

(No Model.)

2 Sheets—Sheet 1.

C. A. HARKNESS.
ELEVATOR CONTROLLING DEVICE.

No. 553,807.

Patented Jan. 28, 1896.

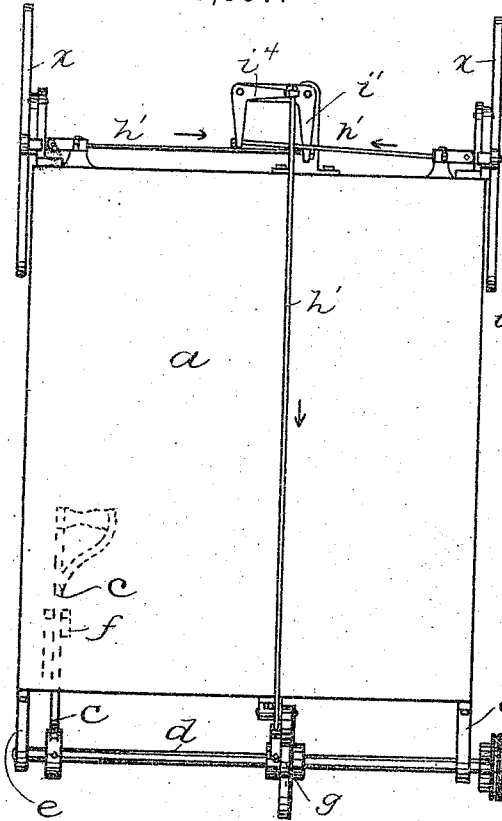


Fig. 1.

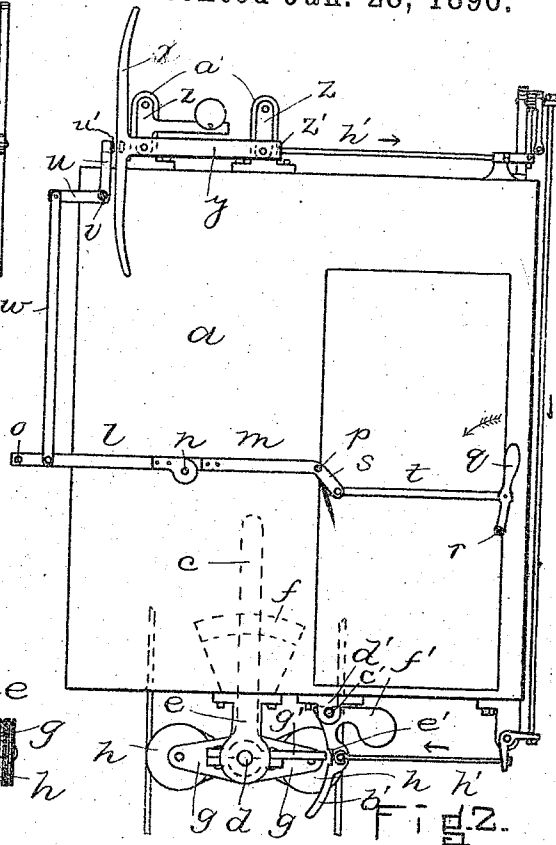


Fig. 2.

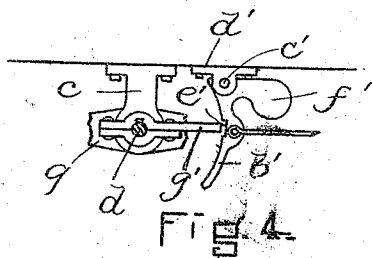


Fig. 4.

