(No Model.) 2 Sheets—Sheet 1.

H. W. RAPPLEYE.

SAFETY DEVICE FOR ELEVATORS.

No. 560,645. Patented May 26, 1896.

FIG. 1.

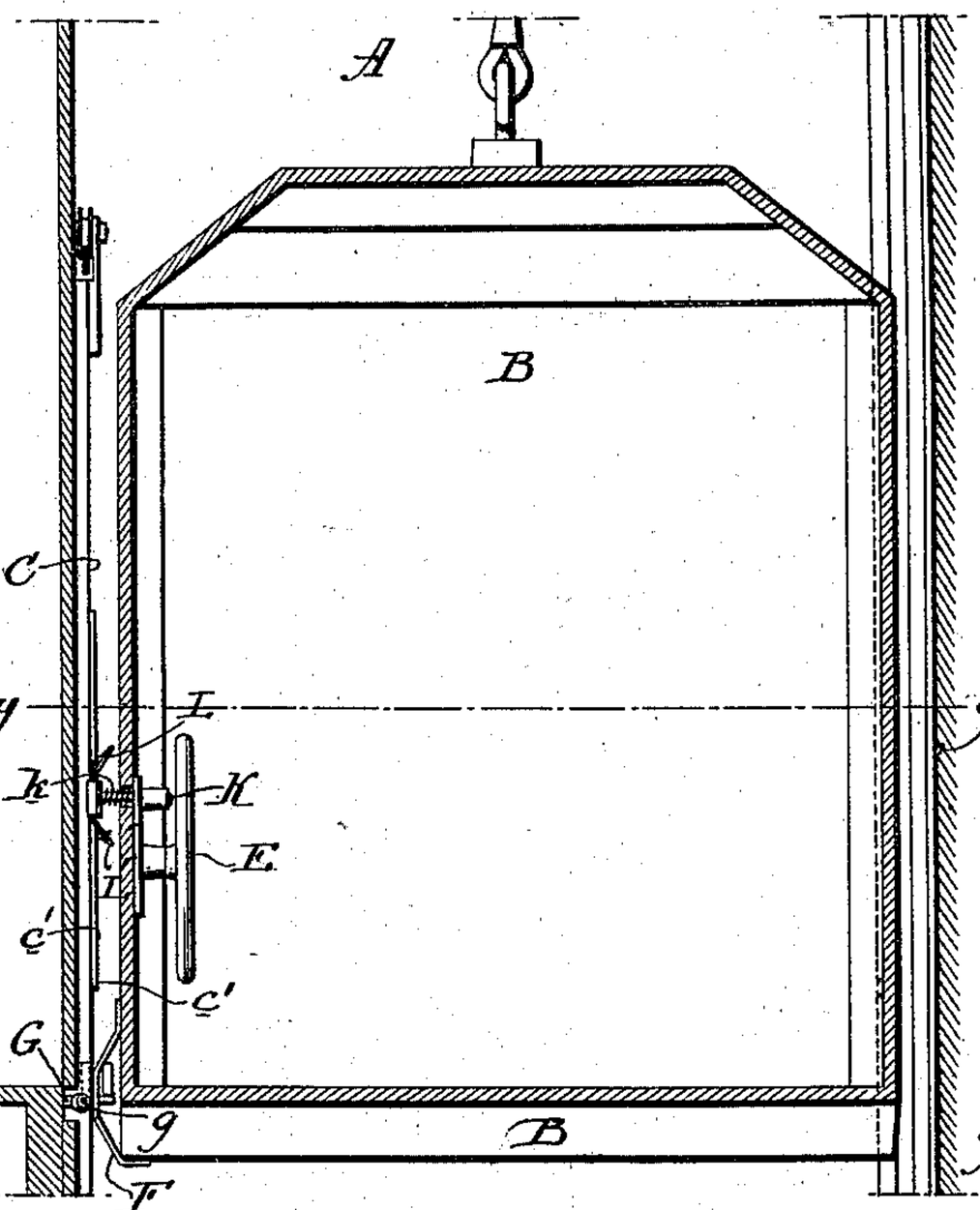


FIG. 3.

