No. 753,572. PATENTED MAR. 1, 1904.

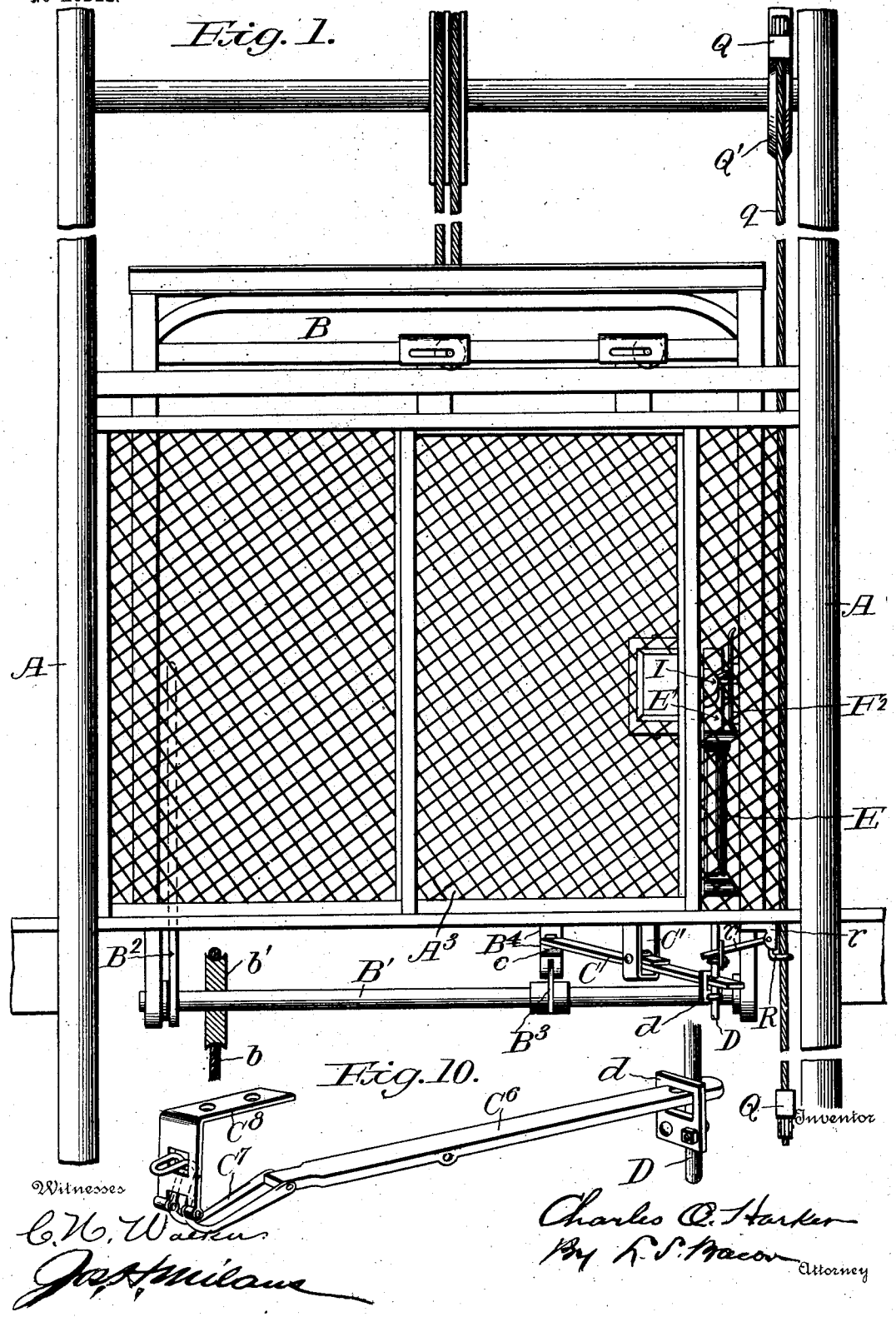
C. O. HARKER.

DOOR LOCKED CONTROLLER FOR ELEVATORS.

