(No Model.)

J. D. CONNER.

SAFETY LOCKING DEVICE FOR ELEVATORS AND ELEVATOR DOORS.

No. 564,956. Patented July 28, 1896.

Fig. 1.

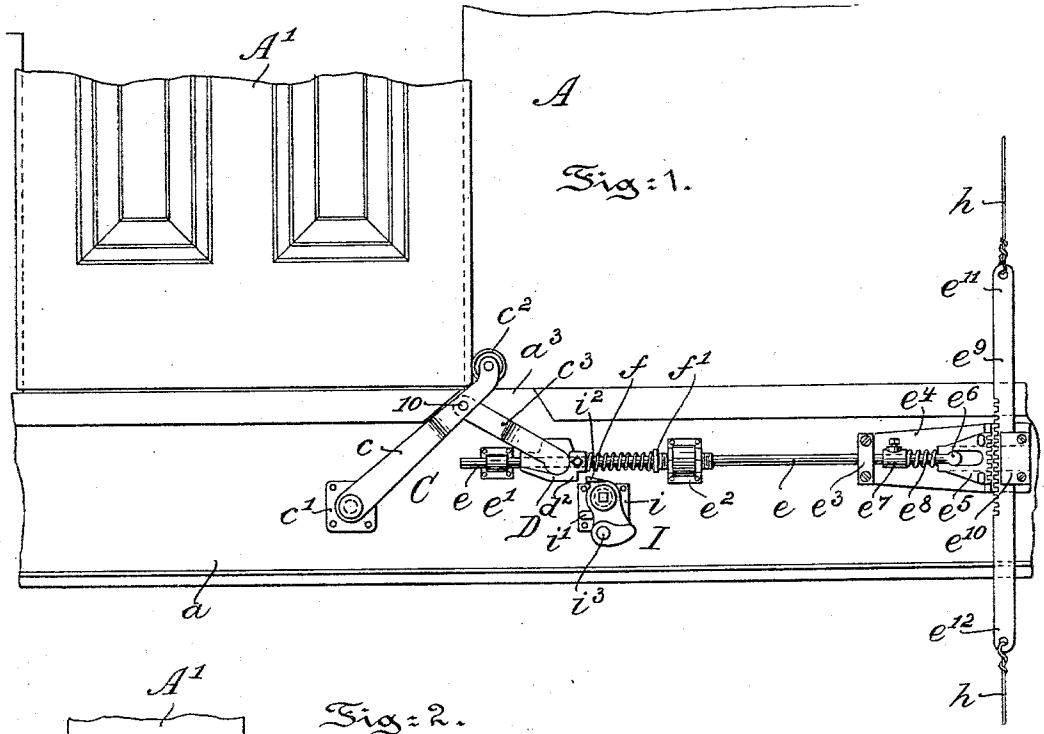


Fig. 2.

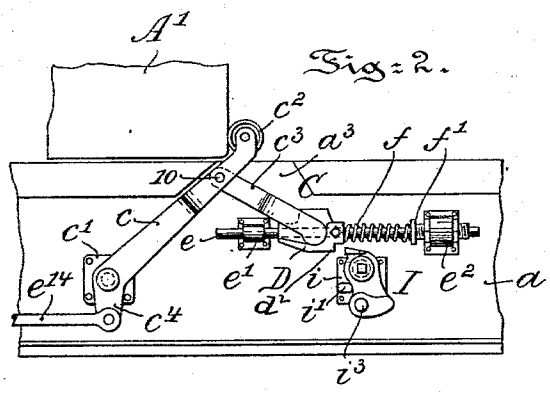


Fig. 3.

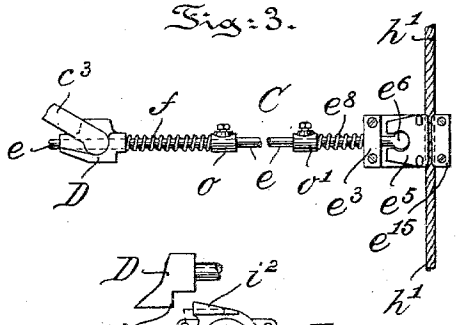


Fig. 4.

