

W. C. YATES.

RHEOSTAT.

APPLICATION FILED DEC. 10, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

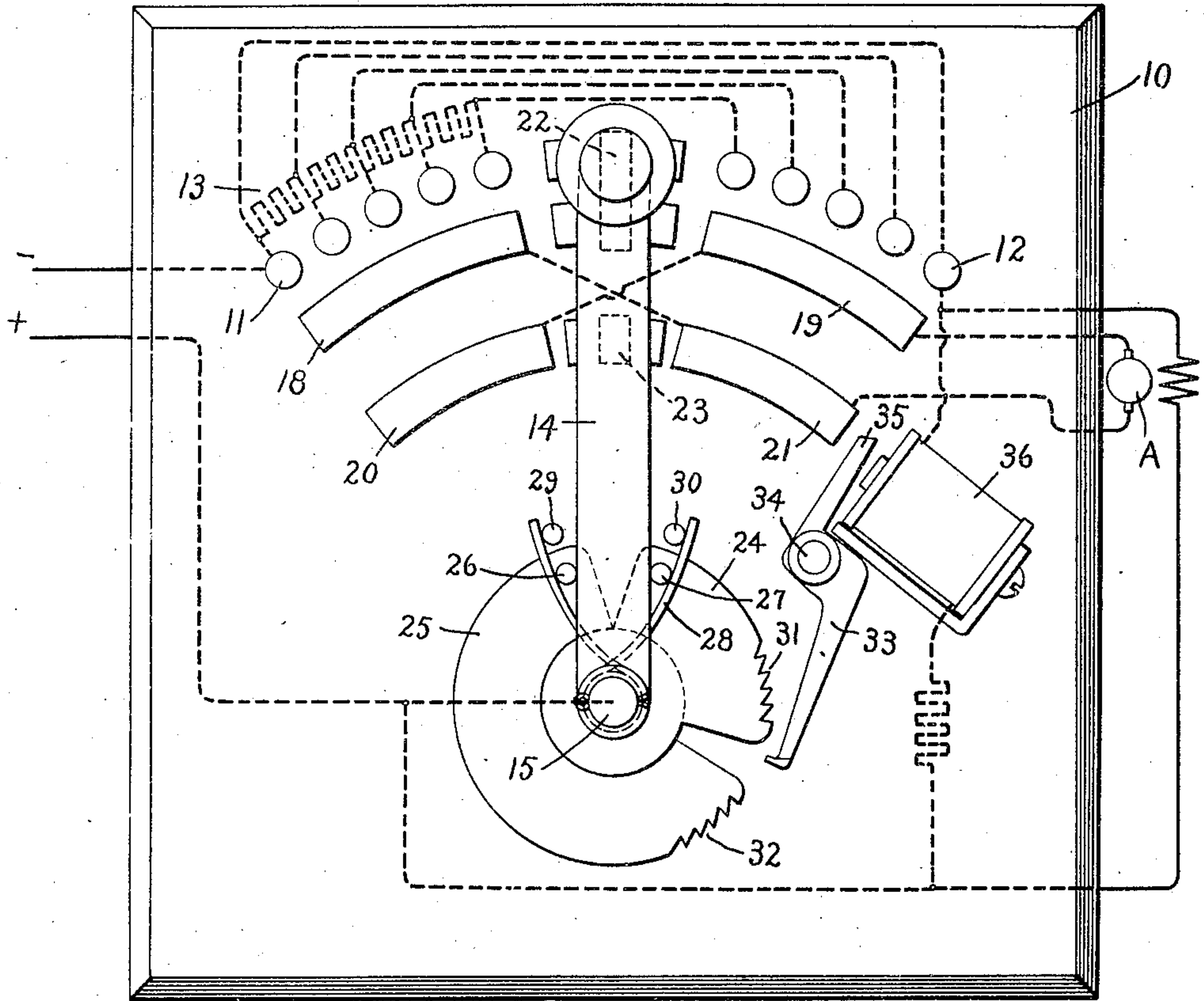
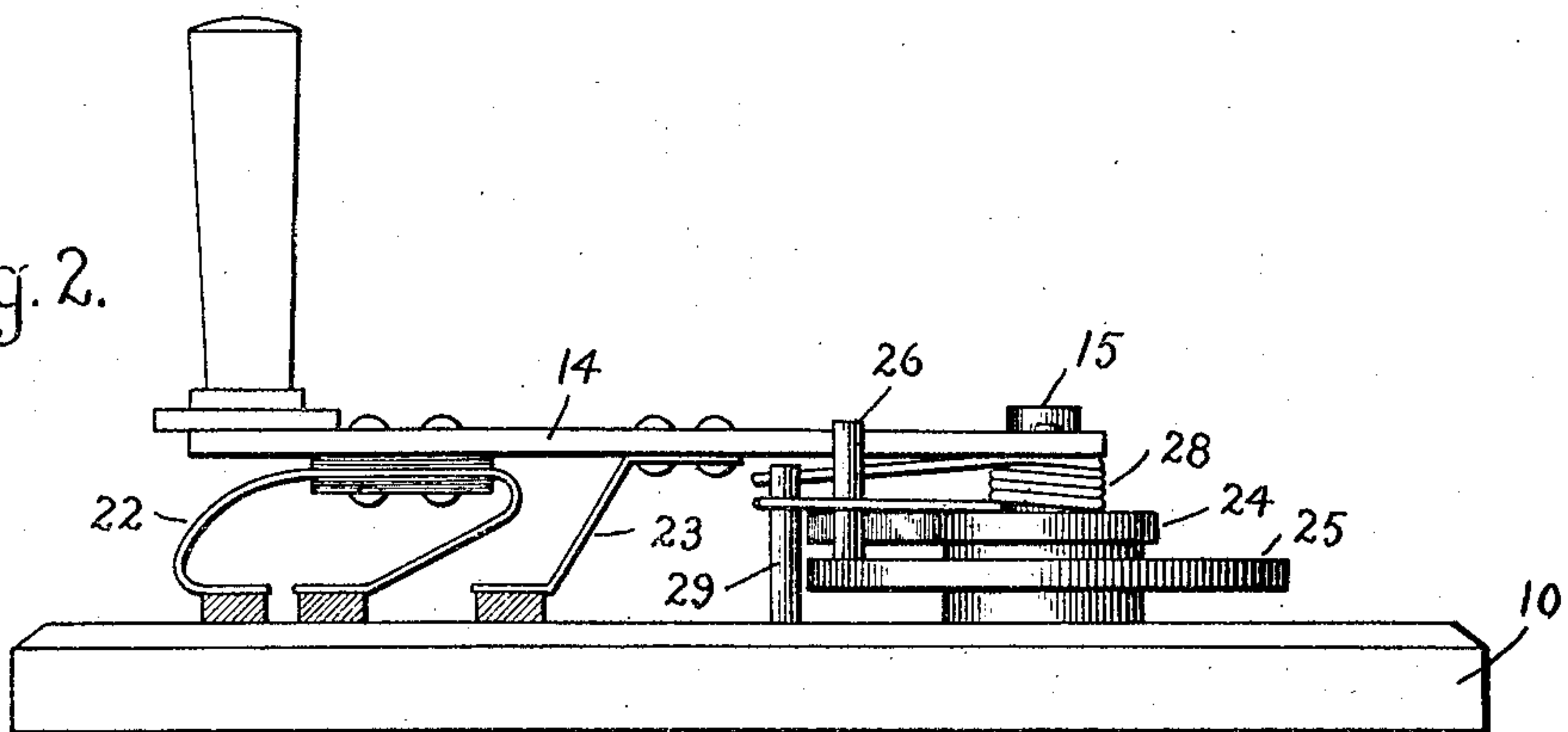


Fig. 2.