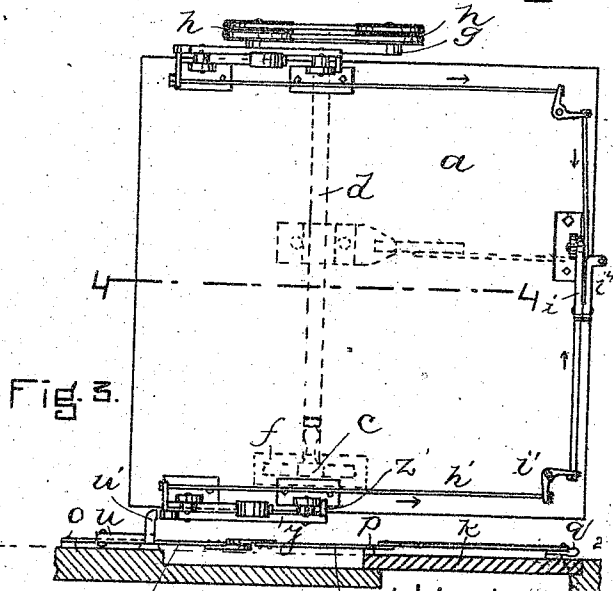


Fig. 3.

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(No Model.)

C. A. HARKNESS.
ELEVATOR CONTROLLING DEVICE.

2 Sheets—Sheet 2.

No. 553,807.

Patented Jan. 28, 1896.

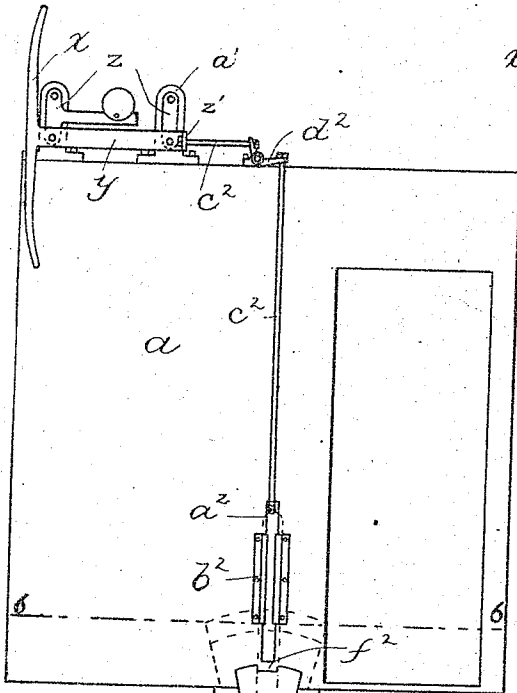


FIG. 5.

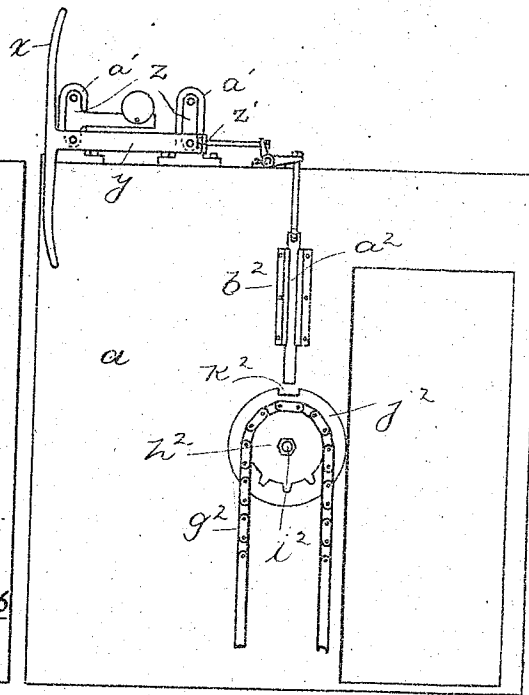


FIG. 7.

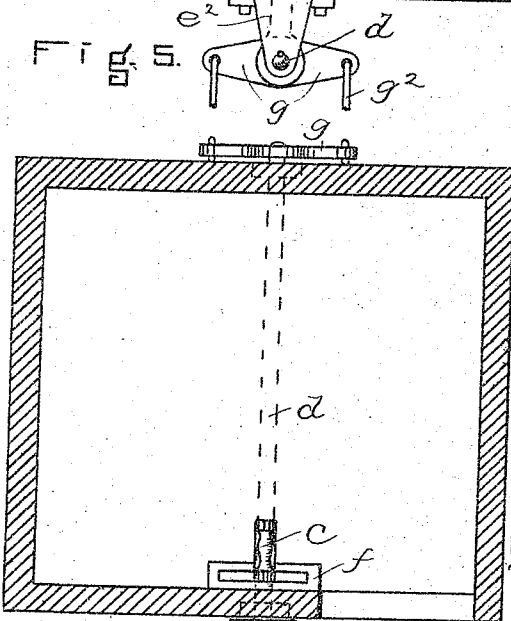


FIG. 6.