APPLICATION FILED OCT. 30, 1902. RENEWED JAN. 22, 1904.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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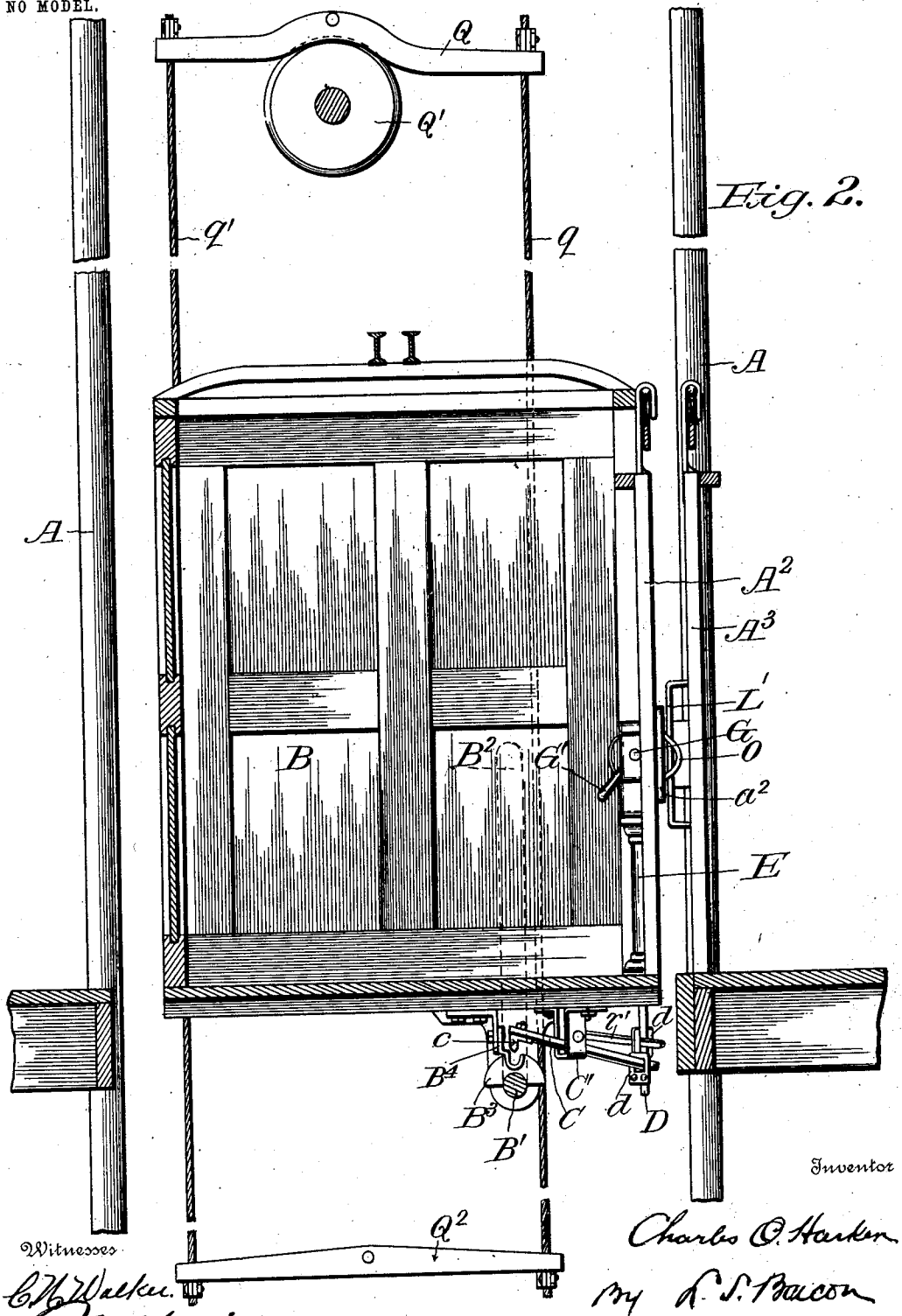
NO MODEL. 4 SHEETS—SHEET 2.

Fig. 2.



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NO MODEL. 4 SHEETS—SHEET 3.

Fig. 3.