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Att'y.

No. 894,564.

PATENTED JULY 28, 1908.

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2 SHEETS—SHEET 2.

Fig. 3.

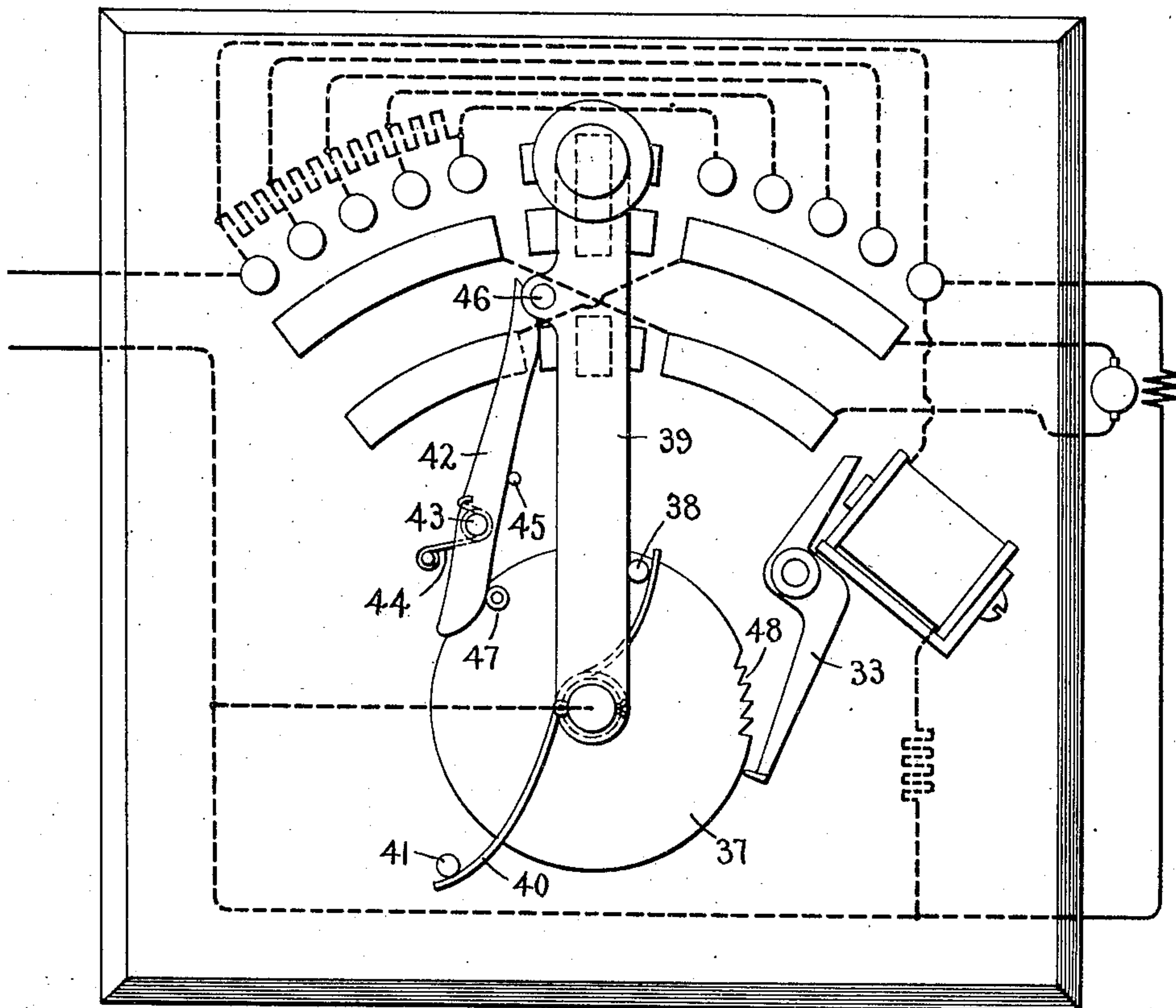
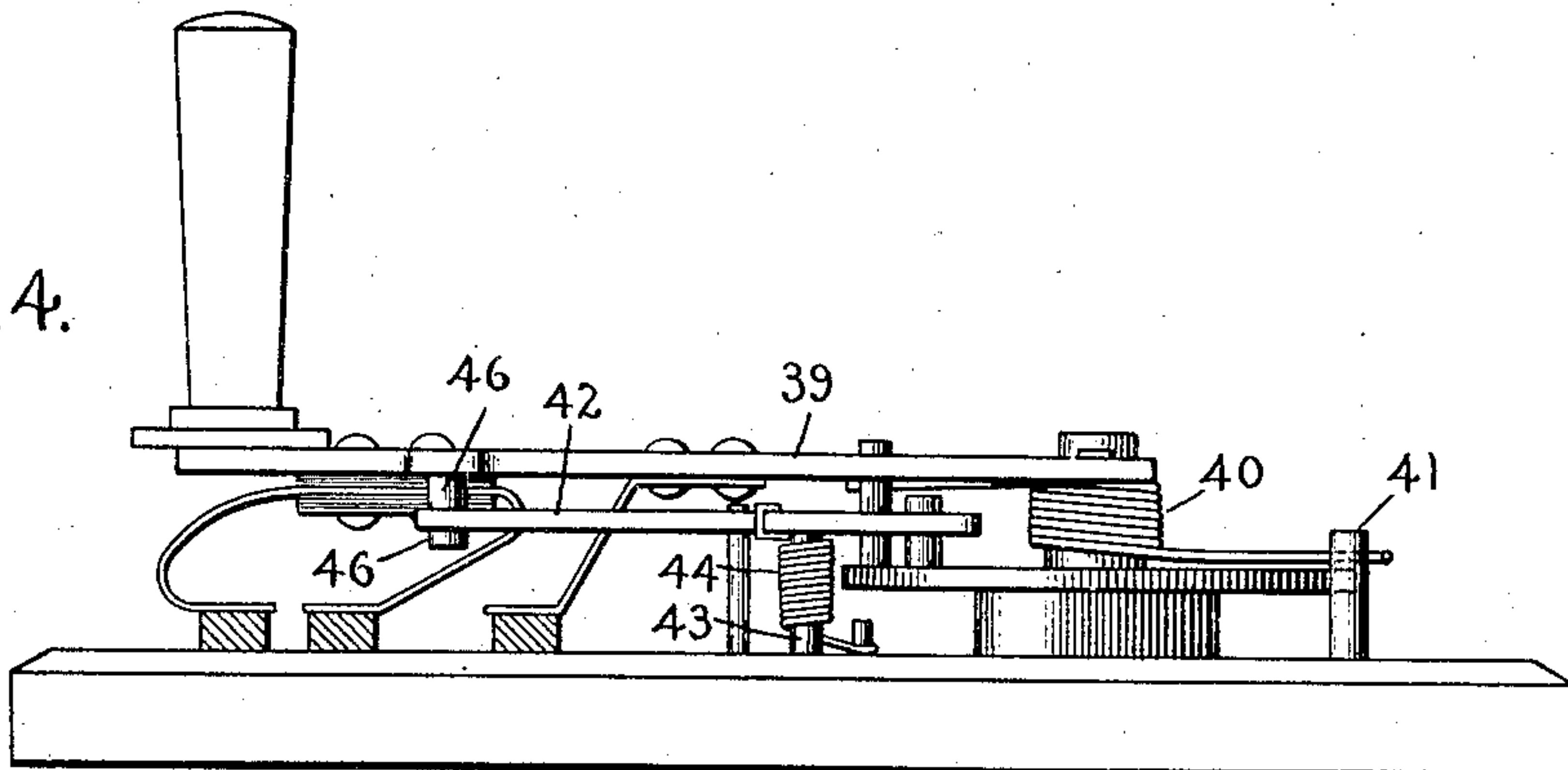


Fig. 4.



