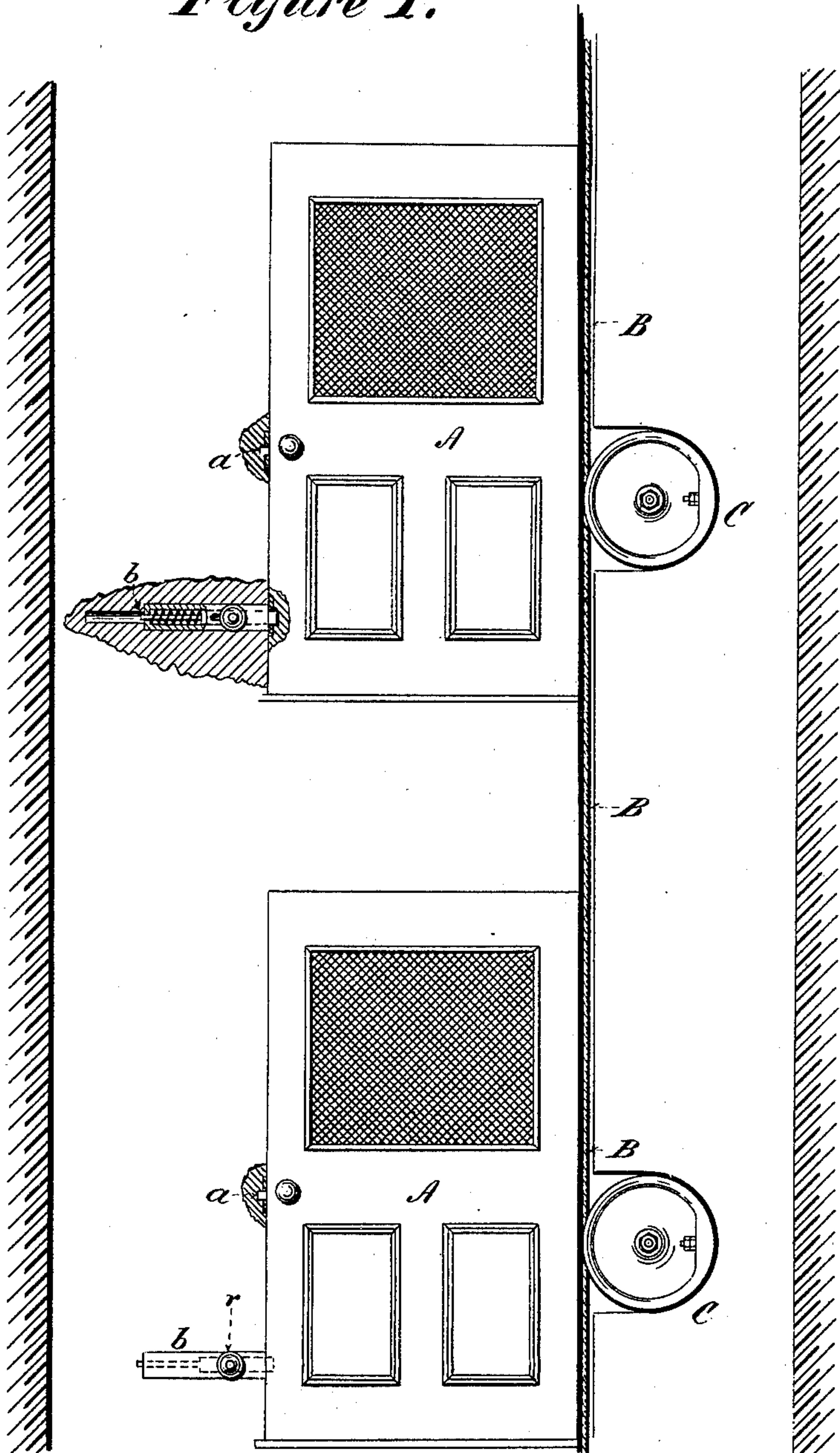


E. N. DICKERSON.
Operating Hatchway-Doors.
