J. J. LONG.

DOOR OPERATING DEVICE FOR ELEVATORS.

APPLICATION FILED JUNE 27, 1908.

917,880.

Patented Apr. 13, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

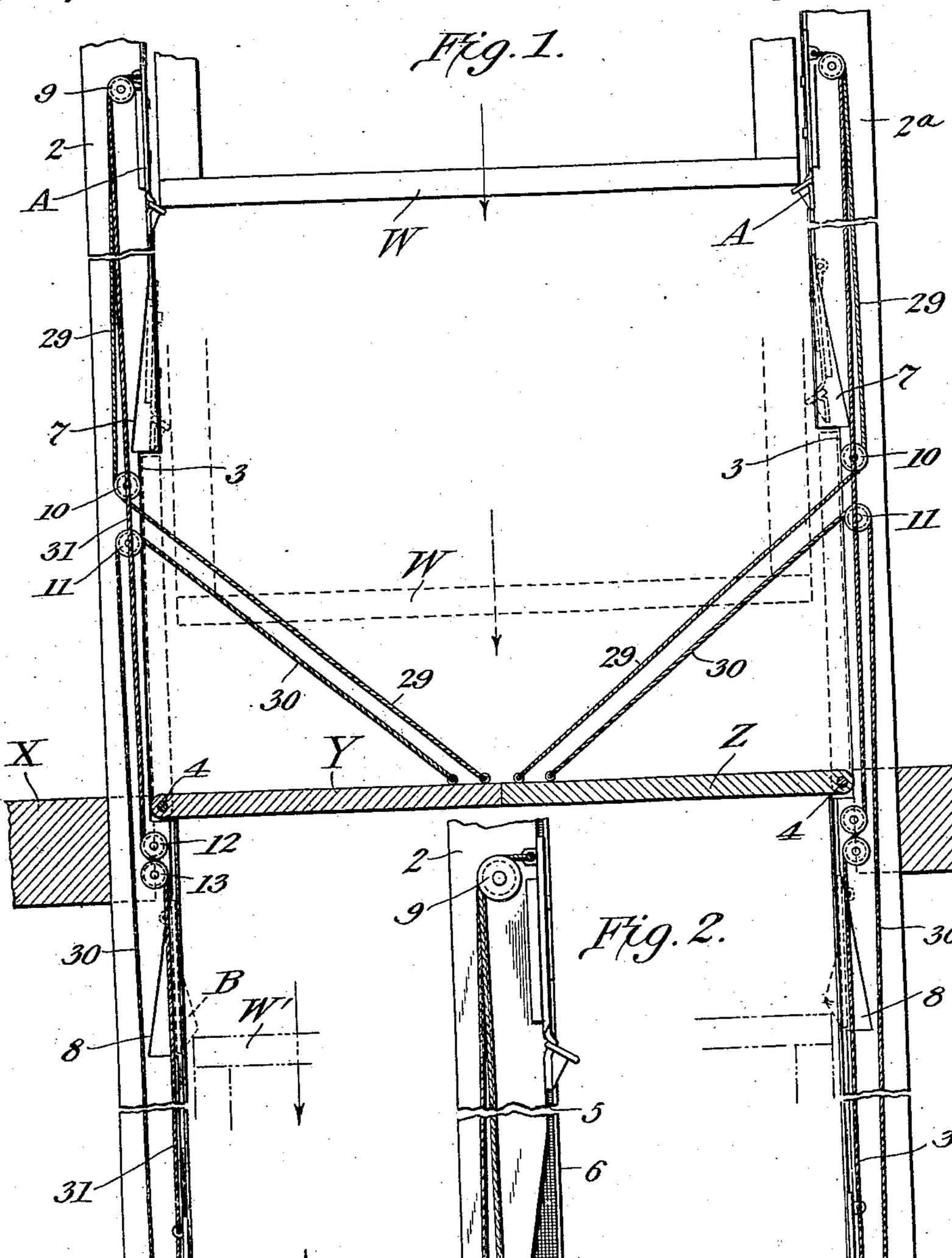

Fig. 2.