Witnesses:

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# UNITED STATES PATENT OFFICE.

WILLIAM C. YATES, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## RHEOSTAT.

No. 894,564.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed December 10, 1907. Serial No. 405,861.

*To all whom it may concern:*

Be it known that I, WILLIAM C. YATES, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Rheostats, of which the following is a specification.

This invention relates to means for controlling electric circuits and has for its object the provision of a device of this character which will reverse a motor and regulate its speed in either direction in a reliable, safe and efficient manner.

One of the objects of my invention is to provide a simple and convenient speed regulating rheostat to vary the speed of a motor in either direction and equip the same with a no-voltage magnet whereby upon failure of voltage, the controlling element will always be brought to a protective position.

In carrying out my invention, I provide in connection with the usual resistance contacts a controlling arm which is mounted to move freely upon its pivot. A ratchet mechanism is provided which is spring-pressed or biased so as to normally engage the controlling arm and give it a bias to an initial position. The ratchet mechanism is adapted to be engaged by a detent which in turn is controlled by a no-voltage magnet. The arrangement of the parts is such that as soon as the magnet is energized the detent engages the ratchet teeth so as to hold the mechanism and relieve the controlling arm of spring pressure. The arm may then be returned or left on any of the studs.

Further objects of my invention will appear in the course of the following specification in which my invention is shown embodied in concrete mechanism for purposes of illustration.

In the accompanying drawings illustrating my invention, Figure 1 shows a plan view of one form thereof; Fig. 2 is a side elevation of the same; Fig. 3 is a plan view of a modified form of my invention; and Fig. 4 is a side elevation thereof.

Referring to the drawings, 10 is an insulating base of slate or soapstone provided with two groups or series of contacts 11 and 12 forming terminals of resistance 13. The studs are arranged in the arc of a circle and the controlling arm 14 is arranged so as to have its off or initial position between the two groups. This controlling arm 14 is piv-

oted at 15 and is provided with contacts adapted to engage the studs as well as the segments 18, 19, 20 and 21. The contact 22 bridges the studs 11 and 12 to the adjacent contacts 18 and 19 respectively, while the contact 23 engages the segments 20 and 21. The contact 23 is electrically connected to the controlling arm while the contact 22 is insulated therefrom. Segments 18 and 21 are cross connected as are also segments 19 and 20.

The studs 12 are connected with the resistance 13 in a well-known manner so as to cut out the resistance in sections successively, and the studs 11 are similarly connected. The arm 14 is biased to the initial position, shown in the drawings, by means of two segmental disks 24 and 25 pivoted to the central pivot 15 to move freely thereon. The disks are provided with pins 26 and 27 which project upward and engage the arm 14 on opposite sides. A spring 28 is coiled about the central pivot and at its free ends engages the pins 26 and 27 in such a manner as to force the pins toward each other. Pins 29 and 30 are mounted on the base so as to likewise engage the ends of the spring as shown. The disks are provided with ratchet teeth at 31 and 32, which teeth are adapted to be engaged by a detent 33 pivoted at 34 and having an armature portion 35 coöperating with a no-voltage magnet 36. The arrangement is such that when the magnet 36 is energized, the detent is drawn up to engage the ratchet teeth.

The arrangement of circuits and the mode of operation of this form of my device is as follows: If it is desired to start the motor, the arm 14 is moved in one direction, for instance to the right, so as to engage the studs 12. This movement causes the arm to engage the pin 27 on the disk 24 and place the spring 28 under tension. The no-voltage magnet 36, which is shown connected across the line, is energized independently of the movement of the controlling arm. The arrangement of this magnet, however, forms no part of my invention and may be varied at will. The detent 33 now engages the teeth 31 but passes over the same as the arm is moved to the right. When it is desired to leave the arm in any position, the detent by engaging the teeth will hold the disk 24 and allow the arm to remain in this position or allow it to return to the left, if desired.