No. 223,322. Patented Jan. 6, 1880.

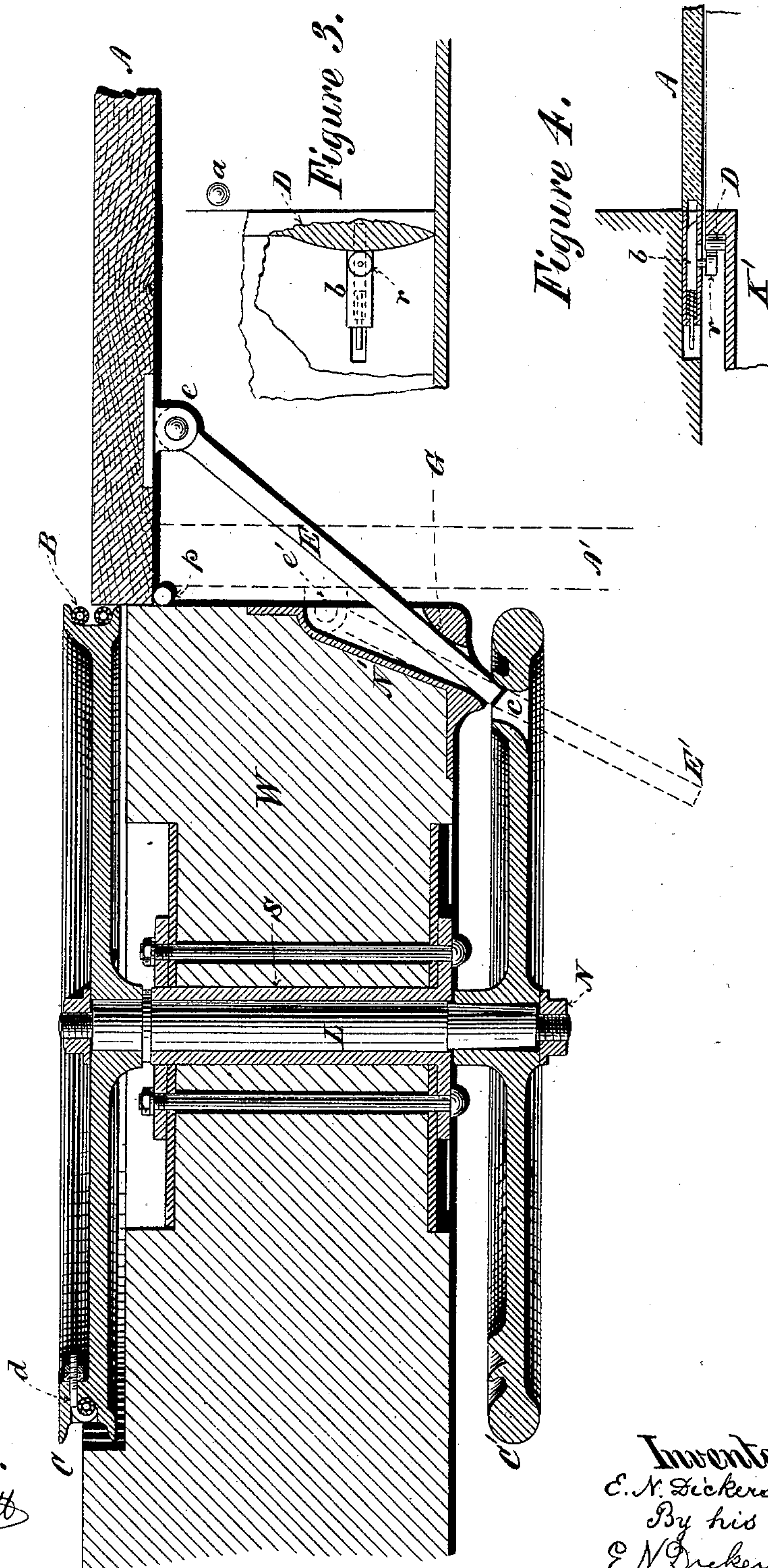
Figure 1.



