(No Model.)

3 Sheets—Sheet 1.

G. H. WHITTINGHAM.

DEVICE FOR REMOVING RESISTANCES IN STARTING ELECTRIC ELEVATORS.

No. 541,798. Patented June 25, 1895.

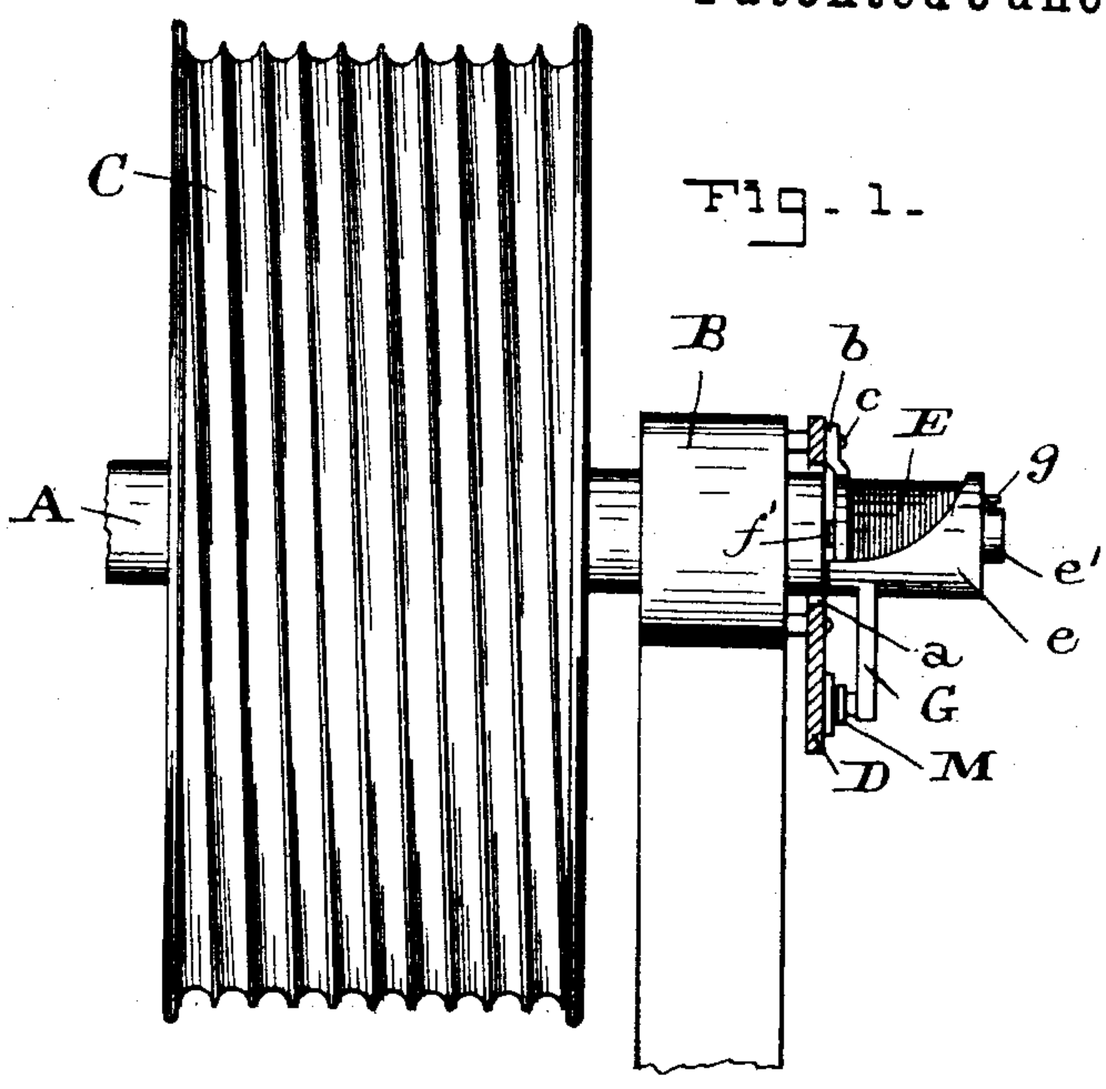
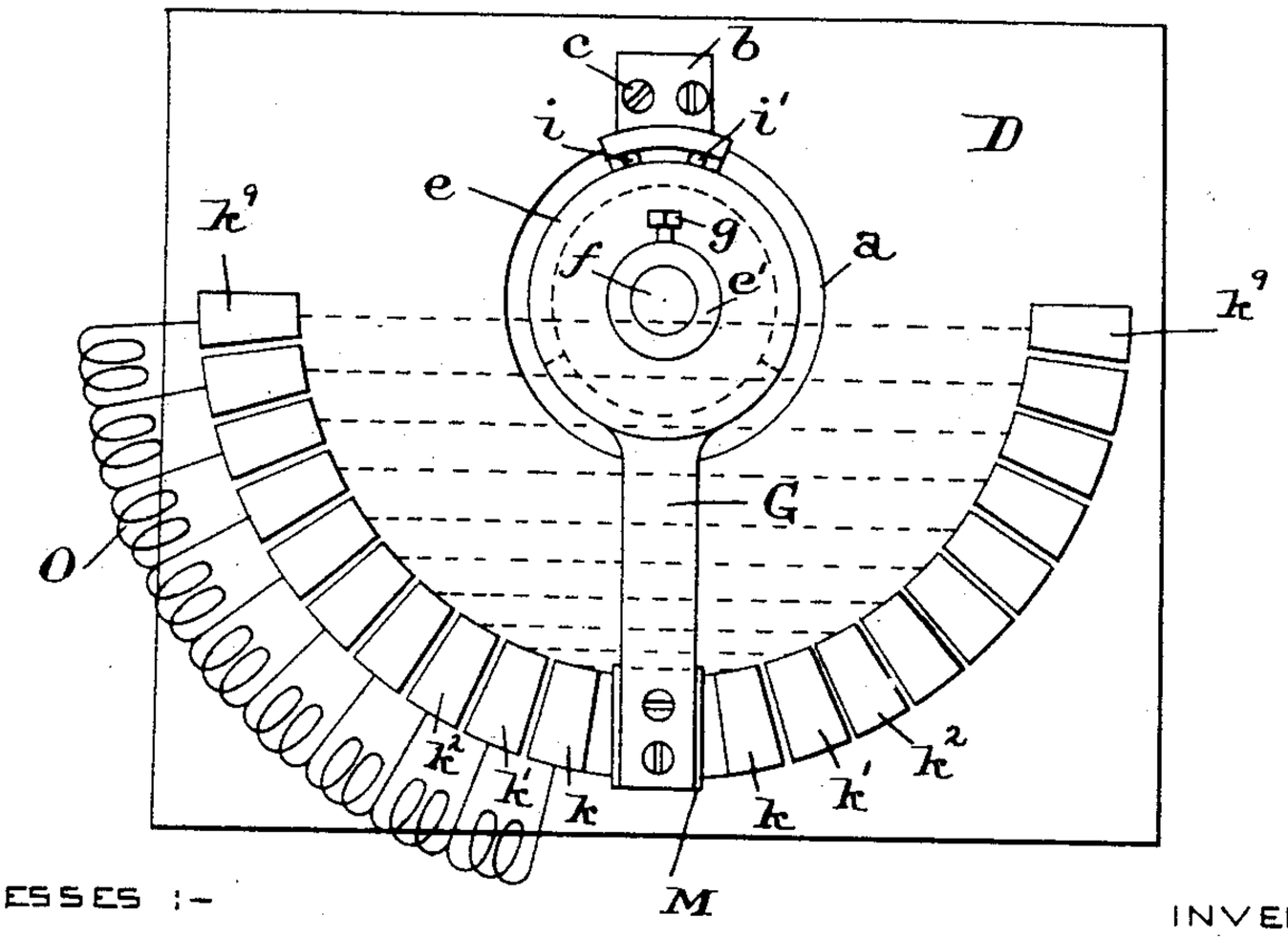


