

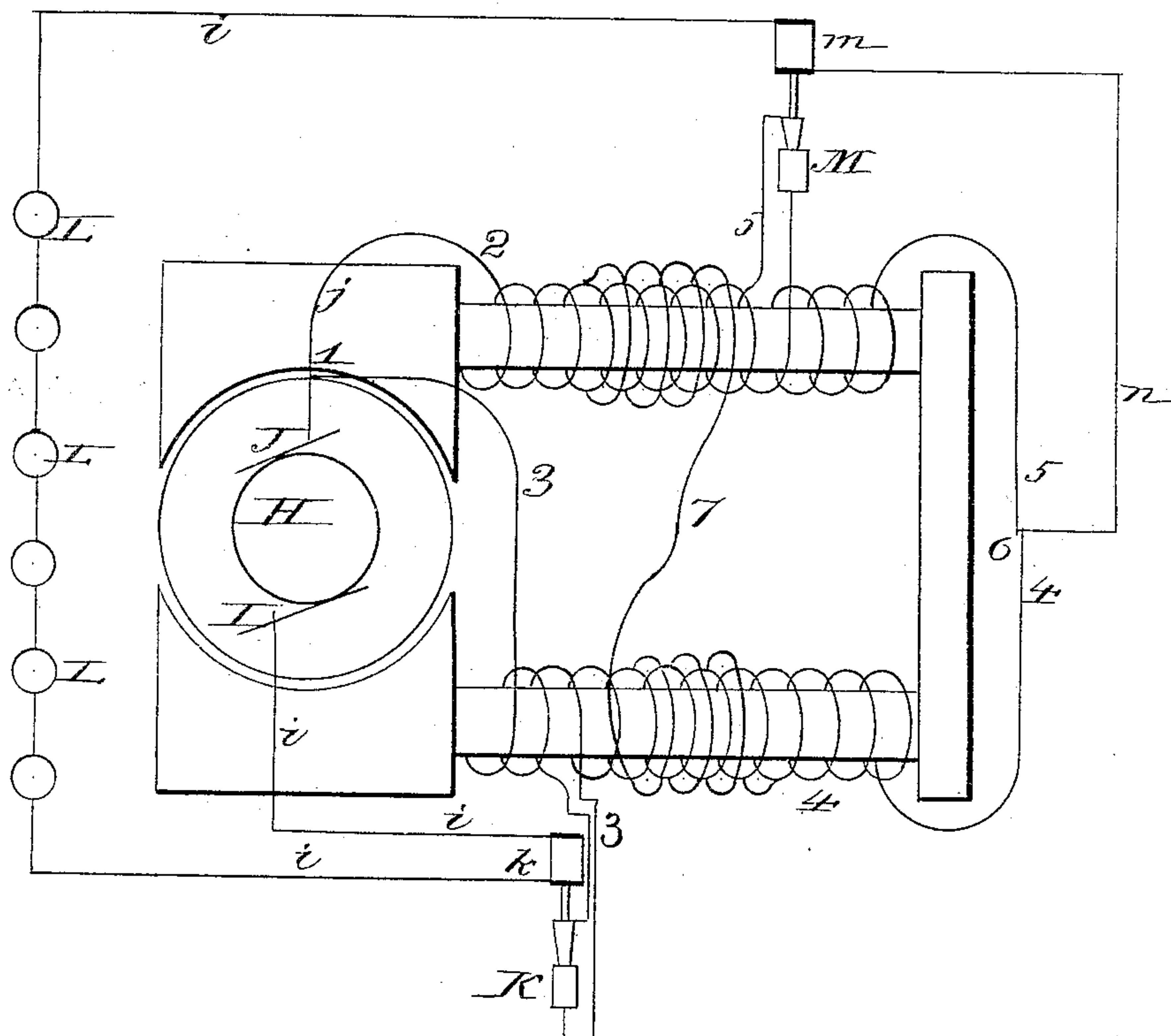
(No Model.)

R. E. BALL.

REGULATOR FOR DYNAMO ELECTRIC MACHINES.

No. 338,333.

Patented Mar. 23, 1886.



