

A. E. HANDY.
ELECTRIC MOTOR CONTROLLING DEVICE.
APPLICATION FILED SEPT. 19, 1904.

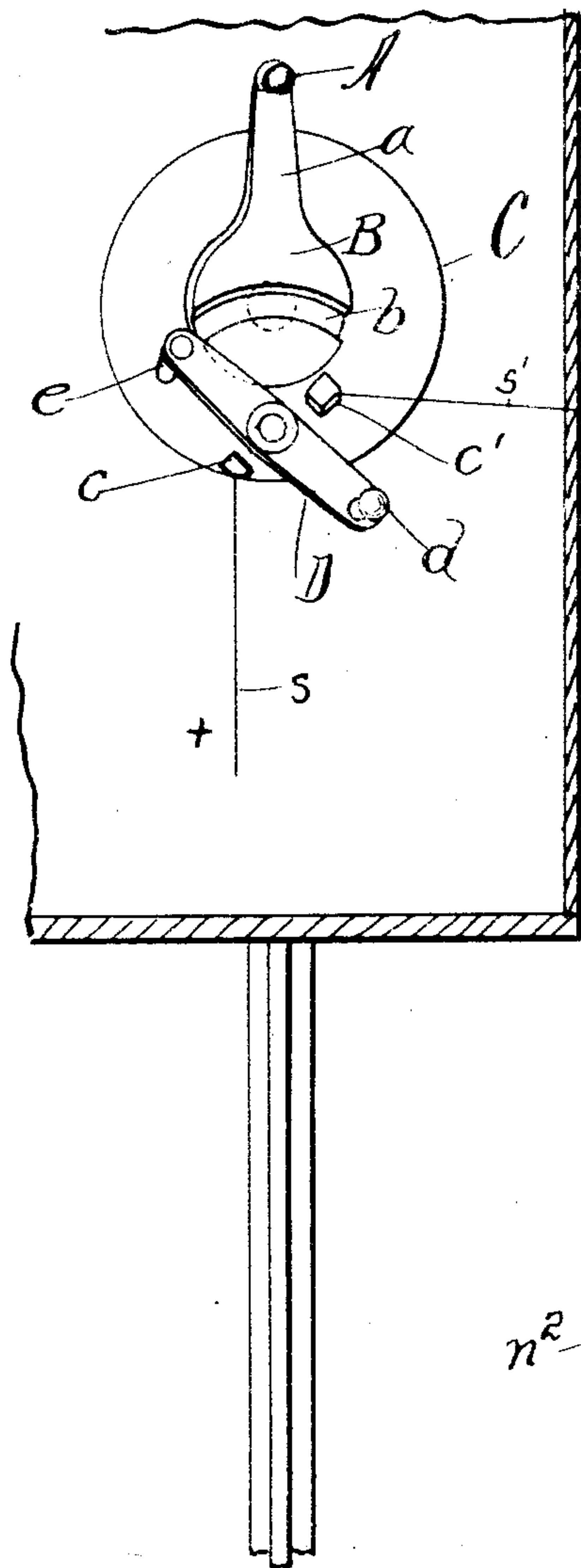
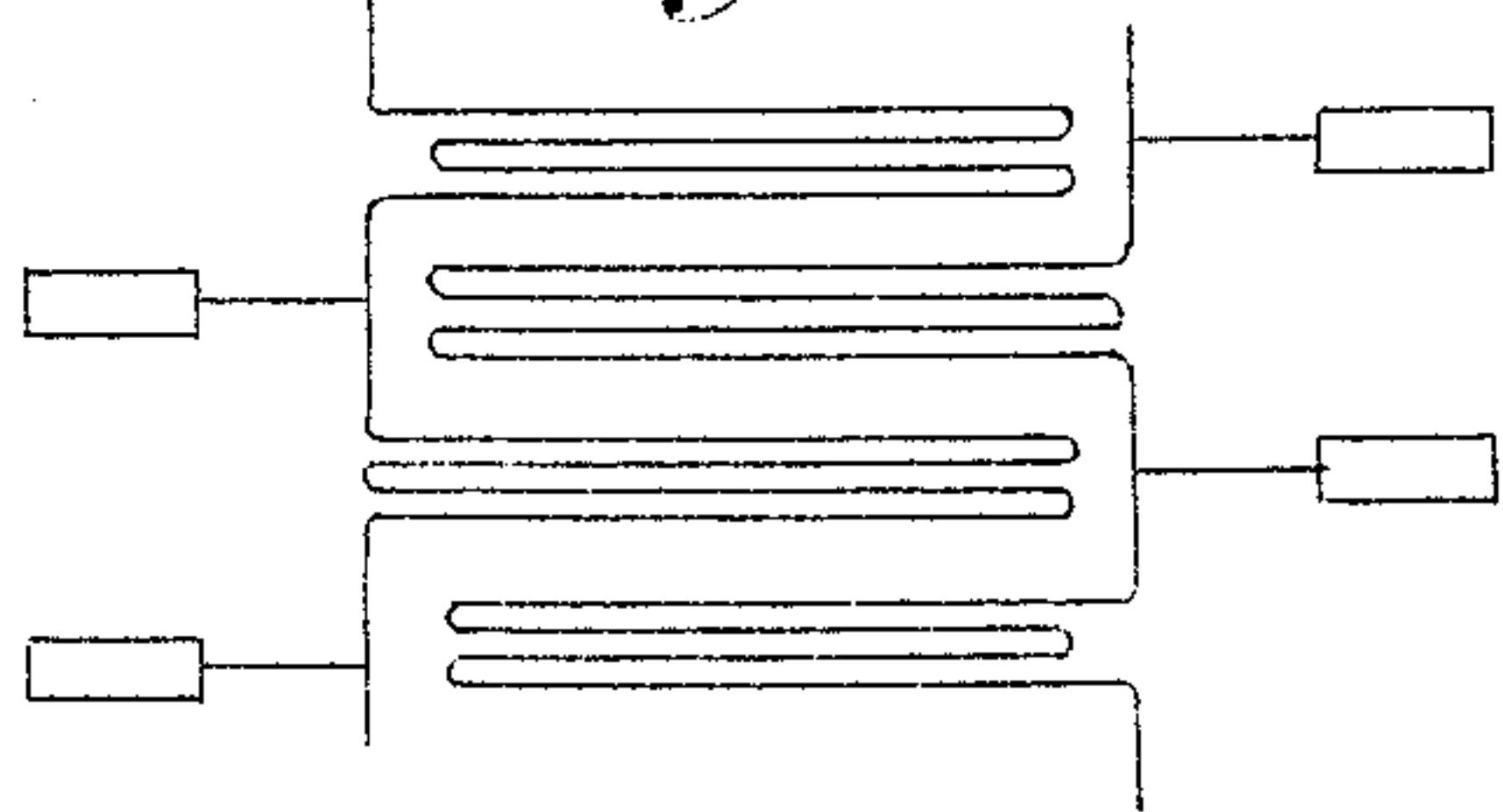


