(No Model.)

J. W. LANGLEY.

REGULATOR FOR DYNAMO ELECTRIC MACHINES.

No. 265,519. Patented Oct. 3, 1882.

Fig. 1.

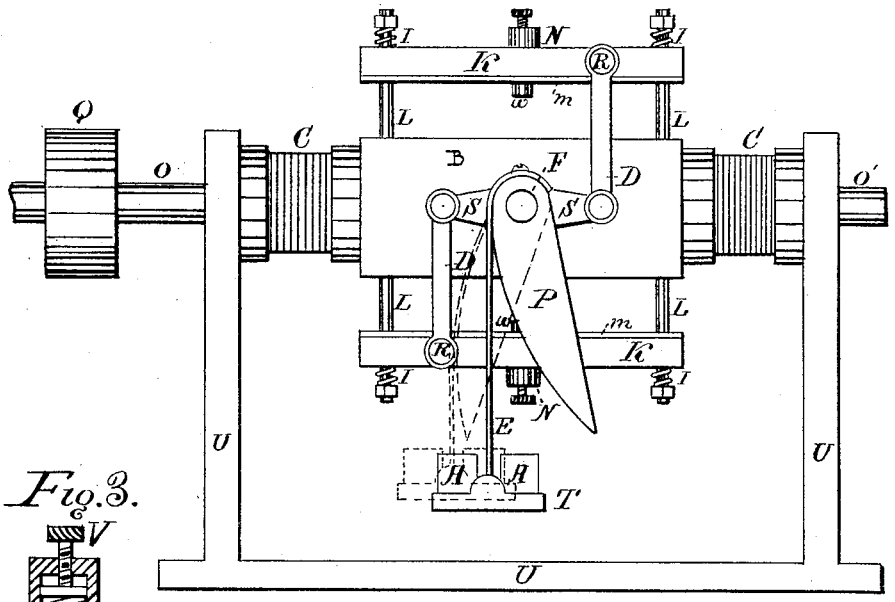


Fig. 3.

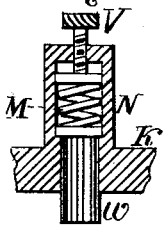
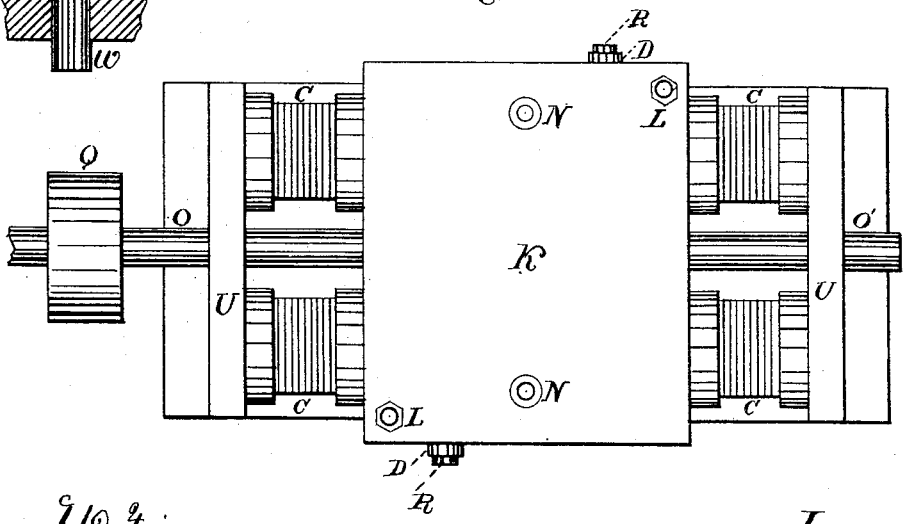


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN W. LANGLEY, OF ANN ARBOR, MICHIGAN.

REGULATOR FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 265,519, dated October 3, 1882.

Application filed March 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. LANGLEY, of Ann Arbor, in the county of Washtenaw and State of Michigan, have invented a new and useful Improvement in Electric Regulators, of which the following is a specification.

In the drawings, Figure 1 is a side view of a dynamo-electric machine containing my invention. Fig. 2 is a top view of the same, and Fig. 3 is a section through the supplemental spring N.

I have purposely omitted the commutator and commutator-brushes, as they form no part of the invention herein claimed, and would simply tend to confuse and complicate the drawings.

