

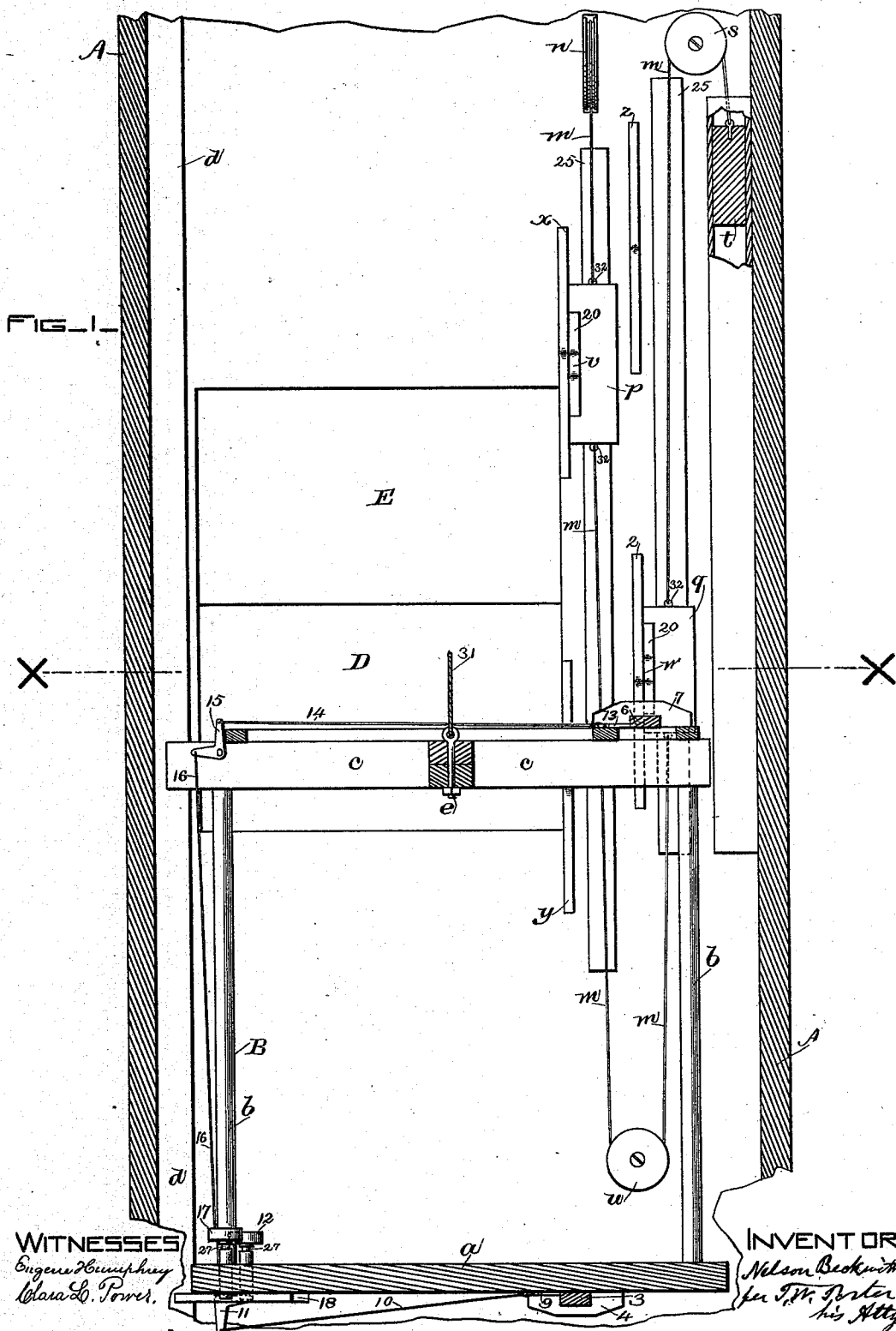
(No Model.)

