

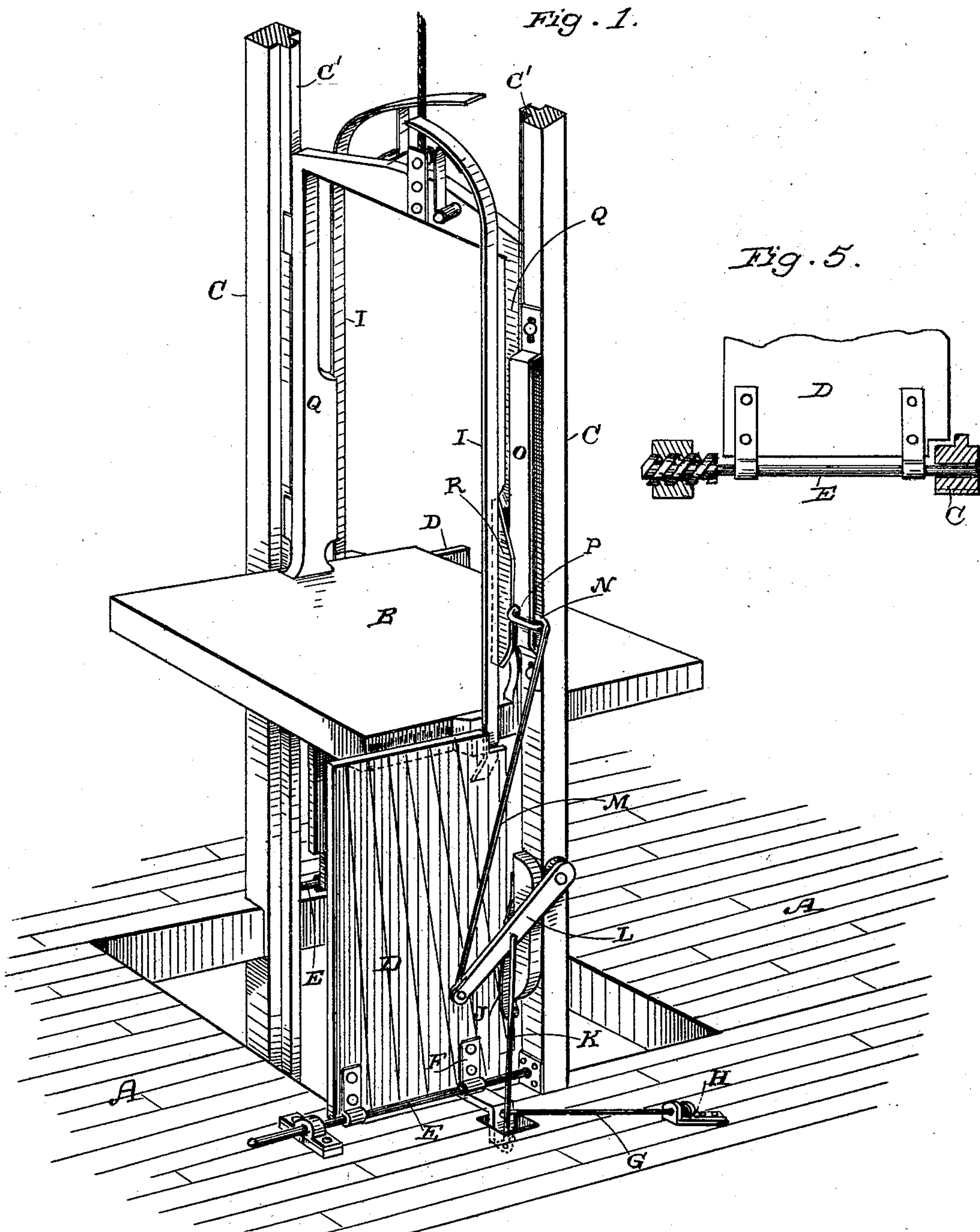
(No Model.)

2 Sheets—Sheet 1.

C. P. STANFORD.
ELEVATOR HATCH.

No. 478,029.

Patented June 28, 1892.



Witnesses,
J. A. Bayless

Inventor,
Charles P. Stanford
By Dewey & Co. atty.

