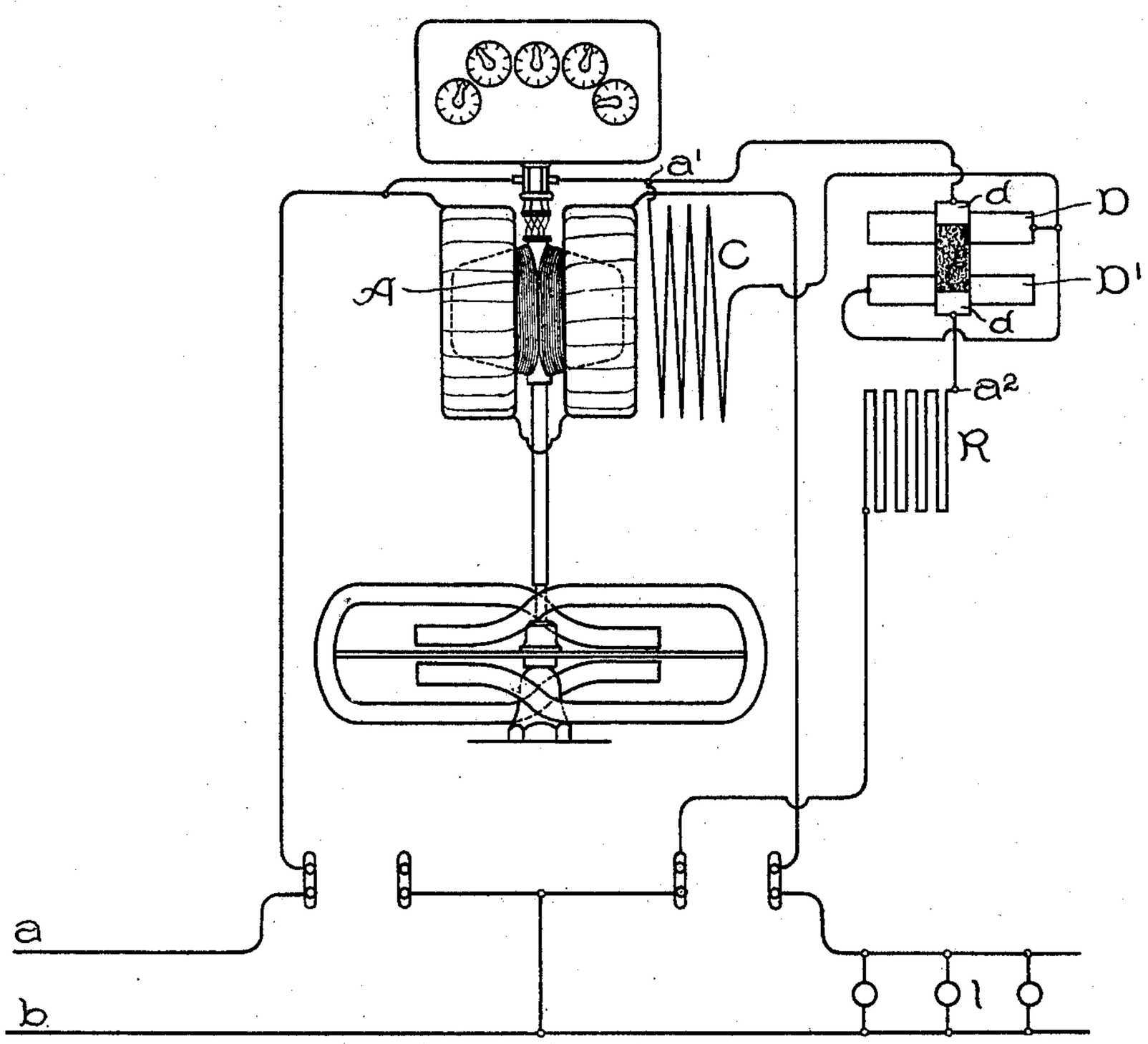
No. 610,899. Patented Sept. 20, 1898.

C. D. HASKINS.

ELECTRIC METER.

(Application filed June 24, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

CARYL D. HASKINS, OF NEWTON, MASSACHUSETTS, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

ELECTRIC METER.

