

(No Model.)

3 Sheets—Sheet 1.

E. L. & G. HAIL.
ELEVATOR.

No. 579,430.

Patented Mar. 23, 1897.

Fig. 1.

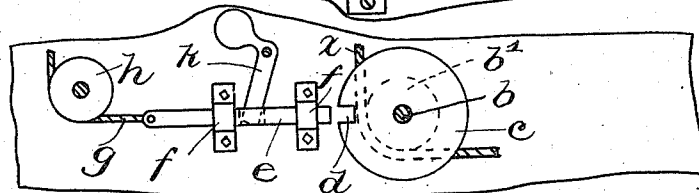
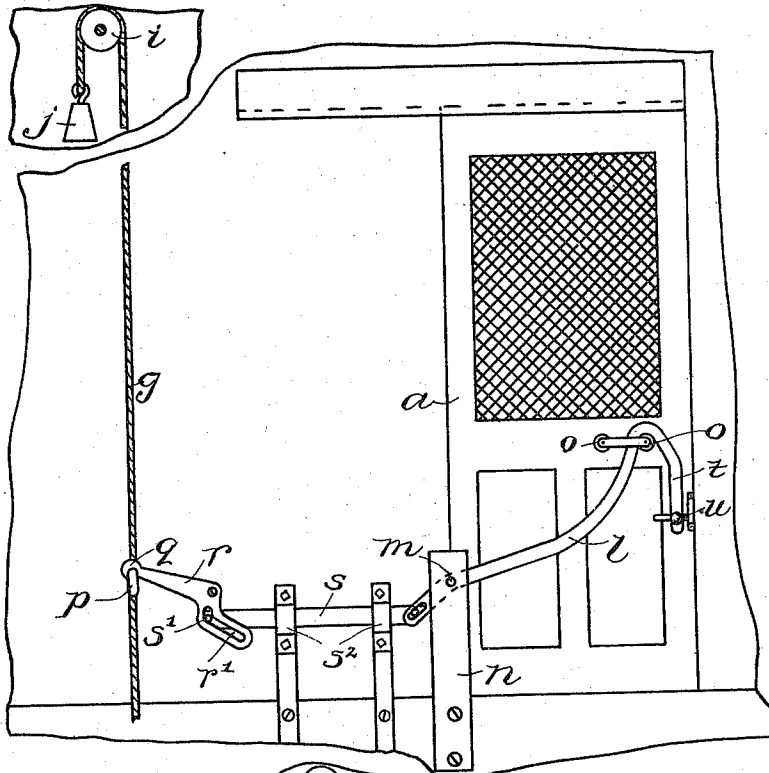
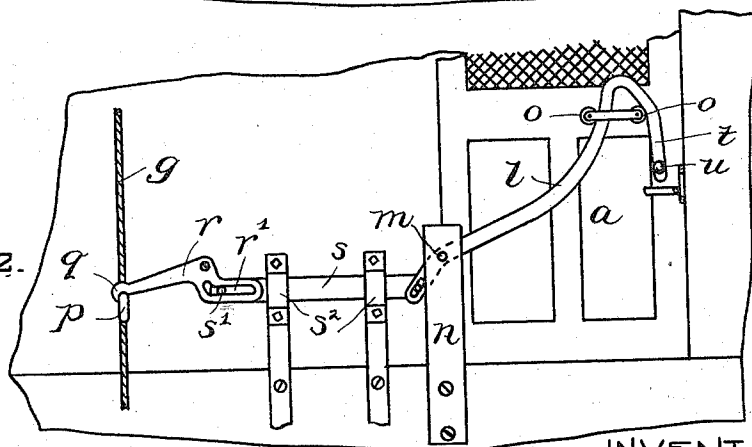
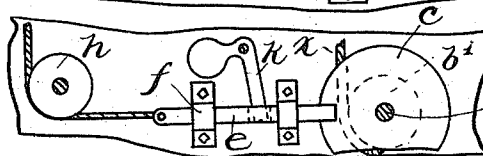


Fig. 2.



WITNESSES.

C. C. Stecher
W. B. Llan



INVENTORS.

Edward L. Hail
George Hail
By *Wm. B. Llan*
ATT'Y.