4 Sheets—Sheet 1.

N. BECKWITH.
ELEVATOR HATCHWAY.

No. 413,643.

Patented Oct. 29, 1889.



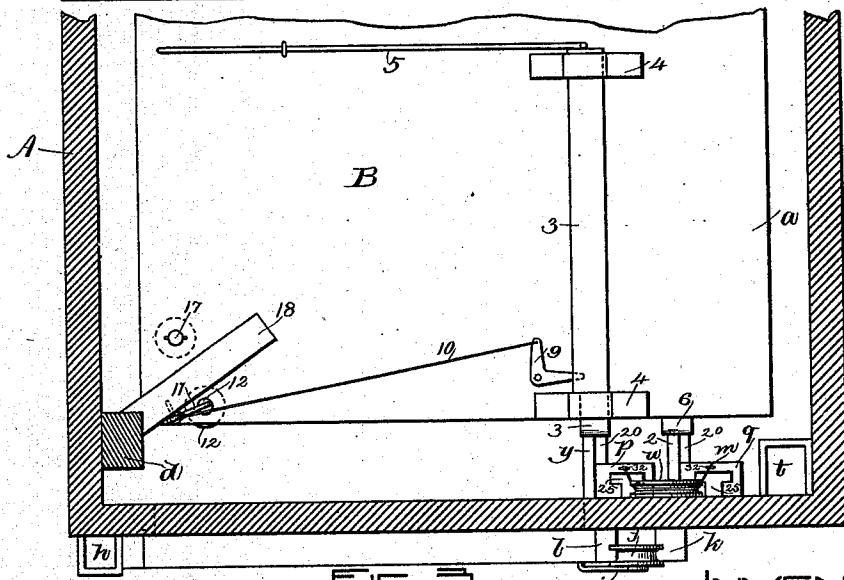
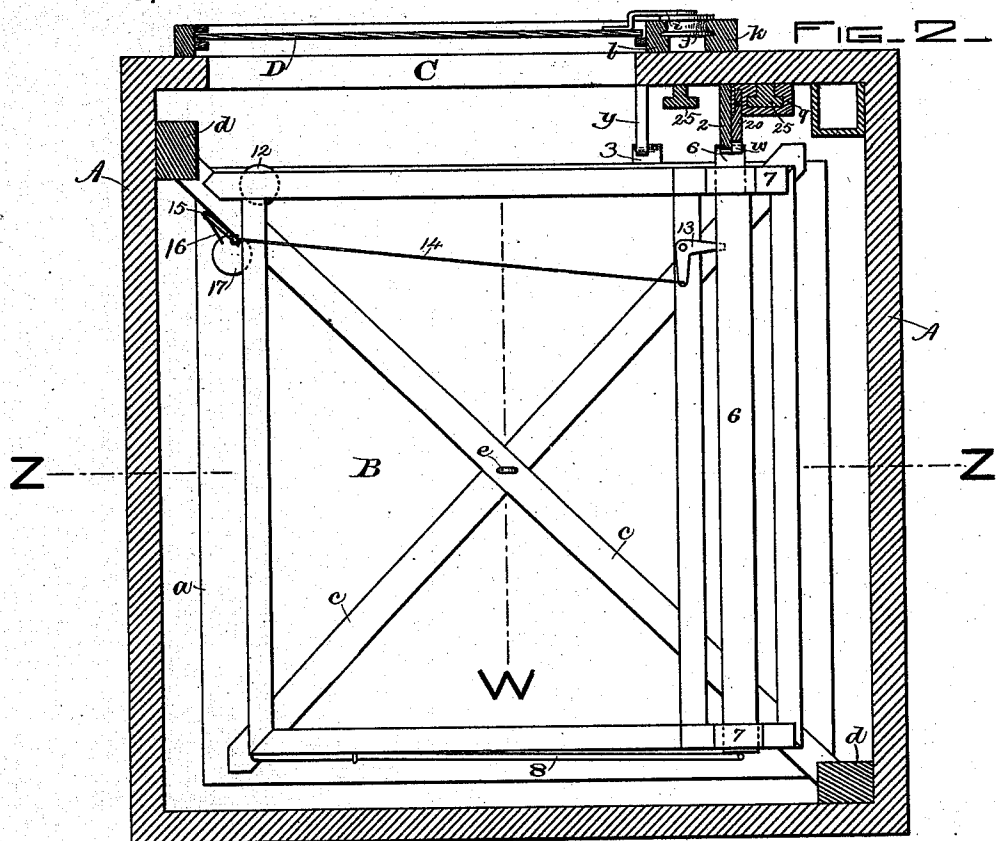
(No Model.)

