

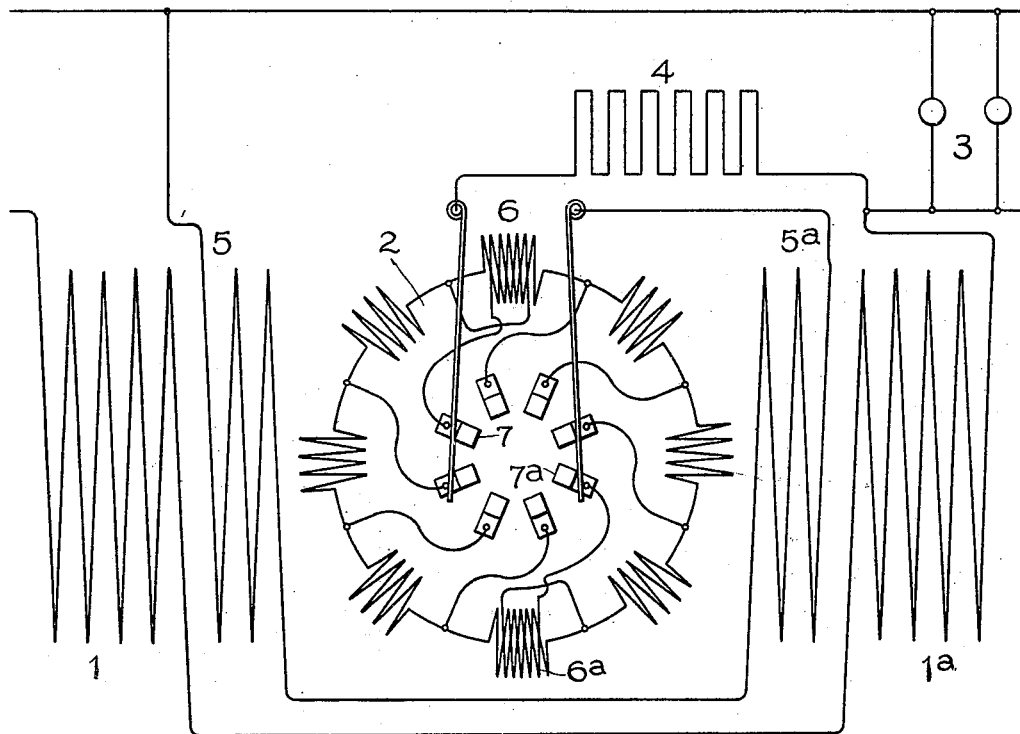
No. 645,671.

Patented Mar. 20, 1900.

E. W. RICE, JR.
ELECTRIC METER.

(Application filed Dec. 20, 1899.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

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ELECTRIC METER.

SPECIFICATION forming part of Letters Patent No. 645,671, dated March 20, 1900.

Application filed December 20, 1899. Serial No. 740,978. (No model.)

To all whom it may concern:

Be it known that I, EDWIN W. RICE, Jr., a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Meters, (Case No. 1,272,) of which the following is a specification.

This invention relates to electric meters.

It is common to provide electric meters, particularly those of the Thomson recording wattmeter type, with an auxiliary field-magnet coil in the armature-circuit to provide a starting torque sufficient to overcome the friction of the parts in starting, so that the recording-dial may give a true measure of the current consumed by the translating devices fed through the meter. In meters provided with this starting-coil, however, it has been noticed that especially when the meter is installed at a point where there is jarring or vibration the meter is maintained in slow operation when no translating devices are drawing current, a result due to the weak torque afforded by the armature and starting field-magnet coil, which is at all times in circuit, being in shunt to the translating devices. The vibration reduces the friction on the bearings and permits a slow "creeping" of the armature, which causes the recording device to register when no current is being used by the consumer.

It is the object of my invention to overcome this difficulty.