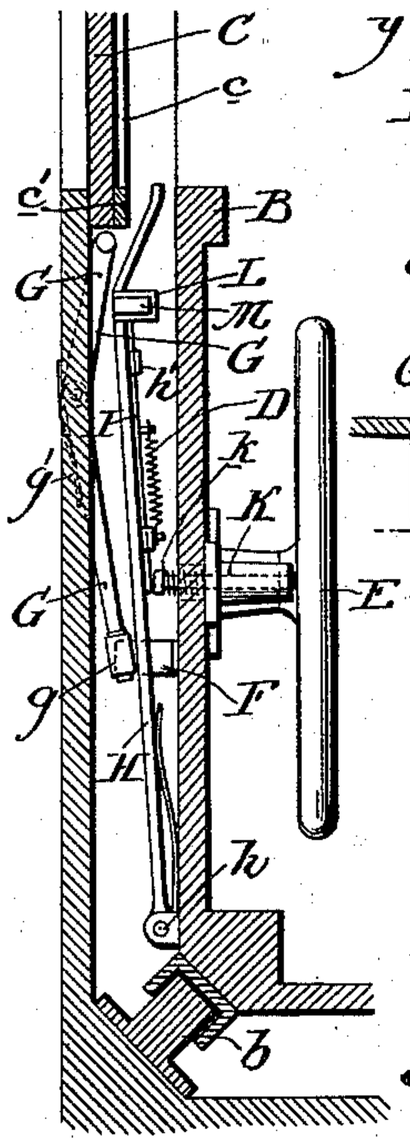


FIG. 4.

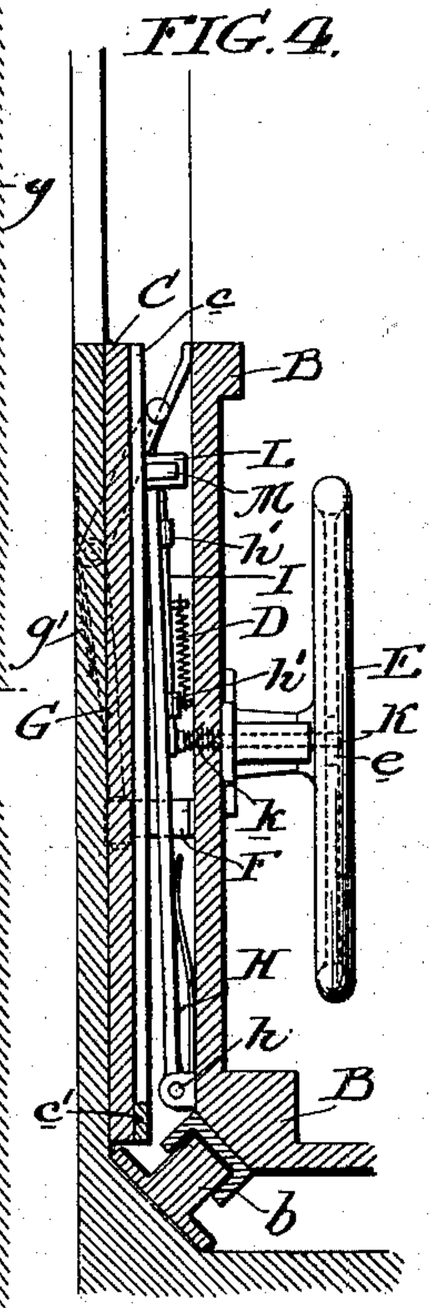


FIG. 2.

FIG. 6.

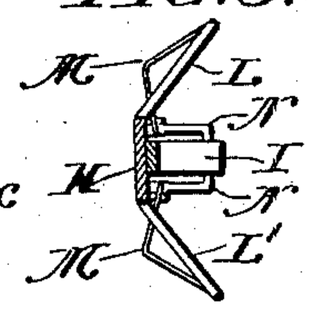
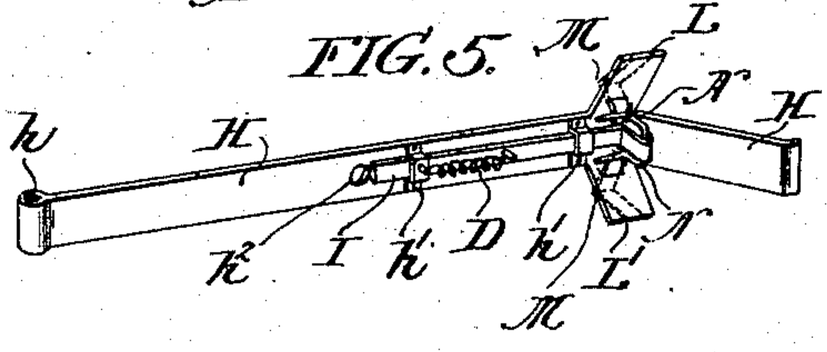


FIG. 5.



