(No Model.)

W. L. STEVENS.

REGULATOR FOR ELECTRO MAGNETIC MOTORS.

No. 355,729. Patented Jan. 11, 1887.

Fig. 1.

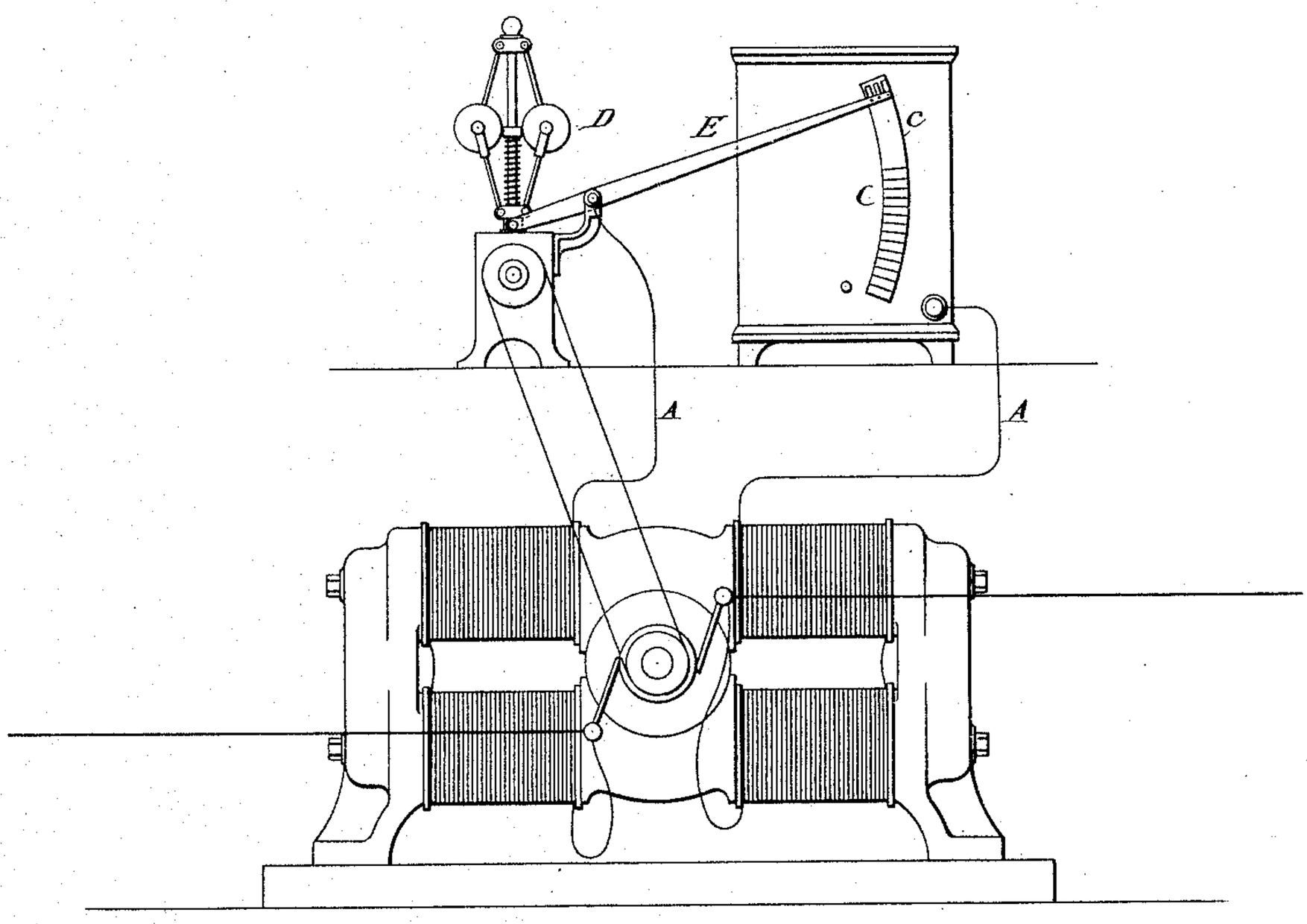
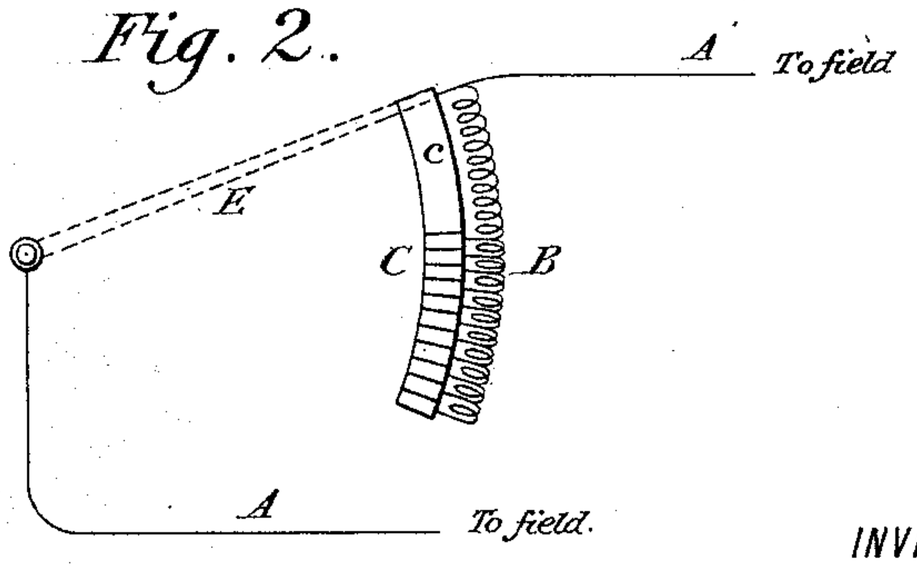