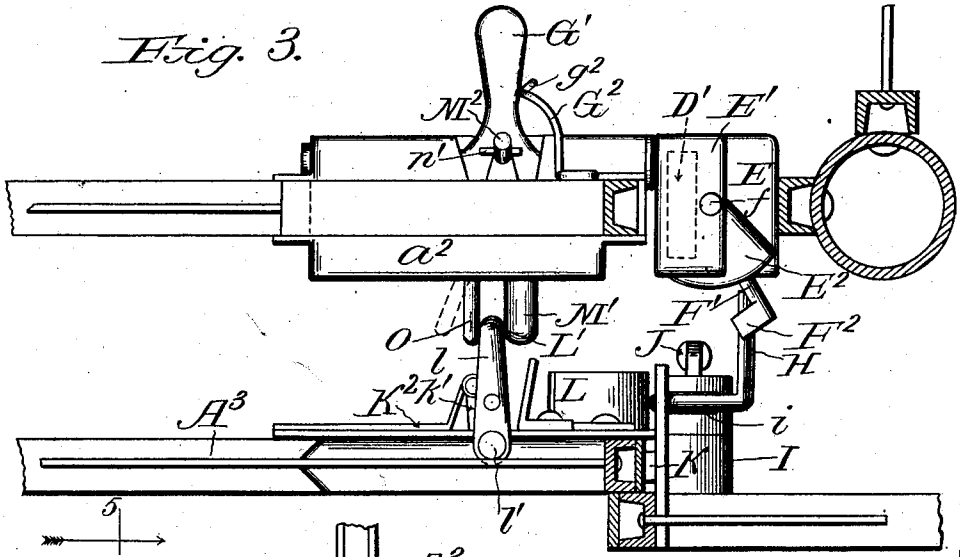


Fig. 4.

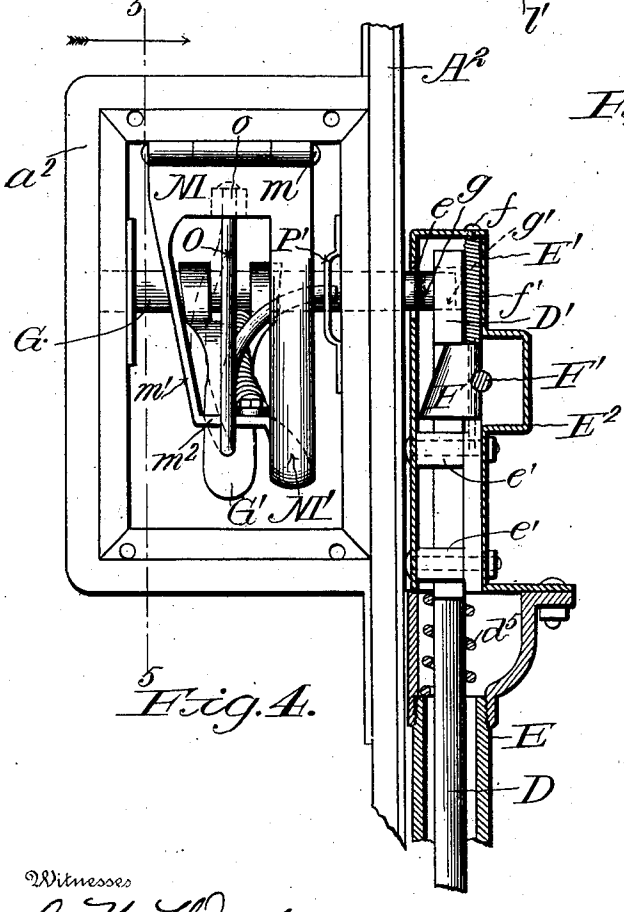
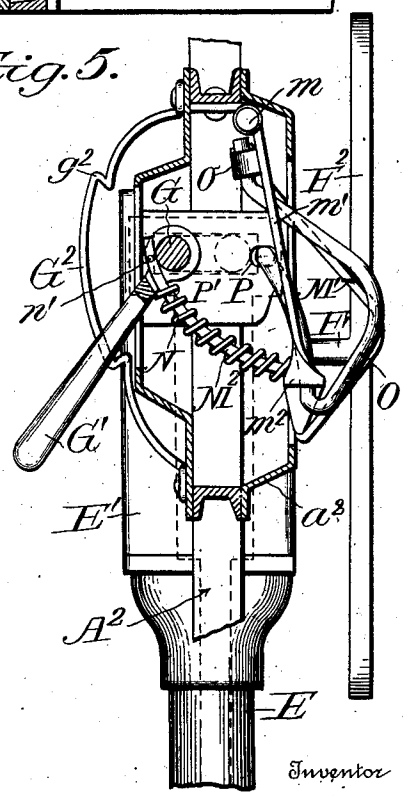


Fig. 5.



Witnesses

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NO MODEL. 4 SHEETS—SHEET 4.

Fig. 6.