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Figure 5.

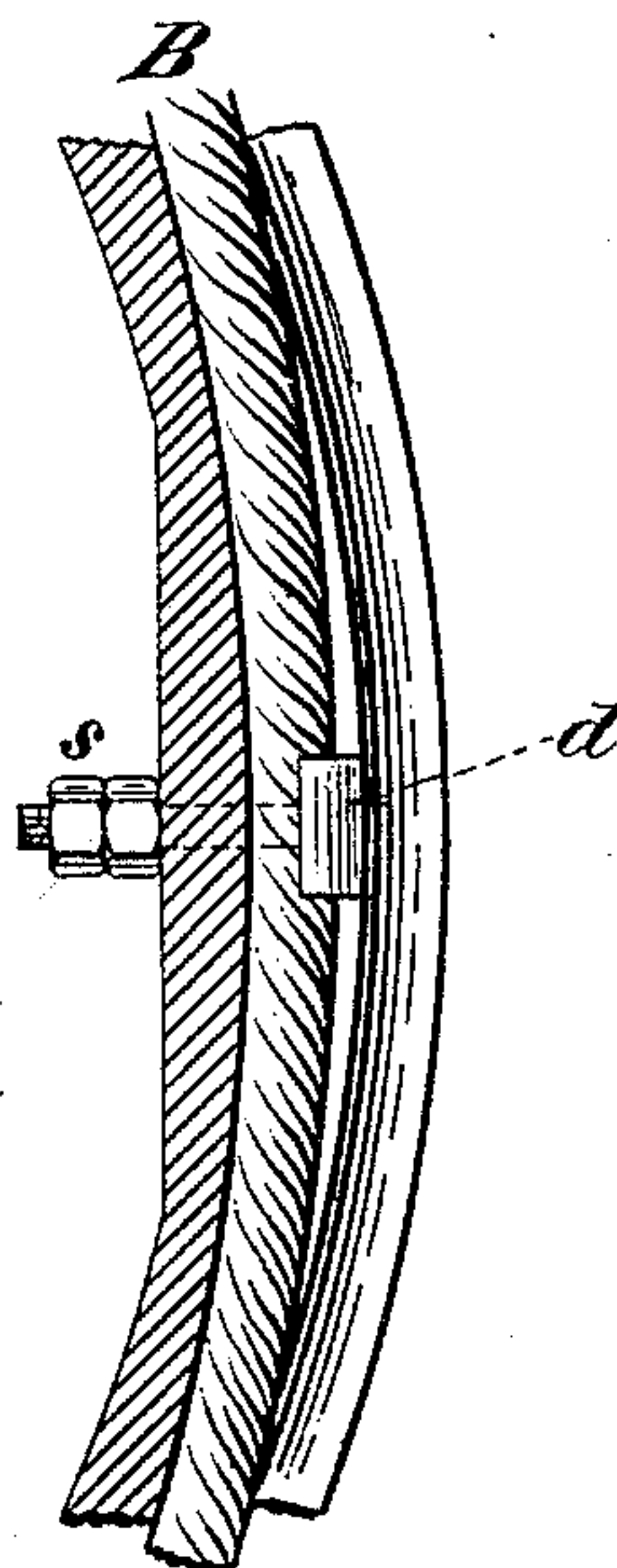
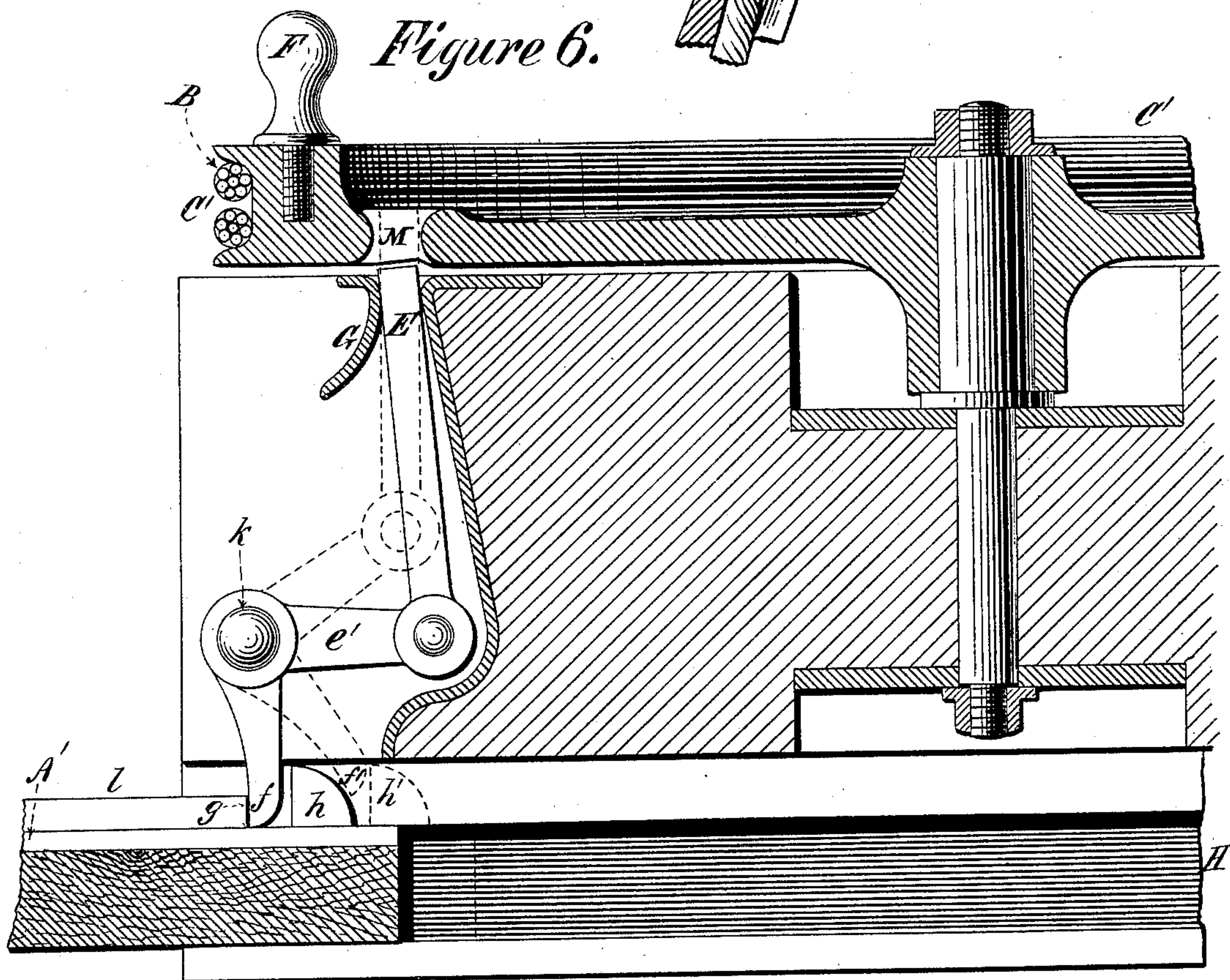


