

No. 618,071.

Patented Jan. 24, 1899.

C. A. DRESSER.  
MOTOR SPEED CONTROLLER.

(Application filed July 28, 1898.)

(No Model.)

Fig. 1.

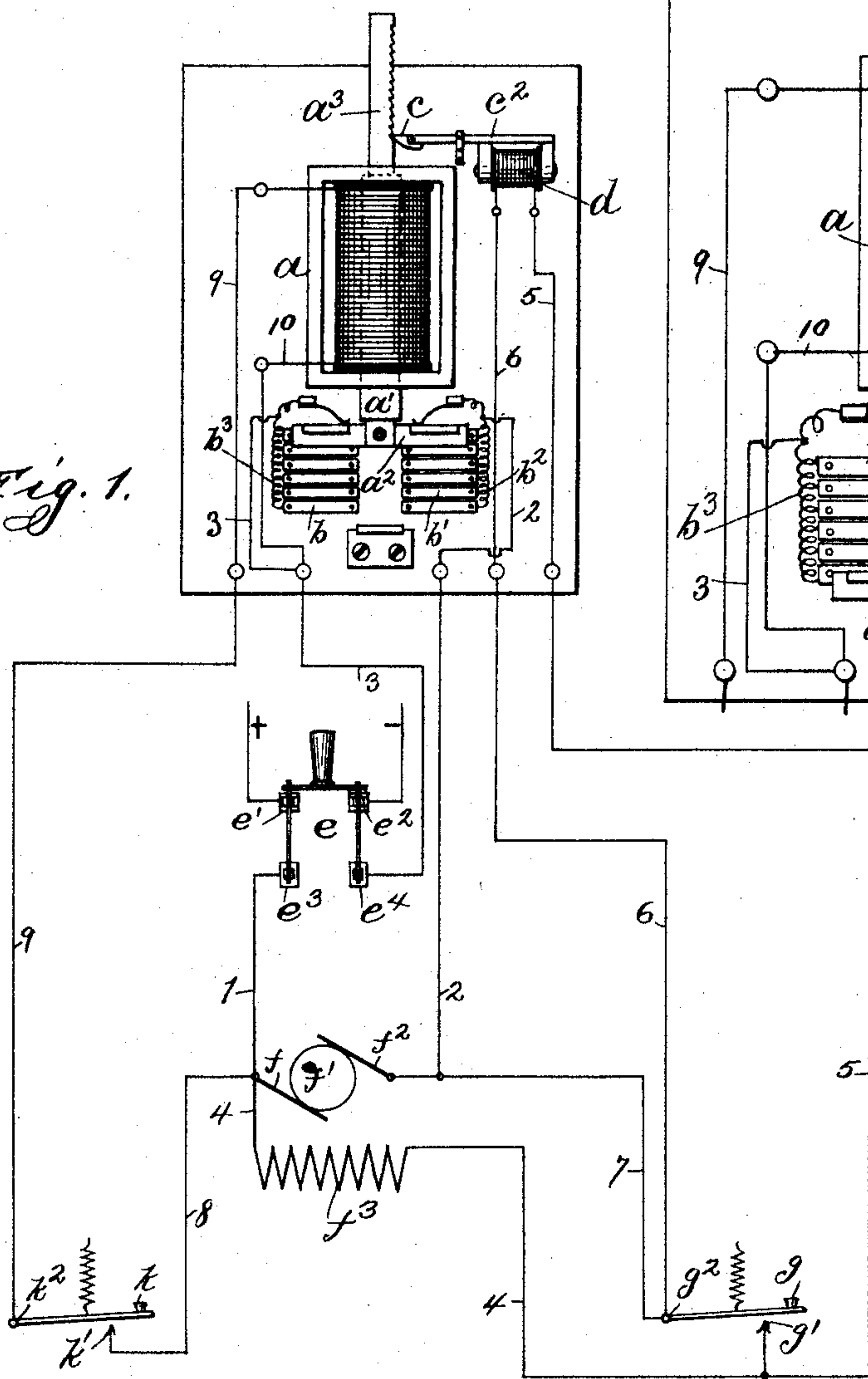
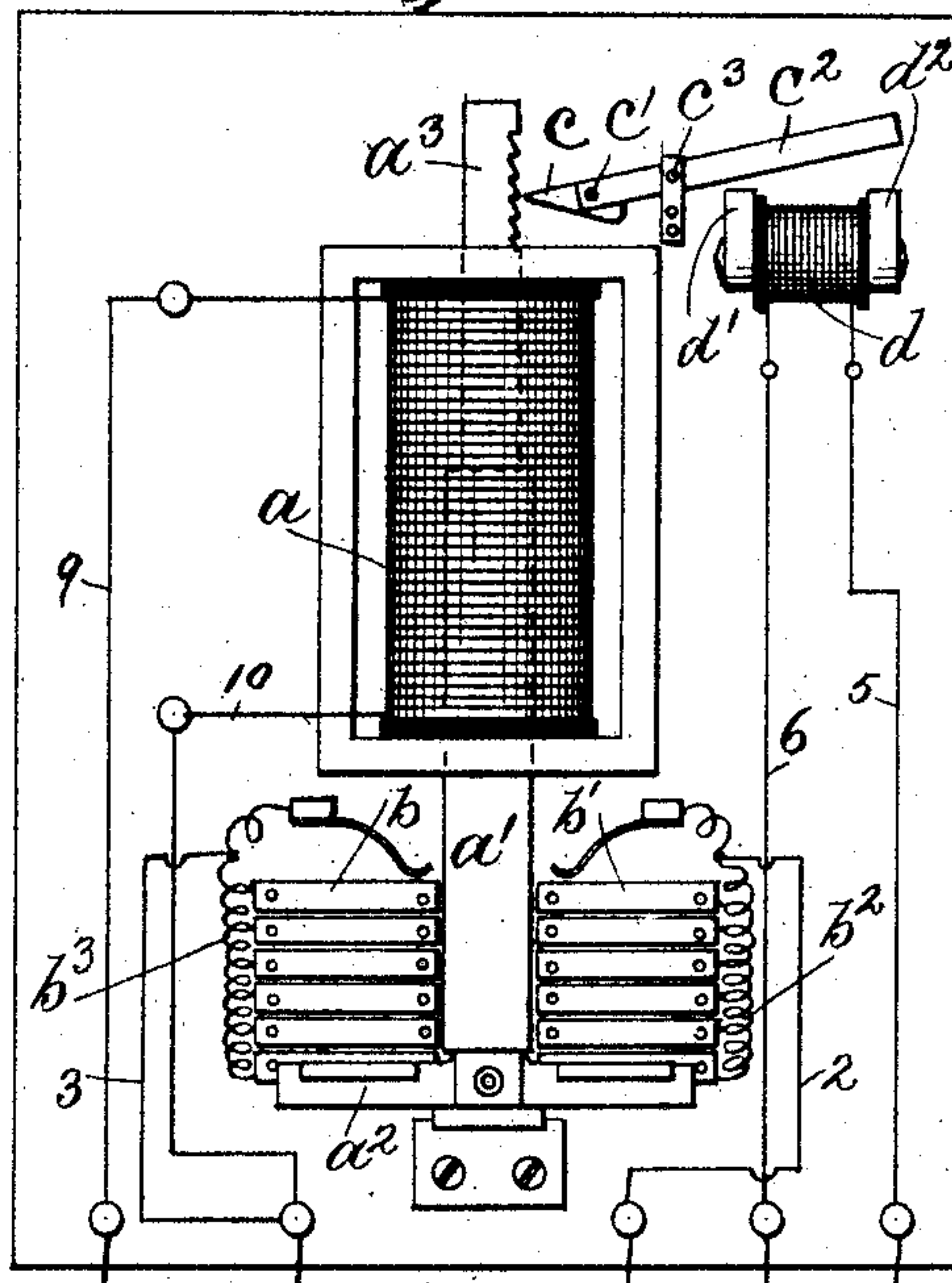


Fig. 2.