In the meantime, the opposite end of the spring is held from influencing the arm 14 by the pin 29. If it is desired to reverse the motor, the arm will be moved to the left of its central position so as to engage the stud 11. When this is done a similar result will be produced. This time, however, the arm engages the pin 26 while the pin 30 keeps the spring from pressing against pin 27. I have shown the resistance 13 connected in the armature circuit so that the speed of the motor is controlled by the armature resistance. When the arm 14 moves to the right, current will pass from the positive main to the arm 14, segment 21, armature A, segment 19, stud 12, resistance 13 and back to line. When the arm is moved in the opposite direction, current will pass from segment 20 across to segment 19 thence to armature A, segments 21 and 18, resistance 13 and back to line.

In Fig. 3 I have shown a modified form of my invention in which only a single disk 37 is used. This disk is provided with a pin 38 which is adapted to engage the controlling arm 39 and is also adapted to be engaged by one end of spring 40, the opposite end of which engages the pin 41 on the base. A lever 42 is pivoted at 43 and pressed by means of a spring 44 against the stop 45. One end of the lever is adapted to be engaged by a pin 46 on the controlling arm when the latter is moved to the left, while the opposite end engages a stud 47 on the disk. When the arm 39 is moved to the right, the operation will be as described with reference to Fig. 1, that is the teeth 48 will be engaged by the detent 33 and held in any desired position. Upon reversing, however, the pin 46 will move the lever 42 on its pivot so that the opposite end of the lever will engage the stud 47 and move it in the same direction as if the arm 39 had been moved to the right. The result accomplished is therefore substantially the same as with the mechanism shown in Figs. 1 and 2. I have shown my invention as applied to armature regulating mechanism and as embodying certain specific structural features. I do not, however, limit my invention to the particular type of rheostat, the method of connection or the structural features herein shown except in so far as it is limited by the scope of the claims annexed hereto.

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

1. A rheostat comprising a series of contacts, a controlling arm therefor having a

bias to an initial position and movable in opposite directions therefrom, a no-voltage magnet, and means rendered operative upon the energizing of said magnet for removing the bias from said member.

2. A rheostat comprising a series of contacts, a controlling arm therefor movable in opposite directions from an initial position, a spring-pressed device arranged to normally engage said arm and give it a bias to said initial position, a no voltage magnet, and means for holding said device out of biasing engagement with said arm when the magnet is energized.

3. A rheostat comprising a series of contacts, a controlling arm therefor movable in opposite directions from an initial position, a spring-pressed ratchet mechanism arranged to normally engage said arm and return it to said initial position, a no-voltage magnet, and a detent controlled thereby for engaging said ratchet mechanism and rendering the returning means inoperative.

4. A rheostat comprising a series of contacts, a controlling arm therefor movable in opposite directions from an initial position, spring-pressed ratchet mechanism arranged to engage said arm and return it to said initial position when it is moved in one direction, means for returning said arm to said initial position when it is moved in the opposite direction, a no - voltage magnet, and means controlled thereby for rendering the returning means inoperative.

5. A rheostat comprising a series of contacts, a controlling arm therefor movable in opposite directions from an initial position, spring-pressed ratchet members arranged to normally engage said arm and return it to said initial position, a no-voltage magnet, and means controlled thereby for rendering the returning members inoperative.

6. A rheostat comprising a series of contacts, a controlling arm therefor movable in opposite directions from an initial position, spring - pressed centrally mounted ratchet disks arranged to normally engage said arm and return it to said initial position, a no-voltage magnet, and a detent controlled thereby for engaging the ratchet disks and rendering the returning means inoperative.

In witness whereof, I have hereunto set my hand this 9th day of December, 1907.

WILLIAM C. YATES.

Witnesses:

BENJAMIN B. HULL,  
HELEN ORFORD.