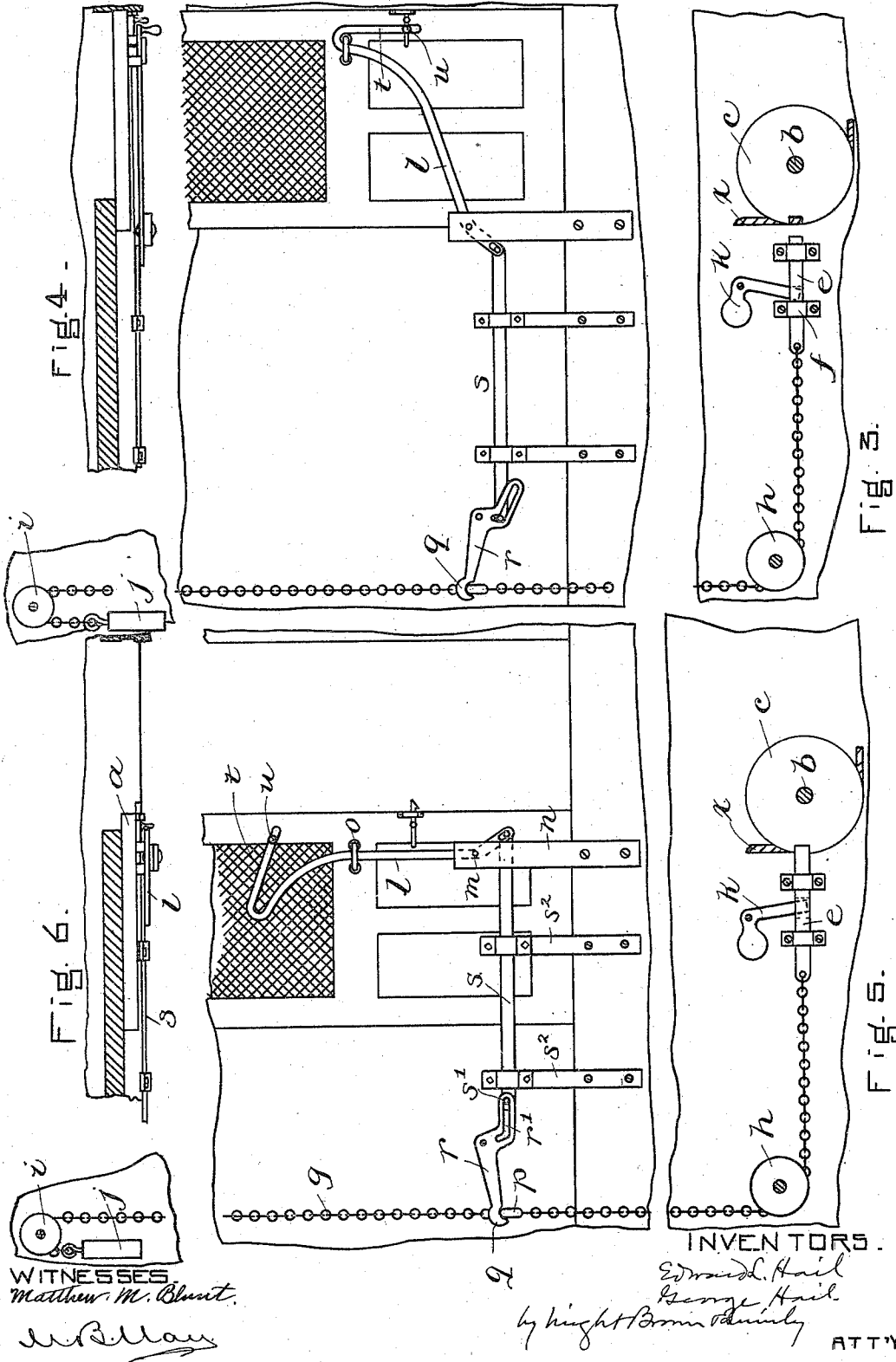
(No Model.)

3 Sheets—Sheet 2.

E. L. & G. HAIL.
ELEVATOR.

No. 579,430.

Patented Mar. 23, 1897.



