No. 741,839. PATENTED OCT. 20, 1903.

A. B. SALIGER.

AUTOMATIC RHEOSTAT.

APPLICATION FILED MAR. 14, 1903.

NO MODEL.

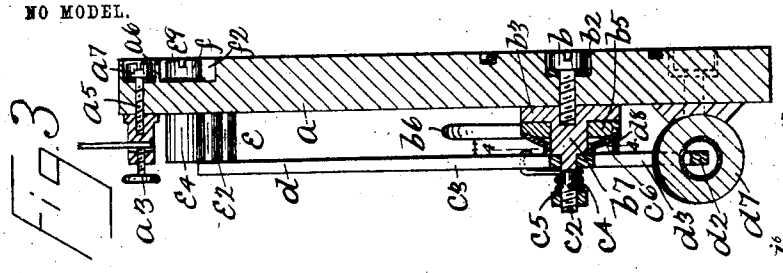

FIG. 3

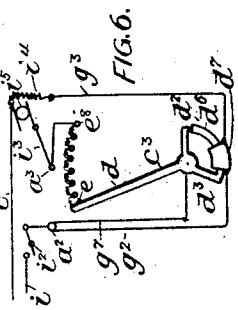

FIG. 6.

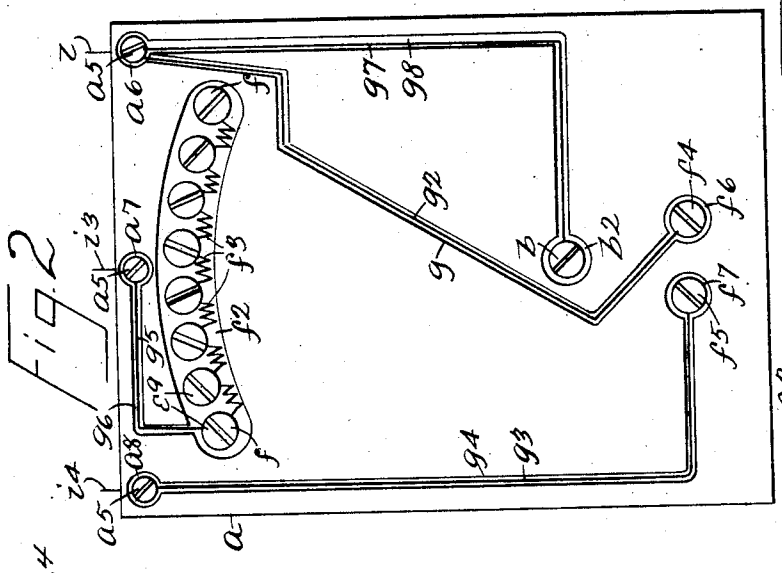

FIG. 2

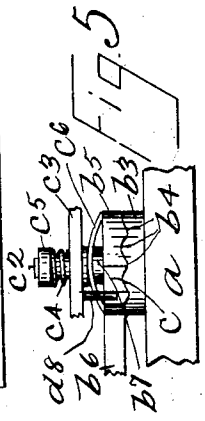

FIG. 5

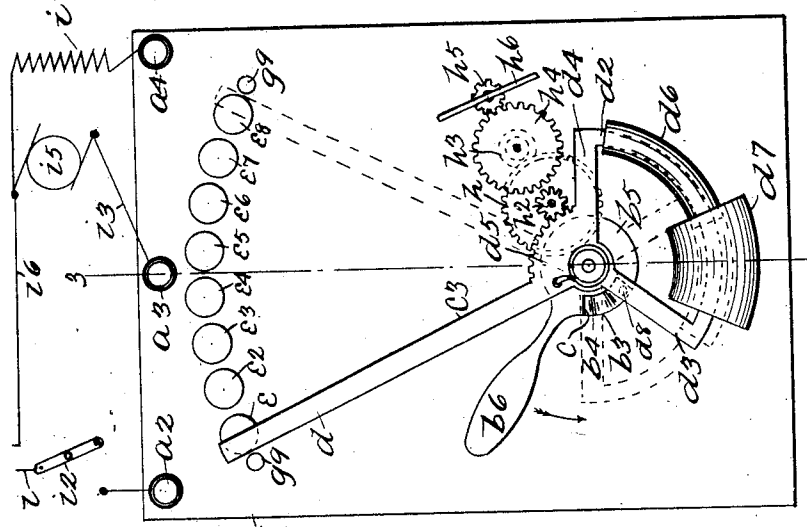

FIG. 1.

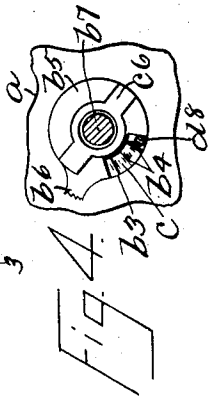

FIG. 4.