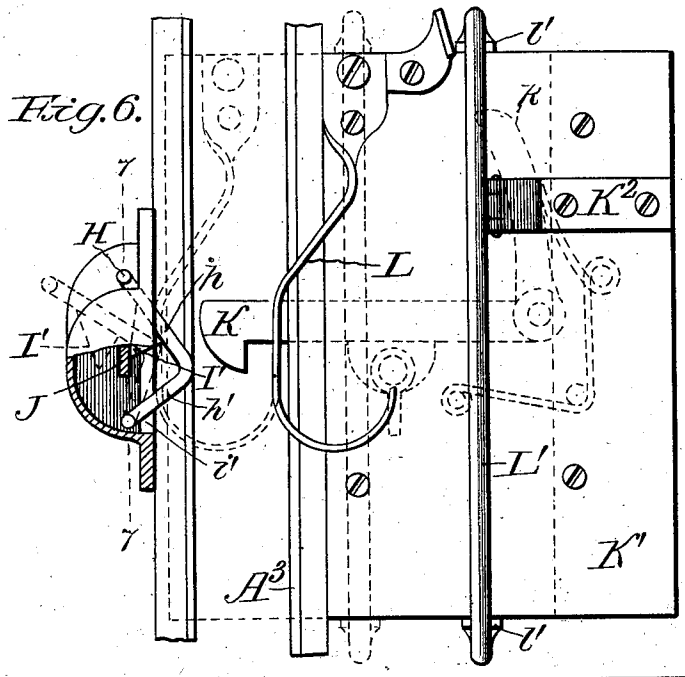


Fig. 7.

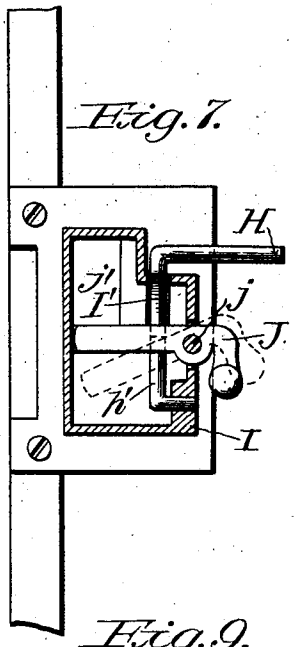
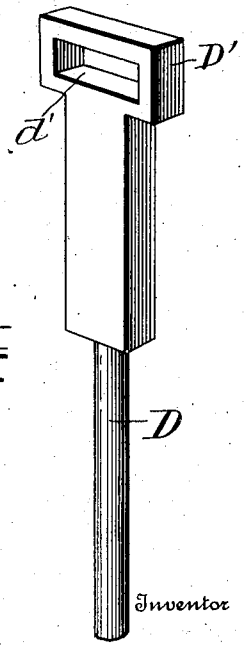


Fig. 9.



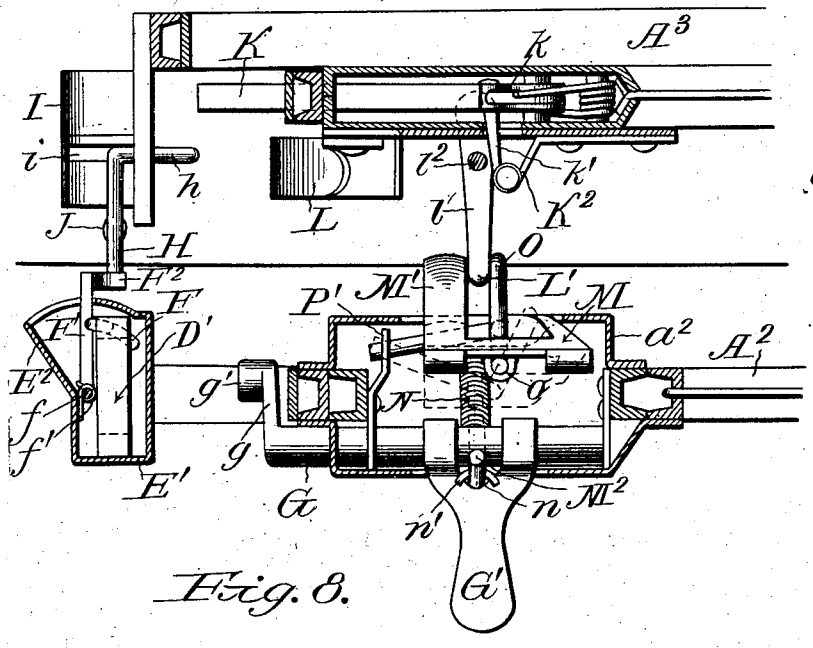


Fig. 8.

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No. 753,572. Patented March 1, 1904.

UNITED STATES PATENT OFFICE.

CHARLES O. HARKER, OF SIOUX CITY, IOWA.

DOOR-LOCKED CONTROLLER FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 753,572, dated March 1, 1904.

Application filed October 30, 1902. Renewed January 22, 1904. Serial No. 190,238. (No model.)

To all whom it may concern:

Be it known that I, CHARLES O. HARKER, a citizen of the United States, residing at Sioux City, in the county of Woodbury and State of Iowa, have invented certain new and useful Improvements in Door-Locked Controllers for Elevators, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in door-locked controllers for elevators; and it is embodied in the construction and arrangement of parts presently to be described, and defined in the claims.

