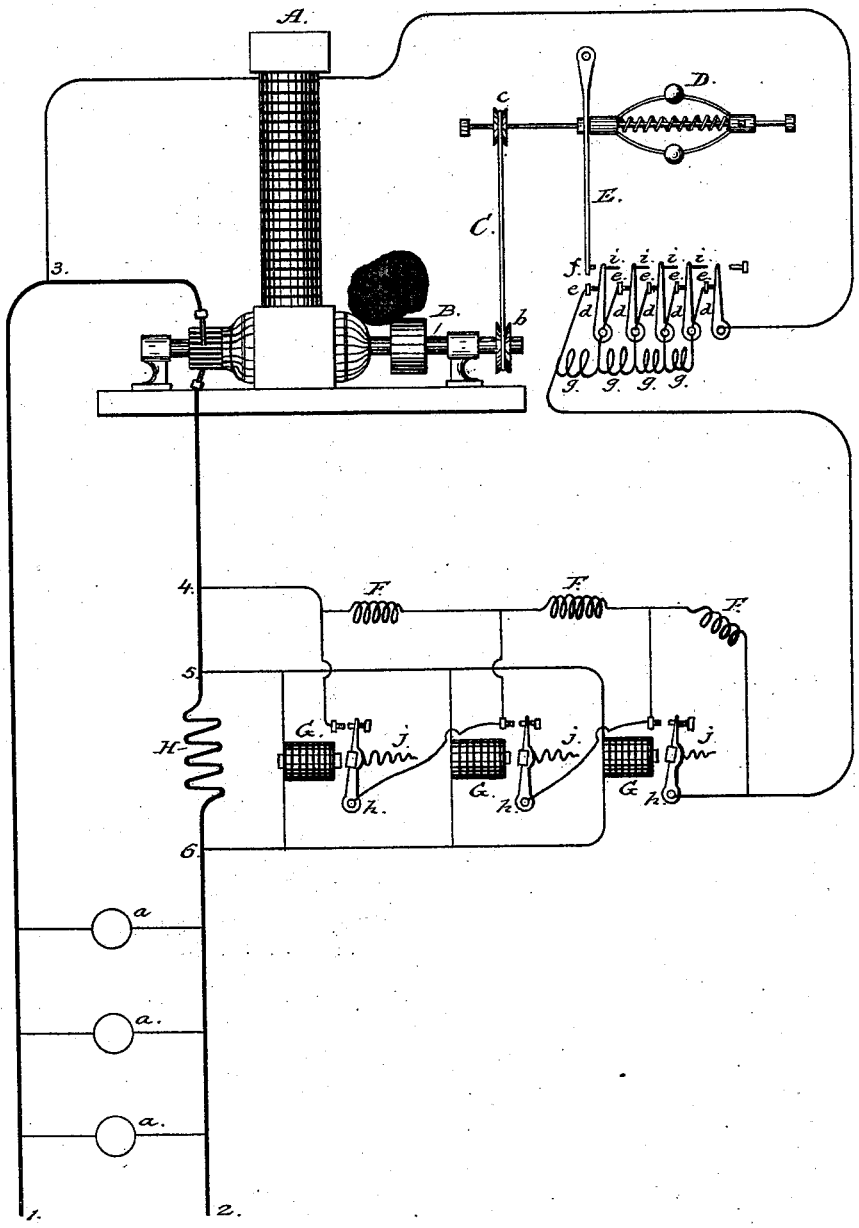
(No Model.)

T. A. EDISON.

REGULATOR FOR DYNAMO ELECTRIC MACHINES.

No. 273,488. Patented Mar. 6, 1883.



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REGULATOR FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 273,488, dated March 6, 1883.

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. 413;) 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.

The object of this invention is to produce a system of regulation for dynamo or magneto electric machines, which system shall consist of means for regulating the current both for an increase or decrease in the speed of the engine actuating the armature, and for variations in the number of translating devices in circuit.

The speed-regulator consists of a centrifugal governor connected to the armature or engine shaft or other revolving portion of the generating apparatus, and also to a movable arm whose motion throws portions of a resistance into or out of the field-circuit of the machine, an increase in the speed of the engine thus causing a movement of the governor and of the movable arm, which causes the immediate throwing in of resistance, and a decrease in speed causing a corresponding throwing out of resistance.

