the points 11 12 as that which exists between the electromotive force and resistance of the machine 2 and its circuit. When this condition is

reached, current ceases to flow in the regulating-circuit 6. Any increase in electromotive force of the main machine 1 over and above that necessary to bring the system back to condition of equilibrium would of course be prevented by the fact that such increased electromotive force would cause a reversal of current in the regulating-circuit 6, thereby acting upon the regulating-winding 7 of the machine 1 and so reducing its field strength.

In the foregoing description I have so far omitted any reference to the operation of the regulating-winding 9 on the machine 2. This winding is not strictly necessary in order to secure regulation in accordance with my invention, but is used for the purpose of hastening the regulating action of the system. This regulating-winding 9 is similar in its action to the regulating-winding 7 and acts in conjunction with the shunt-field 10 of the machine 2, to which it is applied. The resistance of the circuit of the machine 2 being a constant quantity and the final voltage of the regulating-machine 2 also a constant quantity, it will therefore be evident that the machine 1 is constantly adjusted by its regulating-winding 7, so as to have a voltage proportional to the drop of potential in its circuit between the points 11 and 12. In other words, the voltage of the consumption-circuit 5 varies in substantially the same proportion as the variation of resistance of such circuit. A constant or substantially constant current in the consumption-circuit is therefore the result.

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

1. The combination of sources of electromotive force in series with each other, means responsive to the difference of potential across points in the connections between said sources for regulating the electromotive force of one or more of said sources, and translating devices in series between said sources.

2. The combination of a main machine, a regulating-machine, connections joining said machines in series with each other, a regulating-winding on one of said machines in series with a circuit across points in said con-

nections, and series translating devices in circuit with one of said connections.

3. The combination of two dynamo-electric machines connected in series with each other, a regulating-circuit connected across the leads extending between the machines, a regulating-winding on one of said machines in series with said regulating-circuit, and series translating devices in circuit with one of said leads.

4. The combination of a circuit including or adapted to include constant-current translating devices, two sources of electromotive force in series in said circuit, and a regulating-circuit for one of said sources connected across points in said circuit which have no difference of potential when normal current is flowing.

5. The combination of a circuit for carrying normally constant current, a plurality of sources of electromotive force in said circuit, one of which is constant under normal conditions and another of which varies with the load, and a regulating-circuit for the variable source of electromotive force connected across points in the first-mentioned circuit which have no difference of potential when normal current is flowing in the system.

6. The combination of sources of electromotive force in series circuit with each other, a consumption-circuit in a lead extending between two of said sources, and a regulating-circuit connected to one terminal of the consumption-circuit and to another lead extending between said sources.

7. The combination of two shunt-wound dynamo-electric machines connected in series, a consumption-circuit in one of the leads extending between the machines, a regulating-winding on each machine, and a regulating-circuit for said windings connected across the leads which connect said machines.

In witness whereof I have hereunto set my hand this 25th day of October, 1901.

FRANK H. JEANNIN.

Witnesses:

BENJAMIN B. HULL,
ALEXANDER D. LUNT.