Generally speaking, the invention relates to an improvement in mechanism actuated by a door for rendering operative or inoperative means for controlling the elevator.

In the general class of door-locked controllers many suggestions have been advanced whereby the movement of a single door results in the locking or unlocking of the controller.

My invention comprehends mechanism whereby the elevator-controlling means is rendered operative and inoperative solely by the joint action of the door to the shaft or well and the door on the cage, and I am not aware that heretofore it has ever been suggested to utilize the two doors jointly and coactively for such purpose.

My invention also comprehends suitable mechanism for locking the controller, which mechanism is operative only when a door is closed as distinguished from those devices wherein the controller is locked by means independent of the door-actuating means.

The invention also comprehends improvements in locking mechanism for the doors and in various details of construction and arrangement presently to be described.

In the accompanying drawings I have shown a construction embodying the invention; but it is to be understood that various changes and modifications are contemplated and can be made without in the least departing from the nature and spirit of the invention.

Figure 1 is an elevation of a section of an elevator-shaft, showing a cage and various other features, the general arrangement of the cage being shown as largely diagrammatic. Fig. 2 is a vertical section taken at a right angle to the construction shown in Fig. 1, the general features of the shaft and cage being shown conventionally without regard as to accuracy of detail, the same not being a part of my invention. Fig. 3 is a detailed plan view of the forward edge of the well, cage-doors, and other adjacent parts. Fig. 4 is a side elevation of the locking and actuating lever on the cage-door, the front plate being removed and showing parts in section. Fig. 5 is a section through the line 5 5 of Fig. 4, showing a portion of the lever in section. Fig. 6 is a view of the well-door latch looking from the inside and a portion of the keeper, shown in section. Fig. 7 is a detail section taken through the line 7 7 of Fig. 6. Fig. 8 is a plan view in section of the construction shown in Fig. 3, showing the doors partly open. Fig. 9 is a detail perspective view of the reciprocating bar. Fig. 10 is a perspective view of the construction of controlling-grip for use in connection with a standing-rope controller.

A designates the vertical upright of the elevator well or shaft, and B the cage or car, having mounted on its bottom the controller-shaft B′, having a lever or shive b', to which the controlling-rope b is attached. In this connection I would state that the controlling feature or mechanism can be of any of the preferred forms of "standing-rope" type. In the drawings I have shown the operating-lever B^2 extending into the cage.

On the shaft B′ is a notched segment B^3, working in a fixed guide B^4, depending from the bottom of the cage. With the notch of this segment a detent c is adapted to coöperate and when positioned in the notch prevents the rotation of the shaft B′. The detent c is carried by a rocking lever C on a suitable pin carried by brackets C′ on the base of the cage, the outer end of the lever C being apertured, through which aperture the lower end of the reciprocating bar D passes, a loose connection being formed by a suitable clip d, secured to the bar D, through which clip the end of the lever passes, as shown in Figs. 1, 2, and 12. This connection permits of the oscillation of the lever C by the vertical movement of the bar D.

E designates a hollow casing or pillar mounted on the cage adjacent to the front edge of

the door-opening, as shown in Fig. 1, and through this pillar the reciprocating bar D is passed. The upper end of the pillar E carries a housing E′ substantially rectangular in shape, while the upper end of the bar D carries a squared head D′, having a horizontally-elongated slot d' therein positioned in the upper part of the housing E′. (Shown in dotted lines, Fig. 3.) In the front face of the housing E′ is a horizontal slot e, corresponding in shape and size to the slot d' of the head D′. The normal tendency of the bar D is to move downwardly, which movement is limited, and the bar is guided by guides e' in the housing E′. The weight of the bar may be sufficient to trip the lever C, raising the detent c from the groove in the segment B^3, as shown in Fig. 1. This movement of the bar is resisted by relatively light spring d^5, surrounding the same, as shown in Fig. 4, the tendency of which is to normally hold the bar up against its own weight.

To lock the head D′ in elevated position with its slot registering with the slot e of the casing E′ a suitable oscillating catch F is employed, the same being pivotally mounted on a vertically-arranged spindle f, journaled in one of the guides e' and conveniently in the top of the casing, as shown in Fig. 4. This spindle has a spring f' sleeved thereon, the normal tendency of which is to force the holding-catch into position below the head D′, as shown in Fig. 8 at the left. The holding-catch F has its forward face slightly beveled, so that the initial movement will set the head D′ above the beveled surface, and when the head moves downward it will cause a complete oscillation of the catch. To the catch is attached a horizontal rod F′, extending out beyond the side of the casing E′ and carrying on its outer end an elongated bar F^2, extending an equal distance in opposite directions, as shown in Fig. 5. To permit the oscillation of the retaining-catch F, an offset E^2 is made in the housing E′.

