(No Model.) 2 Sheets—Sheet 1.

F. X. HOOPER & C. PETERSEN.

ELEVATOR HATCHWAY.

No. 405,163. Patented June 11, 1889.

Fig. 1.

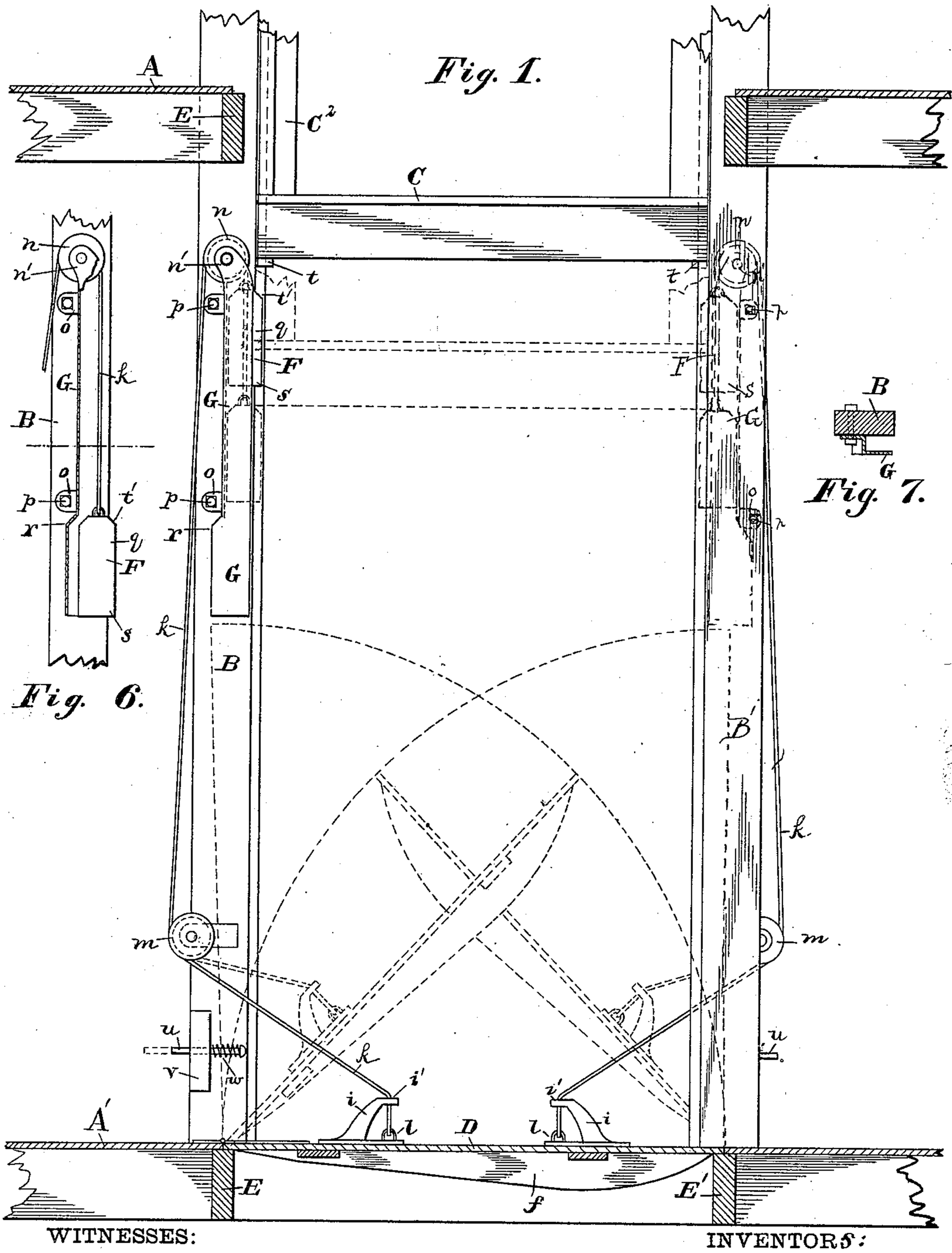

Fig. 6.

Fig. 7.