Figure 6.



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UNITED STATES PATENT OFFICE.

EDWARD N. DICKERSON, OF NEW YORK, N. Y.

OPERATING HATCHWAY-DOORS.

SPECIFICATION forming part of Letters Patent No. 223,322, dated January 6, 1880.

Application filed October 13, 1879.

To all whom it may concern :

Be it known that I, EDWARD N. DICKERSON, of the city, county, and State of New York, have invented a new and useful Improvement in Elevators, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

The object of my invention is to so connect the elevator, elevator-starting mechanism, and the doors opening into the elevator-wellway that an attendant in the elevator may be dispensed with and the elevator can be brought to any of the floors that may be desired, while at the same time a passenger using the elevator runs no risk of injury, either from falling down the wellway or from being injured by the movement of the elevator while entering or leaving the car.

In order to successfully accomplish these results it is necessary to provide at every floor an elevator-controlling mechanism, by means of which the car can be brought to that floor when desired. It is also necessary that every door in the series be locked from within, excepting when the elevator is in position to receive a party desiring to enter it, and, also, that when the elevator is at rest at any floor and the door is open, the starting mechanism be then locked, so as to prevent the movement of the elevator until after the door is closed and the passenger has passed into the elevator.

My invention will be clearly understood from the accompanying drawings, in which—

Figure 1 represents an inside view of the elevator-wellway, showing the starting-wheels and locking mechanism. Fig. 2 is a horizontal sectional view of one of the starting-rope connections and of one of the elevator-doors. Fig. 3 is a detailed view of my mechanism for unlocking the door of the passage to the elevator. Fig. 4 is a sectional view of the same. Fig. 5 shows a means for adjusting the starting-rope on the starting-wheel, and Fig. 6 is a detailed view of a modification of my apparatus employed when a sliding instead of a swinging door is used.

A, Fig. 1, represents the inner view of the doors opening into the passage-way from the elevator. These doors may be either swinging

or sliding, as shown in Fig. 6. They are, of course, arranged, when swinging, to open outward into the hallway.

The elevator-car (not shown) is operated in any of the well-known ways, and is controlled by a starting-rope, B, which passes up inside of the wellway and around a series of wheels, C, one at each floor. It also passes around idler-wheels and through the elevator-car, in the usual way.

The elevator-doors are provided with two latches—one, *a*, controllable from either side of the door; the other, *b*, which consists of a spring-latch, withdrawn by a roller, *r*. This roller is tripped by a cam connected with the elevator, as shown in Figs. 3 and 4.

In Fig. 4, K' represents a portion of the elevator-car provided with cam D. This cam is shown acting against the roller *r*, and in the act of withdrawing the bolt *b*. This cam is so arranged on the elevator with reference to the automatic latches *b* that it will withdraw those latches when the door of the elevator-car is opposite the door entering into the wellway.

It will thus be observed that no door can be opened excepting when the elevator is opposite. The cam D is made sufficiently long to allow of a reasonable variation in the position of stopping the elevator.

The latch *a* is not absolutely essential, but is convenient to prevent the accidental opening of the door, excepting when it is opened by a passenger. Doors A should be preferably provided with automatic springs for closing them, and each door is provided with the mechanism shown clearly in Fig. 2.

The elevator starting-rope is shown at B. Two wheels are provided—the inner one for receiving the starting-rope, the outer one, C', for the hand-wheel. These wheels should be strongly made, and should be supported by a sleeve similar to the one shown at S, or in some other convenient way. The wheels C and C' are, of course, firmly attached to the same spindle L. The wheel C' is made adjustable on said spindle by means of the nut N and the conical taper on the end of the spindle in a manner well known to mechanics; or any other convenient mode of adjusting might be used. This wheel is provided at one place with a slot, *c*.

The door A, pivoted at *p*, is provided with a bolt, E, pivoted to the door at *e*. The wall W between the elevator-well and the passage-way is provided with a casting, N', for supporting and guiding the bolt E. The wheel C' and the bolt E are so arranged that when the door is closed the bolt E is withdrawn from the wheel; but when the door is open it is shot through the wheel, and the bolt will then be in the position shown at E' in dotted lines, and the door in the position shown at A'. When the door and bolt are in the position shown by the dotted lines it is plain that the wheel C' cannot be revolved, and, of course, the locking of any wheel of the series locks every other wheel, since the starting-rope B passes continuously around all of them. The ordinary arrangement of the starting-rope allows said rope to be in three positions—either in a central position, or above or below it.

