No. 657,778. Patented Sept. 11, 1900.

N. B. KEYSER.

SAFETY DEVICE FOR ELEVATORS.

(Application filed Oct. 17, 1893.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

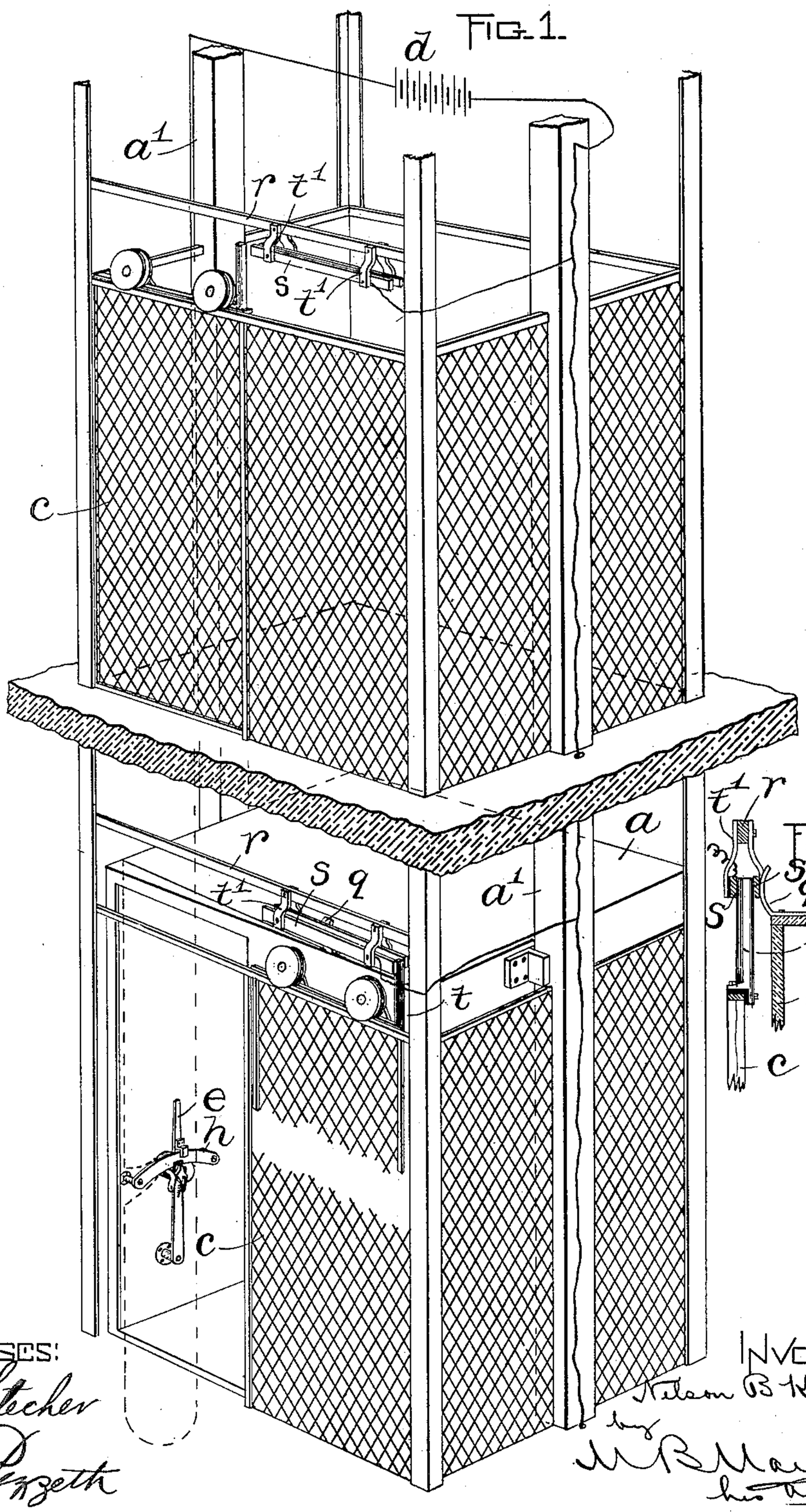


FIG. 2.

