

(No Model.)

J. E. PUTNAM.

AUTOMATIC STARTER FOR ELECTRIC MOTORS.

No. 566,936.

Patented Sept. 1, 1896.

Fig. 1.

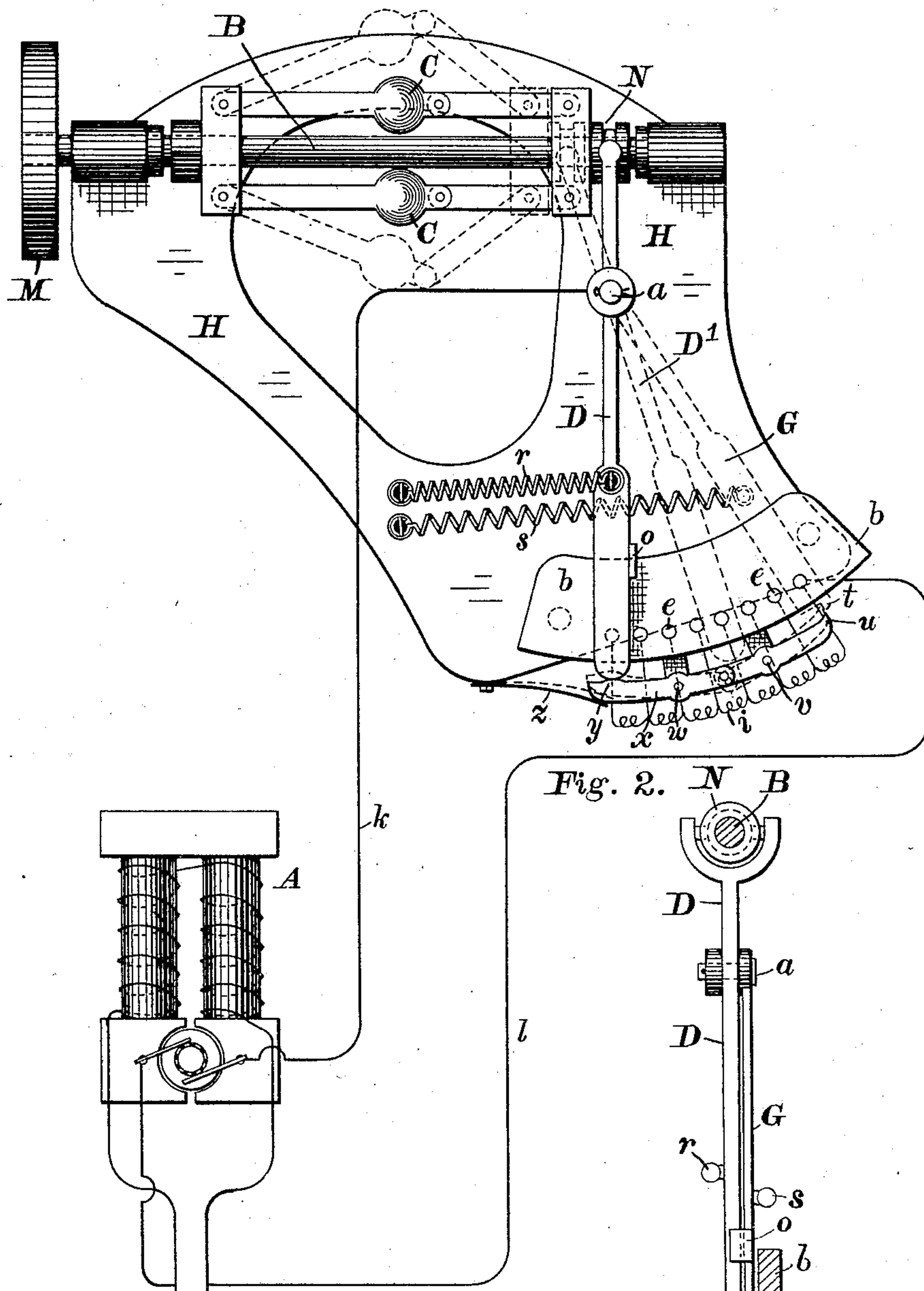
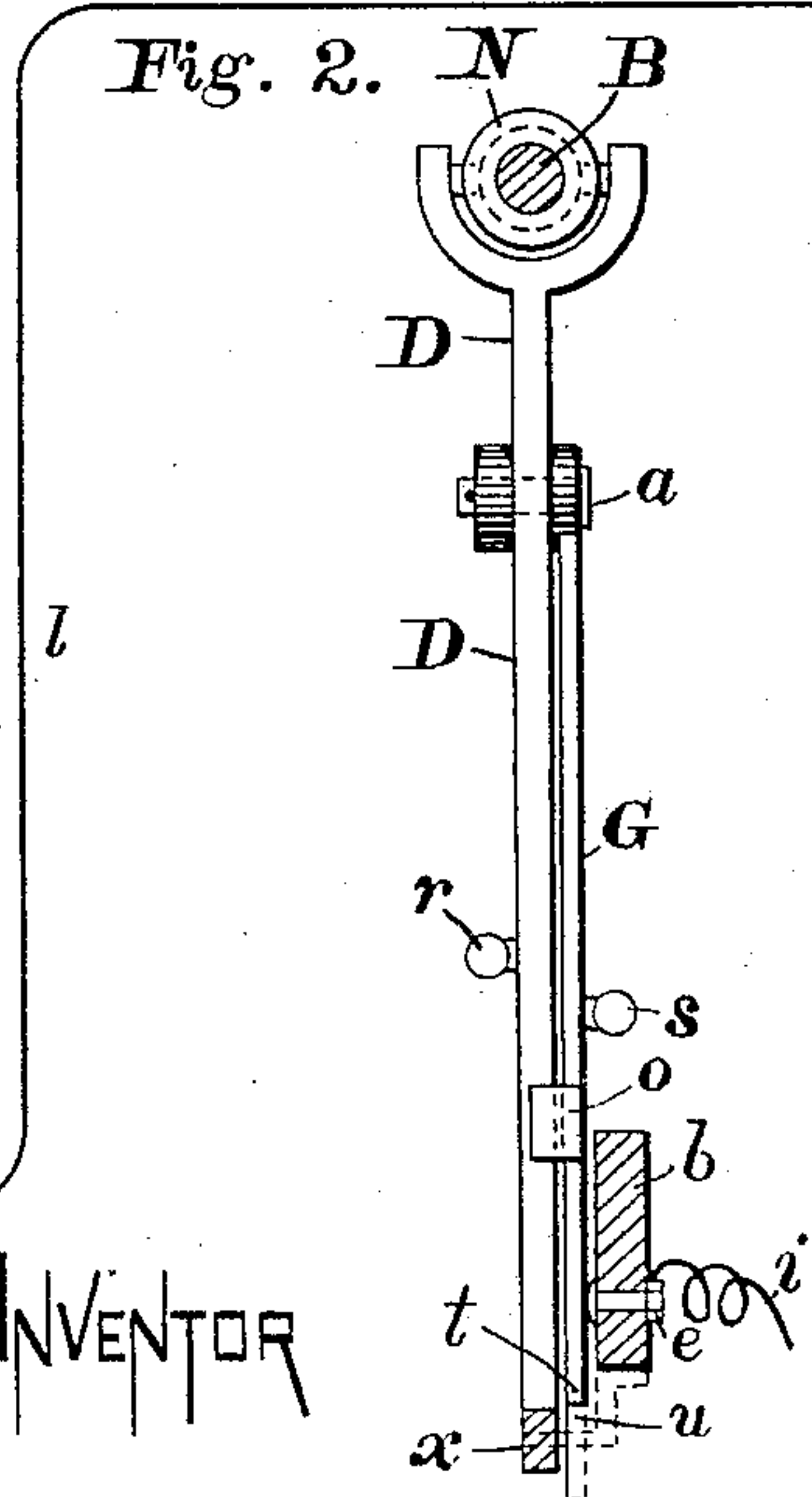


