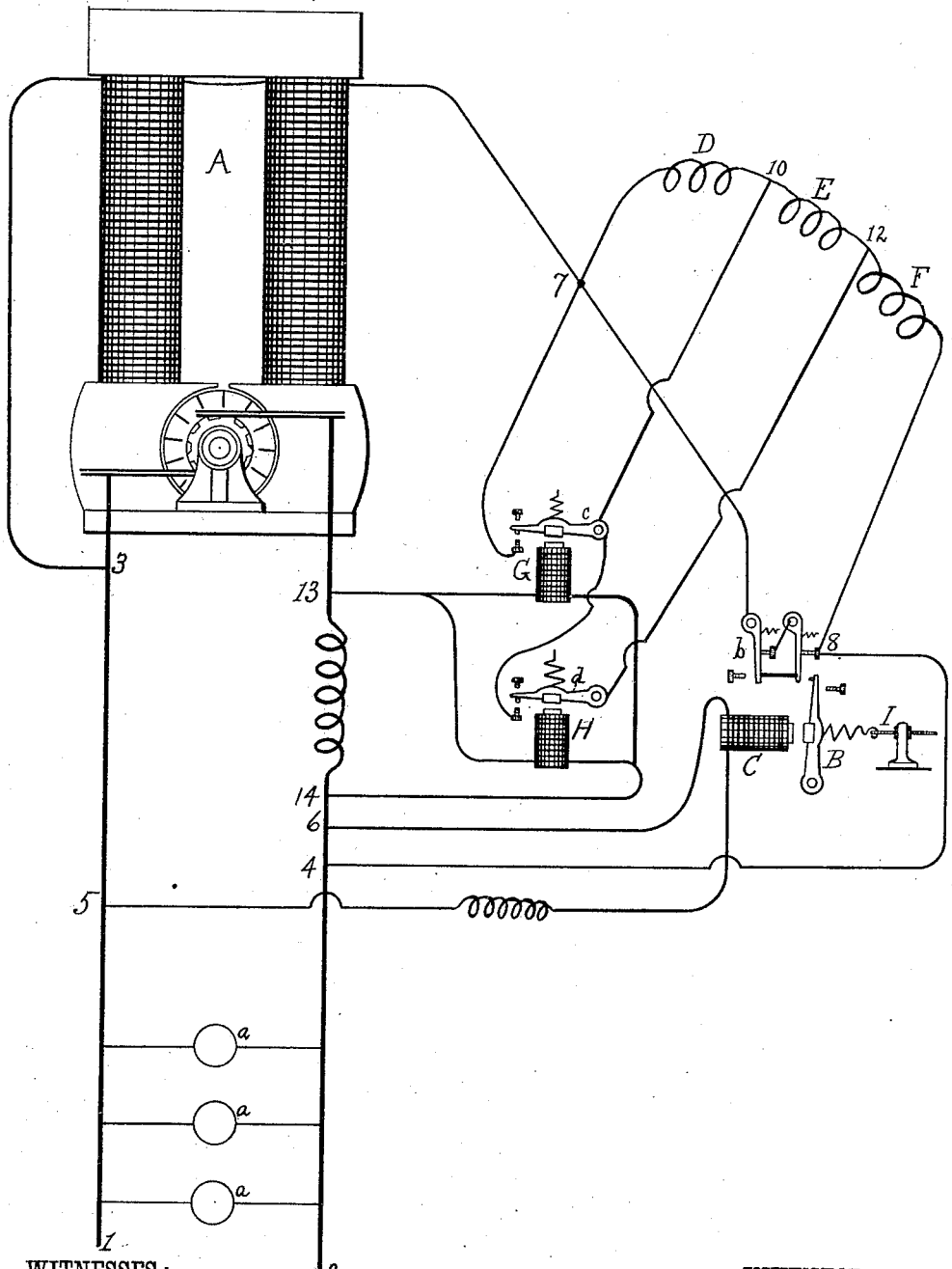
(No Model.)

T. A. EDISON.

REGULATOR FOR DYNAMO ELECTRIC MACHINES.

No. 264,658. Patented Sept. 19, 1882.



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REGULATOR FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 264,658, dated September 19, 1882.

Application filed August 7, 1882. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in the Regulation of Dynamo or Magneto Electric Machines, (Case No. 407;) and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

In an application for a patent of even date herewith I have set forth a means of regulating the generation of current by dynamo or magneto electric machines by the use of a vibrating circuit-controller for regulating the energy of the field-magnet of the machine.