WITNESSES:
C. C. Stecher
A. D. Penzeth

INVENTOR:
Nelson B. Keyser
by
M. B. May
his Attys

No. 657,778. Patented Sept. 11, 1900.

N. B. KEYSER.

SAFETY DEVICE FOR ELEVATORS.

(Application filed Oct. 17, 1893.)

(No Model.) 2 Sheets—Sheet 2.

FIG. 3

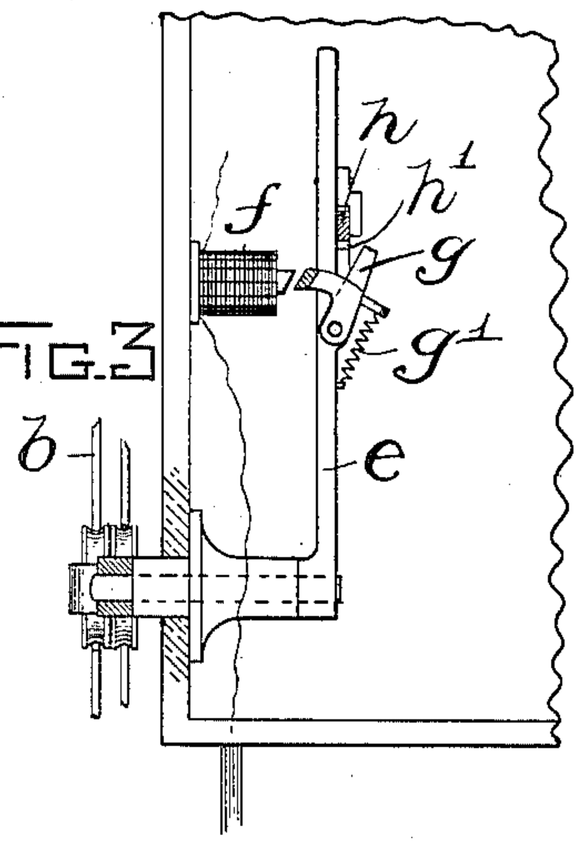


FIG. 4

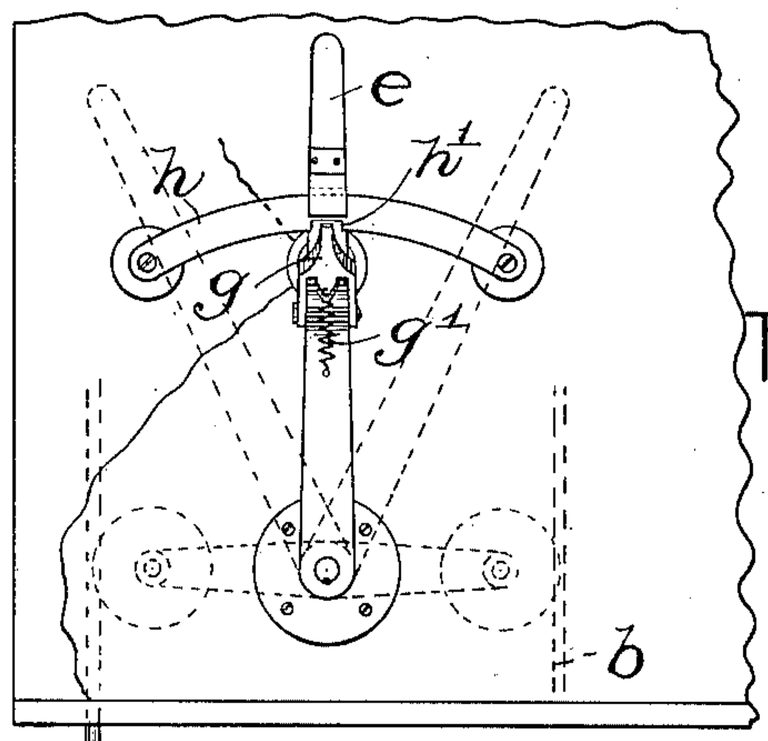


FIG. 5.