WITNESSES

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No. 741,839. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

ALOIS B. SALIGER, OF NEW YORK, N. Y.

AUTOMATIC RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 741,839, dated October 20, 1903.

Application filed March 14, 1903. Serial No. 147,702. (No model.)

To all whom it may concern:

Be it known that I, ALOIS B. SALIGER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Automatic Rheostats, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

The object of this invention is to provide a rheostat whereby the usual resistance is cut out automatically, so that all that is necessary to start an electric motor or other device is to close the switch in the line which conveys the current to the motor, thereby saving time, wear, and tear on the motor and in the case of motor-cars prevent the jolting occasioned by the too sudden starting or stopping thereof, a further object being to provide an apparatus of the class described, whereby the speed of the motor may be regulated at will by simply setting my apparatus at any desired point and also to provide a rheostat whereby the current may be turned on at any point or points at a distance therefrom.

My invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which similar reference characters are used to indicate similar parts in each of the views, and in which—

Figure 1 is a front view of my automatic rheostat and showing diagrammatically the electrical connections therefor; Fig. 2, a back view thereof; Fig. 3, a section on the line 3 3 of Fig. 1, and Fig. 4, a partial section on the line 4 4 of Fig. 3; Fig. 5, a side view of the detail shown in Fig. 4, and Fig. 6, a diagrammatic view showing the system of wiring employed.

In the practice of my invention I provide a plate a, composed of slate, vulcanite, or other non-conductive material, and the plate a is provided at one end with three binding-posts a^2, a^3, and a^4, which are respectively secured to the plate a by means of screws a^5, as shown in Fig. 3, passing from the back to the front and sunk into recesses a^6, a^7, and a^8, respectively. Passing through the plate a and on a central line thereof is a screw b, placed in a recess b^2, and the screw b securely holds an annular plate b^3 to the front of the plate a, and the top of the annular plate b^3 is provided with radial convolutions, as shown at b^4, forming radial teeth, which engage corresponding teeth in a similar plate b^5 placed thereon, which is provided with a handle b^6 and is free to revolve on the upwardly-directed member b^7 of the annular plate b. The plate b^5 is provided with a segmental opening c, which is of a predetermined length, and the reason for which will be hereinafter explained.

Mounted on the member b^7 of the plate b and preferably integrally therewith is a post c^2, screw-threaded at its top, and this post c^2 serves as a pivot for an arm c^3, mounted on the member b^7 and over which is placed a coil-spring c^4, one end of which is passed through an opening in the post c^2 and the other end of which is secured to the arm c^3, and the post c^2 is also preferably provided with a nut c^5, which protects said spring. Between the arm c^3 and plate b^5 is a curved spring-plate c^6, which serves to keep the teeth at b^4 engaged, but which also permits of sufficient play for the said teeth to pass each other when the plate b^5 is turned by means of the handle b^6.

The arm c^3 consists of an extended member d, a segmental member d^2, supported by radial members d^3 and d^4, and a segment-gear d^5 between the radial member d^4 and said extended member, and mounted on the segmental member d^2 is an armature d^6, circular in cross-section, which passes through a similarly-shaped central opening in a solenoid d^7, secured to the plate a, and the radial member d^3 is provided with a pin d^8, which passes downward into the segmental opening c.

The member d of the arm c^3 extends almost the full length of the plate a, and the end thereof normally rests on a contact e of a plurality of similar contacts e^2, e^3, e^4, e^5, e^6, e^7, and e^8, which collectively form the usual variable resistance, as shown at e^9, Fig. 2, and these contacts are held in place by screws f, placed in a recess f^2 and connected by the resistance-wires f^3.

The solenoid d^7 is held in position by screws f^4 and f^5 in recesses f^6 and f^7, respectively, and the recess f^4 is connected by a groove g with the recess f^2 adjacent to the resistance-contact e, said contact e being in electrical

connection with the screw f^4 by means of a wire g^2, while a wire g^3 in a groove g^4 connects the screw f^5 with the screw a^5 of the field binding-post a^4. The contact e^8 is similarly connected, by means of a wire g^5 in a groove g^6, with the arm binding-post a^3, and the screw b of the pivot c^2 is connected, by means of a wire g^7 in a groove g^8, with the line binding-post a^2, and the plate a is provided adjacent to the contacts e and e^8 with stops g^9, which limit the swing of the member d of the arm c^3.

Rotatably mounted on the plate a adjacent to the pivotal point c^2 is a gear-wheel h, which carries on its upper surface a pinion h^2 in operative connection with the segment-gear d^5, and the gear-wheel h engages a pinion h^3 on the under side of a gear-wheel h^4, which is in operative connection with a pinion h^5, upon which is secured a plate h^6, which serves as a fan, and, as will be readily seen, the speed of the movement of the arm c^3 is controlled by the fan h^6.