In carrying out my improvements I provide means for periodically cutting down the torque of the armature during each revolution thereof, thus providing, in effect, a dead point or points at which the creeping of the meter will be arrested when the main field-magnet coils are not energized or, in fact, when no translating devices are consuming current. A convenient way of providing these points of weak torque is afforded by introducing at suitable points on the armature-winding a demagnetizing-coil to reduce the magnetizing value of the armature-current at determinate points of the air-core, by which the armature may creep only for a part of a single revolution, and when it arrives at the dead-point the field-magnet forces of the

starting-coil will be in substantial balance on the two sides of the armature and the latter will be arrested until the translating devices shall have been cut in and the main field-magnet coil energized, when an increased torque is produced and the armature shifted past the dead-point and maintained in continuous rotation so long as the translating devices are in service.

My invention therefore consists in providing the rotary element of a meter-motor with a point or points of decreased magnetization to afford a dead-point to arrest the operation of the motor under the normal bias toward rotation when the translating devices are not in service.

It comprises also a meter-motor the rotary element of which is provided with one or more demagnetizing-coils.

The features of novelty will be more specifically pointed out hereinafter and will be more definitely indicated in the claims.

In the accompanying drawing, which diagrammatically illustrates my invention, 1 represents the main field-magnet coils of a meter-motor of the well-known Thomson recording wattmeter type, and 2 represents the armature thereof. These wattmeters are provided with magnetic circuits constituted of air-cores, the armature being provided with a damper against rapid movement, consisting of a conducting-disk rotating within the field of permanent magnets. The main field-magnet coils are in series relation to the translating devices, represented in the diagram as lamps at 3, though of course they may be translating devices of any other character. The armature is in a shunt-circuit across the translating devices, including a resistance 4, and frequently including also auxiliary starting-coils 5 on the field-magnet. These are so designed as to afford a sufficient armature torque to just counterbalance the starting or running friction of the meter, and when the latter is installed in places where there is mechanical vibration is sufficient to maintain a slow rotary movement of the armature, technically termed "creeping," which creates an excessive registration on the meter-dial. I prevent this false registration by providing the armature with a dead point or points, and

preferably two. This may be effected in various ways, as by reducing the number of ampere-turns at suitable points in the armature-winding by eliminating one or more coils.

5 I prefer, however, to provide the armature with two demagnetizing-coils symmetrically related with respect to its axis, by which the magnetizing value at two opposite diametrical points is cut down at those points.

10 When the translating devices are cut out and the main coils 1 1^a are not drawing current, the meter can creep only for a part of a single armature revolution until the coils of reduced magnetization come into substantially-symmetrical relation to the starting

15 field-magnet coil, of which the torque will be insufficient to shift the armature over the dead-points, and the meter-motor will be arrested. Two such coils are indicated at 6 6^a,

20 the connections with the corresponding commutator-segments being led through two differential coils, as shown in the drawing, in symmetrical relation to the armature-core. As will be evident from the diagram, when

25 the commutator-segments 7 7^a come under the brushes the coils 6 6^a will be demagnetized and will be in substantially-symmetrical relation to the field-magnet coils 5 5^a and will cut down the torque of the motor sufficiently

30 to check it at these points and stop its creeping. When the commutator-segments are moved away from the brushes, the demagnetizing-coils are cut out and the motor operates with constant torque. So long as the main

35 field-magnet coils 1 1^a are in action this reduction of torque is insufficient to check the rotation of the armature.

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

1. An electric meter provided with an operating-motor having a starting-coil to compensate friction, and means for periodically cutting down the armature magnetization. 40

2. An electric meter provided with an operating-motor, an auxiliary starting-coil, and means for establishing a dead-point to neutralize the value of said coil during each revolution of the armature. 45

3. An electric meter comprising a field-magnet circuit in series with the translating devices, an armature-circuit in shunt thereto, an auxiliary starting-coil on the field-magnet in series with the armature, and means for neutralizing the effect of one or more armature-coils at determinate points in the path 55 of rotation of the armature.

4. An electric meter comprising an operating-motor, a field-magnet coil in series with the translating devices, an armature in shunt relation thereto, an auxiliary starting-coil in circuit with the armature, and one or more demagnetizing-coils on the armature cut in when its commutator-segment engages its brush.

5. In an electric motor, means for establishing an opposing or neutralizing magnetomotive force in the armature at definite armature positions. 65

In witness whereof I have hereunto set my hand this 18th day of December, 1899.

EDWIN W. RICE, JR.

Witnesses:

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