

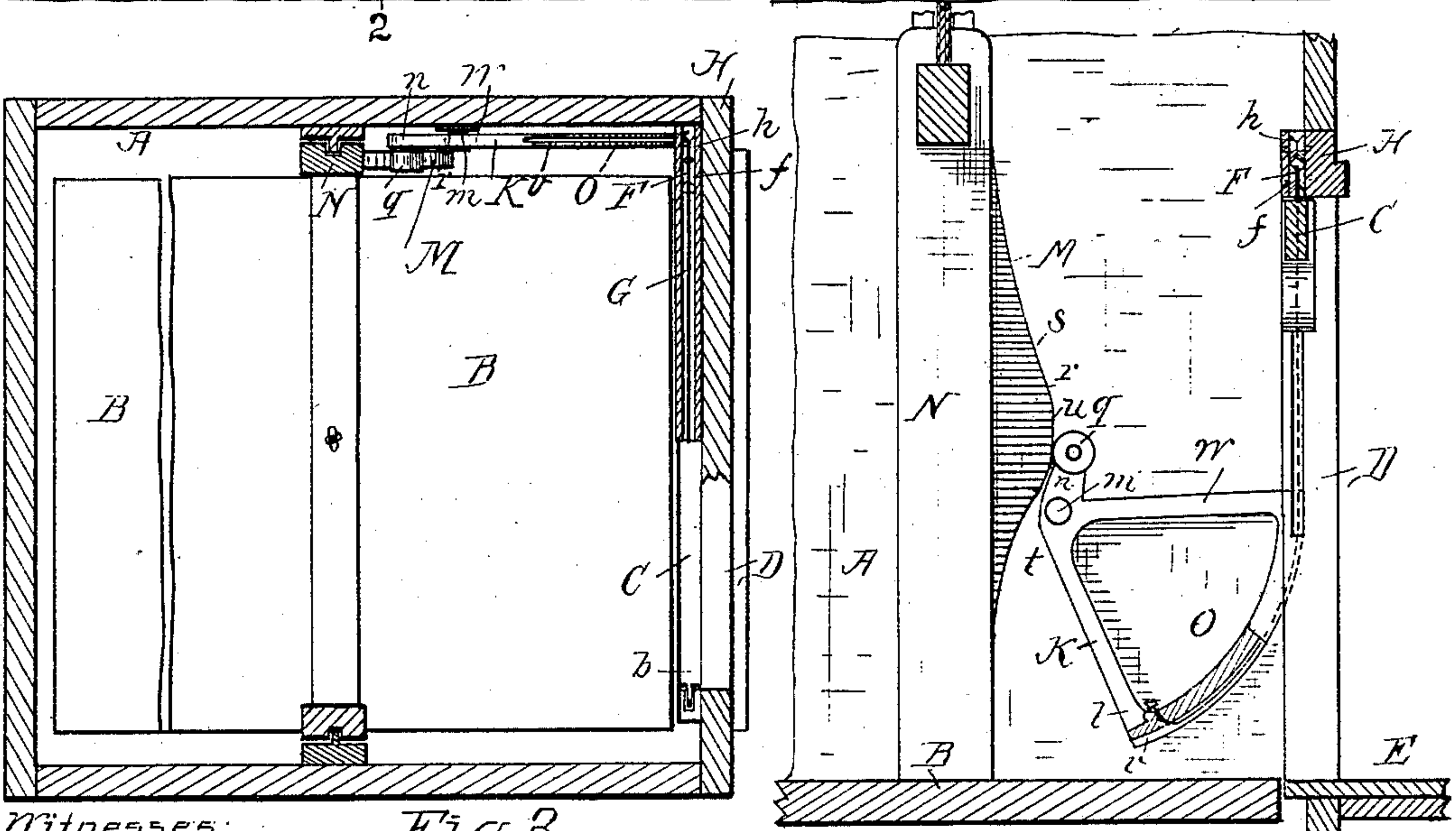