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No. 413,643.

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WITNESSES
Eugene Humphrey
Oliver L. Power

INVENTOR
Nelson Beckwith
per J. M. Porter his Atty.

(No Model.)

4 Sheets—Sheet 3.

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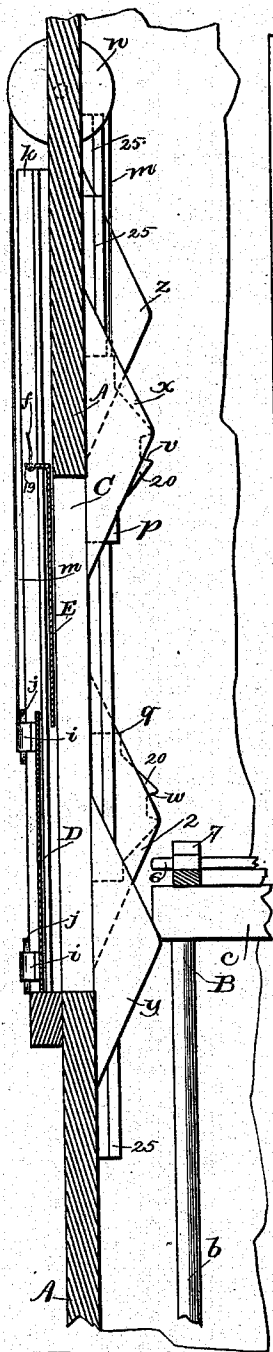


FIG. 4.