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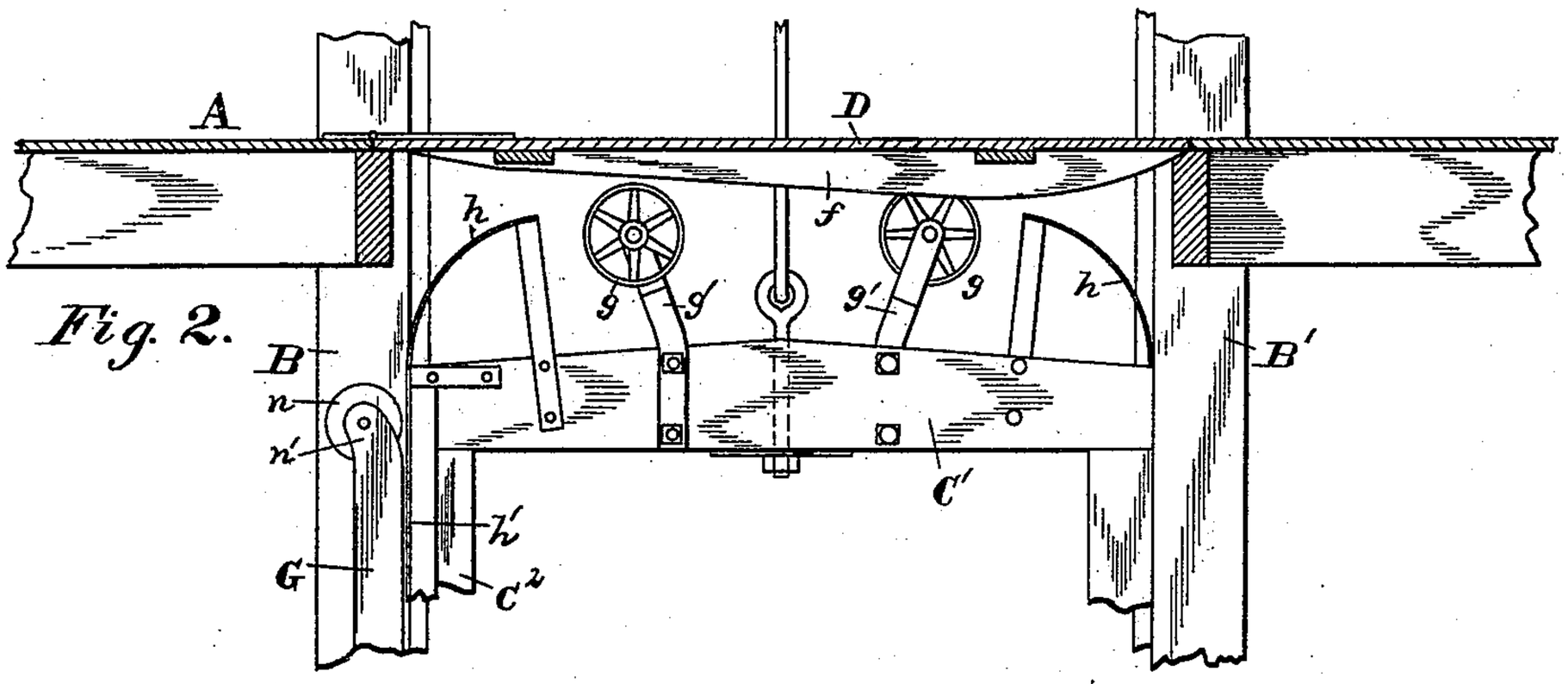

Fig. 2.