Witnesses.

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(No Model.) 2 Sheets—Sheet 2.

H. W. RAPPLEYE.

SAFETY DEVICE FOR ELEVATORS.

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FIG. 7.

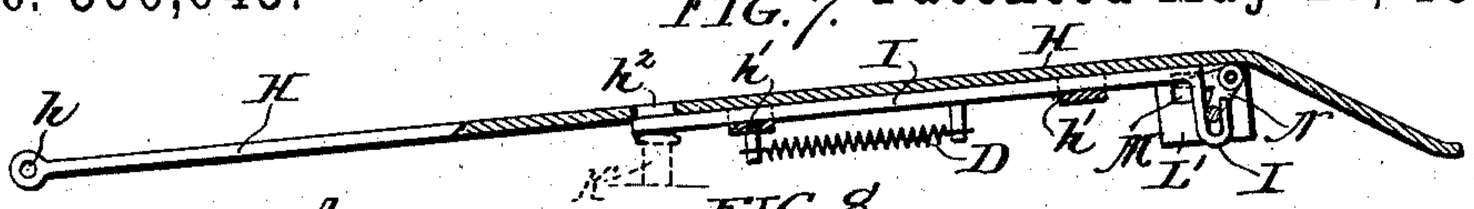


FIG. 8.

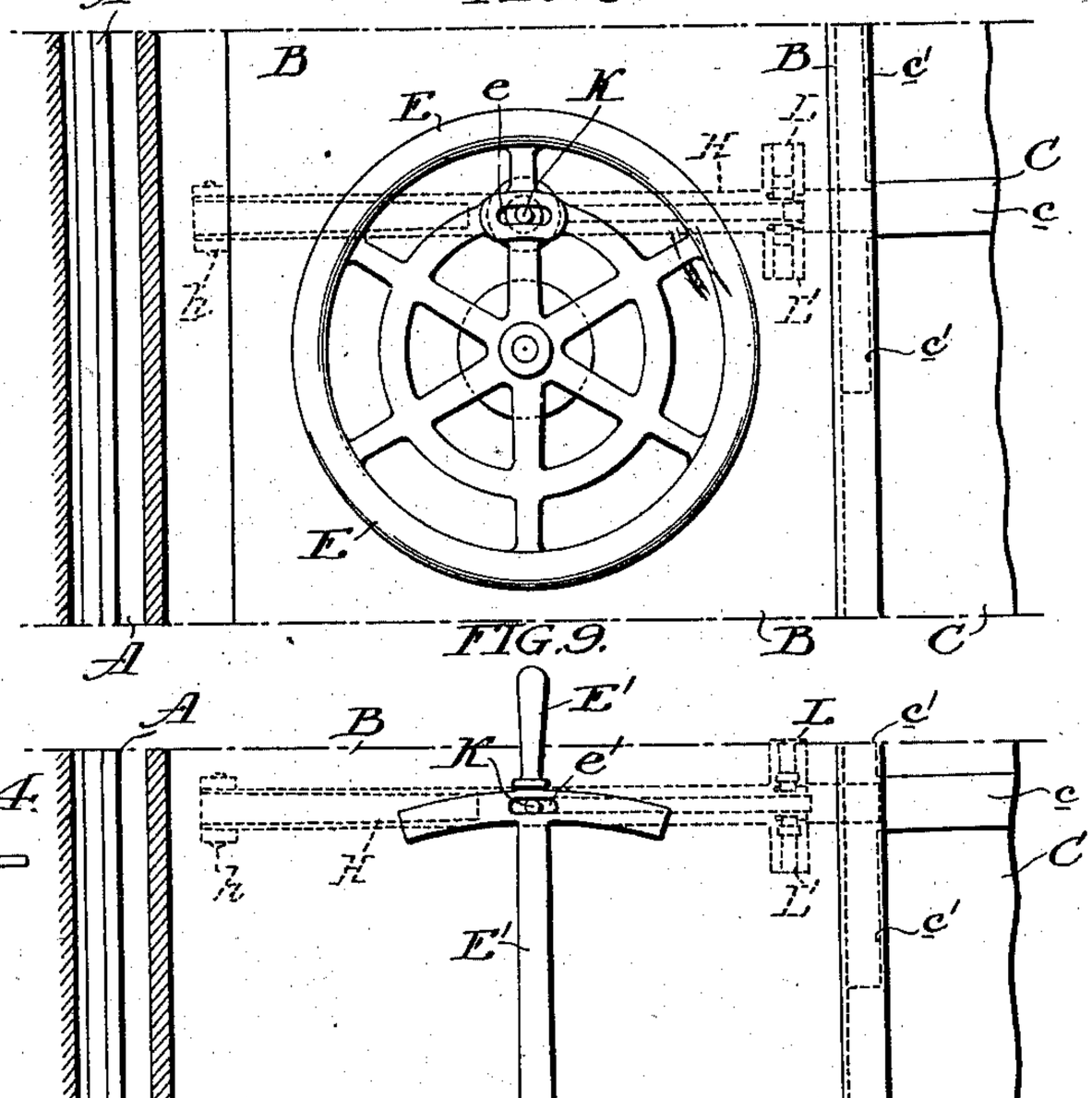