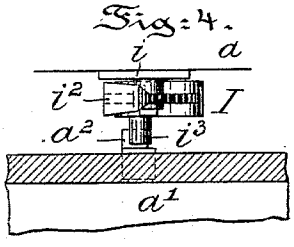
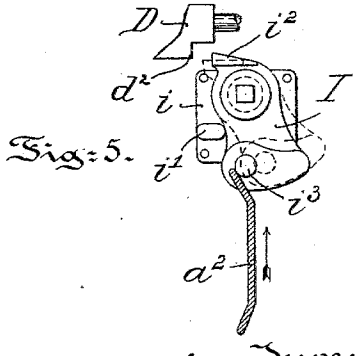


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SAFETY LOCKING DEVICE FOR ELEVATORS AND ELEVATOR-DOORS.

SPECIFICATION forming part of Letters Patent No. 564,956, dated July 28, 1896.

Application filed April 13, 1896. Serial No. 587,319. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. CONNER, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Safety Locking Devices for Elevators and Elevator Doors or Gates, of which the following is a specification.

My invention has relation to a device for preventing the starting of an elevator car or platform while a door or gate at the entrance to a hatchway or elevator-shaft is open or unlatched.

The principal objects of my invention are, first, to provide a simple, durable, and effective locking device for elevators and elevator doors or gates to prevent the starting of an elevator car or platform while a door or gate leading to the entrance of a hatchway or elevator-shaft is either wholly or partly open; second, to provide a safety locking device for elevators and elevator doors or gates, adapted to be located adjacent to the right or left hand end of a sliding door closing the hatchway opening or landing and designed to positively lock the controller rope or cable from movement by the engagement of a device with a rack or friction means carried by the cord or cable extending through the hatchway and suitably connected with the main shifting apparatus, so that when said cable or rope is locked the main shifting apparatus will also be locked, so that the shifting of the car from one landing to another in the hatchway or elevator-shaft is entirely prevented; and, third, to provide a mechanism of the character described having a locking device located adjacent thereto and provided with a pawl adapted to be engaged by a saddle of said mechanism and a cam or incline on the under side of a car to positively lock and hold the same and prevent movement of the door until the actuating-rod of said mechanism is operated to release the controller rope or cable, thereby insuring positive action of said mechanism to prevent starting of the elevator car or platform while a door or gate leading to the hatchway or elevator-shaft is either wholly or partly open.

My invention, stated in general terms, consists of safety locking devices for elevators and elevator doors or gates constructed and arranged in substantially the manner hereinafter described and claimed.

The nature, general features, and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a front elevational view of a door leading to an elevator shaft or hatchway in a closed position, and in connection therewith is illustrated one form of the locking mechanism embodying main features of my invention. Fig. 2 is a similar view in broken section of a door leading to a hatchway or elevator-shaft and a modified form of mechanism for controlling the locking of said door and preventing a car being shifted while the door is wholly or partly open, said locking mechanism being located near the left of the elevator shaft or hatchway. Fig. 3 is a front elevational view in detail of a positive frictional grip mechanism as a modification of the grip mechanism of Fig. 1 for locking the controller rope or cable to prevent movement of the elevator when the door has been shifted to an open or substantially unlocked position. Fig. 4 is a top or plan view of the under side of a car with a cam or incline provided thereat adapted to engage the stud of a pawl locking device to be employed in connection with said safety locking mechanism to positively lock the door leading to the hatchway or elevator-shaft during the ascent or descent of the car to a position adjacent to the opening closed normally by the door; and Fig. 5 is a side elevational view in detail showing the position of said pawl locking device adapted to be engaged by the cam or incline of the car and also showing the recessed or offset end of the saddle of said safety locking mechanism adapted to be brought into engagement with said pawl locking device and back-stop for limiting the range of movement of the stud of said device in one direction.

Referring to the drawings, A represents an elevator shaft or hatchway closed by a sliding door A'.

a is a cross-beam supporting the flooring of one landing or story of a building, and *a'*, as illustrated in Fig. 4, is the bottom of a car, to which is applied on the under side thereof

an incline or cam a^2 of preferably the shape or configuration illustrated in section in Fig. 5 of the drawings.