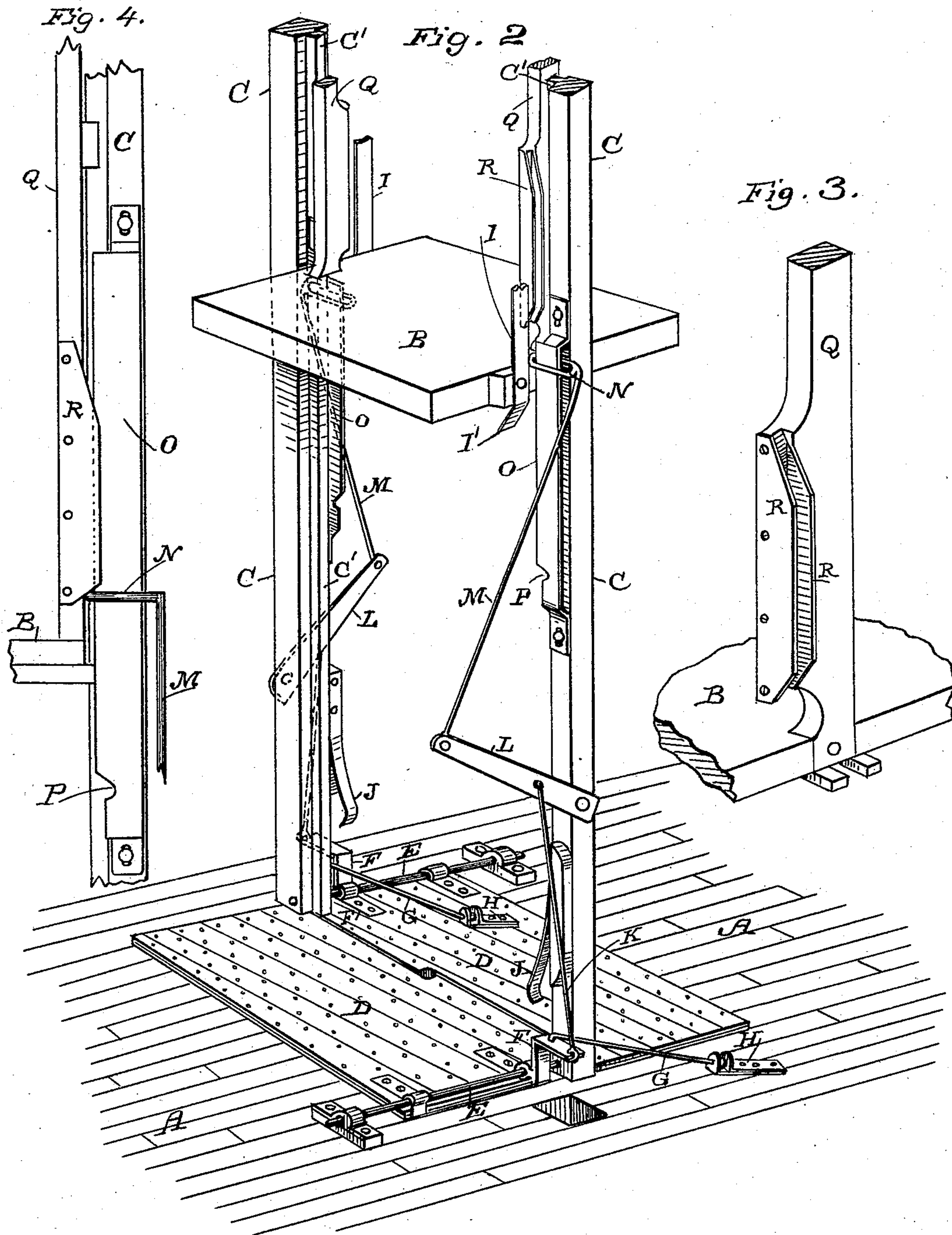
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ELEVATOR HATCH.

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Witnesses,
J. A. House
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Inventor,
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attys

UNITED STATES PATENT OFFICE.

CHARLES P. STANFORD, OF SAN FRANCISCO, CALIFORNIA.

ELEVATOR-HATCH.

SPECIFICATION forming part of Letters Patent No. 478,029, dated June 28, 1892.

Application filed September 10, 1891. Serial No. 405,323. (No model.)

To all whom it may concern:

Be it known that I, CHARLES P. STANFORD, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Elevator-Hatches; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in automatically-operated elevator hatches or doors such as are employed to close the openings in the floors of buildings through which elevator-cages pass or which may be used at any desired intervals to cut off and close the elevator-well.

My present invention is an improvement upon an elevator-hatch for which a patent was issued to me July 8, 1890, No. 431,676; and it consists in certain details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a perspective view of a portion of the elevator, showing the hatches open and the cage about them. Fig. 2 shows the hatch closed. Fig. 3 is an enlarged perspective section showing the lugs R, part of the cage, and its side timbers. Fig. 4 is a section showing a side view of the same and the guide-timbers. Fig. 5 shows the screw for producing a side movement of the doors.