Fig. 1 is a diagrammatic view of the line-wire i, the switch i^2, the armature-wire i^3, and field-wire i^4, and showing also the return-wire i^6, and the wire i^4 is connected with the wire i^6 through the field-magnet of the motor i^5.

When the parts are in the position shown in full lines in Fig. 1 and the switch i^2 is moved to close the circuit, the current from the line-wire i passes to the binding-post a^2 and by means of wire g^7 to the post c^2 and arm c^3, member d to contact e, wire g^2 to screw f^4 and solenoid d^7, through same to screw f^5, wire g^3, binding-post a^4, through motor to return-wire i^6, part of the current also passing through resistance e^9 to binding-post a^3 and to motor. This causes the solenoid d^7 to attract the armature d^6, and thereby moves the arm d, which passes over the contacts e e^2, &c., cutting out a portion of the resistance at each contact, and thereby causing the motor to increase its speed.

When the arm d is on the contact e^8, the current passes from line to post a^2, wire g^7, screw b, pivot c^2, arm c^3 to e^8, wire g^5, post a^3, wire i^3 to motor, and said motor has attained its highest speed. While the arm c^3 was being moved, as described, the segment-gear, by means of gear-wheels h and h^4 and pinions h^2, h^3, and h^5, turned the fan h^6, which prevented too great speed of said arm c^3, and thereby the motor increased its speed gradually, and when the switch i^2 is again opened the coil-spring c^4 draws the arm c^3 back to its normal position, and because of the fan h^6 this motion is gradual also, thereby not injuring the parts.

The segmental opening c in the plate b^5 is preferably made of a size equal to the swing of the arm c^3 or of the pin d^8 on the member d^3 thereof, and when in the position shown in full lines in Fig. 1 the arm c^3 is capable of its full rotary movement; but if the handle b^6 be moved in the direction of the arrow the edge of the opening c is also carried down, and the handle c^6 and plate c^5 are held in any desired position by means of the radial teeth b^4 and spring c^6, and when so moved the pin d^8 will strike the edge of the opening c before the arm c^3 has reached its limit of movement, and the speed of the motor will thus be regulated, according to the contact e e^2, &c., upon which the member d stops. It will be seen by this means of construction that a person grasping the handle b^6 and bringing the same around to any given point will thereby limit the speed at which the motor connected therewith can operate.

The rheostat may also be placed out of the reach of the operator, as in a locked box, and if on a motor-car the superintendent may set the rheostat of each car and the motorman will not be able to exceed the speed so determined, and the starting of the car will thus be gradual, although by stopping the motor and applying the brakes the car may be brought to a sudden stop.

My invention is not limited to the exact construction shown, as it will be apparent that an ordinary electromagnet in connection with a step-by-step arrangement or any other well-known device for producing mechanical motion by electricity may be substituted, and other controlling devices than the clockwork shown may also be employed, and while my rheostat is shown in connection with the unit system of resistance it may also be applied to continuous resistance.

In practice I may inclose my rheostat in a dust-proof case, (not shown in the drawings,) and various other changes in and modifications of the construction herein shown and described may be made without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a rheostat of the class described, a base-plate, an arm pivoted thereon, a variable resistance in electrical connection with said arm, an annular plate mounted on said base-plate at the pivotal point of said arm, radial teeth on said plate, a supplemental plate revolubly mounted thereover and provided with radial teeth engaging said first-named teeth, a handle on said supplemental plate, a segmental opening in said supplemental plate, a pin on said pivoted arm passing into said segmental opening, and a spring-plate bearing on said supplemental plate, said segmental opening in said supplemental plate limiting the movement of said arm, substantially as shown and described.

2. An automatic rheostat comprising a variable resistance, a pivoted arm in electrical connection therewith, means for electrically operating said arm, a governor in operative connection with said arm and adapted to regulate the speed of its movement, and an adjustable controller adapted to limit the move-

ment of said arm in one direction and permit of its free movement in the opposite direction, substantially as shown and described.

3. An automatic rheostat comprising a variable resistance, a pivoted arm in electrical connection therewith, means for electrically operating said arm, a governor in operative connection with said arm and adapted to regulate the speed of its movement, and a controller adapted to limit the movement of said arm in one direction and permit of its free movement in the opposite direction, said controller being pivoted to the support of said arm, substantially as shown and described.

4. An automatic rheostat, comprising a variable resistance, a pivoted arm in electrical connection therewith and provided at one end with a segmental member, an electromagnet through which the segmental member passes, a governor in operative connection with said arm and adapted to limit the speed of its movement, electrical conductors leading to said arm and said electromagnet, supplemental electrical conductors leading from said electromagnet and said variable resistance, a motor in connection with said last-named conductor, means for energizing said motor and a controller operating in connection with said arm and adapted to limit its movement in one direction and to permit of its free movement in the opposite direction, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 12th day of March, 1903.

ALOIS B. SALIGER.

Witnesses:
F. A. STEWART,
J. C. LARSEN.