FIG. 9.



FIG. 10.

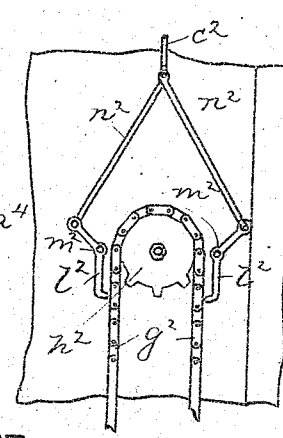


FIG. 8.

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UNITED STATES PATENT OFFICE.

CHARLES A. HARKNESS, OF PROVIDENCE, RHODE ISLAND.

ELEVATOR-CONTROLLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 553,807, dated January 28, 1896.

Application filed October 18, 1895. Serial No. 563,051. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. HARKNESS, of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Elevator-Controlling Devices, of which the following is a specification.

This invention has relation to the class of elevators in which a car traveling in a well or hatchway is provided with a lever or equivalent hand device supplemental to the controlling-line for operating the latter.

Owing to the carelessness or inability of the operatives and to other causes which may or may not be reasonably avoided, there is always more or less danger attending the entrance to or exit from the car by passengers, and it is one of the purposes of this invention to reduce this danger to a minimum by taking the hand device from the control of the operative while a corridor-door is partially or entirely open, by means co-operating with the corridor-door, for locking the lever or equivalent hand device so as to prevent the latter from being moved at such times.

Reference is to be had to the annexed drawings, and to the letters and figures 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.

On the drawings, Figure 1 is a side elevation of an elevator-car with my invention applied thereto. Fig. 2 is a front elevation and a partial section on the line 2 2 of Fig. 3 of the same, the mechanism operated by the corridor-door being shown also. Fig. 3 is a plan view of the car, showing the corridor-door and a portion of the wall of the well in section. Fig. 4 is a detail view of the lock for the lever of the form shown in Figs. 1, 2, and 3, and is a section on the line 4 4 of Fig. 3. Fig. 5 is a side elevation of a car, showing a modified device for locking the lever. Fig. 6 is a horizontal section on the line 6 6 of Fig. 5. Fig. 7 shows the same device employed with a different style of running line. Fig. 8 shows means for locking the lever through the medium of the line, which latter is formed partially or entirely as a chain with centrally-open links. Figs. 9 and 10 show how the lock

may be operated to engage and lock the handle itself.

In carrying out my invention I employ a car *a* suspended in the usual way and raised and lowered by a motor (not shown) of any approved style or type. For starting, stopping, and reversing the motor I employ a line which in Figs. 1 to 4 is a standing line—that is, one relatively to which the car travels—and which is shown in Figs. 5 to 8 as a running line or one attached to the car and traveling therewith.

Referring more particularly to Figs. 1 to 4, inclusive, *c* indicates a hand device on the car operatively connected with the controlling-line and consisting in this instance of the line-shifting lever, which is rigidly secured to a cross-shaft *d* extending under the car and journaled in brackets *e*. The lever projects through the floor of the car and is arranged to move in guides *f* on the side thereof.

g g represent a two-armed lever which is keyed, or otherwise rigidly secured, to the outwardly-projecting end of the shaft *d*, and *h h* represent the line-pulleys which are journaled upon the ends of the said arms *g g*. By swinging the hand-operative lever *c* to the right or left the shaft *d* is rocked and the pulleys *h h* are correspondingly raised and lowered. As illustrated in Fig. 2, the pulleys are at a neutral position and the motor and the car are at rest. Instead of employing pulleys upon the ends of the arms, as used in connection with a standing line, I may remove the pulleys and secure the ends of a running line to the ends of the lever, as in Figs. 5 and 6.