Fig. 1.

Fig. 2.



WITNESSES :-

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(No Model.) 3 Sheets—Sheet 2.

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DEVICE FOR REMOVING RESISTANCES IN STARTING ELECTRIC ELEVATORS.

No. 541,798. Patented June 25, 1895.

Fig. 3.

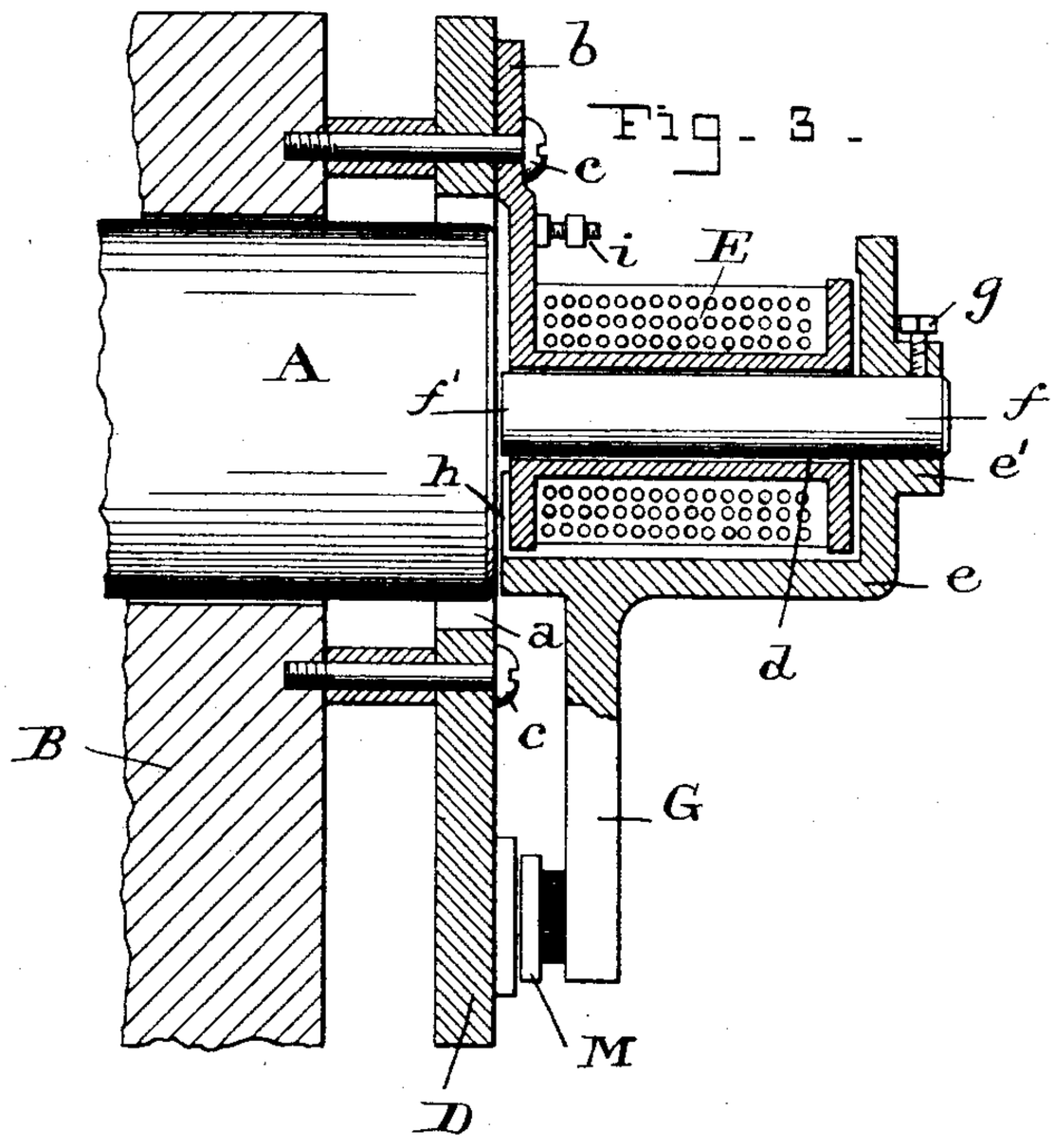

Fig. 4.