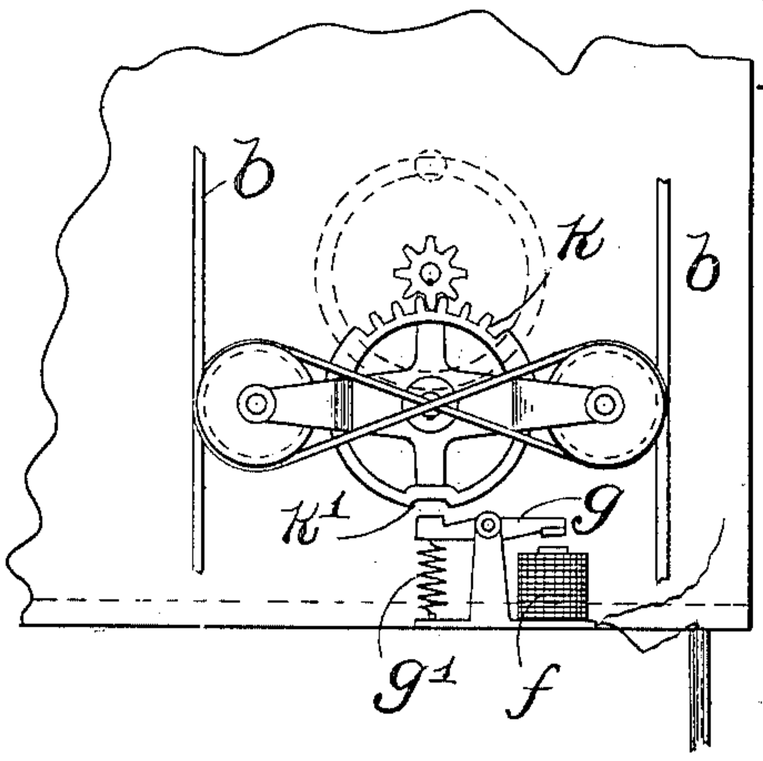


FIG. 6.

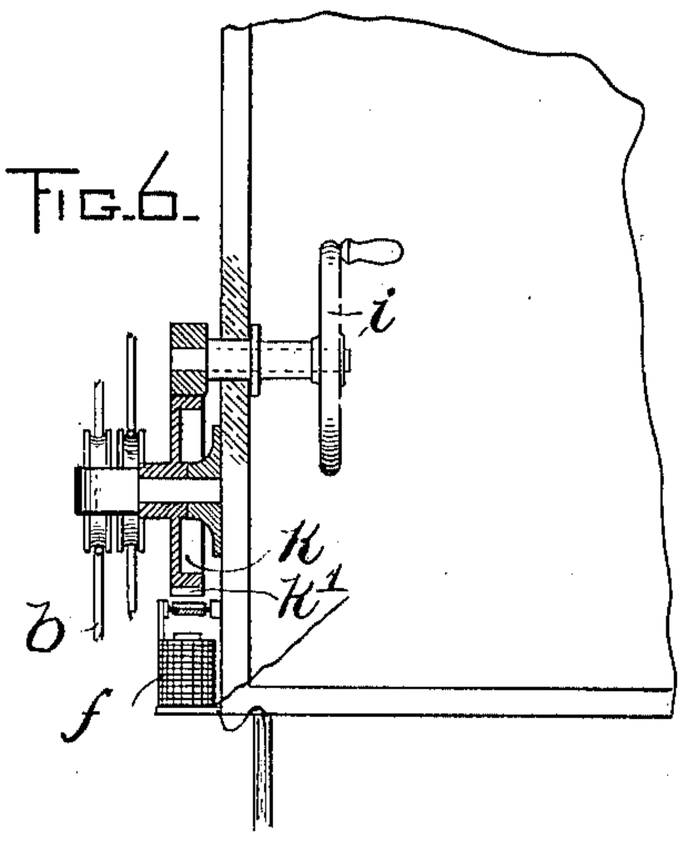


FIG. 7.