FIG. 9.

Fig. 14.

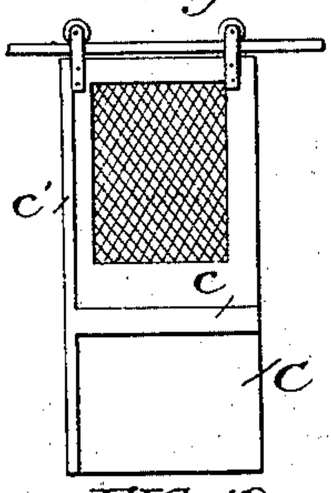


FIG. 12.

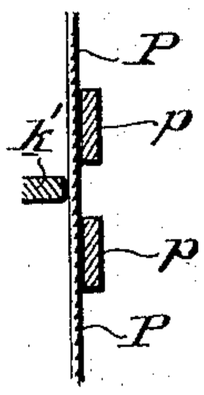


FIG. 13.

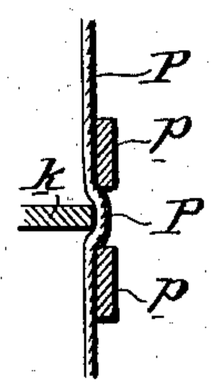


FIG. 10.

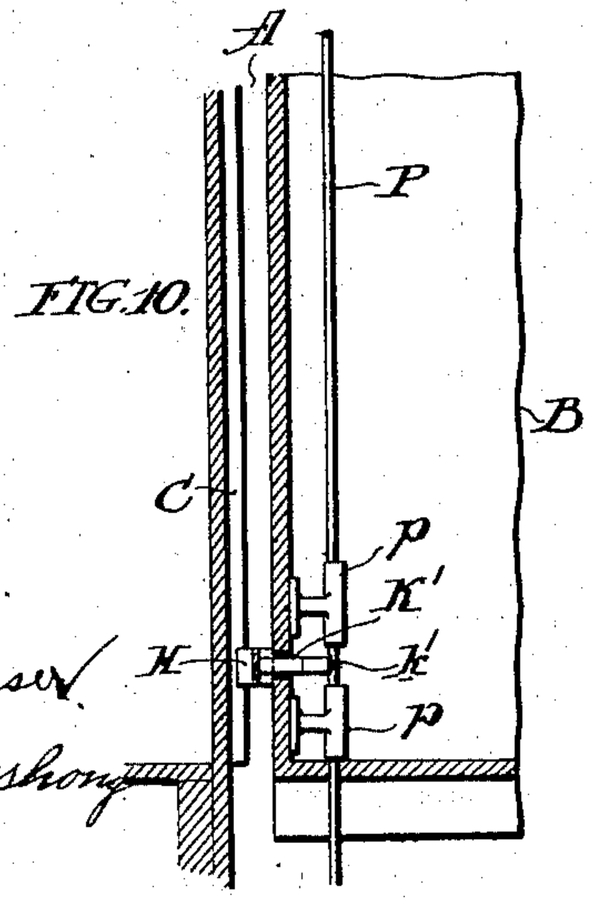
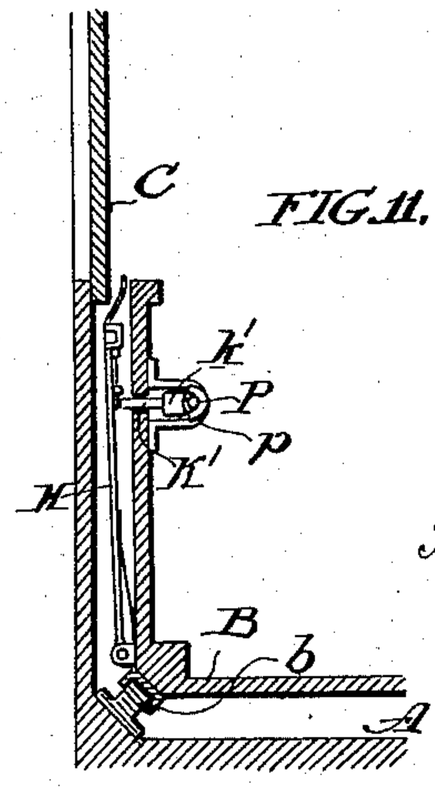