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# UNITED STATES PATENT OFFICE.

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## MOTOR SPEED-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 618,071, dated January 24, 1899.

Application filed July 28, 1898. Serial No. 687,080. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. DRESSER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Motor Speed-Controllers, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part 10 of this specification.

My invention relates to a motor speed-controller, my object being to provide means whereby a variable rheostat may be operated from a distant point to start and stop the 15 motor and vary the speed thereof at will.

In accordance with my invention in the preferred form thereof I provide a starting-resistance adapted to be cut into and out of the armature-circuit by means of a contact-arm, 20 and I provide a solenoid the core of which is attached to the rheostat bar or arm and adapted when the solenoid is energized to move the rheostat-bar over the contact-terminals to gradually cut out resistance, the movement 25 being preferably opposed by a dash-pot or other equivalent regulator. I also provide a catch which serves to lock the rheostat-arm in any position to which the same may be moved, the catch being controlled by a con- 30 trolling-magnet, whereby the catch may be released at will to permit the return of the rheostat-bar to cut in resistance. The circuit through the controlling-solenoid and the circuit through the controlling-magnet are 35 operated by separate switches, preferably in the form of push-buttons or keys, whereby when one is depressed the solenoid is energized to cause the rheostat-bar to be moved to gradually cut out resistance, the movement 40 continuing as long as the circuit is held closed. Upon the opening of the circuit through the solenoid the catch serves to lock the rheostat-bar in the position to which the same has been moved. When it is desired to cut resistance 45 into the armature-circuit, the other push-button or key is operated to shunt the circuit through the controlling-magnet, thus releasing the rheostat-bar and permitting the same to move to cut in resistance, the movement 50 continuing so long as the circuit is held closed

and the rheostat-bar being locked in position again as soon as the circuit is opened.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 is a view in elevation of the con- 55 troller of my invention, the circuits being shown in diagram. Fig. 2 is a view of the controller with all the resistance in circuit.

Like letters and figures refer to like parts in both views. 60

The solenoid *a* is provided with a core *a'*, to the lower end of which is attached the rheostat-bar *a''*, adapted to move over a series of terminals *b b'*, between which the re- 65 sistance-coils *b'' b'''* of the rheostat are connected. The upper end of the core *a'* carries a notched or toothed ratchet-bar *a'''*, with which the dog *c* engages, said dog *c* being pivoted at *c'* to the end of the armature-lever *c''*, which in turn is pivoted at *c'''*, the armature-lever 70 being normally held in a horizontal position and in contact with the poles *d' d''* of the controlling-magnet *d*.

The terminals *e' e''* of the switch *e* are connected with the opposite mains of the sup- 75 ply-circuit, and a conductor 1 extends from the terminal *e'''* of the switch to the brush *f* of the armature, thence through the armature *f'* to the brush *f''*, and then by conductor 2 to the coils *b''* of the rheostat. The coils 80 *b'''* of the rheostat are connected by conductor 3 with the opposite terminal *e''* of the switch *e*. A conductor 4 extends through the field-winding *f'''* of the motor and thence to the contact *g'* of the switch or key *g*, and con- 85 ductor 5 extends therefrom to the controlling-magnet *d*, and a conductor 6 extends from this magnet to the lever *g''* of the key *g*, and a conductor 7 extends thence to the brush *f''* of the motor. From the brush *f* of the motor 90 a conductor 8 extends to the contact *k'* of the key *k*, while a conductor 9 extends from the lever *k''* of the key to the operating-solenoid *a*, the opposite end of the solenoid being connected by conductor 10 with the conduc- 95 tor 3, which extends to the terminal *e'* of the switch.