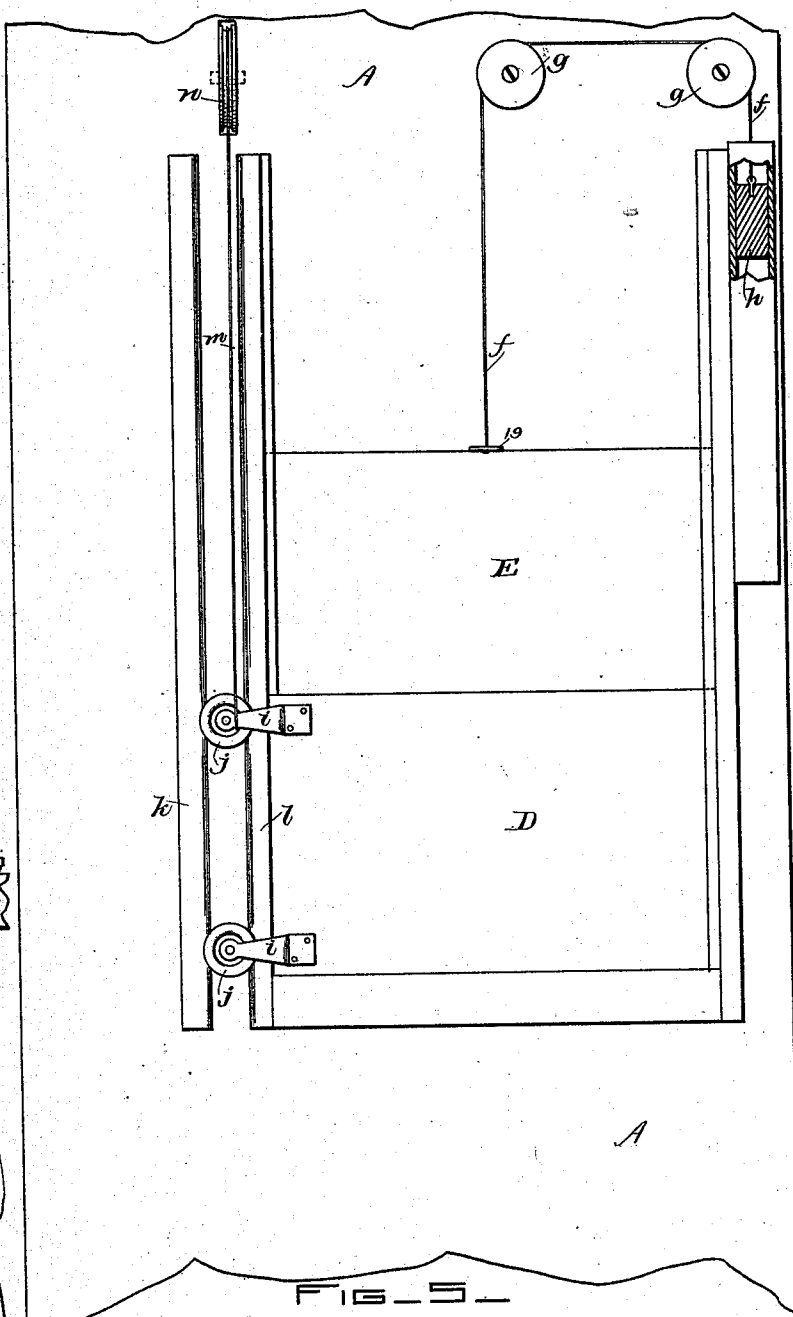


FIG. 5.

WITNESSES

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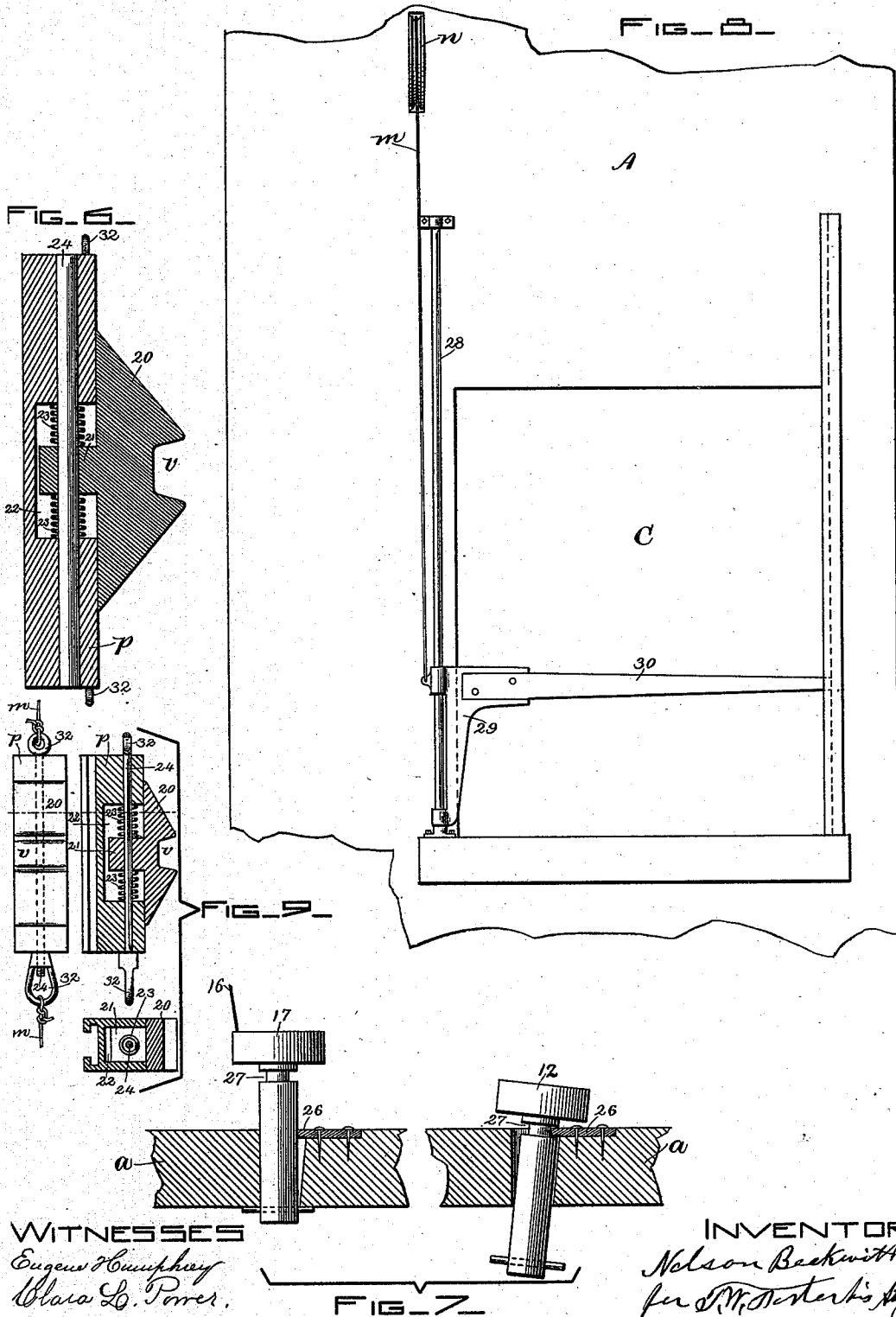
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4 Sheets—Sheet 4.