Witnesses
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UNITED STATES PATENT OFFICE.

ROYAL EDWARD BALL, OF NEW YORK, N. Y.

REGULATOR FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 338,333, dated March 23, 1886.

Application filed May 13, 1884. Serial No. 131,242. (No model.)

To all whom it may concern:

Be it known that I, ROYAL EDWARD BALL, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Regulators for Dynamo-Electric Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawing, which forms part of this specification, and which is a diagram illustrating my invention.

My invention relates to devices for regulating the current generated in dynamo-electric machines.

My invention has for its object the provision of means whereby the current generated is governed and regulated by any variation or resistance in the line.

My invention consists, first, in the combination, with a device for producing a variable resistance, of a dynamo-electric machine in circuit with such variable resistance, and whose field-coils are connected therewith in such manner that any increase in the resistance of such device will operate to produce a partial demagnetization of said field-magnets, and vice versa; secondly, in the novel and peculiar arrangement of the circuits through the generator, the devices for producing a variable resistance, and the line.

As my improvements are applicable to any form of dynamo-electric machines, and as such machines are well known, I deem it unnecessary to particularly describe those parts of the machine which are now in general use, and will consequently describe in detail only what I believe to be new.

The apparatus for producing the variable resistance which I prefer to use is substantially the same as is described and claimed by me in an application of even date herewith, Serial No. 141,341, and I do not therefore claim such device in this present application.

I will now proceed to describe the manner in which the circuits of the machine are arranged and the application thereto of the variable resistance, it being premised that the armature, the line, and the field-coils be in direct circuits, and that the latter be arranged

in multiple arc. As this arrangement can be best illustrated by diagram, I have so shown it in the drawing, where H represents the commutator, I and J the brushes in contact therewith, *i* the wire leading to line through the solenoid *k* of the variable resistance K, and L L L the lamps arranged in series upon said line. The wire *j* from brush J leads to the field-coils, and at the point 1 divides into two branches, 2 and 3, which join again by wires 4 and 5 at point 6. The two circuits 2 5 6 and 3 4 6 are joined at their middles by a wire, 7.

M represents a variable resistance, which is placed in line 2 5; and K, a similar device placed in line 3 4, the whole forming a Wheatstone bridge, and the circuit from said bridge proceeding from point 6 by wire *n* to the solenoid *m*, thence through lamps L L, solenoid *k*, and wire *i* to brush I, thence through armature to brush J, and by divided lines 2 5 and 3 4 to point 6.

It is to be noted that the lines 2, 3, 4, and 5 form the coils of the field-magnet, and that the line 7 is wound upon said field-magnets over the usual coils, so that a current traversing said line 7 in one direction will tend to increase the magnetism of the field-magnets, but when moving in the opposite direction will demagnetize them to a certain extent. When in a normal working condition, the resistances of lines 2 5 and 3 4 are equal—say, for instance, one ohm each—and no current will pass through line 7. Now, if a lamp be cut out of the line-circuit, the resistance of the line being thereby decreased, the solenoids *k m* will become more powerfully energized, drawing in their cores, and increasing the resistance of K and M. The current then being increased by way of 2 7 4 will demagnetize the field to some extent, and thereby decrease the electro-motive force of the machine. If, however, an additional lamp or lamps be switched into the circuit, the action of solenoids *k m* will be reversed, and the greater part of the current going by way of 3 7 5 will re-enforce the magnetism of the field-coils, and thereby increase the electro-motive force of the machine.

Having described my invention, I claim—

1. The combination, with a dynamo-electric

machine having its field-coils arranged in multiple arc, of a variable resistance included in each of its branches, and means for operating said variable resistance, substantially as described.

5 2. The combination, with a dynamo-electric machine having its field-coils arranged in multiple arc and a variable resistance included in each of the branches of said multiple circuit,
10 of a supplemental coil arranged as a shunt

across the field-circuit and surrounding a portion of the field-magnets, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand this 14th day of 15 April, 1884.

ROYAL EDWARD BALL.

Witnesses:

C. E. NYLANDER,

A. A. CONNOLLY.