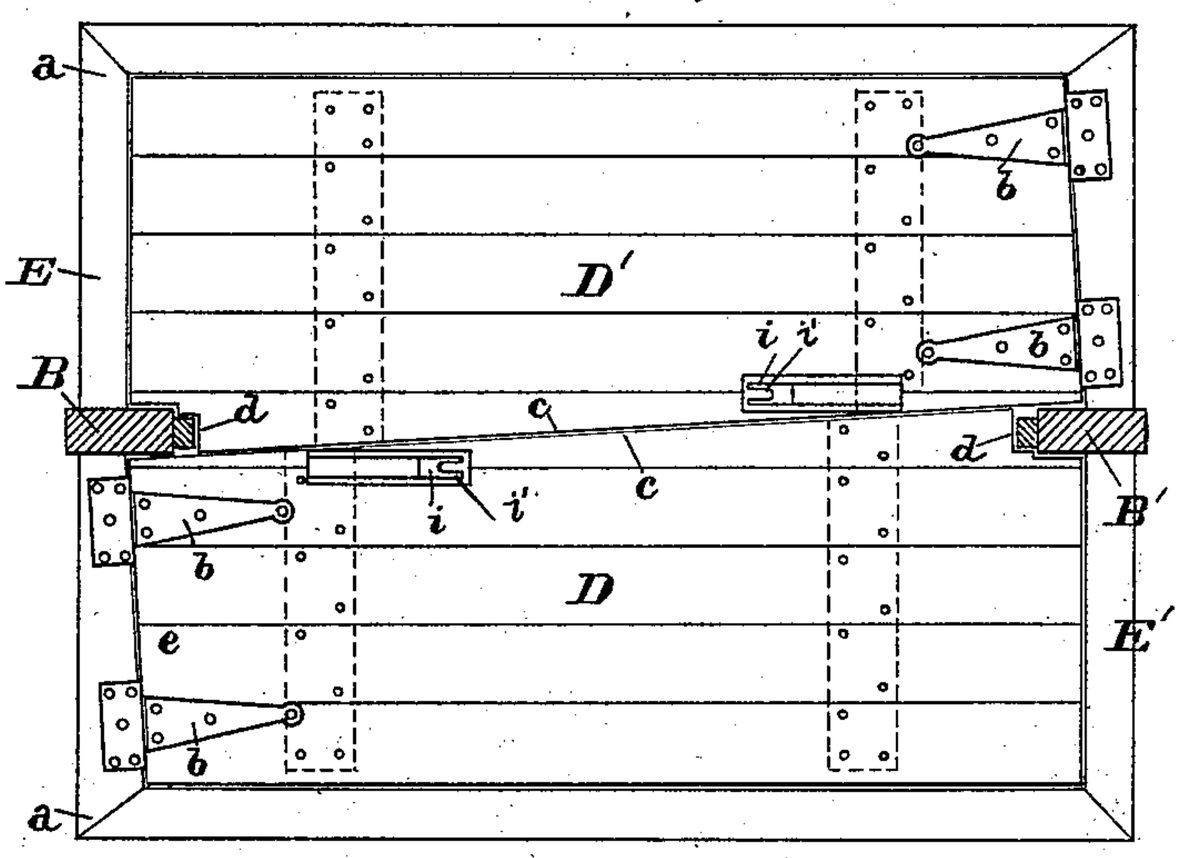

Fig. 3.

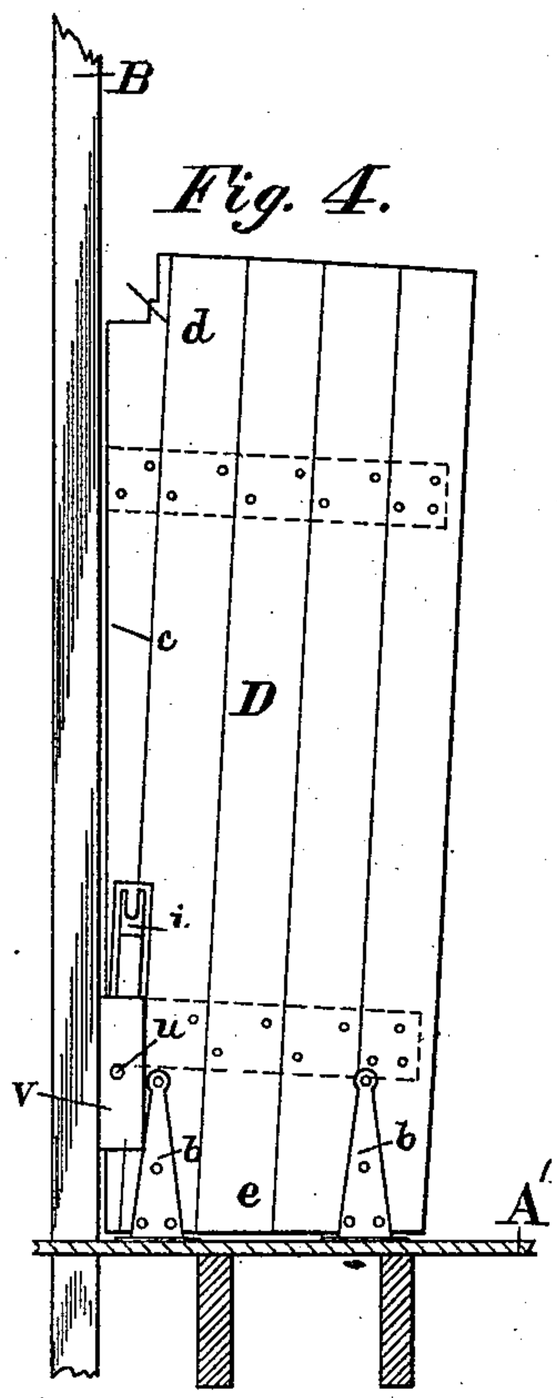

Fig. 4.