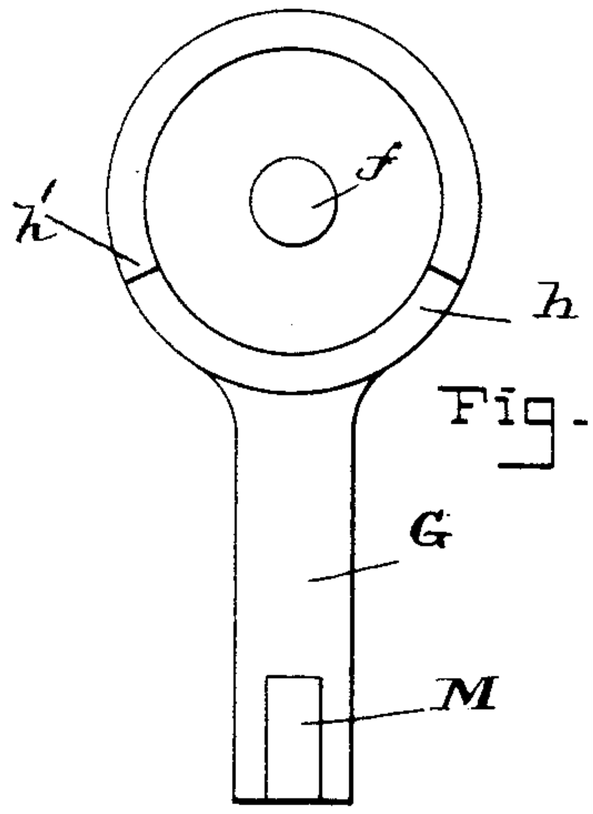

Fig. 5.

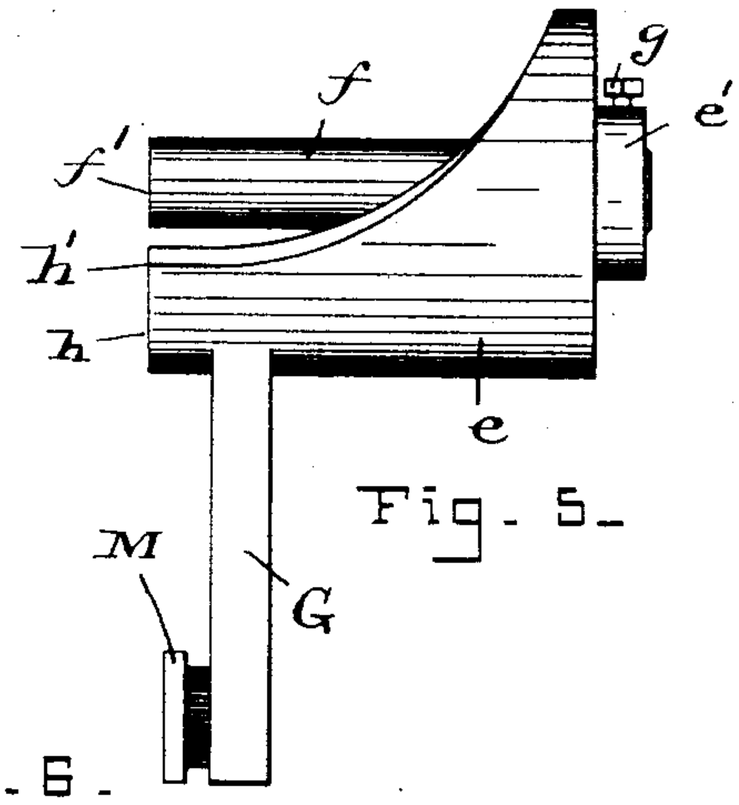

Fig. 6.