The hand-lever may be said to be in constant engagement with the line, whether the latter be a standing line or a running line, (through the medium of the connecting parts) in contradistinction to being loose relatively to the line and adapted to be connected thereby by a clutch.

With the parts described I provide means for locking the lever against movement when the latter is in a neutral position by devices coacting with the corridor-door.

The wall of the well is indicated by *i* and *j*, and the sliding corridor-door is indicated by *k*, there being a corridor-door for each

landing. I employ a lock for the corridor-door, which consists of two toggle-levers l m , pivoted together at their inner weighted ends by a pin n , the outer end of lever l being pivoted to the wall i by a pin o and the outer end of lever m being pivoted to the edge of the door k by a pin p . When the levers are lying in the same horizontal plane with the three pivots in line, the door is locked and cannot be moved until the levers are thrown out of the "dead-center" position, as will be understood. The levers are provided with suitable stops (not shown) for holding them horizontal.

q is the handle of the door, which is pivoted thereto at r and is connected with the extended downward projecting end s of lever m by a link t . When the handle q is drawn in the direction of the arrow in Fig. 2, the link t forces the end s of the lever m forward and downward, and throws the lever m upward, so that the two levers l m form an angle to each other, allowing the door to be opened by pulling upon the handle q .

u is a two-armed lever having an offset u' at the top of the vertical arm pivoted at v upon the wall of the well, and having its horizontal arm connected with the lever l by the link w and having at the upper end of its perpendicular arm a projection u' at right angles thereto, and extending inward toward the car.

x is a cross-head, bow or abutment, having a laterally-extending bar y supported upon swinging links z , one or both of which may be weighted so as to normally hold the cross-head firmly in the position shown in Fig. 2, (in which figure only one link is shown as weighted,) there being a suitable stop z' for preventing the cross-head from swinging too far in the direction of the stress of the weight. The links z are pivoted to brackets a' upon the top of the car.

b' is the locking device for the lever, as shown in Figs. 1, 2 and 3, it consisting of a depending bar pivoted at c' to a bracket d' , secured below the floor of the car. The bar b' is curved upon its inner face and is provided with a notch e' for a purpose to be described. It is also provided with a laterally-extending weight f' which tends to normally throw it forward. Upon the shaft d , which extends beneath the bottom of the car, I mount or secure a latch or catch g' , which is arranged to project laterally from the shaft, so that when the lever is in a neutral position the locking-bar b' may swing forward until the latch or catch g' is engaged by the walls of the notch e' in the said swinging lock-bar. The face of the lock-bar is in the arc of a circle struck from the center of the rock-shaft, the radius of which is the length of the latch or catch g' .

The lock-bar b' is normally held from engagement with the latch or catch g' by the cross-head or abutment x through the medium of rods h' h' h' and bell-crank levers i' i' i' ,

which latter are suitably pivoted to brackets on the car. When the cross-head or abutment is forced in the direction opposite the stress of the weight it will, through the medium of the said rods and levers, allow the lock-bar b' to engage the latch or catch g' on the rock-shaft d and lock the latter in a neutral position.

The means for operating the cross-head or abutment x consists of the two-armed lever u , which has been heretofore described as being connected by a link w with the toggle-lever l .

I have illustrated the car as being provided with duplicate cross-heads or abutments which are connected with the lock-bar b' , so that doors on different sides of the elevator-well may be locked. It will be observed that, should two doors opening from the same floor into the shaft be opened at the same time, the lock-bar would not release the latch or catch until both doors have been closed. This is accomplished by connecting one of the horizontal rods h' to a large bell-crank lever i' and securing the vertical rod h' and the other of the horizontal rods h' in Fig. 1, to the arms of a smaller bell-crank lever i' pivoted to the free arm of the large bell-crank lever i' . Thus by this means either or both of the abutments will operate to lock the lever when the door or doors are opened.