FIG. 11.



Witnesses.

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UNITED STATES PATENT OFFICE.

HANNIBAL W. RAPPLEYE, OF PHILADELPHIA, PENNSYLVANIA.

SAFETY DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 560,645, dated May 26, 1896.

Application filed March 7, 1896. Serial No. 582,186. (No model.)

To all whom it may concern:

Be it known that I, HANNIBAL W. RAPPLEYE, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Safety Devices for Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to safety devices for elevators, and has for its object, first, to prevent the well-door opening into the elevator-shaft from being opened except when the car is immediately opposite the landing; second, to lock the controlling mechanism when the well-door is opened for ingress to the car and hold it locked until the door is wholly closed, and, third, if the well-door should be opened during the operation of the car, and when the car is not opposite the landing guarded by said door, by means of a master-key, the controller-locking mechanism on the car will not be operated by such open door as it will be when the door is opened while the car is opposite the landing.

The invention consists in the construction, arrangement, and combination of parts hereinafter fully described, and defined in the claims.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of shaft, car, and controller-locking and door-locking mechanism. Fig. 2 is a plan view, partly in section, of same, showing the door closed but unlocked and the controller unlocked. Fig. 3 is a view similar to Fig. 2 of a portion of Fig. 2, enlarged, showing the door closed and locked and the controller unlocked. Fig. 4 is a view similar to Fig. 3, showing the door unlocked and open and the controller unlocked. Fig. 5 is a perspective view of the main locking-bar and mechanism secured thereto, adapted to render said bar inoperative when the traveling car strikes an open door. Fig. 6 is an enlarged sectional view of a portion of Fig. 5. Fig. 7 is an enlarged sectional view of the parts shown in Fig. 5. Fig. 8 is a view showing the application of my invention to a controlling wheel or sheave. Fig. 9 is a similar view showing the application of my invention to a controlling-lever. Fig. 10 is a side view, with the car and shaft in section, showing the application of my invention to the control-rope. Fig. 11 is a plan view, partly in section, of the parts shown in Fig. 10. Fig. 12 is a sectional view of the control-rope-locking device disengaged from the rope. Fig. 13 is a similar view showing the rope locked. Fig. 14 is a face view of the door with ledges applied thereto.

A is the shaft; B, the car; *b*, the guides therefor; C, the well-door, the controller being shown as a wheel E in Figs. 1, 2, 3, 4, and 8 and a lever E′ in Fig. 9.

I will first describe my device for holding the door locked when the car is not opposite the landing.

F is a cam (shown in Figs. 1, 2, 3, 4, and 9) secured to the lower end of the front of the car. To the inside of the shaft just beneath each floor is pivoted intermediately a door-locking lever G, carrying a roller *g* at one end in line of travel of the cam F and bent upwardly at its opposite end, so as to lie immediately opposite and in line with the end of the well-door. A leaf-spring *g′* normally holds the lever G in this position, thus preventing the door from being opened, as shown in Fig. 3.