WITNESSES

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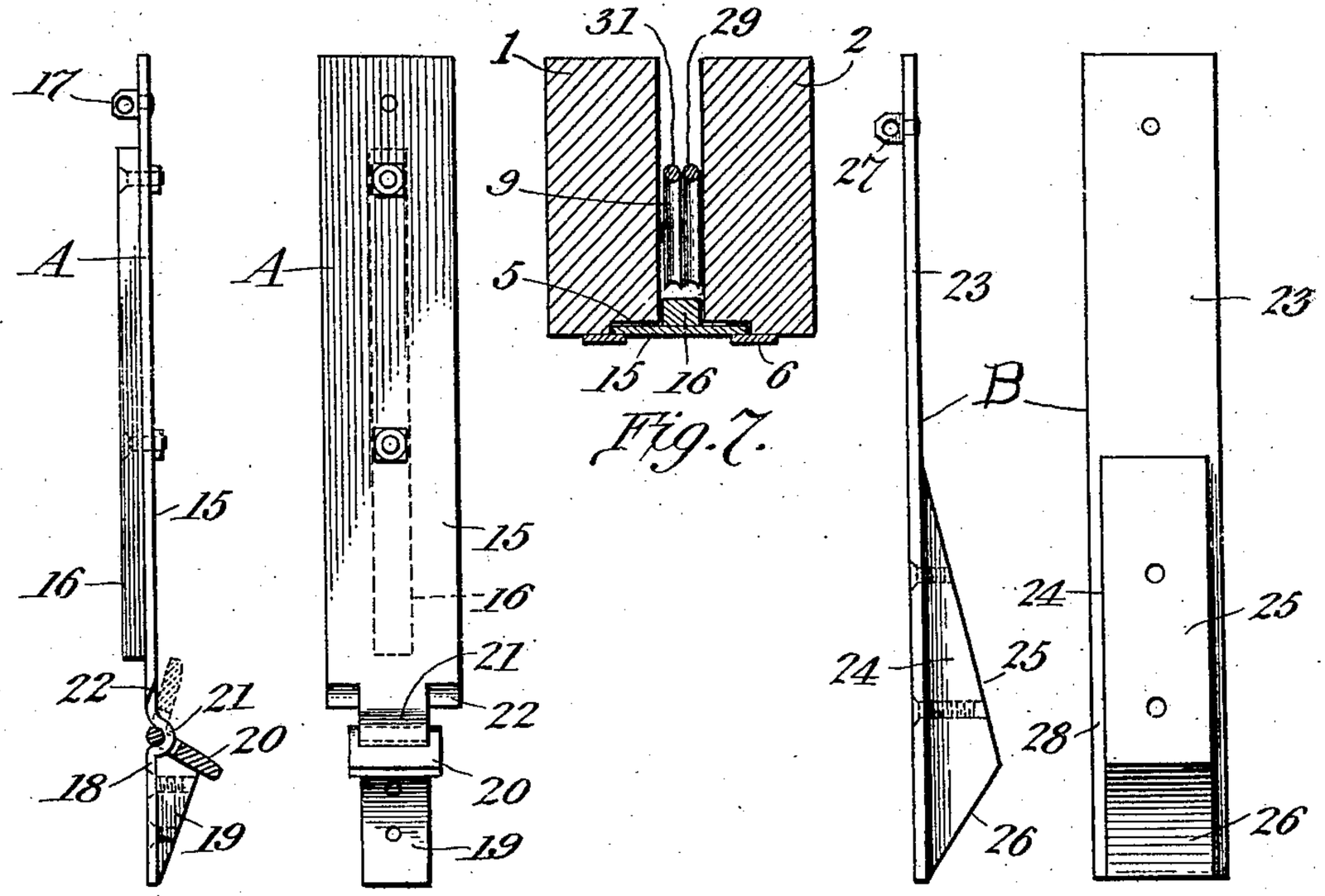

Fig. 3.