The wheels shown are so adjusted that when the starting-rope is in the central position and the elevator at rest the slot *c* will be exactly opposite the ends of the bolt E, which is supported by the casting N; but if any one of the wheels be revolved, then the slot *c* will be out of correspondence with the bolts, and consequently no door can be opened, because the bolts E would bring up against the solid part of the wheel C'. A means of adjustment between the wheel and the starting-rope is shown at Figs. 2 and 5, where the starting-rope is fastened to the starting-wheel C by means of a hook-clamp, *d*. By loosening the set-screw *s* the relation between the wheel and the starting-rope can be altered.

The principle of my improvement can now be understood. The wheels having been properly adjusted so that when the slot is in the central position and the elevator at rest their slots correspond to the bolts E. Suppose a passenger to open the door opposite which the elevator is at rest. The opening of this door would immediately lock the starting mechanism, and the elevator cannot be moved until the door is closed. By this means all danger is avoided from any passenger starting the elevator on any floor while the first passenger is entering. After closing the door the passenger in the elevator starts the car by pulling the rope which passes through said car. As soon as the elevator has begun to move, every door is locked in two ways—first, by the automatic bolts *b*, which are successively tripped as the elevator passes the doors, and, secondly, because the bolts E do not correspond to the slots *c* in the hand-wheel C', so that if a passenger on the second or any other floor should endeavor to enter the elevator while it was passing, at the instant when the elevator tripped the bolt E, he would still be prevented, because of the relation between the wheel C' and the bolt E. When the passenger within the elevator has arrived at the desired story he stops the car in the usual way. In so doing he revolves all the wheels, so as to bring the slot *c* in correspondence with the bolt E, and

at the same time the bolt *b* on the door opposite which the elevator is stopped is tripped, and he is thereby enabled to open the door and pass into the passage. Whenever all the doors are closed and the car at rest, a passenger on any story can readily bring the car to that story by simply turning one of the hand-wheels C'.

The position of the slot *c* with reference to the bolt E will indicate to any passenger on any floor whether the elevator is in use or not, and also whether the elevator is ascending or descending. In this way there will be no danger of interference with the elevator while in motion by any passenger desiring to use it. Of course, different means of adjusting the position of the slot with reference to the bolt could be employed—as, for instance, a slot might be cut in an independent wheel attached to the hand-wheel C', and their relation be regulated by set-screws moving in slots. It is also evident that a sliding bar forming a part of the rope-connection and movable up and down by hand outside in the passage-way, and having a slot in it for the entrance of the bolt when the door was opened, could be substituted for the slotted wheel, and many other modifications might be made; but they would be all operated in the same way and be substantially the same as the form shown, because in all of them the starting mechanism would be locked by the opening of the door and unlocked by its closing.

Fig. 6 represents a modification of my apparatus.

The doors opening into the elevator-wells are of two descriptions—either swinging, as in Fig. 2, or sliding, as in Fig. 6. It is as important that the opening of the sliding door shall automatically lock the starting mechanism as it is that the swinging door should have that effect. The mechanism shown in Fig. 6 is in principle the same. It will be observed that the hand-wheel and the sheave for the rope are combined in one. In this case the starting-rope passes around the periphery of the hand-wheel C' in an annular channel. This wheel is also provided with a handle, F, for convenience, and is also provided with the perforation M. (Found in Fig. 2 of the drawings.)

Set in the wall is the bolt E, which rests in the casing G, preferably metallic, and made sufficiently strong to support and guide the bolt E. This bolt is drawn in and out by means of the bell-crank *e' f'*, pivoted at *k*. The bolt E is attached to the arm *e'*. The sliding door is represented at A' and moves in the slideway H. This door is provided with a surface, (preferably metallic,) *l*, having a jog or corner at *g*. There is also a quadrant-shaped lug, *h*, which is so arranged in connection with the jog or corner *g* that the arm *f'* of the bell-crank will pass into the opening or space between *g* and *h*, as shown in full lines in the figure. The arm *f'*, as will readily be seen, is provided with two sides, one straight and the other curved. The straight side or face engages with

the corner *g* and is operated by it, and the curved side is acted against by the straight side of the quadrant-lug *h*. These operations may be seen in the dotted lines.