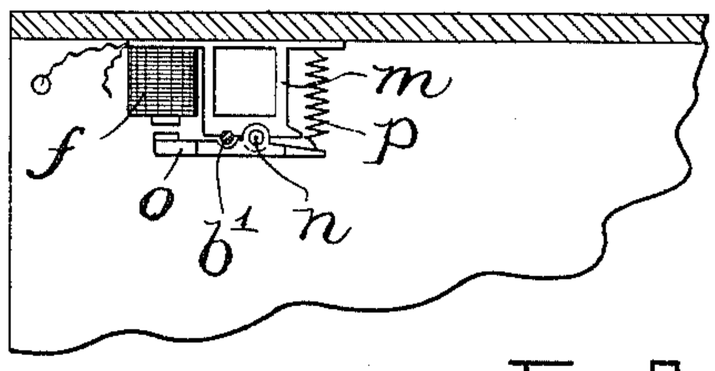
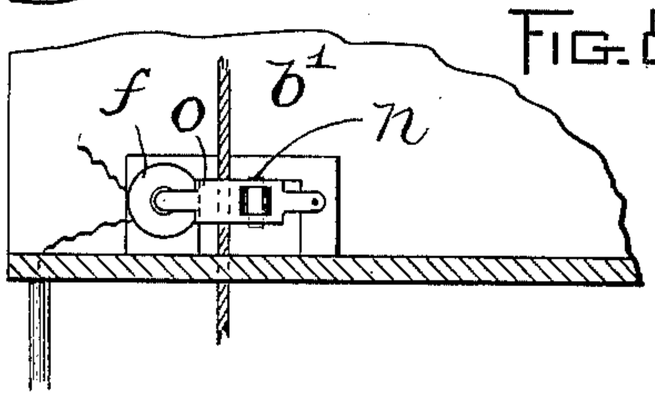


FIG. 8.



WITNESSES:

C. C. Stecher.

D. F. Lizzeth.

INVENTOR:

Nelson B. Keyser.

by M. B. May

his Atty.

UNITED STATES PATENT OFFICE.

NELSON B. KEYSER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO MARCUS B. MAY, OF WINCHESTER, MASSACHUSETTS.

SAFETY DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 657,778, dated September 11, 1900.

Application filed October 17, 1893. Serial No. 488,397. (No model.)

To all whom it may concern:

Be it known that I, NELSON B. KEYSER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Safety Device for Elevators, of which the following is a specification.

This invention has relation to elevator safety devices of the kind wherein elevator-controlling devices are locked while the door leading into the hatchway is open.

The object of the present invention is to provide certain improvements in said safety appliances for enhancing the efficiency thereof to reduce to a minimum the liability of accident to persons attempting to enter or leave the elevator-car.

According to the present invention I employ a source of power or energy, mechanism for locking or preventing the actuation of the device for controlling the motor by which the car is raised or lowered, door-controlled mechanism operated from the source of power, and means by which the locking mechanism is rendered operative or is actuated when the car is stopped opposite the door and said door is opened.

The invention also comprises certain features of construction and relative arrangement of parts, as illustrated upon the drawings, described in the accompanying specification, and particularized in the appended claims.

Referring to said drawings, Figure 1 represents in perspective view a car and a shaft or hatchway therefor. Fig. 2 represents in cross-section the contact in the car with parallel contact-strips and the insulated finger carried by the door. Figs. 3 and 4 represent one embodiment of the invention in which the lock is mounted upon the lever by which the motor is controlled. Figs. 5 and 6 represent another embodiment of the invention in which a hand-wheel is employed for controlling the motor. Figs. 7 and 8 illustrate one embodiment of the invention employed in connection with a hand-rope.