Fig. 2.



WITNESSES:

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WILLIAM L. STEVENS, OF DORCHESTER, MASSACHUSETTS.

REGULATOR FOR ELECTRO-MAGNETIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 355,729, dated January 11, 1887.

Application filed April 26, 1886. Serial No. 200,150. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. STEVENS, a citizen of the United States, residing at Dorchester, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Regulators for Electro-Magnetic Motors, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

My invention is an improvement in regulating mechanism for electro-magnetic motors, and is applicable generally to those motors in which a rheostat or resistance is varied directly or indirectly by the motor.

The form of regulator for which the invention is more particularly designed is that in which a centrifugal governor driven by the motor operates through suitable mechanism to vary the resistance of a derived or shunt field-magnet circuit.

The principle of the construction and operation of the invention is illustrated herein by a regulator of this kind.

When a motor with a derived field-circuit has combined with it a rheostat in the field-circuit and a centrifugal governor driven by the armature-shaft that shifts the contact-arm of the rheostat, it is evident that the resistance of the field-circuit would be increased practically from the time of starting the motor, and that the full working capacity of the motor could not be reached. To avoid this, it has been usual to provide for a certain amount of lost motion, so that the centrifugal governor will not begin to shift the rheostat-arm and insert resistance in the field-circuit until the motor has reached or closely approached its normal speed; but there is a serious objection to this, which renders an exact regulation impossible. The governor at first has practically no load until the speed of the motor approaches the normal. It then encounters the weight and resistance of the contact-arm, which, acting as a load, holds the governor back for some time after the motor has exceeded its normal rate of speed. I have devised a better way of accomplishing the result desired, which is to connect the rheostat-arm with the governor, so that there will be practically no lost motion between the two. I make the first contact-plate of the rheostat, however, of such length or width that the contact-arm does not leave it until the speed of the motor is fully up to or above the normal working speed. This will be more fully explained by reference to the drawings.

Figure 1 is a motor with my improved regulating mechanism combined therewith. Fig. 2 is a diagram illustrating the electrical connections of the rheostat.

The motor in this case, as above stated, has a derived field-circuit, A A, and in this circuit is included a variable resistance or rheostat, of which B are the divisions or coils, and C the contact-plates, insulated, except through the coils. The first plate *c* of the series is electrically connected to the field-circuit.

D is any suitable form of centrifugal governor, driven directly or indirectly by the motor and so that its speed and the consequent spread of its arms will depend upon that of the armature-shaft.

The contact-arm E, that sweeps over the plates of the rheostat, is connected with the governor in the usual manner, and so that the position of the arm with respect to the series of plates will correspond to the spread of the governor-arms. The contact-arm is electrically connected to the field-circuit, so that the latter is completed through the first plate *c* or through one or more of the coils B, according to the position of the contact-arm.

The first plate *c* is made of such length that the arm E remains in contact with it until the motor has attained a speed above its normal working limit. When it does this, the arm E passes on to the next plates of the series and introduces resistance in the field-circuit, thus reducing the magnetism of the field and checking the speed of the motor. By this means no obstacle to the even regulation of the motor is offered, and no loss of energy is occasioned by working the motor below its normal capacity.

The length of the plate *c* may vary somewhat; but I prefer to have it extend over one-half of the entire range of movement of the contact-arm. The remaining plates are the same in number as though all were of equal width; but they are made smaller, so as to occupy but half the space.

What I claim is—

In a motor-regulator, the combination, with an automatically moved or operated contact-arm, of a rheostat having a series of contact or terminal plates, the first plate of the series being much longer than the others, and all the plates being connected together by intermediate resistance-coils, as and for the purpose set forth.

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