When the car approaches the floor, the cam F engages one end of the lever G, pushing it out toward the shaft, pushing in toward the car the opposite end of the lever and removing out of path of travel of the well-door the upwardly-bent end of said lever, as shown in Figs. 2 and 4. If the car stops at the floor, the cam holds the lever in its unlocking position and the well-door is free to open, as the horizontal part of the lever is beneath the bottom of the door. If the car does not stop at the landing, or when, after having stopped, it moves away and the door is closed, the cam recedes from the lever, the spring *g* returns it to its normal position, and the door is again locked. The operation is the same whether the car is moving up or down.

I will next describe my device for holding the controller locked when the car stops at a landing and the door is opened.

H is a horizontal bar, sustained by and pivoted to the car at *h*, which I call the "main locking-bar." This bar extends from its pivot-

point obliquely outwardly to a point a short distance from the end of the sliding door, but not so far outwardly as to be in the line of movement of the door proper. Thence it extends obliquely inwardly. Along the inner side of the door and forming a part of it is secured a horizontal ledge or projecting frame *c*, about four inches in width and of the length of the width of the door, and of such thickness that when the door is opened and the car is opposite the landing the ledge will engage the bar H and move it inwardly on its pivot, the bar thus acting as a cam. This bar is spring-pressed, as shown, to insure its return to its normal position when the door is closed. Secured in guides *h'* on bar H, but longitudinally movable therein, is a secondary locking-bar I, one end of which normally extends over and covers a perforation h^2 in the main locking-bar H. Through an orifice in the front of the car slides a locking-bolt K, surrounded by a coil-spring *k*, one end of the bolt impinging against the end of the secondary locking-bar, the other and inner end of the bolt terminating a short distance from the controlling-wheel E. When the wheel E is brought to a central position to stop the car, the slot or orifice *e* in said wheel is brought immediately opposite the bolt K. When the door is opened, the ledge on the car engages the main locking-bar H, thrusting it and the secondary locking-bar I in toward the car. The bar I engaging the locking-bolt K will push the latter into the slot or orifice *e* in wheel E. So long as the well-door remains wholly or partially open the ledge will be in engagement with bar H and the bolt in engagement with wheel E, so that the latter cannot be moved to start the car until the well-door is wholly closed. The means for locking the lever E' when the latter is adopted as a controller is precisely the same as the means for locking the wheel, there being a slot or orifice *e'* in the lever having the same function as the slot in the wheel.

The reason for providing two locking-bars, one adapted to cover a slot in the other and relatively movable thereto, will be apparent hereinafter. So far as the controller-locking mechanism alone is concerned the secondary bar is wholly unnecessary. It may be dispensed with and the main bar made solid, so that the latter will impinge against and operate the bolt.

It sometimes happens that it is desirable or even necessary for the well-door to be opened, by means of a master-key, for repairs to the shaft, &c., without interrupting the elevator service. The third object of my invention is to provide safety mechanism connected with the controller-locking mechanism which will automatically render it inoperative and at the same time prevent it from breakage when, carried by a moving car, it strikes the ledge of a door which has been opened by the mechanic or some one in authority. I will now describe the mechanism which I have adopted for this purpose.

Secured to or made integral with the main bar are two wings L L', extending obliquely and inwardly, one wing, L, extending upwardly, and the other wing, L', downwardly from the bar. Pivoted to the end of each wing is a cam-plate M, the free end of the same extending inwardly through a slot in the wing and bent in toward the bar, so as to lie between it and one end of a bell-crank lever N, pivoted to the main bar. The opposite end of said bell-crank engages the hooked inwardly-bent end of the secondary bar.

When a well-door is open, the ledge thereof is of course in line of travel of the bar H, and as the car approaches the landing the ledge will first be engaged by the cam M on one of the wings, dependent upon the direction in which the car is moving, effecting the depression of the cam and thereby drawing the bar I along the main bar and uncovering the slot therein. Further movement of the car brings the wing and then the main bar into engagement with the ledge, moving the bar inwardly toward the car to the same extent as when the door is opened after the car has stopped; but the locking-bolt will not be depressed, as its outer end will pass through the perforation in the bar H in consequence of the bar I being withdrawn from over the perforation, for as soon as the cam M moves away from the ledge the bolt begins to be projected through the slot, thus preventing the return of the bar I until the car moves away from the landing. The stoppage of the car at this landing will therefore not lock the controller, and there is no danger of the controller-locking devices breaking by striking the door-ledge, as would occur were the said devices not provided with safety mechanism. The bar I is returned by means of the coil-spring D when the car recedes.