Referring now to the mechanism of my present invention, C represents the safety locking mechanism, comprising a lever c, pivoted to a bearing-plate c', secured in any suitable manner to the beam a. The free end of said lever is provided with a roller c^2. Fulcrumed to the lever at 10 is an oppositely-inclined link c^3, resting in a recessed and offset saddle D, as clearly illustrated in Figs. 1, 2, and 3. The saddle D has extending through the body of the same a rod e, which is held in bearings e', e^2, and e^3, as clearly illustrated in Fig. 1 of the drawings. This rod has mounted thereon a coiled spring f, engaging at one end the rear wall of said saddle and at the other end abutting against a flanged sleeve or collar f', extending through the bearing e^2. This rod e is rigidly secured in Fig. 1 to the body of the saddle D, while in Fig. 3 it is in sliding engagement therewith. The bearing e^3 is provided with a plate e^4, and in sliding engagement therewith is a tapering slotted locking-jaw e^5, in the slot of which engages the knob e^6, formed on the end of the rod e, and mounted on this rod is an adjustable collar e^7, between which and said jaw e^5 is located a coiled spring e^8, whereby through said collar said spring may be maintained always in required compression on said rod.

e^9 is a rack afforded a range of movement in a guideway e^{10}. The rack e^9 has plain surface extremities e^{11} and e^{12}, with eyes for receiving and securing at each of the ends a wire or cable h, leading to a complemental rack either above or below the same adapted to be connected with similar mechanism, as described, located adjacent to the opening of a hatchway or elevator-shaft about another landing or story of the building.

I is a pawl locking device pivotally connected to a bearing-plate i, which is secured to the beam a. This plate is provided with a back-stop i', for a purpose to be presently more fully explained.

The lower end of the pawl locking device I has a stud i^3 and a curvilinear base which is adapted to ride the incline or cam a^2 of the car, as clearly illustrated in Figs. 4 and 5.

In the illustration of Fig. 1 the mechanism is shown in normal position, that is, with the door closed and the rack and jaw e^5 disengaged, to permit of the shifting of a car or platform within the shaft or hatchway, so as to afford a landing at the opening.

In the operation of the door A', by shifting the same to the right, as illustrated in Fig. 1, the roller c^2, connected with the lever c, is depressed into the opening a^3, provided in the beam a, and the roller may then ride on the bottom of the door A', and in such movement it causes the link c^3 to actuate the saddle D of the longitudinal rod e, and thereby compress the springs f and e^8. At the same time the jaw e^5 engages positively with the teeth of the rack e^9. The offset part d^2 of the saddle is not in engagement with the pawl i^2 of the locking device I, because the cam a^2 has shifted the same into the position indicated in dotted lines in Fig. 5, the stud i^3 of said device riding on the incline or cam a^2 of the car, as indicated in Figs. 4 and 5. The car is thus locked from further movement when the floor of the car is on a plane with a landing of the hatchway or elevator-shaft closed by the sliding door A', and which by the foregoing operation has been slid to the right to afford passengers an opportunity to alight or freight to be delivered from the car to the landing or floor or vice versa.

The jaw e^5 (illustrated in Fig. 1) is provided with an oblong slot, so that the end of the rod e may have a range of play therein, under the influence of the springs f and e^8, and at the same time presenting the means whereby through the release of the jaw and rack from engagement from one another the rod may assume a position to the left, as shown in Fig. 1, that is, at the rear end of the slotted portion of the jaw e^5, and with the traveler-roller c^2, in engagement with the back edge of the door A', at the lower end thereof.

The mechanism of Fig. 2 differs from that of Fig. 1 in that the rack and jaw for positively locking the elevator car or platform while the door is open, and also to prevent the shifting of the car while the door happens to be unlatched, is located on the left-hand side instead of the right. In such an instance the rod e is cut off beyond the sleeve f' and the lever c is provided with a projection c^4, forming the same into a bell-crank lever, to the free extremity of which lever is pivoted a rod e^{14}, having at its opposite extremity (not shown) a mechanism substantially like that illustrated in Fig. 1 to the right for positively locking said rack e^9.