My invention is an improvement on the invention described and claimed in Letters Patent of the United States No. 247,664, granted to me on the 27th day of September, A. D. 1881, the principle thereof being fully described in said patent.

U represents the frame of a dynamo-electric machine, having poles B and any form of known armature (not shown) revolving on shaft O O' between poles B.

C C represent the electro-magnets of the machine.

L L L L represent rods, of brass or other diamagnetic material, firmly fastened to and projecting from poles B. There may be four of these rods above the poles and four below; but I find that in practice two above and two below are sufficient.

K K represent two plates of iron large enough to completely cover both the poles at once, and curved to clear the armature when in contact with the poles. Through the opposite corners of plates K holes are bored to receive rods L L, and are of such a size that the plates will slide accurately and easily on said rods. The ends of rods L L are threaded to receive nuts, and between the nuts and the plates are short brass springs I I to prevent the plates from striking violently against the nuts.

S is a short lever, made of brass, and pivoted at its center on a strong pin, F, which projects from the pole B.

Pivoted at each end of lever S are brass arms D, the other ends of which are pivoted to the plates K K, respectively, by pins R, set into the edges of said plates.

Rigidly attached to pin F is a lever, P, to the upper end of which is fastened a flexible cord, strap, or chain, E, at the lower end of which is fastened a platform, T, on which may be placed weights A A; or the weight may be attached directly to the strap. The side of lever P on which strap E hangs is curved, so that as the lever is swung toward the left, as shown in dotted lines in Fig. 1, its effective length is changed in the same ratio as the law of magnetic attraction.

A precisely similar apparatus is fastened to the other pole of the dynamo-electric machine; but the rods D are connected to plates L on the other sides of the centers of said plates, as shown in Fig. 2. The arms S are short, being only about four inches long in a four-light machine, so that pivots R are quite near a line drawn through the center of plate L, and being on opposite sides of said line, said plates are brought together or forced apart without being tilted.

N N are projections cast on plates L, and holes are bored through said projections and plates, in which are set springs M, Fig. 3, which can be tightened or loosened by the thumb-screw V. Springs M may project a short distance beyond the inner surface of plates L; or a small piston, *w*, may be placed under and pressed out by said springs.

m m are narrow strips of thin sheet-brass, attached either to plates L L or poles B, so that said plates and poles cannot come in actual contact, as such contact will sometimes cause the plates to stick tightly to the poles, even after the armature stops running.

The current is regulated, as in my former patent, by the approach of plates L to poles B. As the distance between the plates and poles decreases the attraction of the poles upon the plates increases very unequally, being slow at first, and then increasing very rapidly. The office of the curved lever P is to compensate for this by causing the resistance of a constant weight to increase unequally, such increase being at first slow, and becoming much more rapid toward the end of the stroke of said lever. It will be readily seen that as lever P swings toward the position shown in dotted lines in Fig. 1 its effective length will be the distance in a horizontal plane from pin F to a perpendicular plane passing through the center of the weight, and that this distance will increase

slowly at first, and then increase very rapidly. As plates L come near to poles B springs M or pistons *w* strike against the poles, preventing concussion and assisting weight A and lever P. In actual practice weights A must be so proportioned to the size of the dynamo-electric machine and the amount of work required that when the machine is doing its full amount of work and lever P is at its shortest effective length the resistance of weights A and the magnetic attraction of poles B upon plates L when said plates are distant from said poles, say, two inches will be equal. If the resistance of the external circuit be then diminished, the attraction of poles B upon plates L will overcome the resistance of weights A, the plates will approach the poles, and the amount of current produced will be diminished by the same proportionate amount that the resistance of the external circuit is decreased.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the poles of a dynamo-electric machine and a magnetic metal piece so placed as to be attracted by said poles, a weight acting over and through a curved lever connected with such magnetic metal piece, and tending to force the same away from the poles, as and for the purposes set forth.

2. In combination with the poles B and magnetic metal plates L, the weight A and curved lever P, so connected with plates L that said weight offers an increasing resistance as plates L approach said poles B, as and for the purposes set forth.

3. The combination of the poles B, magnetic metal plates L, pivoted arm S, pivoted connecting-rods D, curved lever P, strap E, and weight A, as and for the purposes set forth.

JOHN W. LANGLEY.

Witnesses:

J. W. HAMILTON,
E. B. HOE.