The operation of the parts is as follows: Suppose the car to have been brought to a standstill opposite one of the corridor-doors by the operative throwing the lever to a central or neutral position. The stopping of the car at the landing brings the cross-head or abutment x opposite the offset u' from the vertical arm of the lever u , so that when the operative draws upon the handle q and throws the door back the lever l lifts the rod w and forces the said offset u' of the two-arm lever u against the cross-head or abutment. The lever u through the offset u' in turn thrusts the cross-head or abutment against the stress of the weight and through the medium of the rods h' and bell-crank levers i' allows the lock-bar b' to engage the latch or catch g' and lock the lever c . This locking the lever is accomplished by the slightest opening of the corridor-door as the links or rods h' are passed through the bell-crank levers i' loosely, and hence the lock-bar b' can be and is arranged in such close proximity to the latch or catch as to engage it by a very slight movement.

When the car is to be started, the door is first closed, so that the lever u with its offset u' will be withdrawn from the cross-head or abutment and the latter will be caused by the weight to return to its normal position. In returning it draws upon the rods h' and bell-crank levers i' and pulls the lock-bar away from the latch or catch, so as to unlock the lever.

In Figs. 5 and 6 I provide a slightly different means for locking the hand-operative lever. In these figures it consists of a lock-bar a^2 sliding in guides b^2 and connected with the

cross-head x by rods c^2 and a bell-crank lever d^2 . The lock-bar a^2 is arranged to drop into engagement with a sector-shaped arm e^2 suitably keyed upon the end of the cross-shaft d .

When the cross-head x is thrust in the direction opposite the stress of the weight by the two-armed lever (not shown in this figure) the lock-bar a^2 will be allowed to drop into a notch f^2 in the arm e^2 , when the latter is in the upright position, by reason of the hand-operative lever being in its neutral position, the arm e^2 thus constituting a catch. A running line is shown as being employed in these figures instead of the standing line, it being secured to the ends of the two-armed lever g .

The latch or catch arm e^2 in Fig. 5 or the latch or catch bar g' in Fig. 2 may be arranged at either end of the lock-bar d , or at any point intermediate of the ends.

In Figs. 7 and 8 I have illustrated a running line as being locked by mechanism operated by a cross-head and its coacting parts. The line which is designated by g^2 is composed in whole or in part of a sprocket-chain passing around the sprocket-wheel h^2 on a shaft i^2 , passing through the wall of the car. On the shaft i^2 is also secured a disk j^2 , constituting a catch with a notch k^2 into which the said lock-bar a^2 may drop so as to lock the handle or lever on the inside of the car, which is not shown.

In Fig. 8 I have shown how the lock-bars indicated by l^2 in this case, and operated as in the other figures by the cross head or abutment and its coacting parts, may be employed to lock the hand-operative device by engaging the links of the chain g^2 . The lock-bars are pivoted at m^2 , one on each side of the chain, and are connected to the rod c^2 by means of other links or rods n^2 . When the rod c^2 is lowered, the lock-bars l^2 will enter the links of the chain g^2 , which in this case form the catch therefor, thus locking the sprocket-wheel h^2 and the hand-operative device on the inside of the car. (Not shown.)

I have shown two lock-bars, so as to lock the line on each side of the wheel and prevent any possible chance of the wheel being accidentally turned. In practice, however, I find that a single lock is sufficient in most cases.

In Figs. 9 and 10 I have illustrated the lock-bar a^3 as dropping into a notch in a casting a^4 , forming a catch secured to the hand-operative lever c , the lock-bar a^3 sliding in a guide b^3 on the wall of the car.

The bow y , bar v , rods h' , and bell crank levers i' in the instance of my invention illustrated in Figs. 1 to 4, constitute lock-actuating mechanism, and in the examples of my invention illustrated in Figs. 5 to 10 this mechanism consists of the bow x , bar y , rods c^2 , and bell-crank levers d^2 .