Fig. 2.



WITNESSES

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# UNITED STATES PATENT OFFICE.

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## AUTOMATIC STARTER FOR ELECTRIC MOTORS.

SPECIFICATION forming part of Letters Patent No. 566,936, dated September 1, 1896.

Application filed February 29, 1896. Serial No. 581,334. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH E. PUTNAM, a citizen of the United States, residing at Rochester, in the county of Monroe, in the State of New York, have invented certain Improvements in Automatic Starters for Electric Motors, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in the construction of automatic starters for shunt-wound electric motors, which improvements are fully described and illustrated in the following specification and the accompanying drawings, the novel features thereof being specified in the claims annexed to the said specification.

My invention is represented in the accompanying drawings, in which—

Figure 1 is an elevation showing also the electric connections. Fig. 2 represents the levers detached in side view.

In the accompanying drawings, representing my improvements in automatic starters for electric motors, A is the motor; F F', the feed-wires; B, a shaft driven by the motor; C, the governor-balls; D, the operating-lever; G, the contact-lever; *e e*, the contacts with the interposed resistances *i*, and H the base or supporting plate.

The operation of the device will be understood when it is stated that upon closing the switch J the field-magnets of the motor A are energized by a portion of the current, the remainder passing through the armature and by the wires *k l*, through the contact-lever G, and through some portion of the resistance *i* until the motor acquires the proper speed. The shaft B is provided with pulley M, connected with the motor by belting or other suitable transmission, and, as soon as the motor starts, the revolution of the shaft B throws the balls or weights C C outward, and this movement, through the sliding collar N, swings the lower end of the lever D from left to right, and this, through the lug *o*, moves the lever G along over the contact-buttons *e*, one after the other, cutting out successively more and more of the resistance until, when the lever G reaches the last button and occupies the position occupied by the dotted lines G in Fig. 1, all the resistance is cut out and the

motor has attained the proper speed under a normal amount of current. In this position the contact-lever G is locked by a suitable form of catch and the supply of current remains constant, although the speed of the motor may vary, the lever D occupying an intermediate position, as indicated by the dotted lines D', until, when the speed decreases materially or the motor is dangerously overloaded, the lever D, returning to its original position, (indicated by the full lines,) unlocks the contact-lever, and it also returns to its first position, thereby cutting in the resistance. The levers D and G are respectively provided with the springs *r* and *s*, attached to suitable arms or posts on the base. These springs constantly draw the levers toward the left, as represented in Fig. 1, but the levers are independent of each other, except as they are compelled to travel together, when D moves, by the pin or projection *o* of the lever G.

The base H is provided with suitable bearings for the shaft B, and it will of course be understood that it may be arranged in any suitable relation with the motor and that it may be placed upright or horizontal, or the shaft B may be arranged vertically. The base is provided with a suitable stud or post *a*, on which the levers D and G are pivoted, and it also carries suitable posts, which support the plate of insulating material *b*, into which the contacts *e* are inserted. The base H may be itself insulated.

Any suitable hook or latch or other suitable device may be employed to secure the contact-lever G in the position where the resistance is cut out. It will be understood that the lever D does not make contact with the buttons *e*. In the particular arrangement shown the lever G is provided with a beveled lug or projection *t* on its lower end, and this lug is engaged by the point of the pivoted latch *u* when the lever G arrives at its extreme position. The latch *u* is pivoted at *v* to an arm or lug *v'*, extending from the plate *b*, or other suitable support, and at its inner end it is jointed to the lever *x*, which is pivoted at *w*, and provided with the inclined surface *y*, arranged to be acted on by the end of the lever D. A spring *z* is arranged in any convenient



way to secure the requisite movement of the levers *u* and *x*, and a stop for limiting such movement may be employed, such as a pin in the arm which carries the pivot *w*. When the lever D begins its movement, the spring *z* interposes the latch *u* in the path of the lug *t*, and the lug passes beyond the end of the latch and becomes engaged therewith. The lever G will then remain at its extreme position until, when the speed falls so that the lever D returns to its original position, it forces the end of the lever *x* outward by contact with the inclined surface *y*, which movement unlatches the lever G and allows the lever G to return to its original position, parallel and in rear of the lever D, and in contact with one of the buttons *e*, so that all the resistance is interposed in the circuit.

I claim—

1. The combination with the electric motor, of the variable resistance *i* and contacts *e e*, the operating-lever D and contact-lever G, provided with lug *o*, the springs on the lever, and suitable means driven by the motor for

operating the lever D according to the speed of the motor, substantially as described. 25

2. The combination with the electric motor, of the variable resistance *i* and contacts *e e*, the operating-lever D and contact-lever G, provided with lug *o*, the springs on the levers, the latch *u* and means for unlatching the contact-lever operated by the return movement of the lever D, substantially as described. 30

3. The combination with the electric motor, of the variable resistance *i* and contacts *e e*, the operating-lever D and contact-lever G, provided with lug *o*, the springs on the levers, and the latch *u*, means for unlatching the contact-lever operated by the return movement of the operating-lever, and suitable means driven by the motor for operating the lever D according to the speed of the motor, substantially as described. 35 40

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Witnesses:

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