It will thus be observed that the only difference between the mechanism illustrated in Fig. 3 and that illustrated in Fig. 1 is instead of employing a rack e^9 and toothed locking-jaw e^5 as positively engaging means to lock the rod e, two friction-jaws e^5 and e^{15} grip the cable h'; and, moreover, upon the rod e, between the saddle D and the gripping-jaw e^5, are mounted springs f and e^8, abutting against adjustable collars o and o', so as to increase or decrease the tension under which said springs can be held to position thereon, as well as to compensate for wear or loss of tensile strength of said springs due to continuous use of the devices of my invention.

It will be observed that the fulcrumed lever c and the link c^3, when actuated to assume a position by the operation of the sliding door to cause the meshing of the jaw e^5 with the rack in Fig. 1, or the two-part friction gripping device of Fig. 3 to engage the cable, it will be absolutely impossible to shift the car, because the said rack, with its cable or wire of Fig. 1 or the cable of Fig. 3, are directly

connected in any suitable manner with the main shifting cord, cable, or device of the car, and hence there is insured a positive lock or grip through the intervention of said rod *e*, under spring tension or compression of said devices.

The racks e^9, together with the wires *h*, constitute controlling connections for the elevator, inasmuch as these parts either constitute the return connection of the controlling rope or cable, or are otherwise connected so as to move with the rope or cable in operating the valve. The same is true of the rope h^8. (Shown in Fig. 3.)

It will be manifestly obvious that as to minor details of my invention modifications may be made without departing from the spirit and scope thereof, and hence I do not wish to be understood as limiting myself to the precise construction and arrangement of all the parts of the same as herein explained and illustrated in the drawings; but,

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

1. In an elevator, the combination with the controlling connection, of a device adapted to engage said controlling connection, a saddle, mechanism controlled by said saddle for operating said device, an elevator-shaft door, a lever acted upon by said door, a link pivoted to said lever and resting upon said saddle and adapted to operate said saddle on the opening of the door, substantially as and for the purposes described.

2. In an elevator, the combination with the controlling connection, of a device adapted to engage said controlling connection, a spring, a saddle, mechanism controlled by said saddle for operating said device against the resistance of said spring, an elevator-shaft door, a lever acted upon by said door a link pivoted to said lever and resting upon said saddle and adapted to operate said saddle in the opening of the door, substantially as and for the purposes described.

3. In an elevator, the combination with the controlling connection, of a device adapted to engage said controlling connection, a rod connected with said device, a spring on said rod adapted to move said device out of engagement with the controlling connection, an elevator-shaft door, a lever acted upon by said door and a link connecting said lever and rod, substantially as and for the purposes described.

4. In an elevator, the combination with the controlling connection, of a device adapted to engage said controlling connection, a rod connected with said device, a spring on said rod adapted to move said device out of engagement with the controlling connection, a saddle secured on said rod, an elevator-shaft door, a lever acted upon by said door and a link connecting said lever and saddle, substantially as and for the purposes described.

5. In an elevator, the combination with the controlling connection, of a rack carried by said controlling connection, a rod, a locking-jaw carried by said rod and adapted to engage said rack, a spring on said rod adapted to move the locking-jaw out of engagement with the rack, a saddle secured on said rod, an elevator-shaft door, a lever acted upon by said door and a link connecting said lever and saddle, substantially as and for the purposes described.

6. In an elevator, the combination with the controlling connection, of a device adapted to engage said controlling connection, a saddle adapted to operate said device, an elevator-shaft door, a lever acted upon by said door and adapted to operate said saddle, a pawl adapted to lock the saddle to thereby through said lever prevent the movement of the door, a car, and means carried by said car to release the pawl when the car reaches the door, substantially as and for the purposes described.

7. In an elevator, the combination with the controlling connection, of a device adapted to engage said controlling connection, a saddle adapted to operate said device, an offset formed on said saddle, an elevator-shaft door, a lever acted upon by said door and adapted to operate said saddle, a pawl adapted to engage the offset to lock the saddle from movement and to thereby through said lever prevent the movement of the door, a car, an incline or cam carried thereby and a projection formed on said pawl and adapted to ride on said incline or cam to thereby retract the pawl from said offset, substantially as and for the purposes described.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JOHN D. CONNER.

Witnesses:
J. WALTER DOUGLASS,
RICHARD C. MAXWELL.