In all the examples of my invention illustrated in the drawings, the toggle-levers $l m$, link w , and bell-crank lever u constitute

means connected with the door to operate the lock-actuating mechanism so as to cause the lock to engage said hand-lever when the door is partially or entirely open.

I do not herein broadly claim a car-controlling device for elevators comprising a flexible line for controlling the motor and a hand device on the car for operating the same, combined with a movable door and a device normally disconnected from the controlling-line and coacting with said door for preventing the operation of said hand device when the door is moved toward open position, and until it is closed, as that forms the subject-matter of a claim in my reissued Letters Patent, dated January 7, 1896, and numbered 11,520; nor do I herein make specific claim to the toggle-levers $l m$ and the means for operating them consisting of the handle q and the link t , nor to such construction of the toggle-levers as adapt them to lock the door, as they are described and claimed in my co-pending application, Serial No. 565,955, filed October 17, 1895.

Having thus explained the nature of the invention and described several devices in which it is embodied, without, however, attempting to set forth all of the forms in which it may be embodied or all of the modes of its use, I now declare that what I claim is—

1. An elevator-controlling apparatus comprising a controlling-line, a hand device on the car in constant engagement therewith, a movable door, and a lock coacting with the door for locking the hand-operative device positively against movement, when the door is partially or entirely open.

2. An elevator-controlling apparatus, comprising a controlling-line, a hand-operative device on the car connected therewith, a lock movably mounted on the car, lock-actuating mechanism, a door, and means connected with said door to operate said lock-actuating mechanism so as to cause said hand-operative device to be locked when the door is partially or entirely open.

3. A car-controlling device comprising a controlling-line, a hand-lever operatively connected therewith, a lock-bar mounted on the car, a movable door, and lock-actuating mechanism on the car, and means connected with the door to operate said lock-actuating mechanism to lock said hand-lever when the door is partially or entirely open.

4. A car-controlling device comprising a controlling-line, a hand-lever operatively connected therewith, a lock-bar mounted on the car, a movable door, an abutment on the car operatively connected with the lock-bar, and means connected with the door and adapted to impinge upon the abutment when the door is partially or entirely opened, and cause the lock-bar to lock the lever.

5. A car-controlling device, comprising a controlling-line, a hand-lever operatively connected therewith, a lock-bar pivoted on the

car; and adapted to lock the said hand-lever, a movable door, and a movable abutment connected with the swinging lock-bar, and coacting with the door to lock the hand-lever when the door is partially or entirely open.

5 6. A car-controlling device comprising a controlling-line, a hand-lever operatively connected with said line, a shaft on which said lever is mounted, and having a latch thereon, 10 a movable lock adapted to engage said latch, a movable abutment on the car connected with said lock and a door adapted to impinge upon said abutment and cause the lock to engage said latch, while the door is partially or 15 entirely open.

7. A car-controlling device comprising a controlling-line, a hand device on the car operatively connected therewith, a catch on said hand device, a lock for said catch and a door 20 with which the lock coacts to engage and lock said catch while the door is partially or entirely open.

8. A car-controlling device comprising a controlling-line, a hand device on the car in 25 constant engagement therewith, a lock for said hand device, a door, and means coacting with the door for causing said hand device to

be locked by said lock while the door is partially or entirely open.

9. An elevator-controlling device comprising a controlling-line, a two-armed lever with which the line is connected, a hand-operative lever, as at c, rigidly secured to said two-armed lever, a movable door, and a lock co- 30 acting with the door for positively locking the hand-lever and the two-armed lever against movement when the door is partially or entirely open. 35

10. An elevator-controlling device comprising a controlling-line, a two-armed lever with which the line is connected, a hand-operative lever rigidly secured to said two-armed lever, 40 a movable door, and a lock-bar coacting with the said door for engaging and locking the hand-operative lever directly when the door is partially or entirely open. 45

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 16th day of October, A. D. 1895.

CHARLES A. HARKNESS.

Witnesses:

M. B. MAY,

ARTHUR W. CROSSLEY.