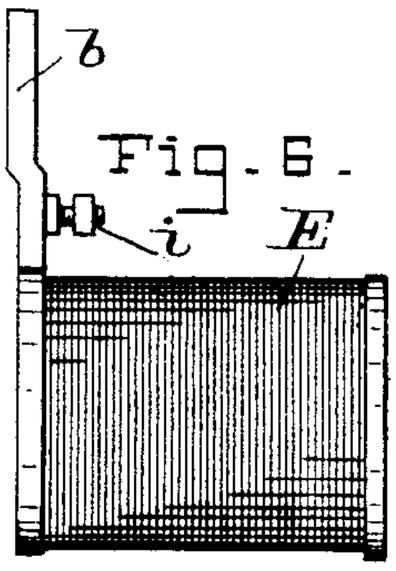

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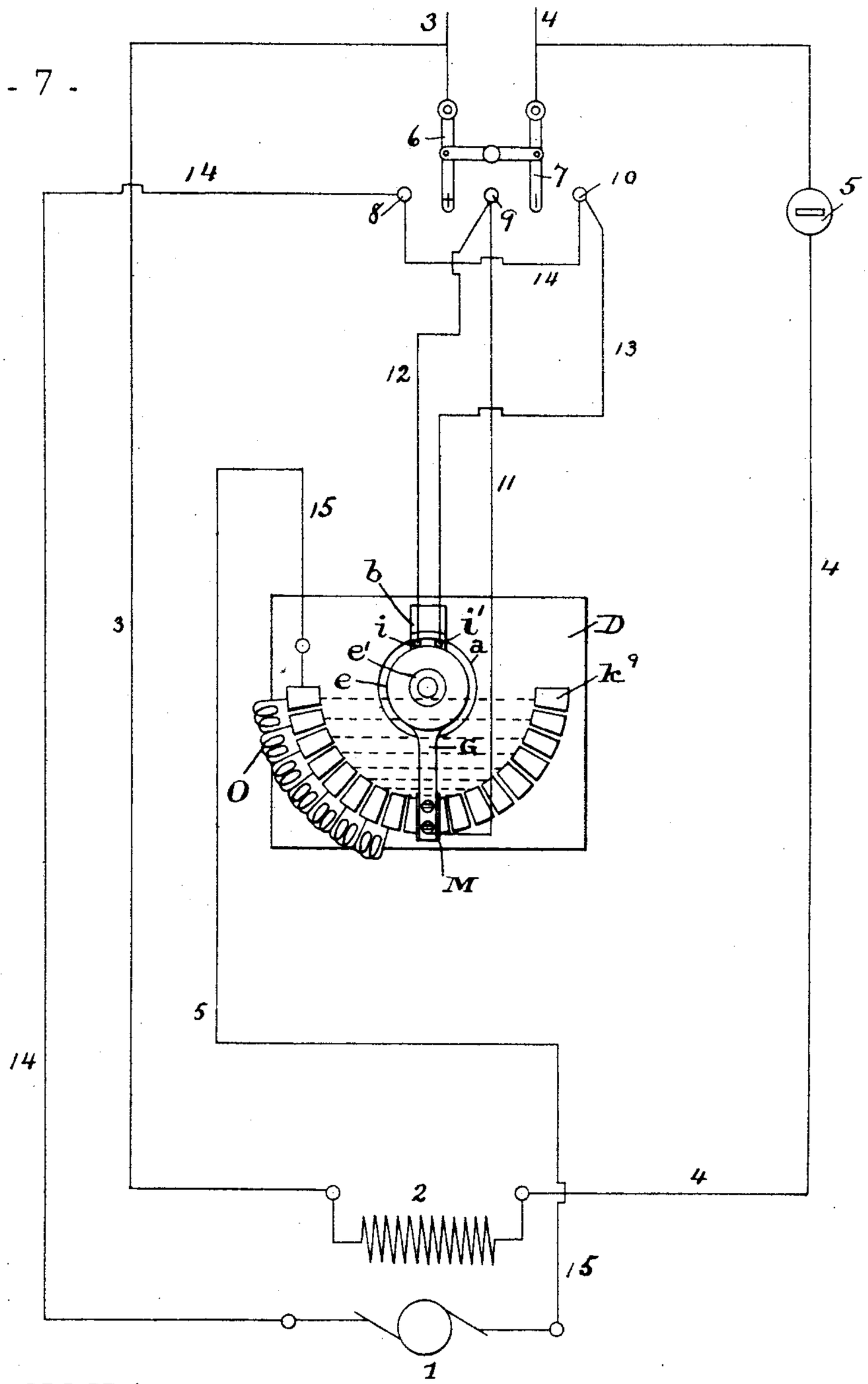
Fig. 7.



WITNESSES:—

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INVENTOR:—

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UNITED STATES PATENT OFFICE.