When the motor is at rest, the rheostat-bar *a''* is at the lower end of its travel, and thus bridges the lower terminals *b b'* to include 100



all of the starting resistance in circuit, and when the switch *e* is closed current traverses the armature of the motor with all of the resistance in circuit. When the key *k* is depressed, circuit is closed from conductor 1 through conductors 8 and 9, through the solenoid *a* and conductors 10 and 3 to the opposite side of the line, and the solenoid *a* is thus energized and attracts its core to move the rheostat-bar upward over the rheostat-terminals to thereby gradually cut out resistance. As the core moves upward the ratchet-bar *a*<sup>3</sup> is also moved upward and the dog *c* rocked on its pivot to permit the upward movement. When the key *k* is released, it opens the circuit through solenoid *a* and deenergizes the same. The weight of the core is imposed upon the dog *c*, thus locking the rheostat-bar in the position to which the same has been moved. The controlling-magnet *d* is normally energized and maintains the armature-lever *c*<sup>2</sup>, carrying the dog *c*, in its horizontal position, the circuit being traced from conductor 1 through conductors 4 and 5 to the magnet *d*, thence by conductors 6 and 7 and 2 to the rheostat, thence through the coils *b*<sup>2</sup> and *b*<sup>3</sup> in circuit to conductor 3, and back to the opposite side of the line. When it is desired to cut the resistance into the armature-circuit again, the key *g* is depressed, thereby short-circuiting magnet *d* and deenergizing the same to release the armature-lever *c*<sup>2</sup> and permit the armature-lever to rock upon its pivot, thereby carrying the dog *c* out of engagement with the ratchet-bar and permitting the same to descend to carry the rheostat-bar downward by gravity over the rheostat-terminals. This downward movement continues so long as the key *g* is depressed, and when released the short-circuit about the controlling-magnet is opened and said magnet is energized to again attract the armature-lever and bring the dog *c* into engagement with the ratchet-bar, and thereby lock the rheostat-bar against further downward movement. When the key *g* is depressed the circuit may be traced from conductors 1 and 4 to contact *g*<sup>1</sup>, and thence by lever *g*<sup>2</sup> directly across to conductor 7, from which the current flows by conductor 2 and the path heretofore traced back to the opposite side of the line. The current thus finds a short path without traversing the magnet *d*.

By manipulating the keys *k* and *g* the movement of the rheostat-bar may thus be controlled as desired, being moved in a direction

to cut out the resistance, and thus start the motor, so long as the key *k* is depressed and being locked in position so soon as said key is released. Likewise the rheostat-bar may be moved to cut in resistance, and thus lower the speed of the motor, by depressing key *g*. The resistance is gradually cut in so long as said key is depressed, the further movement of the rheostat-bar being checked as soon as the key is released. By the alternate depression of the two keys or switches the resistance of the rheostat may thus be varied at will to thereby control the speed of the motor.

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

1. The combination with a solenoid and the core thereof, of a variable rheostat having the movable element thereof connected with said core, a switch for energizing said solenoid to move the core thereof, a lock for holding said core in any position to which the same is moved, a releasing-magnet for releasing said lock and a switch for controlling the circuit through said releasing-magnet, substantially as described.

2. In a motor speed-controller, the combination with a movable element of a rheostat, of a solenoid for moving the same to cut out resistance, means for moving the same to cut in resistance, a ratchet-bar moving with the core of the solenoid, a dog adapted to engage therewith to limit the movement to cut in resistance, a magnet normally energized to hold said dog in locking position, a switch or key for energizing said solenoid and a switch or key for deenergizing said magnet, substantially as described.

3. In a motor speed-regulator, the combination with the movable element of the rheostat, of the operating-solenoid, the core thereof attached to said movable element, a ratchet-bar carried by the core, a controlling-magnet, the armature-lever thereof, a dog carried thereon and engaging said ratchet-bar, a switch or key for closing circuit through said solenoid, and a switch or key for short-circuiting said magnet, substantially as described.

In witness whereof I have hereunto subscribed my name in the presence of two witnesses.

CHARLES A. DRESSER.

Witnesses:

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