For regulating the machine according to variations in the number of translating devices in circuit, I use, preferably, a series of electro-magnets and movable armatures, the former placed in multiple arc to each other across a shunt around a resistance in the main line, and the latter each forming a part of a shunt around a resistance in the field-circuit. These armatures and electro-magnets are so arranged relatively to each other that different amounts of currents are required to cause each magnet to attract its armature, this being accomplished by making the retracting springs or weights of the armatures of different degrees of strength by placing the armatures at different distances from the magnets, or in any other suitable manner. Therefore as more translating devices are placed in circuit the successive increases of the current in the shunt which contains the electro-magnets cause the successive drawing forward of the pivoted armature, and the shunts around the field-circuit resistance are closed one after another, the resistances thus being successively removed from circuit and the energy of the field-magnets increased. Various other arrangements of magnets and armatures may be used for this purpose, if desired, many such being described in former applications made by me for Letters Patent.

The foregoing may be better understood by reference to the annexed drawing, which represents my invention diagrammatically.

A is a dynamo-electric machine, shown in side elevation, and 1 2 are the main conductors leading therefrom, lamps or other translating devices *a a* being placed in multiple arc upon them.

3 4 is a multiple-arc circuit from the main line, which energizes the field-magnet of the machine; but a circuit supplied from any suitable external source may be used for this purpose.

B is the armature-shaft, on which is mounted a pulley, *b*, from which a belt, C, runs to another pulley, *c*, on the shaft of a centrifugal governor, D.

Attached to the governor D in such manner that it will be moved along the shaft by the backward and forward movements of the governor is an arm, E, the lower end, *f*, of which is opposite the free ends of the series of pivoted contact-arms *d d*. These arms normally make contact with points *e e*, the pins *i i* being of insulating material. In a shunt around each of said contacts is a resistance, *g*. A forward movement of the arm E forces the arms *d d* successively away from their contacts, and thus throws the resistances *g g* into the field-circuit 3 4. Such forward movement is produced by an increase of speed of the governor D, caused by an increase in the speed of the armature of the machine, and the increased and unnecessary generation of current produced by such an increase of speed is of course immediately counteracted by the throwing of one of the resistances *g* into the field-circuit.

In the field-circuit 3 4 are also placed resistances F F, and around each of such resistances is formed a shunt-circuit, which includes one of the pivoted armatures *h*. These arma-

tures have springs *j*, of different degrees of strength. The magnets G G, which attract the armatures, are in multiple arc across the shunt 5 6, which is formed around a resistance, H, in the main conductor 2. As more translating devices are placed in circuit and the energy of the magnets G increases the armatures *h* are successively drawn forward and the shunts around the resistances F F are closed, such resistances thus being removed from the field-circuit. As the number of translating devices in circuit is reduced a reverse operation takes place and the resistances F are again included in the circuit.

By using the two arrangements described in connection with each other the machine is automatically regulated both for changes in the amount of current required in the system and for variations in the speed of the motor which drives the armature.

It is evident that the governor D could be run from the shaft of the engine or from any moving part of the apparatus.

It is also evident that other forms of adjustable resistance than that shown could be used in connection with the governor, and that various other arrangements of magnets, armatures, and resistances could be made for the other portion of the regulator.

What I claim is—

1. The combination, with a dynamo or magneto electric machine and translating devices arranged in multiple arc, of adjustable resistance in the field-circuit of the machine, mechanical means connected with and operated by some moving portion of the machine, or of the motor actuating it, for varying such resistance according to variations in the speed of said motor, and an electro magnet or magnets energized by the current generated for varying such resistance, according to variations in the number of translating devices in circuit, substantially as set forth.

2. The combination, with a dynamo or magneto electric machine and translating devices arranged in multiple arc, of an adjustable resistance in the field-circuit, a mechanically-operated device for varying such resistance, and a number of electro-magnets in a shunt from the main line, operating successively to vary such resistance, substantially as set forth.

This specification signed and witnessed this 1st day of May, 1882.

THOMAS A. EDISON.

Witnesses:
H. W. SEELY.
P. B. WILBER.