A represents a floor having an opening through it of sufficient size for the passage of the elevator-cage B.

C C are the vertical guides by which the cage is directed and steadied in its movements, situated upon the opposite sides of the elevator-well, and D D are the two doors, each adapted to cover one-half the opening.

The guide-timbers C are fixed upon opposite sides of the elevator-well and midway between the corners, and each of these main timbers has a central projecting lip or guide-flange C', upon which the cage travels and by which it is steadied as it moves up and down in the elevator-well.

The doors D are hinged upon shafts E, which are journaled parallel with the opposite sides of the hatchway-opening and sufficiently above the level of the floor A to allow the hatches to close upon this floor. As each of the doors D covers one-half of the

opening, each shaft extends from the guide-timber C within which it is journaled to a journal-box upon the floor beyond the edge of the opening, and the shafts have an end movement in these journals by which, when the doors are opened, they are moved outwardly and away from the guide-timbers sufficiently to allow them to open into a vertical position and clear the sides of these guide-timbers. When they are closed, they are again gradually drawn inward until they overlap the guide-timbers sufficiently to bring their inner edges approximately together, so as to entirely close the opening through the floor, with the exception of a central hole of sufficient size to allow the rope or the ram to pass in case either of these devices is employed to raise and lower the cage. This side movement of the doors is produced by rods in a position diagonal to the line of the shaft, having one end attached to some part of the door and the other end to a fixed support or by a screw or cam upon the shaft or by other equivalent device. As illustrated by the door upon one side, tilting levers F extend upward from the hinges and are bent at right angles, as shown in Figs. 1 and 2. To these upwardly-extending arms are connected rods G, which extend diagonally away from the hinges and have their opposite ends connected with a suitable fixture or support H, which allows the rods perfectly-free movement, but which by reason of their angular position with reference to the hinge will push the hinge and the door away from the center when the door is opened and will again draw it toward the center when the door is closed. The same effect will be produced by connecting one end of the rod with the side of the guide-post and having the fixture to which the other end is connected attached to the top of the door, so that the rod extends in an angular direction between its two attachments. I have shown both these devices, either of which acts in essentially the same way, the object being to produce the side movement of the door by the angular position of the rod with reference to the opening and closing door. In Fig. 5 I have shown the same result produced by a screw. In order to open these doors when the cage approaches from below, I have shown the side bars I attached to the cage—one a little to

one side of the guide C and the other at the opposite side of the other guide. These bars are arched or curved at the top and may be made slightly elastic at their free ends, so that when they touch the doors from below the shock will not be too abrupt. As the cage rises these arched portions act to force the doors open, and as the doors are gradually opened the side shifting devices act to push them outwardly from the central line until they are clear of the sides of the posts, and they will then open into a vertical position, standing by the sides of the posts. Springs J are attached to the sides of the guide-posts, so that they press against the doors near the hinges with a sufficient tension to cause the doors to commence to close promptly as soon as the cage has passed in either direction.

The outer ends of the angular extensions of the levers F are connected by rods K with levers L, which are fulcrumed upon the outer sides of the guide-timbers C. These rods connect with the levers between the fulcrumed points and the outer ends, so that while the movements of these rods are small and dependent upon the length of the tilting levers F the outer ends of the levers will have a considerably greater movement. The outer ends of the levers L have rods M connected with them and extending upwardly alongside the guide-posts C.

Upon the posts C are fixed supplemental guides O, which extend up and down the sides of the posts a distance equal to the travel of the upper ends of the rods M. These short guides O are suitably attached to the timbers C, and the upper ends of the rods M have loops N formed upon them, which clasp these supplemental guides and travel upon them. As the cage rises and the doors D open the extensions F of the inner hinges move downward, and drawing upon the rods K, which connect them with the levers L and through these levers upon the rods M, the loops N are drawn downward upon the guides O until they reach the offsets or notches P, which are formed at the lower ends of these guides. At this time the doors will stand in a vertical position, and the cage passing upward between them will by reason of the bars I keep the doors open while the cage is passing up between them.