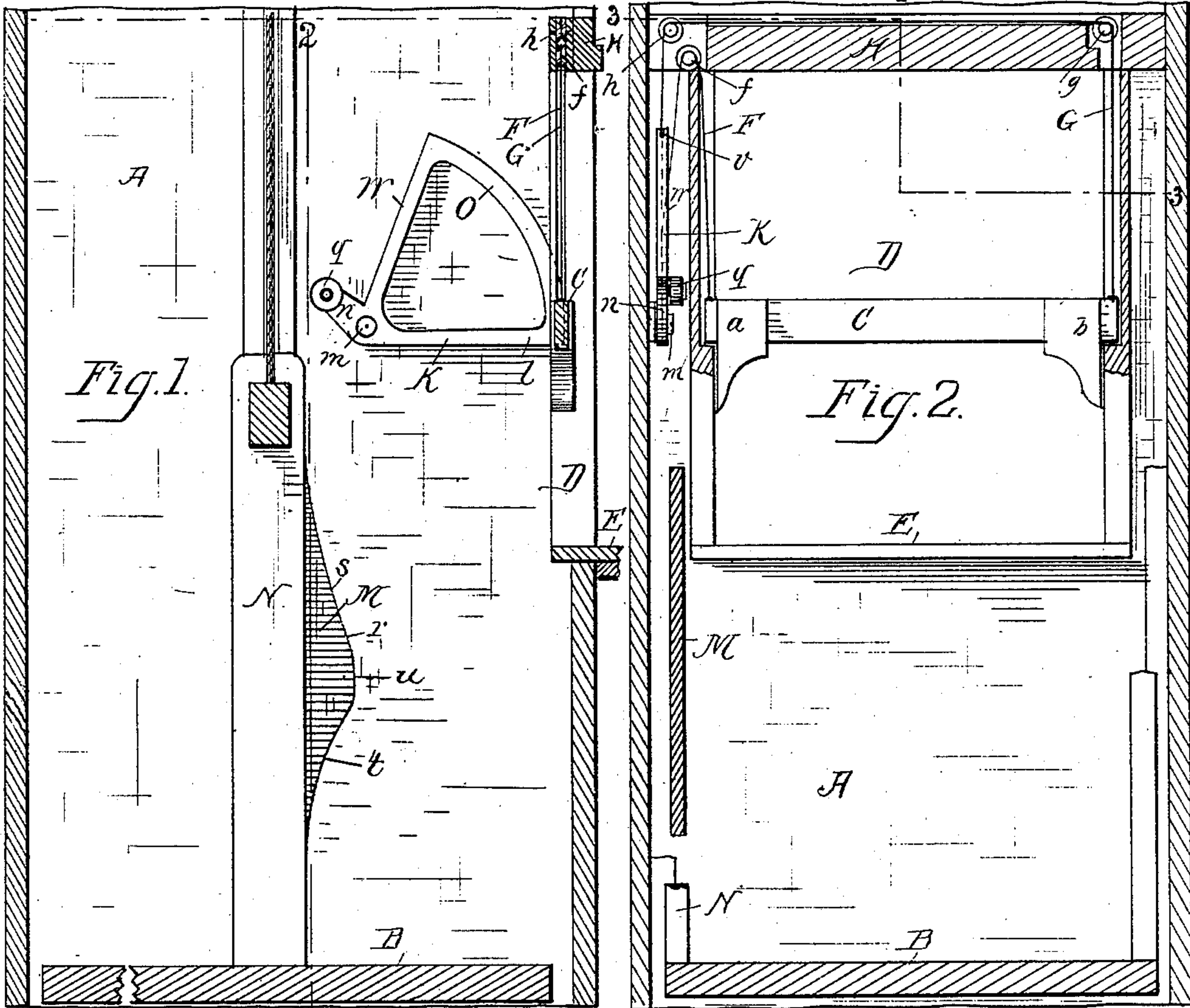
(No Model.)