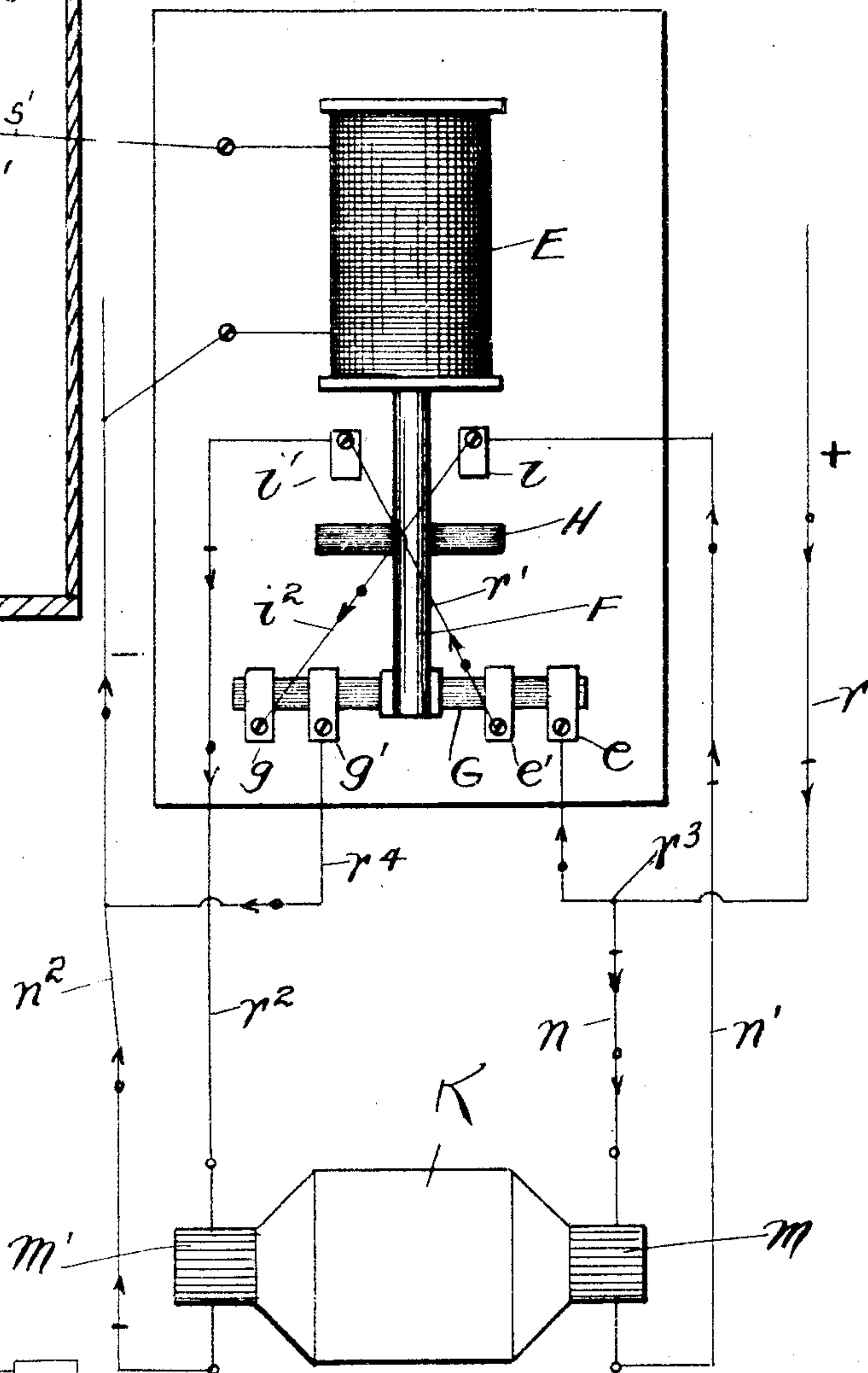
Fig. 2.