Upon the sides of the vertical timbers Q of the cage are fixed the inclined lugs R, and when these lugs reach the inner ends of the loops N they press them outwardly into the notches, previously described, at the lower ends of the supplemental guides P, where they remain until the cage has passed. As soon as the cage has passed above the doors the action of the springs upon the backs of the doors causes them to commence closing promptly, after which their weight will be sufficient to continue the act of closing as the cage moves upward. As the lugs R pass the inner ends of the loops N the latter are immediately pressed up against the lower ends

of these lugs by the weight of the closing doors and follow the cage up to the upper ends of the supplemental guides until the doors are fully closed. When the cage is moving downward, the lower ends of these lugs strike the inner ends of the loops, and, acting through the connecting-rods, levers L, and the levers F of the doors, the latter will be gradually opened as the cage descends, being at the same time forced outwardly from the central line by the side shifting devices, and before the cage reaches the doors they will again stand in a vertical position.

In order to insure the cage passing the tops of the doors, if the latter should not be sufficiently open to clear the cage the lower ends of the bars I are extended a little below the bottom of the cage and bent inwardly, as shown at I', so that these angular extensions will be the first to touch the tops of the doors, if the latter are not sufficiently open, and will thus insure their being fully opened, so as to allow the cage to pass without striking them. As the cage passes down between the doors these bars I keep the doors open until the cage has passed low enough to allow the doors to begin to close over the curved upper ends or extensions of these bars, and these curves are sufficiently easy to allow the doors to close gradually as the cage passes, the doors being again drawn toward each other by the shifting devices, so that when they are fully closed their adjacent edges meet and fully close the opening through which the cage has passed.

By fixing the hinge-shaft E above the rear edges of the doors D the first movement of opening of the latter will throw the doors away from the guides C, and thus allow them to be moved away from each other by the shifting devices without binding or friction against the guides.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an elevator, the guide-posts situated upon opposite sides of the rectangular well, having the central guide-flanges upon which the cage travels, doors each of which is adapted to close one-half of the opening through which the cage passes, hinge-shafts journaled upon the opposite sides of the opening, each having one of the doors attached to it, boxes in which said shafts have an end motion, and shifting devices connecting the doors with a stationary point, whereby when the doors are opened they are moved outwardly from their meeting-line, so as to pass the guide-posts when fully opened, and are correspondingly moved toward each other as they close, substantially as herein described.

2. In an elevator, the guide-posts set centrally in opposite sides of the rectangular elevator-well with guide-flanges projecting from their adjacent faces, upon which the elevator-cage travels, doors hinged to opposite sides of the floor-opening, each of which closes one-

half the opening, angular extensions from the inner hinges of said doors, levers fulcrumed to the guide-posts and connected with said hinges by rods, supplemental guides fixed to the main guide-posts above these levers, rods connected with the outer ends of the levers, having loops N, which clasp the supplemental guides O and travel upon them, and lugs R upon the cage, which engage these loops after the cage has passed above them to allow the doors to be closed gradually by gravitation and which act through the loops upon the doors to open them when the cage is moving downward and before it reaches the door, substantially as herein described.

3. In an elevator, the guide-posts set upon opposite sides of the elevator-well, having the projecting central flanges upon which the elevator-cage is guided, side bars fixed to the cage a little to one side of the line of the guide-posts, having the upper ends arched and curving toward each other, the doors hinged at their outer ends and slidable laterally upon their hinge-rods, whereby they are moved out of contact with the guide-posts, said arched upper ends acting upon the lower surfaces of the doors to open them gradually when the cage is rising, and acting in the same manner to allow the doors to gradually close after the cage has passed below the doors in its descent, substantially as herein described.

4. In an elevator, the guide-posts set centrally in opposite sides of the rectangular ele-

vator-well, having the central flanges upon which the cage is guided, the doors each occupying one-half of the elevator-well and having a sliding hinge connection at their outer ends, the supplemental bars fixed to the sides of the cage, having the upper ends arched to form contact with the lowersides of the doors to open them when the cage rises and to allow them to close as it descends, extensions I' of these bars beneath the bottom of the cage inclining inwardly and engaging the edges of the doors as the cage reaches them in its descent, whereby the doors are fully opened for the passage of the cage, substantially as herein described.

5. In an elevator, the guide-posts situated upon opposite sides of the elevator-well, a cage adapted to rise and fall between said guides, doors each of which closes one-half of the opening through which the cage passes, hinge-shafts above the rear edges of the doors, whereby the doors are moved out of contact with the guide-posts when they commence to open, and mechanism by which they are moved sidewise along the hinge-rods as they are opened, substantially as herein described.

In witness whereof I have hereunto set my hand.

CHARLES P. STANFORD.

Witnesses:

S. H. NOURSE,
J. A. BAYLESS.