By the above-described construction it will be observed that when the head D′ is elevated the retaining-catch F will hold it in its elevated position, in which position the detent c on the lever C engages with the notch in the segment B^3, locking the controller against movement. Should, however, the head D′, with the bar D, be released from the retaining-catch F, it would be free to be moved downward, and thereby throw the detent out of the notch in the segment, as shown in Fig. 2. To facilitate this downward movement and to positively release the detent from the notch and also to prevent the reciprocating bar D from moving after the catch F has been removed, I employ the following instrumentalities: Mounted on the cage-door A^2 is a lock frame or housing a^2, having mounted therein in suitable bearings a horizontal shaft G, the forward end of which projects beyond the casing and is provided with a crank-arm g, having a cylindrical lug g' at the end of its outer face. This lug g' is in diameter sufficient to enter into the slot d' of the head D′, and the crank-arm g, being relatively thin, is permitted to move between the head D′ and the adjacent face of the housing E′, as shown in Fig. 4. Therefore when the parts are brought into engagement the lug g' occupies a position within the slot d', and upon turning the shaft G the head D′ will be moved up or down, as the case may be. To effect this turning of the shaft, a hand-lever G′ is fixedly secured thereto, the same projecting through an opening in the casing a^2. To retain this hand-lever in position of extreme adjustments up or down, a spring-keeper G^2 is employed, having notches g^2, with which the lever G′ engages, as shown more clearly in Fig. 5.

The means above described constitutes convenient mechanism for actuating the bar positively; but it will be observed that to permit the movement of the lever G′ when the door is closed and the lug g' is located in the slot of the head D′ it is necessary to first remove the retaining-catch F from beneath the head D′. This is accomplished through the medium of the well-door A^3 as the same is forced into its latching position. The mechanism for accomplishing this desired result is more particularly shown in Figs. 6, 7, and 8 and consists conveniently of a swinging finger-bar H, which has its end extending outward to a point opposite the tripping-bar F^2 when the cage is at the doorway. The inner end of this finger-bar H is bent obliquely downward, as at h, and thence obliquely downward in an opposite direction, as at h', its extreme end being bent horizontally at right angles and journaled in the keeper-boxing I, as shown in Fig. 7. The boxing I has a slot i in its upper surface, and the forward face of the boxing is slotted, as at i', and through these slots project the angular portions of the tripping-finger H, as shown in Fig. 6. On the under side of the inclined face of the tripping-finger is a substantially **V**-shaped catch I′, having an inclined upper face and a substantially horizontal lower edge.

J designates a pivoted locking-dog mounted on a pin j in the side of the box I, its outer end being weighted, while its inner end is extending inward substantially across the box I and directly below the hook-opening j'' in the front face of the box I, as shown in Fig. 7. This dog J is positioned so that when the **V**-shaped projection I′ is in its extreme forward position, as shown in Fig. 6, the dog will assume a position directly back of the same, so that the trip-finger is locked against movement on its pivot. As soon, however, as the latching-hook K of the latch mechanism for the door A^3 of the well is forced through the opening j'' its hooked end will be forcibly thrown down in the usual manner by the spring of the latch

and in its descent will strike the end of the dog J, forcing it down out of contact with the projection J′ of the trip-finger, releasing the V-shaped projection I′ and permitting the movement of the part H. During the closing movement of the door A^3 the protruding end of the tripping-finger formed by the junction of the angular portions *h* and *h′* is brought into contact with an actuating-spring L, and as the door is closed the spring L is tensioned, the pressure being against the tripping-finger, and as the latch K tilts the dog J the pressure of the spring L will throw the tripping-finger H outward, bringing the protruding end into engagement with the tripping-bar F^2, and thereby force the retaining-catch F from beneath the head D′ of the reciprocating bar D. In this position the movement of the hand-lever G′ will turn the crank at its end, forcing the bar D down, raising the controlling mechanism and at the same time locking the cage-door by turning the crank vertically in the housing.