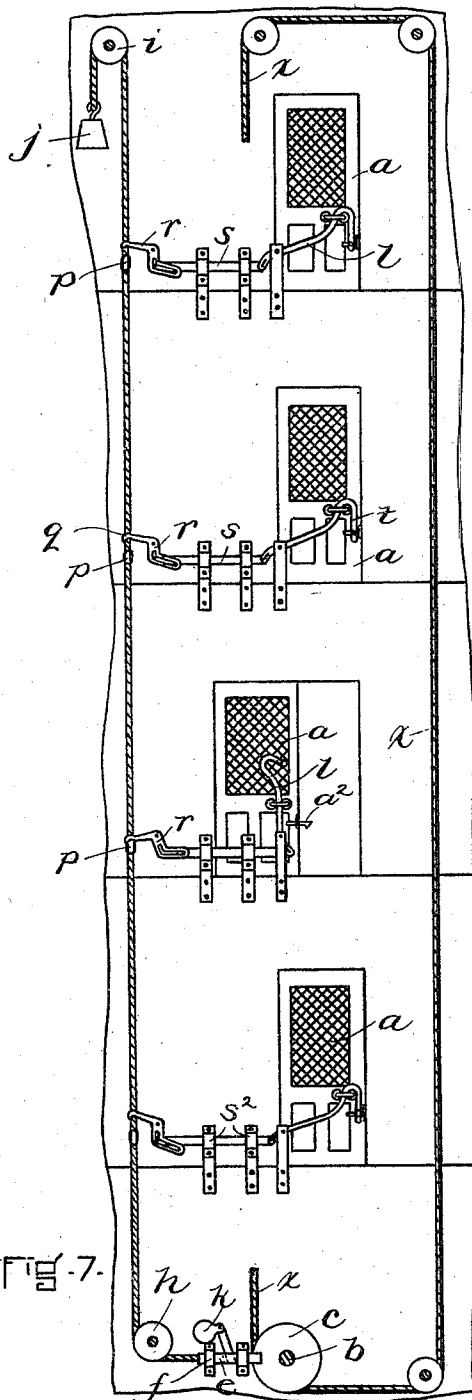
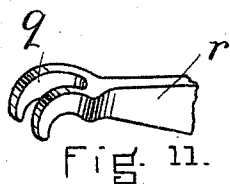
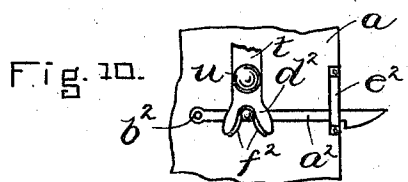
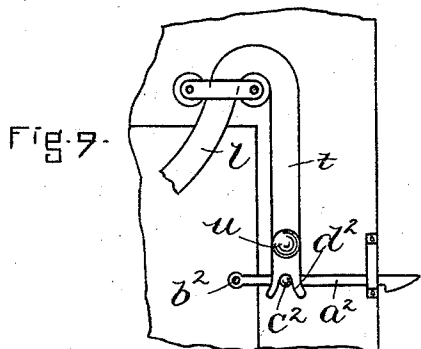
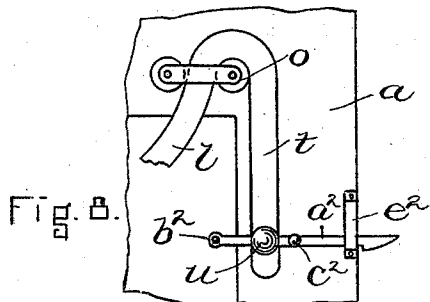
(No Model.)

3 Sheets—Sheet 3.

E. L. & G. HAIL.
ELEVATOR.

No. 579,430.

Patented Mar. 23, 1897.



WITNESSES.

C. C. Stecker.
W. B. May.

INVENTORS.

Edward L. Hail
George Hail
by Hugh B. Brown & Co.
ATT'Y.

UNITED STATES PATENT OFFICE.

EDWARD L. HAIL AND GEORGE HAIL, OF PROVIDENCE, RHODE ISLAND.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 579,430, dated March 23, 1897.

Application filed November 27, 1896. Serial No. 613,536. (No model.)

To all whom it may concern:

Be it known that we, EDWARD L. HAIL and GEORGE HAIL, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Elevators, of which the following is a specification.

This invention has relation to elevators of the class known as "passenger-elevators," which are employed for carrying persons between the floors of a building. There are many dangers incident to taking passengers on and letting them off from an elevator-car, resulting from the possibility of the car starting before the door of the corridor is closed, and hence one of the objects of our invention is to prevent dangers of this kind by connecting the door of the corridor in such way with the motor-controlling device as to lock the same from action during the time that the corridor-door is open and until it is closed.

To these ends, therefore, the invention consists of an elevator having a driving mechanism for elevating and lowering the car, a device for controlling the movements of the driving mechanism and operated by a line, an opening device for the door of the corridor, a lock for locking the motor-controlling device, and connections between the door-opening device and the lock whereby when the door is opened by the said device the lock is moved into engagement with the motor-controlling device to hold the latter from movement.

The invention likewise consists of other features of improvement, which we will hereinafter describe with particularity, and set forth in detail in the claims hereto appended.