J. P. RICHARDSON.

SAFETY GUARD FOR ELEVATOR HATCHWAYS.

No. 285,681.

Patented Sept. 25, 1883.



Witnesses:
Wm. S. Bellows
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Fig. 3.

Fig. 4. John P. Richardson,
Inventor,
per Brown & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

JOHN P. RICHARDSON, OF CAMBRIDGE, MASSACHUSETTS.

SAFETY-GUARD FOR ELEVATOR-HATCHWAYS.

SPECIFICATION forming part of Letters Patent No. 285,681, dated September 25, 1883.

Application filed July 21, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN P. RICHARDSON, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain
5 new and useful Improvements in Safety-Guards for Elevator-Hatchways, of which the following is a full, clear, and exact description.

This invention relates to a guard or gate to an opening or entrance to a hatchway of a
10 building, &c., in which hatchway an elevator or car is arranged to travel, as ordinarily, which guard or gate is used for the purpose of preventing any one accidentally falling down the hatchway; and it relates to the raising of such
15 guard when the elevator approaches or is at the floor, and of lowering the same to its position to guard such entrance when the elevator leaves the floor.

The invention consists of a guard or gate to
20 an opening or entrance to a hatchway of a building at any floor thereof, constructed and arranged to be raised and lowered in suitable guideways at such opening, and to be respectively operated and controlled in such move-
25 ments by the elevator or car as it approaches or leaves the floor where such guard or gate is applied, all substantially as hereinafter fully described and shown.

In the accompanying plate of drawings this
30 invention is illustrated, Figure 1 being a vertical section, in detail, from front to rear of a hatchway with an elevator or car arranged to travel therein, and having applied at the opening or entrance thereof on one of the floors the
35 present invention. Fig. 2 is a vertical cross-section at right angles to that of Fig. 1 and on line 2 2, Fig. 1, looking from the elevator-platform toward the entrance. Fig. 3 is a horizontal section on line 3 3, Fig. 1; and Fig.
40 4 is a detail vertical section, to be hereinafter referred to.

In the drawings, A represents a hatchway, having arranged therein, to travel in the usual and ordinary manner, the elevator or car B.

45 C is the guard or gate to the opening D to said hatchway, in the present instance in the form of a horizontal bar, and constructed and arranged to move or slide up and down by its ends *a b* in vertical-groove guideways *d* in
50 front of said opening D above the floor E.

This guard C is suspended at a suitable height to guard the opening D to the hatchway by ropes, cords, or chains F and G, which cords or chains are respectively attached to the ends
55 *a b* of the guard, and extend up to and over pulleys *f, g*, and *h*, secured to the upper framework, H, and then together down at one side of the opening D, their other ends being secured to the end of one arm, *l*, of a lever, K, arranged
60 to swing vertically on a pivot, *m*, on the side casing or wall of the hatchway. The other arm, *n*, of said lever K, near its end, carries a friction-roller, *q*, and the lever is so located and arranged in the hatchway relatively to
65 the pathway or line of travel of the elevator that the edge *r* of a projection or cam, M, attached to the standard N of the elevator, will abut against the periphery of said roller in the movements of the elevator in the hatch-
70 way and cause the lever to swing on its pivot, and by its arm *l*, through the cords F and G, raise the guard to the height desired, and also allow and control its descent, as the case may be, as will now be described.

The edge *r* of the cam M has two incline
75 portions, *s* and *t*, which incline portions are preferably concave in their lengths and are joined by the straight or vertical portion *u*, as shown in Figs. 1 and 4, for operation on said
80 lever as follows: As the elevator or car ascends in the hatchway and approaches a floor having this invention applied at the opening thereto the upper incline edge, *s*, will bear against the roller *q* of the lever K, and through
85 the continued upward movement of the elevator the roller will ride up said incline, swinging the lever, and thereby its arm *l*, downward, consequently raising, through the rope-connection, the guard, and when the roller
90 reaches and bears on the vertical portion *u* of the cam-edge *r* the elevator will be at the floor, and so long as it remains at said floor the guard will be held in its raised position, as shown in
95 Fig. 4. If the elevator is then caused to move upward, the roller *q* of the lever will travel down the lower incline edge, *t*, which allows the arm *l* of lever K to swing upward, and thus the guard to descend to its proper position to guard the opening to the hatchway, as shown
100 in Figs. 1 and 2. In approaching the floor by

the downward movement of the elevator the raising and lowering of the guard is accomplished by the cam-edge *r* in a reverse manner—that is, as the elevator descends the lower incline edge, *t*, causes through the lever the guard to be raised, and the upper incline edge, *s*, allows and controls its descent. The lever acts by the travel of its roller up either incline edge *s* or *t* to raise the guard; but the descent of the guard to its normal position to guard the entrance to the hatchway is by its gravity, but controlled in such descent by the travel of the roller down either incline edge *s* or *t*.

The roller *g* is located on the arm *n* of the lever *K* vertically relatively to its pivot *m*, (when the guard is down and during its movements above the horizontal plane of said pivot,) as shown more particularly in Fig. 1, by which, as the roller travels up the incline edge *t* of the cam in the downward movement of the elevator, the required downward swing or movement of the lever-arm *l* to raise the guard at the opening is secured. This arrangement of the roller on the lever is important, in order to secure from the incline edge *t* a downward swing or movement of the arm *l* of the lever, which, as is obvious, is necessary to raise the guard, for if said roller were located on the lever-arm *n* so as to be on or below the same horizontal plane of said pivot the action of the incline edge *t* as the elevator descended would cause the lever-arm *l* to swing upward, which, as is obvious, would be in the wrong direction to raise the guard.