GEORGE HERBERT WHITTINGHAM, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE AUTOMATIC SWITCH COMPANY OF BALTIMORE CITY, OF MARYLAND.

DEVICE FOR REMOVING RESISTANCES IN STARTING ELECTRIC ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 541,798, dated June 25, 1895.

Application filed May 24, 1894. Renewed February 18, 1895. Serial No. 538,869. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HERBERT WHITTINGHAM, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Devices for Removing Resistances in Starting Electric Elevators and Replacing Same, of which the following is a specification.

The object of this invention is to utilize the power or motion of the operating mechanism of an electric elevator to operate a resistance controlling device, so that when the current is turned on and the elevator starting the resistance in the motor circuit will be gradually reduced automatically from that of the greatest to that of the least.

The manner here employed of automatically cutting out the coils of resistance one after the other in the motor circuit has heretofore been shown and described in my United States Letters Patent No. 518,906, dated April 24, 1894, but in the present instance the gear of the elevator mechanism furnishes the power for operating the resistance controlling device.

In the accompanying drawings, Figure 1 illustrates a part of the operating mechanism of an electric elevator with my improved resistance-controlling device applied. In this instance the "operating mechanism." is represented by a winding-drum. Fig. 2 is a front view of the resistance-controlling device on a larger scale than shown in Fig. 1. Fig. 3 shows a partly-sectional view of the controlling device as applied to the shaft and bearing of an elevator-operating mechanism. Fig. 4 is an inside view of the pendent switch-arm which carries the contact-shoe. Fig. 5 is a side view of the same. Fig. 6 is a view of the electromagnet. Fig. 7 is a diagram of the device and circuits.

My improvement may be applied to any electric-elevator operating-mechanism. In the present instance the letter, A, designates a shaft of mechanism which operates an electric elevator; B, the bearing for the shaft, and, C, a winding-drum on the shaft. These parts are here shown simply by way of illustrating an example of "operating mechanism" with which my resistance controlling device may be combined, and from which the power for operating the same will be obtained.

A switch plate or base, D, of slate or other suitable material of poor conductivity, has in the present instance a hole, *a*, and a stationary electro-magnet, E, is rigidly attached to the plate by an arm, *b*, and screws, *c*, through the arm and plate and has position at the hole. The electro-magnet is immovable and comprises a suitable spool which is properly wound with wire and a hole, *d*, is central through the spool. The switch plate, D, has on its front two series of contact plates, *k*, *k'*, k^2, &c., arranged in a semi-circle described from the center of the said electro-magnet, E. These contact plates are insulated from each other and are respectively connected with a resistance coil, O. The lowermost plates, *k*, at the center are at the point of greatest resistance, and the plate, k^9, at each end of the semi-circle, respectively, is at the point of least resistance.

A pivoted switch arm, G, carries at its lower end a contact shoe, M, which successively engages the insulated contact plates. This arm, G, is attached to a head, *e*, which has a horizontal core-pin, *f*, that fits loosely and pivots in the central hole, *d*, of the magnet-spool, E. The core-pin is secured to the head by the end of the pin entering a hole in the end, *e'*, of the head, and a set-screw, *g*, in the said end binds against the pin and firmly holds it. By this means the core-pin, *f*, serves as a pivot on which the switch arm turns. When the circuit is broken the switch arm will hang down by virtue of its own gravity and make contact with the plate, *k*. The head, *e*, has the form of a partial cylindrical shell—the upper portion of which has been removed leaving only the lower portion and one end, *e'*. This head has a curved lower face, *h*, which is coincident in the same vertical plane with the free end, *f'*, of the core-pin. This free end, *f'*, of the pin and curved face, *h*, comprise the friction surface of the resistance device that makes frictional contact with the revolving part, A, of the elevator mechanism and serves as a clutch. The head, *e*, and pin, *f*, are free to have a slight longitudinal movement.

The device is mounted in the present instance so that the electro magnet, E, has po-

sition in front of the end of the shaft, A. The switch plate, D, is secured to suitable stationary parts, B, of the operating mechanism of the elevator and in such position that the friction surfaces, f', and, h, of the switch arm will be able to make contact with the end of the revoluble shaft, A. In the present instance this frictional contact will be made through the hole, a, of the switch plate, D.