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ELEVATOR HATCHWAY.

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Patented Oct. 29, 1889.



UNITED STATES PATENT OFFICE.

NELSON BECKWITH, OF CAMBRIDGE, MASSACHUSETTS.

ELEVATOR-HATCHWAY.

SPECIFICATION forming part of Letters Patent No. 413,643, dated October 29, 1889.

Application filed July 5, 1888. Serial No. 278,995. (No model.)

To all whom it may concern:

Be it known that I, NELSON BECKWITH, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Elevators, which will, in connection with the accompanying drawings, be hereinafter fully described, and specifically defined in the appended claims.

In said drawings, Figure 1 is a sectional elevation, the section being taken as on line Z Z, Fig. 2, and the view as from the near or bottom end of the sheet, and as if standing in the elevator-well and looking toward the doorway and the closed doors, which latter are arranged at the outer face of the wall of the well. Fig. 2 is a sectional plan view, the section being horizontal and taken as on line X X, Fig. 1, and the view being as from above that line. Fig. 3 is an under side or inverted plan view of the elevator, the walls of the well being shown in horizontal section. Fig. 4 is a sectional elevation, the section being vertical and taken as on line W W, Fig. 2, and the elevation as looking to the right. Fig. 5 is an external elevation of the doors and other parts, such view being from a diametrically-opposite point of view from Fig. 1. Fig. 6 is an enlarged vertical section through one of the catch-blocks, showing the catch-piece and cushioning-springs in elevation. Fig. 7 is a detached sectional elevation showing one of the studs by which the catch-bars are held out of contact with the catch-blocks and a device for locking said stud when depressed, so that until it is released it will hold the catch-bar to which it is attached out of contact with the catch-block. Fig. 8 is a detached elevation showing a guard-bar arranged in lieu of the door and to be operated by the same means. Fig. 9 shows modifications of the catch-blocks.

This invention relates to that class of elevators shown in United States Letters Patent No. 372,107, issued to me October 25, 1887, and also shown in application No. 263,203, series of 1880, filed by me in United States Patent Office February 7, 1888, to which patent and application reference is to be had; and the invention consists in features of novelty, which will next be pointed out, and will be specified in the claims.

