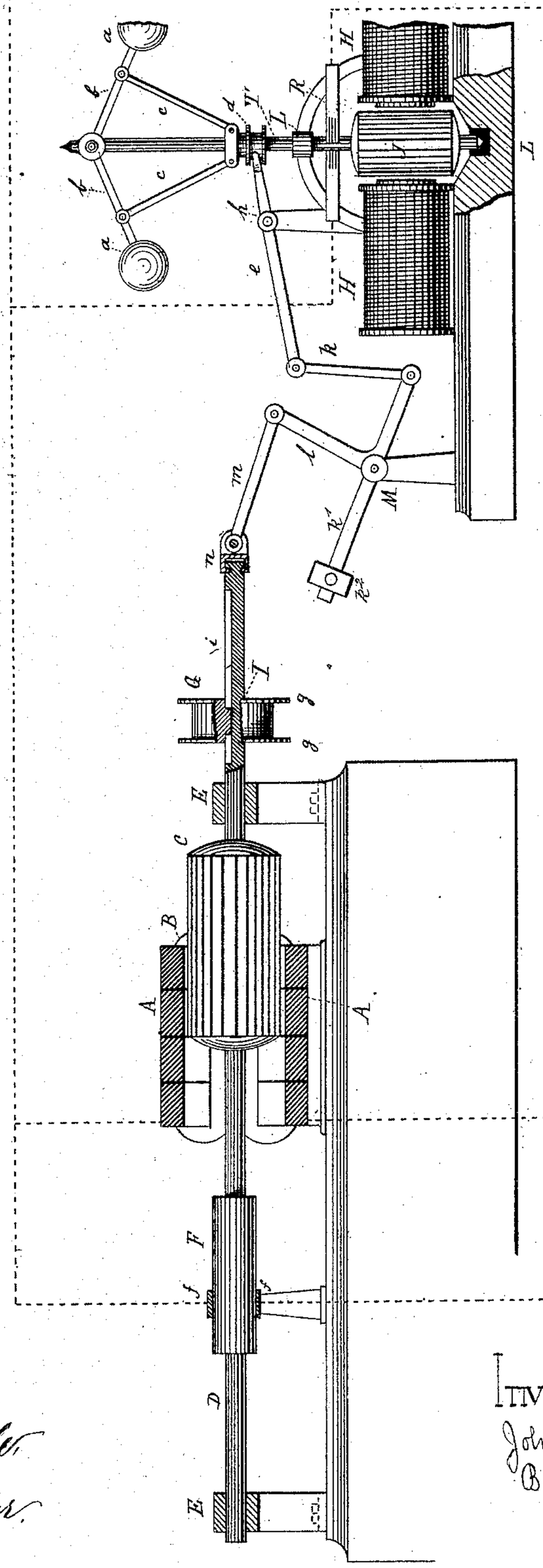
(No Model.)

J. H. IRWIN.

REGULATOR FOR DYNAMO ELECTRIC MACHINES.

No. 354,791. Patented Dec. 21, 1886.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN H. IRWIN, OF MORTON, PENNSYLVANIA.

REGULATOR FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 354,791, dated December 21, 1886.

Application filed March 2, 1882. Serial No. 54,137. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. IRWIN, of Morton, county of Delaware, and State of Pennsylvania, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention relates especially to electric generators or dynamo-electric machines, and has for its object the production of a device whereby the strength of the current generated is automatically regulated in order to supply only the energy required in the circuit.

My present invention consists in arranging the constituent parts of the generator in such a manner that the relative surface of action between the armature and field-of-force magnets may be automatically changed or varied by a suitable apparatus located in the main or a shunt circuit and engaging with the shaft of the armature of the generator, whereby the current is regulated, in the manner fully set forth in an application for Letters Patent for an improvement in dynamo-electric machines filed by me February 25, 1882; and my invention involves certain novel and useful combinations or arrangements of parts and peculiarities of construction and operation, all of which will be hereinafter first fully described, and then pointed out in the claims.

My invention herein consists in the method of regulating automatically the electro-motive force of a dynamo-electric generator and one of the means by which the same may be accomplished.

The drawing presented herewith shows an electric generator in section as constructed upon my improved plan, in connection with an electromotor which governs the position of the generator-armature.

Like letters of reference, wherever they occur, indicate corresponding parts.

A are the exciting-magnets, constructed in the usual manner and wound with bobbins B. C is the armature, and D is the elongated shaft thereof. E are the bearings therefor. F is the commutator, and *f f* are the brushes.

G is the pulley for rotating the armature, said pulley being provided with wide flanges *g*, which prevent the belt slipping therefrom when the shaft travels to the right or left. A spline, I, playing in a groove, *i*, in the armature shaft, holds the pulley from turning thereon.

H are the helices of an electromotor, and J is the armature, placed in a vertical position, the shaft T thereof running in bearings L. Upon the upper extremity of shaft T is located a centrifugal governor having balls *a*, located upon arms *b*, connecting-links *c* passing from said arms to a grooved sliding collar, *d*. A forked lever, *e*, connected with collar *d*, is fulcrumed at *h*, and connected by means of a rod, *k*, to a bell-crank, *l*, fulcrumed at M, and having a counterbalance-arm, *k'*, bearing weight k^2. The other arm of bell-crank *l* is connected by a rod, *m*, to a clutch, *n*, upon armature-shaft D. The main or a shunt circuit operates the motor.

When constructed and arranged in accordance with the foregoing description, the operation of my improved device is as follows: If the full power of the generator is required, but a given current passes through the circuit of the governor-motor, allowing the balls thereof to fall. Should the resistance in the circuit be decreased from any cause, such as turning out lamps, the strength of the current increases, giving more rapid motion to the governor-motor, raising the lever actuating the bell-crank and drawing the armature of the generator from the field of force of the exciting-magnets. As the current of the generator grows weaker, the armature will be automatically pushed into the field of the exciting-magnets, thus automatically increasing and decreasing the quantity of current generated in accordance with the demands of the circuit.

Having now fully described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The method of automatically regulating the electro-motive force of a dynamo-electric generator, which consists in varying the relative reacting surfaces of the inducing and induced parts of the generator through the agency of the current generated by the machine, in accordance with the variations in said current due to the requirements of the circuit.

2. The combination, with a dynamo-electric generator having an armature adapted to be drawn out of or pushed into the field-of-force magnets, of a centrifugal governor adapted and arranged to draw out or push in such armature, whereby the electro-motive force of the generator is automatically regulated, substantially as described.

3. In combination with a dynamo-electric generator, an electric motor and governor in the main or a shunt circuit, adapted and arranged to draw the armature out or push it into the field-of-force magnets, whereby the electro-motive force of the generator is automatically regulated, substantially as described.

4. In combination with a dynamo-electric machine having an armature adapted to be drawn out of or pushed into the field-of-force magnets, an electric motor and governor in the main or shunt circuit, and bell-crank-lever connections between said governor and the armature-shaft, substantially as and for the purposes described.

5. In a dynamo-electric machine of the character herein specified, a reciprocating armature, C, having shaft D, in combination with an electromotor located in the main or a shunt circuit, the upright armature-shaft of said motor bearing a centrifugal governor having lever *e*, rod *k*, bell-crank *l*, rod *m*, and clutch *n*, engaging with armature-shaft D, the whole arranged to operate substantially as shown and described.

In testimony that I claim the foregoing I have hereunto set my hand in the presence of two witnesses.

JOHN H. IRWIN.

Witnesses:

F. W. HANAFORD,

A. M. PIERCE.