This invention relates to the same subject; and it consists in the use, in connection with this vibrating circuit-controller, of resistances for reducing the spark, so arranged in the field-circuit that when a certain definite proportion of the lamps or other translating devices supplied by the plant are in circuit a certain constant resistance for reducing the spark will be in the field. To do this I place in the field-circuit a vibrating circuit-controller, preferably one constructed so as to break circuit at several points simultaneously. This is preferably actuated by an electro-magnet placed in a multiple arc-circuit from the main line, and regulates the generation of current, as set forth in the application above referred to. In a shunt around the circuit-controller is placed a series of equal resistances, around which are formed shunts including the armatures of electro-magnets placed in a shunt or shunts from the main conductors. When only a few lamps are in circuit and little current passes in the main line the last-mentioned magnets are but slightly energized, and the shunt-circuits around the resistances in the field are open; but when the certain predetermined number of lamps is exceeded and a greater current flows in the main line one of the electro-magnets attracts its armature and closes the shunt around a portion of the spark-reducing resistance, for it is now unnecessary to have so large a resistance in the circuit; and this operation continues according to the number of parts into which the resistance is divided.

The invention may be better understood by reference to the drawing, which is a diagram illustrating the same.

A is a dynamo-electric machine, from which lead main conductors 1 2, the field-magnet being energized by a derived circuit, 3 4. In the circuit 3 4 is placed a vibrating circuit-controller, *b*, actuated by the movement of the armature-lever B of the electro-magnet C, the latter being in a derived circuit, 5 6. In a shunt-circuit, 7 8, around the circuit-controller *b* are constant resistances D E F. Around resistance D is a shunt, 7 10, including the armature-lever *c* of the magnet G, while a shunt, 10 12, around E includes armature-lever *d* of magnet H. The magnets G H are in multiple arc to each other in the shunt-circuit 13 14.

The operation of these devices is as follows: Each of the resistances D E F is proportioned for one-third of the lamps *a a* supplied by the machine. As shown, only a few lamps are in circuit, and the resistances D E F are all in use for reducing the spark caused by the vibrations of the circuit-controller *b*, which regulates the machine, a suitable device, I, being used to adjust the tension of the spring B, and so regulate the candle-power of the lamps; but when more than one-third of the entire number of lamps is placed in circuit the increase of current in the shunt 13 14 causes the magnet G to attract its armature, which closes the shunt-circuit 7 10 and cuts out the resistance D, for as more current must now flow in the field, it is desirable to decrease the resistance in the shunt so as to reduce the spark at the breaking-points. The magnet H and armature *d* are so arranged that a greater amount of current is required to attract the armature than is the case with magnet G. When more than two-thirds of all the lamps are placed in circuit the armature *d* is attracted and the resistance E cut out of circuit, leaving in only the resistance F for reducing the spark. The resistances, by reducing the spark at the breaking-points, and thus preventing sudden fluctuations of current, prevent any sudden varyings of candle-power or flickerings in the lamps which might otherwise ensue. The throwing in and out of these resistances has, however, no direct effect upon the lamps, but simply and solely affects the spark caused by the breaking of circuit.

Instead of using the magnet C to operate

the circuit-controller directly, it, being wound to respond quickly to variations of current, could be used to open and close the circuit of another magnet which would do the work, this magnet being placed in any convenient location, but preferably in a shunt around the resistance in the main line or around the resistance F in the field.

It is evident that this invention is as well adapted to magneto as to dynamo electric machines, or to machines in which the main current energizes the field-magnet, in which case the circuit-controller *b* would be in a shunt around the field.

It is also evident that the number of spark-reducing resistances and of electro-magnets connected therewith and the proportion of lamps required to be in circuit in order that these magnets will operate might be varied in any desired manner.

I do not claim broadly the use of a vibrating circuit-controller for regulating the generation of current, or a spark-arresting shunt around such a circuit-controller, or providing such a circuit-controller with an adjustable retractor, since such invention forms the subject-matter of claims in my application No. 68,627, of even date herewith.

What I claim is—

1. The combination, with a dynamo or magneto electric machine, of a vibrating circuit-controller for regulating the generation of current, and a shunt around said circuit-controller containing a series of constant resistances for reducing the spark, and means adapted to cut each of such resistances into or out of circuit by the removal or addition of a definite predetermined number of translating devices, substantially as set forth.

2. The combination, with the vibrating circuit-controller and spark-reducing resistances in a shunt around the circuit-controller, of the electro-magnets in a shunt from the main line, each adapted, upon the addition or removal of a certain number of translating devices, to cause the throwing in or out of circuit of a portion of the spark-reducing resistances placed in a shunt around the vibrating circuit-controller, substantially as set forth.

3. The combination of the vibrating circuit-controller placed in the field-circuit, the electro-magnet for operating the same, placed in a derived circuit from the main line, the series of constant spark-reducing resistances placed in a shunt around the circuit-controller, and the series of electro-magnets in a shunt from the main line, for throwing said resistances out of circuit one after another, as desired, substantially as set forth.

This specification signed and witnessed this 28th day of February, 1882.

THOS. A. EDISON.

Witnesses:
H. W. SEELY,
THOMAS JOHNSTON.