In Figs. 10, 11, 12, and 13 there is shown means for applying the locking devices directly to the operating-cable. P represents the control-rope, and secured to the inner frame of the car are brackets which sustain stationary clutches *p p*, partially surrounding the operating-cable. A movable clutch *k* is carried by the inner end of the locking-bolt K'. In Fig. 12 the clutch is shown in its inoperative position, while in Fig. 13 the clutch is shown in its operative position, grasping the rope between the guides *p p*. When the rope is clutched, the controller cannot be manipulated until the bolt is withdrawn by the closing of the door.

Vertical ledges *c' c'* extend along the inner edge of the door above and below the horizontal ledge *c*. These ledges may be made integral with each other and then secured to the door, or both ledges may be made integral with the door. These vertical ledges prevent the door from being opened when the car is a few inches above or below the level of the floor unless the control device is moved

to the center; otherwise in attempting to open the door the vertical ledge will be stopped by the lever H, which cannot be moved in toward the car for the reason that the bolt K will strike the solid portion of the lever or wheel.

In the claims I have used the term "controller" to indicate, broadly, the means of regulating the operating mechanism, whether the rope itself or a lever or sheave, while the term "controlling device" has been used to indicate the lever, sheave, or other means for operating the rope.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. In an elevator, the combination with the car, its controller and the well-door, of a locking-bolt carried by the car adapted when actuated to lock the controller, a locking-bar adapted to engage the bolt, one end pivoted to the car and the other end in line of travel of the well-door, whereby when the door is opened the bar will be moved to actuate the bolt and lock the controller.

2. In an elevator, the combination with the car, its controller and the well-door, of a ledge on the door, a locking-bolt carried by the car adapted when actuated to lock the controller, a locking-bar adapted to engage the bolt, one end pivoted to the car and the other end in line of travel of the ledge, whereby when the door is opened the bar will be moved to actuate the bolt and lock the controller.

3. In an elevator, the combination with the car, its controller and the well-door, of controller-locking mechanism carried by the car adapted to be engaged and operated by the opening of said door when the car is opposite the landing, and means connected with the controller-locking mechanism in alinement vertically with the open door, adapted when operated by engagement with the door to render said mechanism inoperative.

4. In an elevator, the combination with the car, its controller and the well-door, of a locking-bolt carried by the car adapted when actuated to lock the controller, a locking-bar having a perforation in alinement with the bolt, one end pivoted to the car and the other end in line of travel of the well-door, a secondary locking-bar movable upon the main bar and normally covering said perforation, whereby when the door is opened the bars will be moved to actuate the bolt and lock the car, and a cam connected with said secondary bar in alinement vertically with the door when open and adapted when operated to move the secondary bar and uncover the perforation.

5. In an elevator, the combination with the car, its controller and the well-door, of a locking-bolt carried by the car adapted when actuated to lock the controller, a locking-bar having a perforation in alinement with the bolt, one end pivoted to the car and the other end in line of travel of the well-door, a secondary locking-bar movable upon the main bar and normally covering said perforation, whereby when the door is opened the bars will be moved to actuate the bolt and lock the car, upwardly and downwardly projecting wings on the main bar, a cam carried by each of said wings in alinement vertically with the open door, and a bell-crank pivoted to the main bar, one end lying adjacent to said cam and the other end engaging the secondary bar.

6. In an elevator, the combination with the car, its controlling device and the well-door, of a locking-bolt carried by the car, in alinement with an orifice in said controlling device when the latter is in its central position, and the bolt-operating mechanism in line of movement with the door, whereby when the car is opposite a landing and the door is opened said mechanism will be moved to move the bolt into said orifice.

In testimony of which invention I have hereunto set my hand.

HANNIBAL W. RAPPLEYE.

Witnesses:

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CAROL H. DESHONG.