Reference is to be had to the accompanying drawings, and to the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 is a more or less conventional view showing one form in which our invention may be embodied, there being illustrated in said figure a corridor-door, a motor-controlling device, a lock for the motor, a device for opening said corridor-door, and connections between said door-opening device and the lock for the motor-controlling

device. Fig. 2 is a similar view illustrating the position of the various parts when the door-opening device has been moved to cause the locking of the motor-controlling device. Figs. 3 to 6, inclusive, illustrate a slightly-different embodiment of the invention. Fig. 7 illustrates a series of corridor-doors all equipped with door-opening devices each of which controls the lock for the motor-controlling device, one door being represented as having been opened and the motor-controlling device being shown as locked. Figs. 8, 9, and 10 illustrate latches for locking the door and which are arranged to be operated when the handle of the lever is grasped. Fig. 11 shows in perspective the hook end of the bell-crank lever.

Referring to the drawings, *a* indicates a corridor-door which is adapted to slide back and forth to open and close the aperture leading from the corridor into the elevator-hatchway.

At *b* we have indicated a shaft the movements of which control the movements of the mechanism for raising and lowering the elevator-car and is controlled by a pulley *b'* on which a controlling-line *x* passes, which line may be actuated by the attendant on the car. The raising and lowering mechanism may consist of a motor of any nature that it may be desirable to use—such as an electric motor, a hydraulic cylinder, &c.—the motor not being shown, as it forms no part of the present invention. Upon the said shaft *b*, on which, as above stated, is affixed a pulley *b'* for the controlling-line, (and between said line and the motor,) we rigidly secure a disk *c*, which is provided in its periphery with the notch *d*, and when the disk is in that position which it will assume when the motor is at rest the notch *d* is in alinement with and is adapted to receive a sliding bolt *e*, which reciprocates in the guides *f f*. The said bolt is connected at its end with a line *g*, which may be either a rope, a chain, or any other means for accomplishing the purpose to be described, which line is passed around an idler-pulley *h* near the bolt and an idler-pulley *i* at the top of the well or hatchway and has upon its end a weight *j*. The line extends throughout the length of the hatch-

way in position to be engaged by the door-opening device or levers connected therewith, as we will proceed to hereinafter describe.

The weight j is sufficiently heavy to hold the bolt e out of engagement with the notch d in the disk c , and in order to throw the sliding bolt into the notch when desired we employ a weighted lever k , having an end extending down into an aperture or slot in the bolt. When the bolt is relieved of the weight j , the weighted lever k will throw it forward so as to enter the notch d in the disk c . For drawing down upon the line g , so as to throw the bolt e into engagement with the motor-controlling device, we employ means which coact with the corridor-door, as we will now describe.

l is a lever, fulcrumed at m on a stationary support n , which is shown as on the wall of the hatchway. The lever passes between two rollers $o o$, journaled on the door a , and is cam-shaped or curved, so that when it is swung upon the pivot m it throws the door open, as will be understood.

The line g is provided with stops, clips, or attachments p , with which may engage the forked end q of a bell-crank lever r , pivoted on the wall of the hatchway in proximity to the line, and the end of the lever r is connected by a link s with the end of the door-opening lever l .

The end of the bell-crank lever to which the link s is attached is provided with a cam-slot r' , into which a pin s' on the link s extends. The link slides longitudinally in guides $s^2 s^2$, and the cam-slot is so arranged that the first movement of the lever l upward will cause the pin s' to thrust the rear end of the bell-crank lever upward and force the forked end downward to operate the lock for the motor-controlling device, the remainder of the movement of the lever l not affecting the lever r , since the pin s' travels in a straight portion of the cam-slot, as shown in Fig. 2.

The rollers $o o$ on the door are separated far enough to allow the lever l to be moved sufficiently to cause the locking of the motor-controlling device prior to any movement of the door toward open position.

Now it will be seen from Figs. 1 and 2 that when the lever begins to move upward and backward the link s will be drawn forward, rocking the lever r on its pivot, and thereby causing the forked end thereof to engage the clip or attachment p on the line g , thus forcing down the said line and allowing the weighted lever to throw the bolt e into the notch d of the motor-controlling device, and then the continued movement of the lever will cause the moving of the door to open position.

In Fig. 7 we have shown a series of doors (one being opened) each equipped with an opening device for operating on the line connected to the lock for the motor-controlling device, and from the said figure it will be seen that if any one of the said doors be opened the motor-controlling device will be locked.

The door-opening lever is provided with a depending portion t , having a knob or handle u on the lower end thereof, which may be grasped by the attendant on the car for throwing the lever upward and backward.

In Figs. 3 to 7, inclusive, we have shown the door opening and closing lever as operating to start the door toward open position immediately upon its being swung on its pivot, and in this case the entire movement of the lever is utilized in opening the door, although the motor-controlling device is locked before the door is moved to any extent. In all other respects the devices operate precisely the same as above set forth.