5 Supposing the hand starting-wheel *C'* to be in the position shown in Fig. 6, so that the slot or opening *M* corresponds with the bolt *E*, and sup-
 10 posing the sliding door *A'*, the bolt *b* of which has been tripped by the elevator, to be opened, the first result would be that the bell-crank *e'*
 15 *f* would be swung about on the pivot *k* into the position shown in the dotted lines. This is accomplished by the action of the corner *g*
 20 against the arm *f* of the bell-crank. This movement, of course, throws the bolt *E* through the slot or opening *M*, and the bolt remains in
 25 this position until it is returned by the shutting of the door. This is accomplished by the engagement of the straight side of the quad-
 30 rant-lug *h* against the curved side of the arm *f*, as shown at *f' h'*. This movement will return the bolt into the position shown in the solid lines. Of course, where a sliding door
 35 is used a bolt, *b*, suitable for locking such door, should be employed. This can be readily supplied, and it should be tripped in the same way by the cam on the elevator.

When the elevator is in position the start-
 30 ing-rope passes over two wheels—one at the bottom and the other at the top of the wellway. One part of this rope passes through the elevator in the usual way, and is controlled by mechanism in said elevator. The other part
 35 passes around the starting-sheave heretofore described. Now, it is evidently necessary that the starting-wheels be so exactly adjusted with
 40 reference to this rope that when the elevator is at rest and the slot *c* in the neutral position the slots in the wheel shall correspond
 45 with the bolts, and it is also evident that any lengthening or stretching of the starting-rope will also throw these slots out of their corre-
 50 spondence with the bolts.

The starting-wheels, spindles, bolts, and
 45 other parts of the mechanism should be made sufficiently strong to be able to resist any strain thrown upon them by an attempt to open the door under conditions in which the slot in the wheel and the bolt are not in correspondence.

50 The hand-bolt *a* and the automatic bolt *b* might be combined in one by an arrangement which would prevent the withdrawal of a bolt, *a*, excepting when the elevator was opposite.

By means of this apparatus perfect safety

in the use of passenger-elevators is obtained, 55 because no one can be injured by entering the elevator-well when the elevator is not opposite the door; and, secondly, no one can be injured by the starting of the elevator at the same time that he is attempting to enter the 60 car.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the wellway-door of an elevator, of a locking mechanism acting 65 in combination with the starting mechanism of the elevator, whereby the open door prevents the movement of the elevator until said door has been closed, substantially as de-
 70 scribed.

2. An elevator wellway-door provided with mechanism which acts, in connection with the elevator-starting mechanism, to prevent the movement of the elevator on the opening of a door, and which also prevents the opening of 75 the door excepting when the elevator is stationary, substantially as described.

3. The combination, with an elevator and its wellway-door, of two latches, one of which is automatically tripped by the elevator, the other 80 of which is operated by the passenger, substantially as described.

4. The combination of an elevator wellway-door, elevator-starting mechanism, and a bolt connected with said door and constructed to 85 pass through and engage with the elevator-starting mechanism, whereby the movement of the door automatically locks said starting mechanism, substantially as described.

5. In combination with an elevator and well- 90 way, a series of wheels, one arranged at each stopping-place of the elevator and connected with the elevator-starting mechanism, each wheel being provided with a slot and a locking-bolt connected with the wellway-door, and 95 passing through it at a definite position of the wheel, substantially as described.

6. The combination, with a wellway-door, of an elevator-starting wheel and a bolt connected with said door, and so combined with 100 the elevator-starting wheel as to pass through a slot in the same when the elevator is at rest, substantially as described.

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