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A. MAGNUSON & T. ESKILSSON.
MEANS FOR CONTROLLING THE OPERATION OF LOCKS OF ELEVATOR
HATCHWAY DOORS.

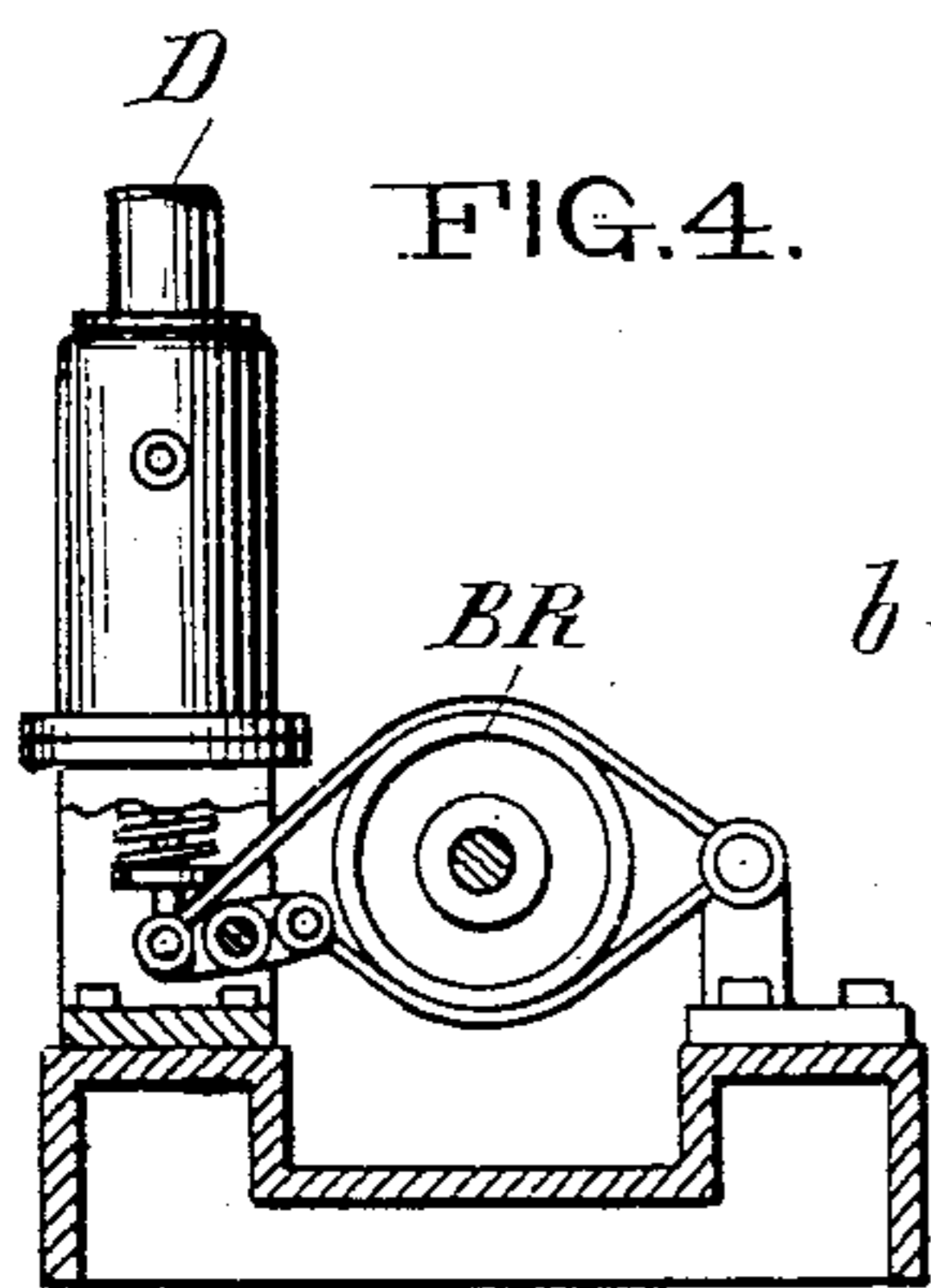
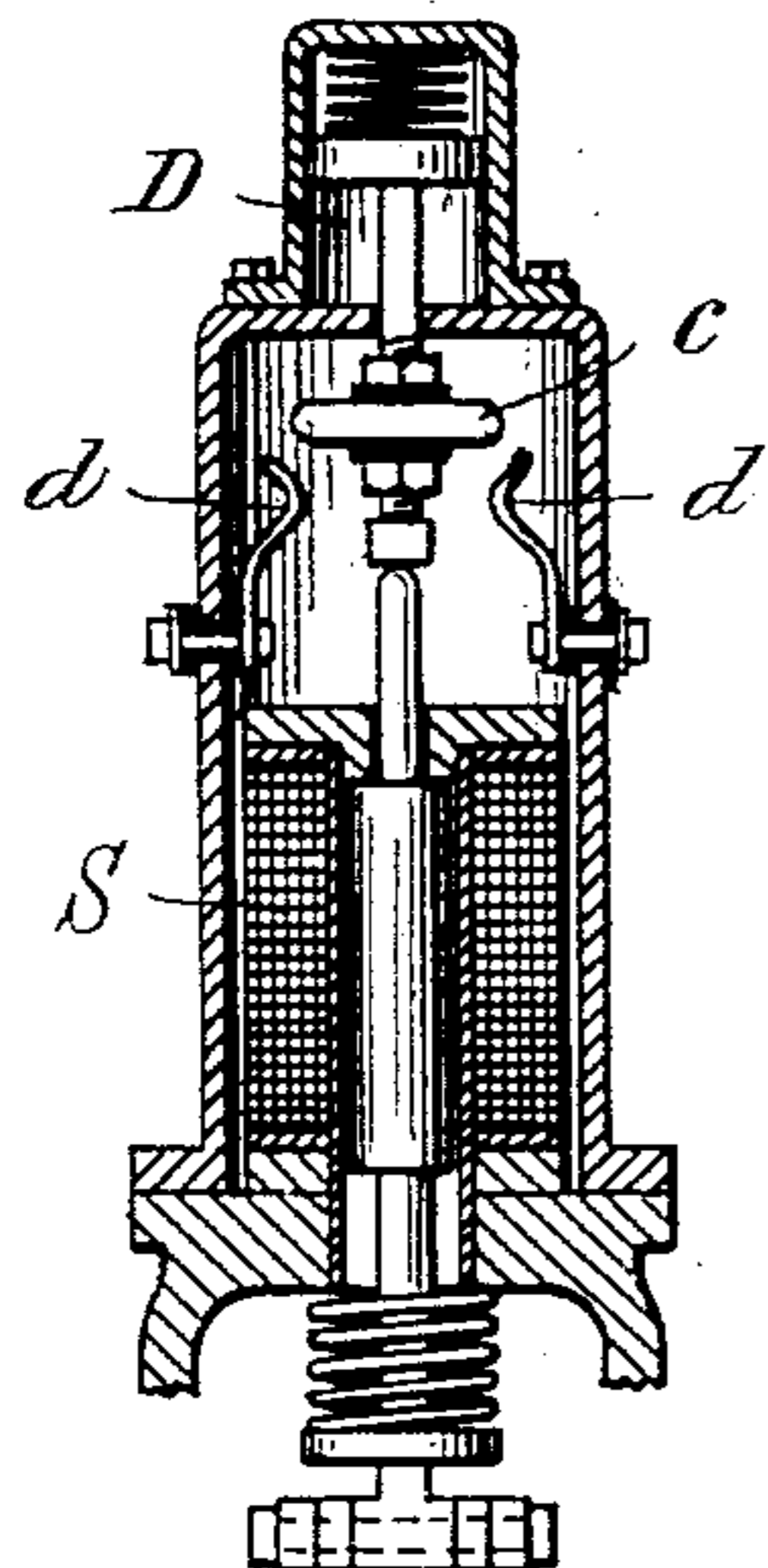
APPLICATION FILED NOV. 12, 1903.