Referring to the drawings, *a* indicates an elevator-car adapted to travel between the usual guides *a'* and raised or lowered by a suitable motor. The movable parts of the motor are connected to the controlling device, which is operable from the car. Said motor-controlling device may include the double line *b* (shown in Figs. 4 to 6, inclusive) or a single line *b'*, as portrayed in Figs. 7 and 8, and in the latter case the car may be brought to a state of rest by clamping the line to the car to shift the movable parts of the motor, after which the car is prevented from creeping until the line is released. The doors, which are located at the landings and lead into the well, are indicated at *c* and are shown as in opened and closed positions, respectively.

The mechanism for locking the motor-controller includes a suitable source of energy or power, as a battery or other generator *d*, a lock for the motor-controlling device, and means for supplying or conveying power (shown in this case as flexible) to said lock upon the opening of the door, whereby when one of the doors is opened when the car is opposite thereto the lock is actuated and the car is prevented from starting. In the present embodiment of the invention said means, as shown, include an electrical conductor connected to an electromagnetic lock and the generator and circuit make and break devices controlled by the door and the car for causing the actuation of the lock when the door is opened. The lock may be arranged in various ways, several of which are shown. When a lever *e* is used to shift the controlling-line, as portrayed in Figs. 3 and 4, an electromagnet *f* is mounted thereon, which when energized draws a latch *g* into engagement with a notch *h'* in the segment *h*, the latch being held normally out of engagement by a spring *g'*. The notch is centrally located in the segment, so that the lever can be locked only when it is in the neutral position to which it was moved in bringing the car to a state of rest.

When a hand-wheel *i* is used for actuating the controlling-line *b*, the partial gear *k*, which is actuated thereby, is formed with a notch *k'* to receive the end of the latch. As shown, the latch is fulcrumed in a bracket located outside of the car and is arranged operatively with relation to the electromagnet, also supported by said bracket. In both the constructions referred to the armature for the magnet

is secured to or forms a part of the lock and the latter is held in a normal inoperative position by a spring.

When a single controlling line or rod adapted to be grasped by the hands of the attendant is employed, (and in such cases the line or rod b' passes vertically through the car,) I employ a lock consisting of a bracket m, to which is pivoted at n a lever o, the end of which constitutes an armature for the electromagnet f. The lever and bracket are grooved to receive the hand-rope b' and to rigidly clamp the same when the magnet is energized. The lock is normally held in inoperative position by a spring p.

The electromagnet on the car is electrically connected with a circuit make and break device or contact consisting of a convex strip q, mounted upon the top of the car and adapted to engage any one of a series of circuit make and break devices or contacts mounted in the hatchway.

Arranged above each door there is a bar r by which is supported two parallel contact-strips s s, separated a short distance from each other, so as to receive between them an insulated finger t, extending upwardly from the door at the rear edge thereof. These contact-strips are carried by spring-hangers t' t', and they are insulated from each other, as indicated in Fig. 2. Said strips are so located that when the door is in a closed position the finger t is out of engagement with them; but the first movement toward open position causes the finger to enter the space between the strips and to close a circuit between them, and said finger is in contact with said strips until the door is fully closed. Each pair of contact-strips is in branch circuit connected with a main circuit, said main circuit including the electromagnetic mechanism on the car and the contact q, carried by the car. Consequently in order to actuate the electromagnetic lock it is essential that the car should be opposite a door with the contact q in engagement with one of the contact-strips adjacent said door and that said door be open. The opening of a door does not cause the actuation of the electromagnetic lock except when the contact q is in engagement with the contact-strip at that particular door. The purpose of this arrangement is to prevent any one accidentally or maliciously opening a door, and thereby preventing the car from moving.

In the various embodiments of the invention the opening of a door opposite which the car is stopped closes the circuit through the electromagnetic lock and the motor-controlling device is rendered inoperative, whereby it is impossible for the attendant to start the car until said door is fully closed.

I have not attempted to herein illustrate or describe the various forms in which the invention may be embodied; but it will be understood that it is in no wise limited to the constructions set forth.

In using the word "latch" in referring to the part which locks the lever or other controlling device I do not limit myself to any particular form or shape of locking device.

Having thus explained the nature of the invention and described a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

1. In a safety device for elevators, a controlling-lever, a latch adapted to lock said lever, and an electric circuit including an electromagnet for actuating said latch to lock said lever.