Referring again to the drawings, A repre-

sents the wall of the elevator-well, and B is the "carriage" or "cage," as it is indifferently termed. Said cage is shown as formed with the bottom *a*, standards *b*, secured therein at the corners, and cross-bars *c*, secured to said standards at the top, said cross-bars being interlocked with and arranged to slide upon the vertical guideways *d*, and in Fig. 3 a stay-bar 18 is shown as engaging said ways *d* to steady and guide the bottom of the cage, a like bar being so arranged at the diagonally-opposite corner. The doorway C in wall A is shown as closed by the two parts or leaves D E of the door. Said leaf E is partially counterbalanced by weight *h*, arranged to move vertically in a guideway, as shown in Figs. 1 and 5. A cord *f*, attached to a short arm 19, secured to said leaf, passes over sheaves *g* and sustains the weight, which latter, though aiding in raising leaf E, yet is of such less weight that the leaf moves readily downward to its seat when released by leaf D, as will be explained.

Leaf D at one side, as shown in Figs. 1 and 5, has projecting from it, near its upper and lower edges, an arm *i*, in each of which is journaled a concave-faced sheave *j*, which are arranged between and to move on guides *k l*, and when the cord is arranged as shown the upper sheave bears against guide *l*, while the lower sheave bears against guide *k*. Said leaf D is moved up and down through the movement of the cage by means of the following devices: A cord *m* is secured to the upper arm *i* on leaf D. This cord passes up over sheave *n*, supported upon wall A, Figs. 1 and 5. It then passes downward under sheave *u*, thence upward over sheave *s*, and has weight *t* attached to it, said weight not being sufficient to raise leaf D, yet being, with weight *h*, sufficient to hold both leaves D E in place when they have been raised to open doorway C. Between sheaves *n* and *u* a catch-block *p* is interposed in cord *m*, constituting, in fact, a section thereof, and upon said block is arranged the catch or seat *v*, while between sheave *u* and *s* is the similar catch-block *q*, interposed in the cord and having a like seat *w*.

Upon the top of cage B is the catch-bar 6, arranged to slide lineally in cleats 7, and which is by arm-spring 8 (when not otherwise controlled) forced into the path of catch-block

5 *q*, so as to engage in seat *w* therein; hence
 when the cage rises said bar 6 will engage in
 seat *w*, thereby opening the door, as leaf *D*
 will rise coincident with block *q'* by reason of
 10 cord *m*, and when the upper edge of leaf *D*
 arrives at arm 19, projecting from leaf *E*, that
 leaf will then move with leaf *D*, the bar 6 be-
 ing forced out of seat *w* by its engaging the
 fixed incline or cam *z*, which is so positioned
 15 that said bar 6 will be disengaged from the
 seat in block *q* at the moment when the door
 is opened, and just before the floor of the cage
 arrives at the floor of the building; and when
 the cage again ascends the catch-bar 3, which
 20 is arranged beneath the cage to slide in cleats
 4 and is forced outward by arm-spring 5, will
 engage in seat *v* of block *p*, and thereby raise
 the weight *t* through cord *m*, thus allowing
 the door to descend and close the doorway.
 25 When the cage descends, bar 3 again engages
 the seat in block *p*, thus carrying it down-
 ward and opening the door, the block *q* rising
 coincidentally with the door by the action of
 weight *t*, and when the cage again descends
 30 below the door the bar 6 upon the top of the
 cage engages block *q*, thereby raising weight
t and allowing the door to close. A double
 incline or cam *y* is arranged to engage the
 end of bar 3 and force it out of contact with
 35 catch *v* when the cage descends, and a simi-
 lar cam *x* disconnects said bar 3 from catch *v*
 when the cage is ascending, each cam being
 properly positioned to release the bar when
 the doors have completed the desired move-
 40 ment. By thus employing the pulleys *n*, *u*, and
s, and carrying cord *m* from the door around
 said pulleys and attaching weight *t* to it, and
 also arranging catch-blocks *p* *q* in the cord,
 the catch-bars (with the co-operation of cord
 45 *f* and weight *h*) operate the doors entirely
 through and by means of cord *m*, and hence
 the doors may be arranged upon the outer
 side of wall *A*, regardless of its thickness,
 without further elongation of the catch-bars
 50 3 6, and by properly arranging pulley *n* at the
 inner face of the wall and a similar pulley
 opposite to it on the outer face of the wall it
 would be immaterial at what distance apart
 the cage and doors were arranged.
 55 To prevent shocks, I form the catch-piece
 20 of blocks *p* *q* separate from the block, as
 shown in Fig. 6, a projection 21 on said catch-
 piece extending into the elongated mortise
 22 in said block, and coiled springs 23 being
 60 arranged on each side of said projection, while
 rod 24 passes through the springs, the projec-
 tion 21, and the block, to which latter it is
 rigidly secured, and the block is provided
 with eyes to which the cord is secured; hence
 65 whenever the doors are started, through en-
 gagement of the catch-bars with the catch-
 piece, said springs serve to cushion the block
 and cause the doors to start without shocks.
 Said blocks *p* *q* are formed with a longitudi-
 nal groove, and are arranged to slide upon the
 guides 25, as shown in Fig. 2.