Witnesses

Frank A. Foster
E. D. Ogden.

Fig. 1.



Inventor

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By

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UNITED STATES PATENT OFFICE.

ARTHUR E. HANDY, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE RHODE ISLAND ELEVATOR AND MACHINE COMPANY, OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

ELECTRIC-MOTOR-CONTROLLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 791,464, dated June 6, 1905.

Application filed September 19, 1904. Serial No. 225,084.

To all whom it may concern:

Be it known that I, ARTHUR E. HANDY, a resident of the city of Providence, in the county of Providence and State of Rhode Island, have
5 invented certain new and useful Improvements in Electric-Motor-Controlling Devices; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and
10 to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an electric-motor-controlling device, and has for its primary object the construction and arrangement of
15 an attachment to an electrically-operated elevator whereby the torque of the motor may be controlled from the car at will to increase or decrease the lifting capacity of the elevator.

The invention is fully set forth in this specification and more particularly pointed out in
20 the claims.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating one arrangement of mechanism for controlling the action
25 of the electric current to the motor. Fig. 2 represents the two separate windings on the armature.

Referring to the drawings, A is the controlling-handle located within the car and manipulated by the operator. This handle is connected through lever *a* with the disk B, which
30 disk is mounted to rotate on the fixed plate C, and through connections (not shown) arranged to start and stop the car-operating motor. Through this disk B is a slot or channel *b*, made on the arc of a circle. Projecting outwardly from one end of this auxiliary
35 switch-bar D is the handle *d*, while the pin *e* projects inwardly from the opposite end of said bar.

e and *e'* are contact-pieces located on the fixed plate C.

When it is desired to make a connection between the contact-pieces *e* and *e'*, the handle
45 A must be brought to the center or stop position in order to bring the channel *b* in position for the pin *e* to pass through it. The bar may then be swung around to a position

at right angles to that shown in the drawings and establish the necessary connection to operate the motor at double the lifting capacity,
50 as hereinafter more fully described.

At E is the solenoid-magnet, and F the reciprocating core thereof. On this core are located two contact cross-bars G and H. When
55 the core F is in its down position, the bar G engages the contact-pieces *e e'* and *g g'*, making an electrical connection between each pair. When the core is in its up position, the bar H engages the contact-pieces *i* and *i'*, establishing a connection between them. K is the
60 motor-armature with a double winding and has two commutators *m* and *m'*, one at each end thereof.

I do not wish to be confined to the exact
65 construction of switch shown and described, as it may be varied to suit the various conditions under which my apparatus is operated.

To enable others skilled in the art to apply and use my invention, I will now more fully
70 describe the operation of the same.

It is found in the practical construction and operation of electric elevators to be desirable and often necessary for the motor to raise a heavier load than it was originally designed
75 to carry at its maximum speed. In order to make the machine do this, it has been customary with the old-style motor to have an attachment of gearing similar to the ordinary back gearing on a lathe, which is thrown in by
80 hand and acts to increase the lifting capacity of the elevator. My improved construction is for the purpose of doing away with the back gears and accomplishing the result electrically, controlling the lifting capacity of the
85 elevator from the car, the essential features of my invention being a device for increasing the lifting capacity of an elevator by using a double commutator-motor with two separate windings on the armature, one-half of said
90 winding leading to one commutator and one-half to the other. A simple and handy auxiliary switch D is placed in the car, by which the motor-windings, through the action of the solenoid-switch E, may be made to run either
95 in series or parallel, thus causing the motor to

change from one-half the speed and double the pull to double the speed and one-half the pull, which changes are effected as follows: When the core of the solenoid-switch E is down in its ordinary running position, as illustrated in the drawings, the current enters on line r and proceeds to the point r^3 , where the current is divided, one portion going to the contact-piece e , thence through bar G to contact-point e' , thence up line r' to contact-point i' and from i' through line r^2 , passing through the commutator m' and out through line n^2 , the other portion of the current going down line n , through commutator m , up line n' to contact i , down line i^2 to contact g , across on bar G to g' , down line r^4 , and out. The armature-windings of the motor are then said to be connected in multiple, and the motor will run with its maximum speed, but with one-half of its maximum torque, which is the ordinary condition under which the elevator is operated. When it is desired to raise a heavier load than can be done through the multiple winding, the direction of the current through the windings must be changed from multiple to series. To do this, the operator brings the starting-lever A to the central position, as shown in the drawings, and the motor is stopped. Then the auxiliary switch-lever D may be moved over to a position at right angles to that shown in the drawings, making a connection between contact-point c and c' , and allowing the current to flow in through line s and s' , thus energizing the solenoid-magnet e , drawing up its core F, and bringing the contact-bar H into connection with the points i and i' . The current will then enter through the line r , pass down line n , through commutator m , up line n' to contact i , across bar H to contact i' , down line r^2 , through commutator m' , and out through line n^2 , when said winding will be run in series which gives it one-half the speed with double the pulling or lifting capacity. The development of foot-pounds in both of the above cases is the same, the result being full speed at one-half lifting capacity or one-half speed with double lifting capacity.