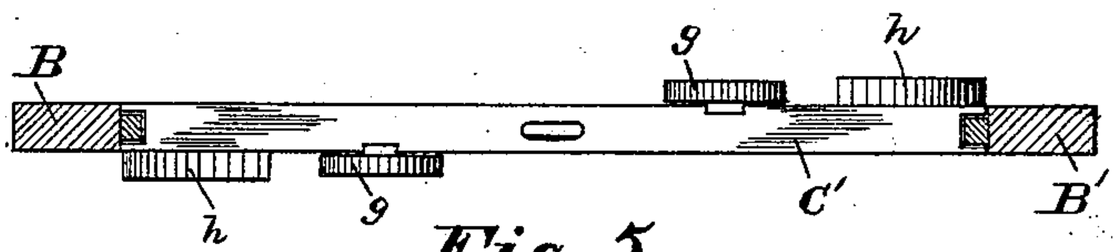

Fig. 5.

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UNITED STATES PATENT OFFICE.

FRANCIS X. HOOPER AND CHRISTIAN PETERSEN, OF BALTIMORE, MARYLAND.

ELEVATOR-HATCHWAY.

SPECIFICATION forming part of Letters Patent No. 405,163, dated June 11, 1889.

Application filed August 7, 1888. Serial No. 282,140. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS X. HOOPER and CHRISTIAN PETERSEN, citizens of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Elevator-Hatchway-Door Mechanism, of which the following is a specification.

Our invention relates to hatchway-doors and mechanism for operating them, and is illustrated in the accompanying drawings, in which—

Figure 1 is a section of two floors of a building and hatchway-doors, and shows the vertical elevator-guides, the cage, and the mechanism. Fig. 2 is a section of a floor of a building and hatchway-doors, and shows the top part of the cage just below the doors. Fig. 3 is a top view of the hatchway-doors closed. Fig. 4 is a view of one vertical elevator-guide and one hatchway-door open. Fig. 5 is a horizontal view on the line 5 5, and shows the top part of the cage. Fig. 6 is a vertical sectional view of the box, and shows the vertically-movable counterbalance-weight which controls the door and box in which it moves. Fig. 7 is a cross-section of the box.

The letters A A′ designate an upper and a lower floor of a building; B B′, the usual vertical guides of the elevator, extending up and down at two sides of the hatchway; C, the cage, which is raised and lowered, and D D′ the two doors which are at each floor of the hatchway.

The shape, construction, and manner of mounting the doors are shown in Figs. 2, 3, 4, and 5. The two vertical guides B B′ are located on opposite sides E E′ of the hatchway and midway between the corners *a* thereof. Two doors are used, and each door is hinged to the hatchway at a side opposite the other, the hinges *b* being attached at those sides of the hatchway where the guides are located. In other words, one door D has its end *e* hinged to that side E of the hatchway whereat the free end of the other door D′ closes. The meeting edges *c* of the two doors, when closed, (see Fig. 3,) extend in an oblique direction across the hatchway. The edge of each door extends from the side of that vertical guide adjacent to which its own hinges *b* are located obliquely across the hatchway to that side of the other vertical guide which is adjacent to the hinges of the other door. The free end of each door has a notch or cut-away *d* at one corner to take about one of the said vertical guides. The hinged end *e* of each door is at a right angle with respect to its oblique meeting edge *c*, whereby, when either door D is opened or raised, as in Figs. 4 and 5, the said oblique meeting edge *c* will be vertical and take position alongside of and parallel with one of the said vertical guides B. Thus one door D when open will have a vertical position alongside of one vertical guide B, and the other door D′ will have a vertical position alongside of the other vertical guide B′. Each door has on its lower surface a curved bar *f*, against which are pressed the roller *g* and curved plate *h* on the top bar C′ of the cage when the latter is ascending.

A vertically-movable counterbalance-weight F is connected with each door, as follows: A bracket-arm *i*, having bearings *i′*, is attached to the upper surface of the door, and a chain or cord *k* has one end made fast at *l* to the door below the bracket, and from the said point of fastening the chain or cord passes over the bracket *i* to a roller *m* on the vertical guide B, thence up to the top roller *n* and then down, and attached to its end is the vertically-movable weight F, which controls the door. A vertical box G has flanges *o*, and is secured by bolts *p* through the said flanges to the vertical guide B. The upper end of the vertical box G has a bearing *n′* for the top roller *n*, before named. The entire side of the box G which confronts the cage C is open, and the said weight F moves up and down in the open box, and one side *q* of the bar projects out of or beyond the said open side of the box G. This projecting side *q* of the bar is in the path of the ascending and descending cage C. When the latter comes in contact with the said projecting side, the bar is thereby moved vertically, as hereinafter stated.