2. In a safety device for elevators, the combination with a lever carried upon the car, a latch or lock for locking said lever in a neutral position, an electromagnet for operating said latch or lock, an electric circuit including said magnet, and a plurality of door-operated circuit make and break devices.

3. In a safety device for elevators, the combination with a motor-controlling lever upon the car, of a latch or lock adjacent to said lever, an opening in said lever with which said latch or lock may be engaged when the lever is brought to a position to hold the car at rest, a solenoid or magnet for operating said latch or lock, an electric circuit including said solenoid or magnet, and a plurality of door-operated make and break devices in said circuit.

4. The combination with a device controlling the operating mechanism of an elevator-car, of an electromagnet affixed to said car in proximity to the said device, a latch or lock controlled by said electromagnet, and adapted to lock said device when a current of electricity is passed through the said electromagnet, and suitable mechanism for establishing a complete and independent circuit through said magnet at each landing when the elevator-car is brought to a stop thereat and the door at that particular landing is opened, and for breaking said circuit when the door is closed; substantially as described.

5. In an elevator, the combination with a motor-controlling device, electromagnetic mechanism for locking said controlling device, and an electric circuit including a circuit make and break device controlled by a door and a circuit make and break device operated automatically independently of the door.

6. In an elevator, the combination with a motor-controlling device, electromagnetic mechanism for locking said controlling device, and an electric circuit including said magnet, and also including two independent circuit make and break devices which are operable simultaneously to cause the operation of said gripping devices.

7. In an elevator, the combination with motor-controlling devices, electromagnetic mechanism for locking said controlling devices, and an electric circuit including said magnet, and

also including two independent circuit make and break devices which are operated simultaneously to cause the operation of said gripping devices, one of said make and break devices being controlled by the door, and the other being controlled by the car.

8. In an elevator, a car, a motor-controlling device, a plurality of doors, and electrical mechanism inoperative except when the car is opposite one of said doors, for automatically locking the controlling device upon the opening of said door.

9. In an elevator, a car, a motor-controlling device, a plurality of doors, and electrical mechanism for preventing the operation of said device upon the opening of a door, including an electric circuit, a circuit make and break device operated by each door, and a contact carried by the car.

10. In an elevator, a car, a motor-controlling device, a plurality of doors, electromagnetic mechanism for preventing the actuation of said device, and an electric circuit having an independent branch for each door, and mechanism in each branch whereby the electromagnetic mechanism is actuated only when the car is opposite a door and said door is opened.

11. In an elevator, a plurality of doors, a motor-controlling device, a single source of power, mechanism for preventing the actuation of said device, means for conveying energy or power from said source to said mechanism, and means controlled by any one of said doors for causing the conveyance of power or energy only when the car is opposite a door and said door is opened.

12. In an elevator, a plurality of doors, a motor-controlling device, a single source of power, mechanism on the car for preventing the actuation of said device, flexible means for conveying power or energy from said source to said mechanism, and means controlled by any one of said doors for causing the conveyance of power or energy only when the car is opposite a door and said door is opened.

13. The combination with an elevator-car, the doors, a motor-controlling device, of an insulated finger carried on each of said doors, two parallel insulated contact-strips placed at each landing in proximity to the door thereat in such position that when the door is opened said insulated finger will make contact with said strips, electromagnetic mechanism for preventing the actuation of said motor-controlling device, and an electric circuit including said electromagnetic mechanism and said contact-strips.

14. The combination with an elevator-car, the doors, and a motor-controlling device, of an insulated finger carried on each of said doors, two parallel insulated contact-strips placed at each landing in proximity to the door thereat in such position that when the door is opened said insulated finger will make contact with said strips, electromagnetic mechanism for preventing the actuation of said motor-controlling device, a contact on the car adapted to make contact with one of said strips, and an electric circuit including said strips, said contact, and said electromagnetic mechanism.

NELSON B. KEYSER.

Witnesses:
FRANK M. WOLF, Jr.,
A. P. DOUGLASS.