My improved device for controlling the torque or pulling capacity of an electric motor is not confined to elevators alone, but may be operated on any mechanism which may require such a device. The motors may also be wound so that any desired increase of torque may be obtained.

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

1. In a device of the character described, an electric motor having two commutators and two separate windings on the armature, means including an electromagnet for changing the connection to the winding of the armature only when the main switch is in its off position so that said windings will run

either in series or in multiple, to vary the torque of the motor.

2. In a device of the character described, an electric motor having two commutators and two separate windings on the armature, means including an electromagnet for controlling the flow of the current to said armature, so that said windings may be made to run either in series or in multiple, to vary the torque of the motor.

3. In a device of the character described, an electric motor having two commutators and two separate windings on the armature, an auxiliary switch, an electromagnet caused to be energized and deenergized by the movement of said auxiliary switch to move contact-bars into and out of connection, and control the flow of current to said armature, so that said windings may be made to run either in series or in multiple, to vary the torque of the motor.

4. In a device of the character described, an electric motor having two commutators and two separate windings on the armature, a switch for controlling the flow of the current to said armature, means whereby said switch can only be thrown when said motor is at rest, so that said windings may be made to run either in series or in multiple, to vary the torque of the motor.

5. In a device of the character described, an electric motor having a double winding and two commutators, an auxiliary switch, an electromagnet controlled in its action by the movement of said auxiliary switch to throw the windings on said armature from multiple to series and vice versa, means whereby said switch can only be made to make or break the connections to said magnet when the motor is at rest.

6. In a device of the character described, an electric motor having two commutators and two separate windings on the armature, an auxiliary switch, an electromagnet caused to be energized and deenergized by the movement of said auxiliary switch to move contact-bars into and out of connection, and control the flow of current to said armature, so that said windings may be made to run either in series or in multiple, to vary the torque of the motor, means whereby said magnet can only be moved when the motor is at rest.

7. In an elevator-controlling device, an electric motor for actuating the elevator-car, said motor having a double winding and two commutators, an auxiliary switch located within the car, an electromagnet controlled in its action by the movement of said auxiliary switch to throw the windings of said armature from multiple into series and vice versa to vary the torque of the motor.

8. In an elevator-controlling device, an electric motor for actuating the elevator-car, said motor having a double winding and two commutators, an auxiliary switch located within

the car, an electromagnet controlled in its action by the movement of said auxiliary switch to throw the windings of the armature from multiple into series and vice versa, means whereby said switch can only be moved to make or break the connection to said electromagnet when the motor is at rest.

9. In an elevator-controlling device, an electric motor for actuating the elevator-car, said motor having a double winding and two commutators, a controlling-lever within the car for starting and stopping the same, an auxiliary switch, an electromagnet controlled in its action by the movement of said auxiliary switch to throw the windings of the armature from multiple into series and vice versa, means whereby said switch cannot make or break the connection to said magnet, until said controlling-lever is in its central or stop position.

10. In an elevator-controlling device, an electric motor for actuating the elevator-car, said motor having a double winding and two commutators, a controlling-lever within the car for starting and stopping the same, a slot in said lever, an auxiliary switch, a projection in said switch to register with the slot in said lever only when said lever is brought to its central position, an electromagnet controlled in its action by the movement of said auxiliary switch to throw the windings of the armature from multiple into series and vice versa to vary the torque of the motor.

In testimony whereof I have hereunto set my hand this 16th day of September, A. D. 1904.

ARTHUR E. HANDY.

In presence of—

HOWARD E. BARLOW,
E. I. OGDEN.