It will be observed that by the construction thus far described it is necessary that the outer door first be closed before the controlling means can be released, and, further, that the movement of the controlling means is prevented by the locking means on the cage-door and is only operated when the handle G′ is turned to force the reciprocating bar D downward. Therefore the complete closure of both doors is necessary before the controlling means can be released—a principle which I believe in this particular art has never heretofore been suggested. To secure a simultaneous movement of the two doors and to unlatch the two doors at the same time, I have provided the following instrumentalities: The lock K′ of the outer door is or may be of a conventional type having the catch K and a rigid right-angle extension *k*, (shown in dotted lines, Fig. 6,) against which latter extension the actuating-spring rests. Usually this extension *k* is actuated by the hand of the operator. In my construction I introduce a mechanical finger *k′*, extending through the casing of the lock, its inner end arranged to press against the extension *k*, while its outer end is pivoted to a suitable bracket K^2, mounted on the side of the lock. The means for pressing this finger backward to raise the latch K consists conveniently of an elongated vertically-disposed bar L′, having its opposite ends *l* bent inward and pivoted, respectively, to the top and bottom of the lock-casing K′, as at *l′*. This bar is located beyond the door and projects into the elevator-well, and between the same and the lock-casing is a vertical cross-bar l^2, positioned directly in front of the finger *k′*, as shown in Fig. 8, so that as the bar L′ is moved transversely on its pivot the cross-bar will be brought into contact with the finger *k′*, raising the latch K and unlocking the outer door. To permit this movement being had or secured by the operator within the cage, I provide the inner or cage door with devices interlocking with or engaging the actuating-bar L′, which devices consist of the following constructions: Located within the casing of the lock of the inner bar a^2 is a vibrating plate M, conveniently pivotally secured at its upper end by a pivot *m* to the upper part of the lock-casing. (See Fig. 4.) This plate has an outwardly-curved arm M′ of substantially V-shaped form, the lower end being extended back and slightly upward and for the sake of rigidity of structure terminates in the bracing-arm *m′*, formed of an extension of the plate M. This bracing-arm is positioned at the opposite side of the plate M, leaving an opening or spaces between the two arms *m′* and M′. To move the plate M upward and inward, a curved finger or arm M^2 is extended from the lower part m^2 up to and passes through a guide-groove *n* at the base of the lever G′. The bar or arm M^2 is perforated, and a pin *n′* is passed through the perforations above the lever G′. A spring N is sleeved on the arm M^2 between the lower end of the brace *m′* and the under surface of the lever G′, the tendency of which is to force the arm M′ outward to the position shown in Fig. 5, while at the same time, owing to the loose connection between the arm M^2 and the lever G′, the gripping-arm M′ may be forced backward should the same meet with an obstruction during the upward or downward movement of the cage. Manifestly it is necessary to embrace the bar L′ on both sides, so that the doors may be moved backward and forward together. To accomplish this, I provide a movable gripping-arm O, pivoted at its upper end in the block *o* on the inner face of the plate M. This arm O is bent outward on lines substantially like those of the gripping-arm M′, and its opposite end is carried first upward and thence transversely into a slightly-elongated opening P in the bracket P′ on the side of the lock-casing. The position of the horizontal end of the jaw O, in connection with the pivoting of the upper end of the jaw, results in a movement of the jaw O toward and from the jaw M′, as shown in dotted lines, Figs. 4 and 8, and this movement is acquired when the handle G′ is moved up—that is to say, when the handle G′ is in an elevated position the two jaws will be drawn in or retracted and at the same time the jaw O will be turned on its pivot transversely. This is important in that as the operator arrives at a point where he wishes to actuate the doors he forces the handle G′ downward, carrying the two jaws M′ and O outward and on opposite sides of the actuating-bar L′, and in a continued movement the jaws are brought into parallelism, as shown in Fig. 4 and Fig. 8, and closely grip the sides of the bar L′, so that upon the movement of the inner door the latches are first raised and the doors moved backward on their rollers

and upon closing of the doors the latch on the outer door is permitted to drop, entering its keeper-opening, raising the dog, permitting the spring L to force the tripping-arm over into engagement with the tripping-bar D, thereby raising the bar D from its retaining-catch F and permitting the operator to raise the handle G′, forcing the lug g' downward, together with its inclosing head D′ and the bar D, locking thereby the controlling mechanism.

In view of the above description of the construction and the description of the operation, it is thought that a further detail description of the operation is unnecessary. It is, however, to be observed that in the mechanism the following important features are present: first, means for uniting the two bars for conjoint movement; second, means for permitting one member of the uniting means to yield against contact with fixed projections; third, means for preventing the actuation of the controller until both doors are firmly closed, and, fourth, convenient means for actuating a door-lock-controlling device.