NO MODEL.

FIG. 1.

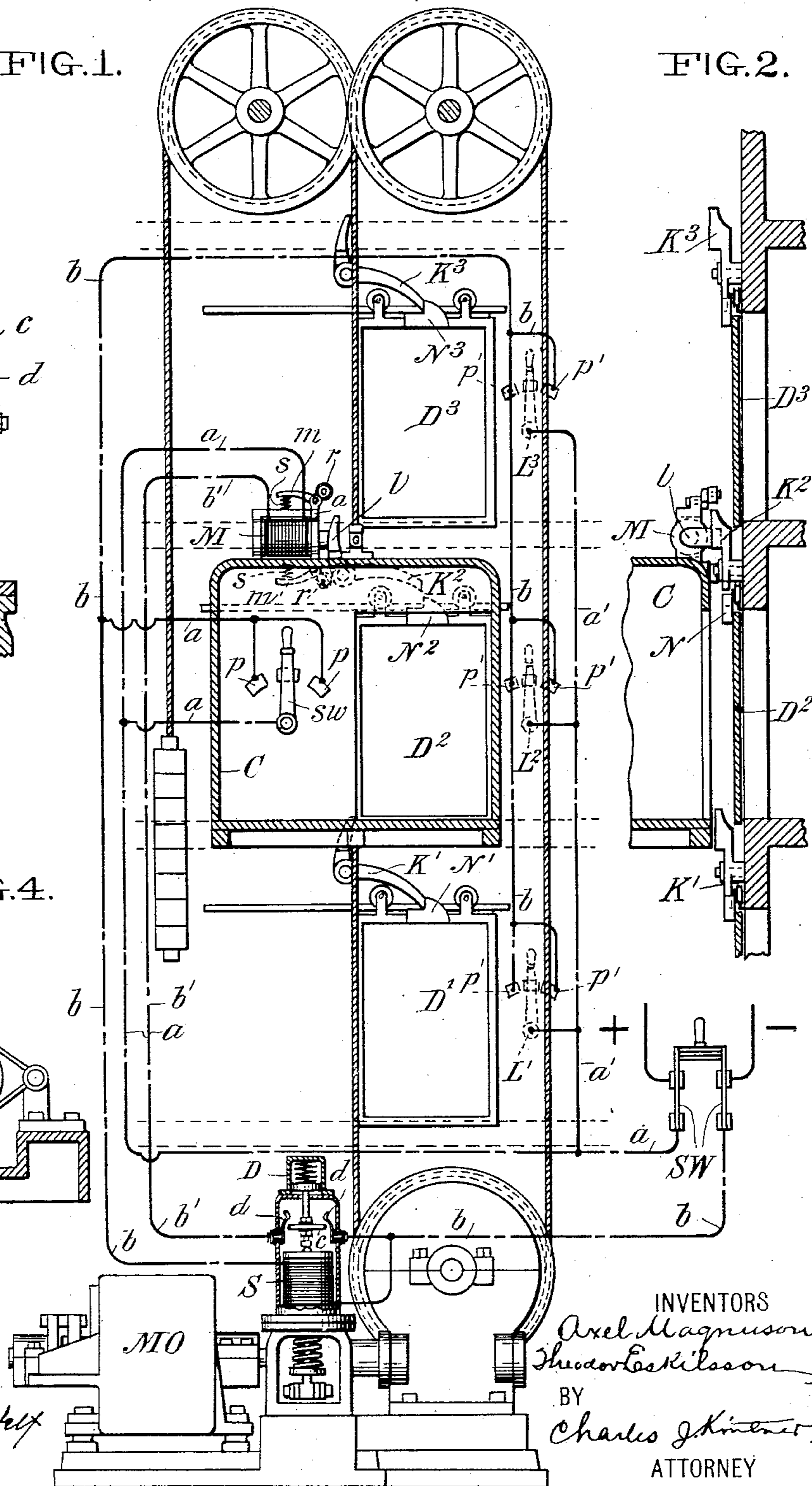
FIG. 2.

FIG. 3.



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AXEL MAGNUSON, OF NEW YORK, AND THEODOR ESKILSSON, OF LONG ISLAND CITY, NEW YORK.

MEANS FOR CONTROLLING THE OPERATION OF LOCKS OF ELEVATOR-HATCHWAY DOORS.

SPECIFICATION forming part of Letters Patent No. 751,799, dated February 9, 1904.

Application filed November 12, 1903. Serial No. 180,819. (No model.)

To all whom it may concern:

Be it known that we, AXEL MAGNUSON, a citizen of the United States, and a resident of New York, borough of Manhattan, county of New York, and THEODOR ESKILSSON, a subject of the King of Sweden and Norway, and a resident of Long Island City, county of Queens, and State of New York, have made a new and useful Invention in Means for Controlling the Operation of the Locks of Elevator-Hatchway Doors, of which the following is a specification.