By the above location of the roller *g* in relation to the pivot of the lever, as described, it is preferable that the incline edge *t* should be more or less concave in its length on account of the roller and the pivot being in a line nearly at right angles to said incline edge *t*, which causes more or less bind or strain upon the lever, preventing an easy and free working of the same, which the curving of the incline edge obviates. The line of curve of said incline edge at its lower end should preferably vary but a little from a vertical line, and then gradually approach the upper part of the curve, where from the then position of the lever and its roller, when acted upon by said incline, the said angle becomes so acute as to relieve such strain or bind. As the line between the roller and the pivot is nearly in the same line as the upper incline edge, *s*, such incline edge does not require to be concave, but can be straight, if desired.

The guard is raised and lowered at a speed regulated by the angle of the incline edges *s* and *t* and the speed of the elevator in its movements up and down the hatchway, and it is preferable that said incline edges should be gradual and of a sufficient length in relation to the speed with which the elevator travels to have the guard move moderately, as its too sudden rise or fall might injure any person who should be hit by it. To insure

the fall of the guard at the proper time it is weighted sufficient to overcome the weight of the lever and its connecting parts, but whether such weight is much in excess or not, its fall is regulated and controlled entirely by the movements of the elevator and the angle of the incline edges *s* and *t*, as above stated.

Extending up from the end *l* of lever *K* is a sector-arm, *O*, and in a groove, *v*, of its periphery, in the movement of the lever to raise the guard, the ropes *F* and *G* are guided and disposed. An arm, *W*, connects the upper end of sector-arm *O* with the lever, near its pivot, to strengthen the same, although it can be dispensed with, and as well also the whole can be made solid. In the operation of the lever the sector-arm *O* serves to maintain the pull of the lever upon the ropes in the same vertical line, whereby a uniform movement of the guard is maintained as it is raised or lowered.

By this invention a guard to an entrance to a hatchway is raised, and is regulated and controlled in its descent automatically by the elevator in its movements up and down in the hatchway. The construction and arrangement of the parts are simple, its operation is practical and efficient, it can be made at a small cost, is durable, not liable to get out of order, is easily and readily applied, and has been found to work satisfactorily in all respects in practical operation.

The cam *M* can be attached to any part of the elevator. Its middle portion, *u*, can be of any length, according to the time it is desired the guard shall remain in its raised position after the elevator has left the floor.

The sector-arm *O* can be dispensed with, although it is preferable to use it. One or both of the incline edges *s* and *t* can be straight, in lieu of being in a concave line; but it is preferable to have the lower incline edge concave, for the reasons stated, and the end *n* of lever *K* can bear upon the cam *M*, dispensing with the roller, although it is preferable to have the roller, as it reduces wear and friction.

Having thus described my invention, what I claim is—

1. A guard to an opening to a hatchway, arranged to slide in suitable guideways at such opening, in combination with a lever arranged to be operated by the elevator or car as it moves up and down in said hatchway in such manner that said guard, through said lever, is raised and lowered at said opening, for the purpose specified.

2. A guard to an opening to a hatchway, arranged to slide in suitable guideways at such opening, and connected by a cord or cords to a lever having a sector-arm, in combination with an operating-cam on the elevator or car, substantially as and for the purpose specified.

3. A guard to an opening to a hatchway, arranged to slide in suitable guideways at such opening, and connected by a cord or cords to a lever having a sector-arm, in combination with an operating-cam on the elevator or car,

having two incline edges, *s* and *t*, for the purpose specified.

4. A guard to an opening to a hatchway, arranged to slide in suitable guideways at such opening, and connected by a cord or cords to a lever, in combination with an operating-cam on the elevator or car, having an incline concave edge, *t*, substantially as and for the purpose specified.

10 5. A guard to an opening to a hatchway, arranged to slide in suitable guideways at such opening, and connected by a cord or cords to a lever, in combination with an operating-cam on the elevator or car, having incline concave
15 edges *s* and *t*, substantially as and for the purpose specified.

6. A guard to an opening to a hatchway, arranged to slide in suitable guideways at such opening, and connected by a cord or cords to a lever, in combination with a cam on the elevator or car, arranged to act on one arm of said lever at a point above the horizontal plane of the pivot of said lever.

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

J. P. RICHARDSON.

Witnesses:

EDWIN W. BROWN,
WM. S. BELLOWS.