The device will operate as follows: The field circuit of the elevator motor is first closed by the main switch, 5. The switch, 6, 7, by which the elevator is operated may then be moved in either direction desired for starting. The closing of the circuit immediately energizes the electro magnet, E, of the resistance controller and attracts the switch-arm head, moving the pin, f, endwise and causing the end, f', and the face, h, to press against or clutch the end of the revolving shaft, A, of the elevator operating mechanism. The electro-magnet thus brings about a mechanical friction or clutch between the revolving elevator shaft, A, and parts of the switch arm, G, which latter is thereby caused to move up over the contact plates and gradually cut out the resistance from the motor circuit. When the point of lowest resistance, k^9, has been reached one of the shoulders, h', of the face, h, will abut against the supporting arm, b, of the magnet-spool and thereby the upward swing of the switch arm, G, will be stopped. This stop overcomes the mechanical friction induced by the magnetic action, and the continued rotation of the shaft, A, will have no effect on the switch-arm, but the parts in frictional contact will slip and continue to slip until the current is broken. The contact shoe, M, will be maintained at, k^9, the point of lowest resistance, during the time the motor is running. When the motor switch is open and the circuit of the magnet broken, the switch arm, G, will swing back by virtue of its own gravity to the point of greatest resistance, k, ready to start the motor again.

The circuits are shown in Fig. 7 and may be described as follows: The numeral, 1, designates the armature motor; 2, the field magnet; 3, the positive wire; 4, the negative wire; 5, the main switch; 6, 7, the two arms of the reversing switch. 8, 9, 10, are three terminals of the reversing switch. The central terminal, 9, is connected by a wire, 11, with the contact shoe, M, on the switch arm, and by a wire, 12, with one of the binding posts, i, on the electro magnet. One of the other terminals, 10, is connected by a wire, 13, with the other binding post, i', on the electro magnet, and also by a wire, 14, with the opposite terminal, 8, and by the same wire with one of the commutator brushes of the armature, 1, while a wire, 15, connects the resistance plates with the other brush of the armature.

It will be seen that I have shown and described means whereby the movement of electric elevator operating-mechanism will furnish the power to operate a switch device by which the electric current may be turned into the motor gradually when starting.

The accompanying drawings are to be regarded as a mere illustration of means for carrying my invention into effect. Obviously the particular parts shown as well as their construction and arrangement, may be changed and varied considerably. My invention therefore is not limited to such construction.

Having thus described my invention, what I claim is—

1. An automatic resistance controlling device for starting electric elevators, having in combination, a revoluble shaft of the operating mechanism of the elevator; a resistance in series with the armature of the elevator motor when starting; an electro-magnet mounted near the end of said revoluble shaft; and a switch arm having a part which makes frictional contact with said revoluble shaft when the magnet is energized and carrying a contact device which engages said resistance.

2. An automatic resistance controlling device for starting electric elevators, having in combination, a revoluble shaft of the operating mechanism of an electric elevator; a switch plate and its resistances; an electro-magnet; a switch arm; and means whereby when the magnet is energized the said revoluble shaft of the elevator mechanism will afford the power or motion to move the switch arm from the position of greatest resistance to the position of least resistance.

3. An automatic resistance controlling device for starting electric elevators, having in combination, a revoluble shaft of the operating mechanism of the elevator; an electro-magnet mounted near the end of said shaft; a resistance-coil; a series of contact plates in a semicircle concentric with the core of said magnet and connected with the resistance coil; and a pivoted switch arm engaging the said contact plates and which is moved by the said revoluble shaft of the elevator mechanism when the magnet is first energized.

4. In an automatic resistance controlling device for starting electric elevators, the combination of a switch plate and its resistances; a switch arm carrying a contact device which engages said resistance; the operating mechanism of an electric elevator; a stationary electro-magnet; and means whereby when the electro-magnet is energized the power or motion of the said elevator mechanism will move the switch arm and gradually cut out the resistance and maintain the circuit at the point of lowest resistance during the run of the motor.

In testimony whereof I affix my signature in the presence of two witnesses.

GEORGE HERBERT WHITTINGHAM.

Witnesses:

CHAS. B. MANN, Jr.,

L. ISMY VAN HORN.