By means of sheaves *j* *j*, attached to leaf *D*

at the side thereof, and the supporting-guides
k *l*, I am enabled to attach the cord to the
 door at any point between the right and left
 70 hand extremities thereof, or at any point be-
 tween its upper and lower extremities, as con-
 venience may require, and with the edge that
 is opposite said pulleys arranged loosely be-
 tween vertical guides the door will neither
 75 catch nor rattle, but will move noiselessly and
 freely in its bearings.

In order that the operator may pass the
 door in any story when going up or down
 without disturbing such door, I arrange the
 80 vertically-sliding stud 17 in the floor of the
 cage at the corner thereof, as shown in Figs. 1
 and 3, and to the top of said stud I secure wire
 16, which at its upper end is attached to the
 arm of bell-crank 15. A wire 14, secured to
 85 the opposite end of said crank, extends across
 the cage, Figs. 1 and 2, and is there secured
 to the free arm of bell-crank 13, the oppo-
 site arm of which engages catch-bar 6, as
 there shown, and by the operator depressing
 90 stud 17 by the action of his foot said bar will
 be retracted, and hence can, whether going
 up or down, pass catch *w* without engaging
 it. I also employ the similar stud 12, the
 lower end of which engages the horizontal
 95 arm of bell-crank 11, while wire 10, secured
 to the opposite arm of said lever, extends
 across the cage and is attached to the free
 arm of bell-crank 9, the other arm of which
 engages catch-bar 3, so that by depressing
 100 stud 12 said bar may be held out of contact
 with catch *v*, and hence the cage may pass
 any door without said bar 3 engaging with
 said catch and thereby actuating the door. It
 being obvious that, in going up, if the catch-
 105 bar 6 be held out of contact with block *q*, so
 that the doors are not opened, then bar 3 will,
 by reason of cam *x*, pass block *p* without en-
 gaging it; and when the cage descends, if bar
 3 is held out of contact with block *p*, so as
 110 not to open the door, then bar 6 would not
 engage block *q* by reason of cam 2; and hence
 in either ascending or descending the operator
 need give heed to but one catch-bar in order
 to leave the doors undisturbed.

115 It will be apparent that leaf *D* may be of
 a height to close the doorway, in which event
 leaf *E*, with its cord *f* and weight *h*, would be
 dispensed with, while all the other devices
 would perform the functions and accomplish
 120 the results herein set out, and that the door
 may be arranged either at the outer or inner
 face of wall *A*, as circumstances may render
 desirable.

125 Instead of arranging block *p* in line *m* be-
 tween sheaves *n* *u*, catch *v* may be arranged
 upon weight *t*, with cam *x* properly arranged
 beside its path, and with cord *m* of such
 length that when door *D* was opened or closed
 weight *t* would be in proper position, in which
 130 case the operation of the parts would be the
 same as if block *p* were employed, as in such
 case the catch-block at the end of the cord
 would also serve as the counterpoise.