In addition to the above-described mechanism I propose to provide a stop against the elevator creeping, and this consists conveniently of a brake bar or shoe Q, pivoted at the upper end of the shaft and having its opposite ends extending on opposite sides of the suitable friction-wheels Q′, mounted on the power-shaft of the elevator. The opposite ends of the brake Q have cables q and q', the lower ends being connected to the pivoted bar Q^2, mounted at the base of the well. Located on the cage is a clutch R, supported on a suitable bracket r and having an extension r' connected with the reciprocating bar D in a manner similar to the latter's connection with the lever C. (Shown in Fig. 1.) By raising the bar D the clutch R, which surrounds the cable q, is forced backward, carrying the cable onto the clutching-shoe of the bracket r, so that any movement of the cage will cause the brake Q to rock and frictionally grab the wheel Q′. It will therefore be seen that, in addition to the locking or controlling mechanism, the cage is also locked against creeping.

When the standing rope is to be employed, the controlling device is made in the form shown in Fig. 12, wherein the movement of the bar D actuates the lever C^6, tilting the clutching-loop C^7 around the cable passing therethrough and draws the cable tight onto the vertical base of the bracket C^8, attached to the base of the cage. It is to be understood, however, that other forms of locking or clutch mechanism than those shown can be employed.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In a door-locked controller for elevators, the combination with an elevator-shaft door, a cage and a door for the cage, of a controller on the cage, and means for preventing the actuation of the controller comprising mechanism having parts positioned to be actuated respectively by the individual doors, substantially as described.

2. A door-locked controller for elevators, in combination with a well-door and a cage-door, of means actuated in successive order by the respective doors and by the joint movement of both doors for permitting the movement of the controller, substantially as described.

3. In an elevator, the combination with controlling means for the elevator, of a well-door and a cage-door, and mechanism actuated by the individual doors upon the joint movement of the two doors for permitting the movement of the controller, substantially as described.

4. In an elevator the combination with controlling instrumentalities, a lock therefor, a door on the elevator, a door for the elevator-shaft, means for actuating the lock, and mechanism for governing the action of said means operated by the individual doors and upon the movement of both doors, substantially as described.

5. In an elevator the combination with controlling means, of a lock for the controller, means for operating the lock, a shaft-door and a cage-door, a lever on the cage-door for actuating the lock, and means actuated by the movement of the well-door for rendering operative the said lock-controlling means, substantially as described.

6. In an elevator the combination with a controller, and means for rendering the same operative, of a cage-door and a well-door, means carried by the cage-door for actuating the controller-lock, and means actuated by the well-door for permitting the actuation of said lock-actuating means, substantially as described.

7. In an elevator the combination with a well-door and a cage-door, of a latch on the well-door, a controller-lock on the cage, a lever for actuating the lock, and means on the cage-door actuated by the said lever for actuating the latch.

8. In an elevator, the combination with a cage-door, a well-door, and a controller, of locking means for the controller, means carried by the cage-door for actuating said locking means, a lock for said locking means, and a trip actuated by the well-door for releasing said lock, substantially as described.

9. In an elevator, the combination with a cage and a controller, of a lock for the controller, means for preventing the movement of said lock, and means for removing said preventing means, substantially as described.

10. In an elevator, the combination with a controller and a cage-door, of a lock for the controller, a crank on the cage-door, means actuated by the movement of the crank for

actuating the controller-lock, and an independently-actuated catch for preventing the movement of the controller-lock, substantially as described.

11. In an elevator, the combination with a controller and a cage-door, of means for locking the controller, a crank on the cage-door for actuating said locking means, a catch for preventing the action of said locking means, a trip mounted on a stationary part of the elevator-well, and means actuated by the movement of the well-door for releasing said trip, substantially as described.

12. In an elevator, the combination with the well, of a trip device thereon, a well-door, means actuated by the door for moving the trip device, a cage, controlling means on the cage, a lever for actuating said controlling means, a catch for rendering operative the lever-actuated means, and a projection on the catch actuated by said trip, substantially as described.

13. In combination with a controller and a cage-door, of a lock for the controller, a reciprocating bar connected with the lock, and a crank on the door detachable from said bar and adapted to engage the same to actuate the lock upon the movement of the crank, substantially as described.

14. In an elevator, the combination with a cage-door and a well-door, of means actuated by and through the conjoint movement of the doors, a lock, and means for rendering operative the lock by the said conjoint door-operated means, substantially as described.

15. In an elevator, a door-locked controlling means, and means actuated by said door-locked controlling means for preventing the creeping of the elevator, substantially as described.

16. In an elevator, the combination with a cage-door having a spring thereon, a door-lock controller, a tripping device with which the spring engages, a lock for said tripping device, and means on the door for releasing the said lock after the spring has been tensioned against the trip, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES O. HARKER.

Witnesses:
L. S. BACON,
JOS. H. MILANS.