In Fig. 8 the door-latch a^2 is pivoted at b^2 and has a pointed hooked end to engage a catch on the door-framing. It is provided with a knob c^2 , being so placed as to be at the side of the handle u , so that both may be grasped by the attendant at the same time to both unlatch the door and raise the lever to start the said door toward open position, the knob c^2 being released as soon as the latch strikes the bridge e^2 .

In Fig. 9 the end of the depending arm of the lever is bifurcated, as at d^2 , thereby allowing the knob c^2 to be placed below and near to the handle u in a position to be easily grasped.

In Fig. 10 the bifurcated end of the lever is provided with springs f^2 , which yielding engage the knob on the latch, so that in opening the door the operator merely takes hold of the lever-handle u and swings the lever upward, the springs drawing the latch out of engagement with the catch and then releasing it, as the latch is prevented from further upward movement by the bridge e^2 .

From the foregoing it will be observed that it is not necessary to always employ the mechanism for locking the valve in connection with a door opening and closing lever, as a hand-operated lever may be employed separately and independently of the door for locking the valve-controlling devices.

We make no claim herein to the means shown and hereinbefore described for opening the door *per se*, this being the subject-matter of our copending application, Serial No. 596,105, filed June 19, 1896.

It will be understood that we do not intend to limit ourselves to the precise details of construction as herein shown and described, nor to the particular form of motor-controlling line or device employed, since any other of the well-known electrical or mechanical controllers may be used.

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

1. In an elevator, a corridor-door, a motor-controlling line, a motor-controlling device between the line and the motor, a lock for

said device, means for opening the corridor-door, and connections between said door-opening means and said lock whereby, when the door is opened, the motor-controlling device is locked against movement.

2. In an elevator, a corridor-door, means for opening said door, a motor-controlling line, a motor-controlling device between the line and the motor, a lock for said device and a line connected with said lock and with said door-opening means whereby when the door is opened the motor-controlling device is locked.

3. In an elevator, a corridor-door, a lever for opening said door, a motor-controlling line, a motor-controlling device between the line and the motor, and a lock for said motor-controlling device coacting with the door-opening lever whereby when the door is opened the motor-controlling device is locked.

4. In an elevator, a corridor-door, a lever for opening said door, a motor-controlling line, a motor-controlling device between the line and the motor, a lock for said motor-controlling device, a line connected with said lock, and means extending from the door-opening lever and adapted to engage said line for causing the lock to engage the motor-controlling device when the door is opened.

5. In an elevator, a motor-controlling line, a motor-controlling device between the line and the motor, a lock for the same, a weighted line normally holding the lock out of engagement with said device, means for acting upon said weighted line to allow the lock to engage the motor-controlling device, and means for opening the corridor-door and connected with the last-said means whereby when the door is opened the motor-controlling device is locked.

6. In an elevator, the combination with a motor-controlling line, a motor-controlling device between the line and the motor, a weighted bolt adapted to normally engage the motor-controlling device, means for holding the bolt out of engagement with the motor-controlling device, and a lever connected with the last-said means in such way that when the door is opened the lock will be allowed to engage the motor-controlling device.

7. In an elevator, a movable door, a motor-controlling device, a lock for said device, a lever for opening said door and fulcrumed on

a support relatively to which the door moves, and connections between said lever and said lock for locking said controlling device prior to any movement of the door toward open position.

8. In an elevator, a movable door, a motor-controlling device, a lock for said device, a lever for opening said door and fulcrumed on a support relatively to which the door moves, said door-opening lever being connected to said door but having a limited movement relatively thereto, and connection between said lever and said lock, whereby the said lever may be actuated to lock the motor-controlling device prior to its opening the door.

9. In an elevator, a movable door, a motor-controlling device, a lock for said device, a lever for opening the door and having a pin and a bell-crank lever having a cam-slot to receive the pin on said lever, and connections between said bell-crank lever and the said lock.

10. In an elevator, a motor-controlling line, a motor-controlling device between the line and the motor, a lock for said device, a hand-operated lever, and connections between said lever and said lock whereby when the lever is actuated the motor-controlling device is locked.

11. In an elevator, a corridor-door, a movable latch thereon, in combination with a motor-controlling line, a motor-controlling device operated by said line, a lock for said motor-controlling device, a lever for opening said door, and connected to said lock for the motor-controlling device, said lever having means for yieldingly engaging the latch, whereby when said lever is operated, the latch is disengaged from its catch, the motor-controlling device is locked, and the door is opened.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 21st day of November, A. D. 1896.

EDWARD L. HAIL.
GEORGE HAIL.

Witnesses:

CHARLES A. HARKNESS,
GILMAN E. JOPP.