Our invention relates particularly to novel means for effectually locking such doors when closed and maintaining them so locked at all times, whether the car be in motion or at rest, and for unlocking them only when the car is in proper position to receive or discharge passengers at any landing or floor.

It also contemplates the application of the brake at the same time, whereby the car is not liable to move by reason of any change of load.

For a full and clear understanding of our invention, such as will enable others skilled in the art to construct and use the same, reference is had to the accompanying drawings and to the following specification descriptive thereof, the essential points of novelty being particularly pointed out in the claims which follow.

Figure 1 of the drawings is a sectional view of an elevator of well-known construction, the car being connected by cables running over and under pulleys to a counterweight and drum driven by an electric motor provided with brake mechanism, also electrically controlled, and our invention being applied thereto. Fig. 2 is a detail vertical sectional view taken through Fig. 1 and illustrating our novel lock-controlling device as applied to elevator-hatchway doors. Fig. 3 is an enlarged detail sectional view of the brake-controlling solenoid and its inclosing casing, showing also a part of our invention as combined therewith; and Fig. 4 is a part sectional, part side elevational, view of the brake-controlling mechanism, illustrating a band-brake and the application thereof to the brake-pulley in a well-known manner, the dash-pot and electrical connections embodying a part of our inven-

tion being shown at the top of this figure of the drawings.

In a prior United States Patent granted to us on the 29th day of September, 1903, numbered 740,154, we have described, shown, and claimed novel means for operating and controlling the locks of elevator-hatchway doors in which a movable cam is carried by the car and is brought into and put out of operation as desired by the operator in the car.

Our present invention is designed to simplify the operation of the locking and unlocking device and does away with the cam referred to in the aforesaid patent, so that we are enabled to perform the same and even more perfect results with less apparatus and with more certainty of operation, with the additional very desirable feature of applying the brake at all times when a car is standing opposite a hatchway-door and the source of power disconnected, a feature of importance, for that with counterbalanced elevators like that shown in the drawings when the counterbalance is greater in weight than the car the latter may move after a passenger has left the same or, vice versa, when the load is increased by passengers entering the car.

Referring now to the drawings in detail, C represents the car of an elevator, in the well of which are shown three sliding hatchway-doors D^1 D^2 D^3 , supported in the usual manner. This car is sustained by cables passing around pulleys and counterbalanced, as shown, the usual driving-drum being provided in the basement and driven by an electric motor MO, connected in any well-known manner to the mains a and b , SW being the main switch.

BR, Fig. 4, is the braking mechanism of the well-known strap type and controlled in the usual way by the core of a brake-solenoid S, having its coils connected directly in the main b , the arrangement being such that so long as current is flowing to and through the motor MO the brake is off, and vice versa when the motor is out of circuit.

N^1 N^2 N^3 are locking-notches at the tops of the doors, and K^1 K^2 K^3 are bell-crank locking-dogs pivoted inside the well above and to one side of the notches, the longer or locking

arm being the heavier, so as to fall by its own weight into locking position, as shown at the first and third landings. The short arms of these dogs extend laterally, as shown in Fig. 1, 2, and are curved, as shown in Fig. 1, so that they all lie normally in the same vertical line and will as the car ascends and descends be located in the magnetic field of the laterally-extending pole l of the core of an operating-magnet M , carried on top of the car, the arrangement being such that as the car ascends and descends the pole l , which is of hard iron or soft steel adapted to retain some residual magnetism, will pass sufficiently near said arms to draw them into their upper or released positions, when the core of the magnet M is energized by a strong current passing through the coil, as will be more particularly described later on.

sw is the operator's controlling-switch carried in the car and adapted to contact electrically with either of two contacts p , which are connected by cable to the main b on one side, the pivot-point of the switch being connected by cable a and branch conductor b' to one of the spring-contacts d in the casing of the brake-solenoid S , the other of said contacts being connected directly to the main b .

r are friction-rollers carried by bell-crank levers pivotally supported upon a frame which sustains the magnet M and provided at their free ends with springs s , the function of these rollers being to release the locking-dogs when the car starts in either direction and to force the dogs into their locking positions.

L^1 L^2 L^3 are switches located outside the well and accessible only to authorized persons, as the operator, so that he may apply or release the brake on leaving the car at any landing, said switches being in a branch circuit a' and adapted to apply the brakes by connecting the branch circuit a' through any contact p' to the cable, solenoid S , and main b .