From the top roller *n* downward a certain distance the box G is narrower than the breadth of the weight F, (see Figs. 1 and 6,) and therefore, as above stated, one side *q* of the weight projects beyond the box. At the lower end of the box is a lateral offset *r* on the side remote from the cage, whereby the

box is widened. This wider part of the box is spacious enough to receive the entire breadth of the weight F. The normal position of the vertically-movable weight F, when the hatchway-doors are closed, is shown in Fig. 1, and when the door has been raised or opened to a vertical position, as shown in Fig. 4, the said weight has position at the lower wide end of the box, as seen in Fig. 6. While the cage C is passing the weight F, either going up or down, the said weight is forced sidewise into the lateral offset *r*, where the box is wide enough to receive the weight and avoid having its side *q* project.

The top bar C′ of the cage, as shown in Figs. 2 and 5, is provided with a roller *g*, mounted on an upwardly-projecting arm *g′*, attached to the side of the weight, and at the end and also the side of the said top bar is an upwardly-projecting curve plate *h*. When the cage is ascending, this curved plate forces the hanging weight F sidewise into the offset *r* of the box. This plate continues straight down, at *h′*, the side of the vertical standard C^2 of the cage, and this straight plate keeps the hanging bar F in the lateral offset *r* of the box while the cage is passing the said bar, either going up or down.

A hanging weight F, connected as it is with the door and movable vertically in the open box—and it will be understood each door has its own separate hanging weight—comprises the contrivance or means for operating the doors when the cage C is going up. The roller *g* and curved plate *h* press the lower surface of the door and raise it on its hinges, and the weight F at once descends in the box G. As already stated, the curve plate *h*, coming in contact with the bottom *s* of the hanging weight F, will force said bar sidewise into the offset *r*. As soon as the cage and its straight plate *h′* have passed the hanging weight F, the latter will swing away from the offset *r* in the box G and will move upward along the narrow part of the box as the door lowers. When the cage is coming down, the hanging weight F will be at the highest part of the box G, and the bottom of the cage at *t* will come in contact with the beveled top *t′* of the projecting side *q* of the weight F and will force said weight downward along the narrow part of the box. As the bar moves down the door, of course, rises. When the weight F arrives at the offset *r*, its beveled top will slip away from the bottom of the cage, and the latter will force it into the offset *r*, and the cage will pass down. As soon as the cage passes below the doors, the latter will lower or close and the weight F will move up again.

Each vertical guide is provided with a pusher to bear against the door when raised. This pusher consists of a rod *u*, having a head and movable endwise in a bearing *v*, and surrounded by a spiral spring *w*, which presses it toward the door. Each door has its own operating mechanism, rollers, cord, hanging bar, and box.

The notch or cut-away *d* in the free end of the door in certain constructions may be dispensed with; but, whether notched or not, the free end of each door closes down across the front face of the vertical guide, which is on the side of the hatchway opposite from its hinged end.

Having described our invention, we claim and desire to secure by Letters Patent of the United States—

1. The combination, with the cage moving between the vertical guides B B′ of an elevator, of the doors having inclined abutting edges hinged to opposite sides of the hatchway, the curved bars *f*, secured to the under side of each door, and the rollers *g* and curved plates *h*, connected to the bar C′ of the cage, whereby the said doors are elevated when the cage is elevated, substantially as specified.

2. The combination, with the cage and the guide B, having a vertical box G, with an offset *r*, of the projecting counterbalance-weight F, having a beveled upper portion *t′*, the door D, the pulleys *m n*, and the chain or cord *k*, engaging said pulleys and connected to said door and weight, all arranged to operate in the manner as shown and described.

3. The combination, with the cage and the hinged door provided with a bracket-arm *i*, having a bearing *i′*, of the vertical guide B, having a box G, with an open side and offset *r*, the projecting counterbalance-weight F, with a beveled upper portion *t′*, the rollers *m n*, mounted in bearings on the box and guide, and the chain or cord *k*, secured at *l* to the door, and engaging the bearing *i′* of the bracket, and passing over the said pulleys and connected to the weight, substantially as and for the purpose specified.

In testimony whereof we affix our signatures in the presence of two witnesses.

FRANCIS X. HOOPER.
CHRISTIAN PETERSEN.

Witnesses:
JNO. T. MADDOX,
JOHN E. MORRIS.