SPECIFICATION forming part of Letters Patent No. 610,899, dated September 20, 1898.

Application filed June 24, 1898. Serial No. 684,359. (No model.)

To all whom it may concern:

Be it known that I, CARYL D. HASKINS, a citizen of the United States, residing at Newton Centre, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electric Meters, (Case No. 644,) of which the following is a specification.

My invention relates to electric meters, and has for its object to correct an error that sometimes occurs in operating such devices in places where there is considerable vibration, such as the switchboards of large power-stations, in factories, or other places where machinery is running. In such cases where the meters are provided with starting-coils consisting of a few turns of fine wire in series with the armature and in shunt to the load, so designed as to give just sufficient torque to counterbalance the friction of the armature, but not to start it at no load, the meters will run correctly when first calibrated and will not run when the field in series with the work is cut out. Under vibration, however, the armature is apt to creep, and thus there is a steady source of error, almost imperceptible from observation, but in the course of time noticeable in the registration. It is the object of the present invention to correct this by adjusting the starting-coil to local conditions after the meter has been installed. The method of accomplishing this result is to change the ampere-turns of the coil itself by changing its resistance or the resistance in series with it without changing the resistance of the armature-circuit as a whole. This adjustment is effected after the meter is in place and may be made just such as is necessary to prevent vibration or any extraneous influence to which the motor may be exposed from affecting the registration.

To effect the results pointed out, I place in series with the coil a resistance which is also in series with the armature and with the usual current-reducing resistance of the armature-circuit, and in shunt to the coil but in series with the armature and its main resistance, a second resistance. By the inverse regulation of these two latter resistances, which I may call "auxiliary" resistances, the effect of the coil may be adjusted so that just the amount of field necessary to give the desired torque will be developed without varying the resistance of the armature-circuit as a whole and thus without varying the current passing in the armature.

The accompanying drawing is a diagram which illustrates the application of my invention to the well-known Thomson recording-wattmeter.

In the drawing, *a b* are the mains or branches from the mains, between which are included the lamps *l*, forming the load. The armature A is, as is well known, in shunt across the mains and is of high resistance, so as to take but small current. An auxiliary resistance R of large amount is also included in the circuit of the armature, so that the current flow is still further reduced.

C is the starting-coil, which is in shunt to the mains and in series with the armature. Between the coil C and the resistance R are the auxiliary resistances D D′. These may be of any material desired, though small carbon rods are a good form. A slider provided with contact-pieces *d d* acts to cut in or cut out suitable portions of the resistances in inverse relation. It will be observed that the entire change of resistance in the circuit of the starting-coil is between the points a' a^2; but the resistances D D′ are so proportioned that however the resistance of the two circuits between these points may be shifted the total resistance between them is always the same. Thus the current flow in the armature will always be the same and the speed will be maintained in exact conformity with the factory calibration. If the slider be moved to the right, for instance, a part of the resistance D will be cut out, and the current flow in the coil C will be proportionately diminished, but the total current flow between the points a' a^2 will be preserved constant, because the same movement of the slider causes part of the resistance D′ to be cut into circuit in series with the resistance D and the coil C. The method of operation is thus seen to be the preservation of a constant cur-

rent flow in the circuit of the starting-coil, so as to afford exactly the proper amount of torque.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an electric meter, the combination of an armature in shunt to the mains and field-coils in series with the load, with a starting-coil also in series with the armature and in shunt to the mains, and means for changing the current flow in the starting-coil without affecting that in the armature-circuit.

2. In an electric meter, the combination of a field-coil in series with the work, an armature in which a sensibly-constant current is to be maintained, connected across the mains, a starting-coil in series with the armature and with an auxiliary high resistance, two resistances, one in series with the coil, the other in shunt thereto, and means for inversely regulating the two resistances.

3. The method of calibrating an electric meter, which consists in changing the current flow in the starting-coil to compensate for local errors without changing the current flow in the armature-circuit.

In witness whereof I have hereunto set my hand this 22d day of June, 1898.

CARYL D. HASKINS.

Witnesses:

FRANK P. COX,

A. F. MACDONALD.