In Fig. 7 the studs 12 and 17 are shown in position in floor *a*, each having the recess or seat 27 near the head, and a guide-bar 26 is shown as secured in the floor, in which the studs slide freely, and when depressed and moved laterally can be locked to the bar, as shown in said Fig. 7. By this means of locking said studs 12 17, and thereby holding bars 3 6 out of the path of catches *v w*, a person leaving the cage at either the top or bottom of the well may thus lock the stud that holds back the catch-bar that would open the door at the next movement of the elevator, and then a person upon any floor, by lowering the leaf *E* by hand and actuating the shipper, can move the elevator to the floor he is upon without disturbing the door at any other floor; or, if the cage be stopped upon any floor between the upper and lower one, then by locking both said studs 12 17, as described, a person upon any floor above or below the cage may move it to his own floor without disturbing the door upon any other floor; and as in many establishments the cage is operated by any one who requires it, instead of by a regular attendant, such means of locking the catch-bars out of the path of the catch-blocks is highly useful.

As a substitute for door *D*, so far as relates to a safeguard at the doorway, I show at 30 in Fig. 8 a safety-bar or guard-bar that extends across the doorway. This bar is bolted to an angle-iron 29, having hollow projections that embrace rod 28, on which the iron 29 slides when it is actuated by the cord *m*, thereto attached, as shown. Said rod or bar 28 serves as a substitute for bars *k l*, and, with only the weight of bar 30, the iron 29, arranged to slide on rod 28, is a substitute for sheaves *j* in supporting the said bar, as the opposite end of the bar moves freely in a guideway, and hence the entire weight of the bar and its supporting-iron is sustained by a positive connection with said bar 28, as the sheaves *j* are positively held in position by guide-bars *k l*. By arranging studs 12 17 in the floor of the cage the operator is enabled to readily actuate them by the use of his feet, thereby leaving his hands free for the management of other parts.

I claim as my invention—

1. In an elevator, the combination, with the door, of a cord thereto attached and carried over a sheave above the door, thence around a lower sheave, thence over an upper sheave, and having a suitable weight attached to its pendent end to counterpoise the door, two catch-blocks secured to said cord and provided with suitable catches, one of said blocks being arranged to open and the other to close the door when actuated, two catch-bars arranged upon the cage with springs to force them into contact with said catch-blocks, and cams duly positioned to disengage said bars, all substantially as specified.

2. In an elevator, the combination, with the door, of the cord *m*, sheaves *n, u*, and *s*, the weight *t*, the catches *v w*, connected with said cord, the cams *x, y, z*, and 2, duly arranged to coact with said catches, and the catch-bars 3 and 6, provided with the actuating-springs, all substantially as specified.

3. The combination, with the leaf *D* and the means for raising and lowering it, consisting of cord *m*, the sheaves *n u s*, the weight *t*, catches *v w*, the cams *x y z* 2, and the bars 3 6, with their engaging-springs, of the door *E*, the cord *f*, its supporting-sheaves, the arm 19, and the weight *h*, substantially as specified.

4. In an elevator-hatchway-operating device, the catch-blocks formed with a recess or mortise, catch-piece 20, having a projection 21, and springs 23, arranged between said projection and the end wall of said mortise, to cushion the force exerted upon said blocks, substantially as specified.

5. In an elevator, the combination, with the cage, the door, and the catch-blocks and catch-bars, of studs 12 17, arranged in the floor of the cage, respectively connected with said bars, whereby either bar may at will be held inoperative, substantially as specified.

6. The combination, with studs 12 17, connected to actuate the catch-bars and formed with a seat or recess 27, of a catch or detent 26, wherewith said seat may at will be engaged, substantially as specified.

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Witnesses:

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R. W. E. HOPPER.