Referring now to Fig. 3, in which is illustrated the details of the apparatus for simultaneously effecting the application of the brake with the stoppage of a car, D represents a dash-pot secured by bolts or screws directly to the top of the casing of the brake-solenoid S , the plunger of said dash-pot resting under a spiral spring and the lower end of said plunger carrying an insulated contact or an arm c , adapted to make contact momentarily between the spring-contacts d as the core of the solenoid S descends when the brake is applied by interrupting the current flow at the switch sw . The dash-pot D and its retarded plunger have for their function to permit the gradual descent of the contact-arm c , so that it shall make a contact of sufficient length between the conducting-springs d to insure a proper closure of the circuit to the operating-magnet M on top of the car C .

The operation is as follows: The car C is at the middle landing and the operator's switch

sw is in the open position. On tracing the circuits from the main switch SW it will be apparent that the brake-solenoid is demagnetized and that its core has descended under the influence of its strong spring at the lower end of the core. As it descended, therefore, the retarded plunger of the dash-pot D followed slowly and during the descent momentarily closed the circuit between the spring-contacts d through branch circuit b' , magnet M , and cable to main a , thus causing the pole-piece l of that magnet to act strongly upon the short arm of the dog K^2 and lift it into its released or unlocked position, as shown. As soon as the short arm comes into magnetic contact with the pole-piece l the residual or permanent magnetism is sufficient to maintain it in the unlocked position, so that, although circuit be again broken at contacts d , as the plunger descends the dog will remain in the position shown or until the car is moved by releasing the brakes through the application of the controller-switch sw .

It is obvious that because of the constantly-applied brake so long as the controller-switch is open the car cannot move by any change of load, a feature of especial merit and utility. When the door is closed and the car starts on in either direction, the locking-dog will be restored to normal or locking position by the corresponding roller r passing over the curved face of the short arm.

We do not limit our invention to the especial details of construction shown in the accompanying drawings. We believe it is broadly new with us to so combine automatic releasing devices for hatchway-doors with braking mechanism that the doors cannot be unlocked without applying the brake during the act of unlocking, and also that it is new with us to control the locking devices solely by electromagnetic releasing devices so arranged that cams are done away with and the damaging effects due to the mechanical action thereof on the locking devices wholly eliminated, and our claims are generic as to these features; nor do we limit the use of our invention with electrically-propelled elevator-cars.

Having thus described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. A hatchway-door provided with means for locking it; in combination with a brake and means carried by the car for releasing the lock and additional means operatively connected to the releasing devices and the brake, whereby the latter is always applied when the releasing means is actuated.

2. A hatchway-door having means for locking it; in combination with braking means and a car carrying electromagnetic releasing means electrically connected with braking means and so arranged that the door can only be opened after the brake is applied.

3. An elevator having a series of hatchway-

doors provided each with a locking device; in combination with a car carrying an electromagnetic releasing device adapted to actuate the locking device at each door only after the car has stopped at the corresponding landing; together with circuits and circuit connections between the electromagnetic-releasing device, an electromagnetic brake, the controller on the car, and a source of electrical energy, whereby any door can be opened only after the car is brought to a stop at the proper landing and the circuit to the source of electrical energy disrupted.

4. An elevator having a series of hatchway-doors provided each with a locking-dog and an armature carried thereby; a car carrying an electromagnet having a core adapted to retain sufficient residual magnetism to hold any dog in its open or unlocked position; in combination with a source of electrical energy and circuits and circuit connections whereby the locking-dogs remain undisturbed as the car passes them unless the electromagnet be energized.

5. A hatchway-door provided with locking means, a car provided with an electromagnet adapted to release the lock when the electro-

magnet is energized; the core of said magnet having sufficient residual magnetism to maintain the released condition; in combination with additional means carried also by the car and adapted to mechanically restore the locking means to locking position as the car moves in either direction.

6. In an elevator a series of hatchway-doors provided each with a locking device; a car carrying an electromagnet provided with a pole-piece adapted to be moved in close proximity to the locking device; an electrically-controlled brake connected in closed circuit when the car is moving; in combination with a circuit-closing device operatively connected with the brake and adapted to momentarily close the circuit to the electromagnet carried by the car after the brake is applied.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

AXEL MAGNUSON.
THEODOR ESKILSSON.

Witnesses:

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