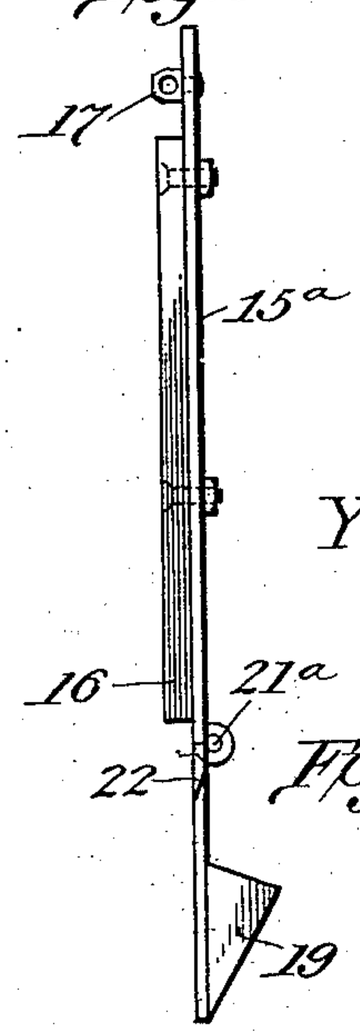

Fig. 4.

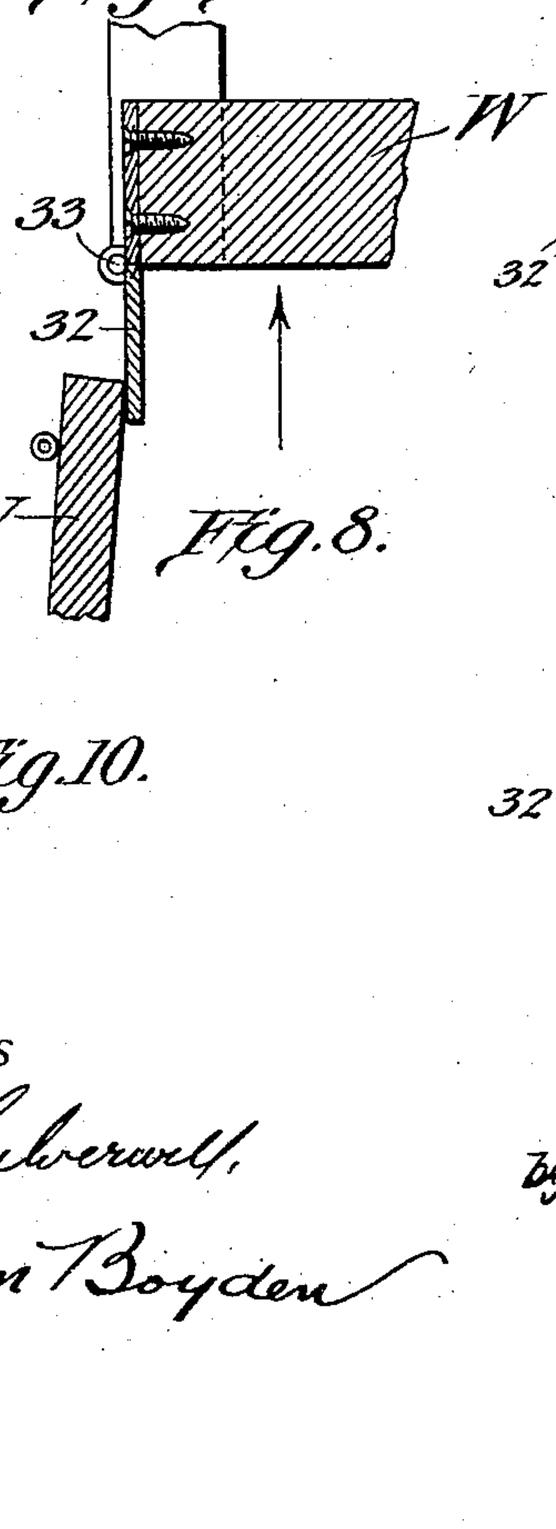

Fig. 8.

Fig. 5. Fig. 6.

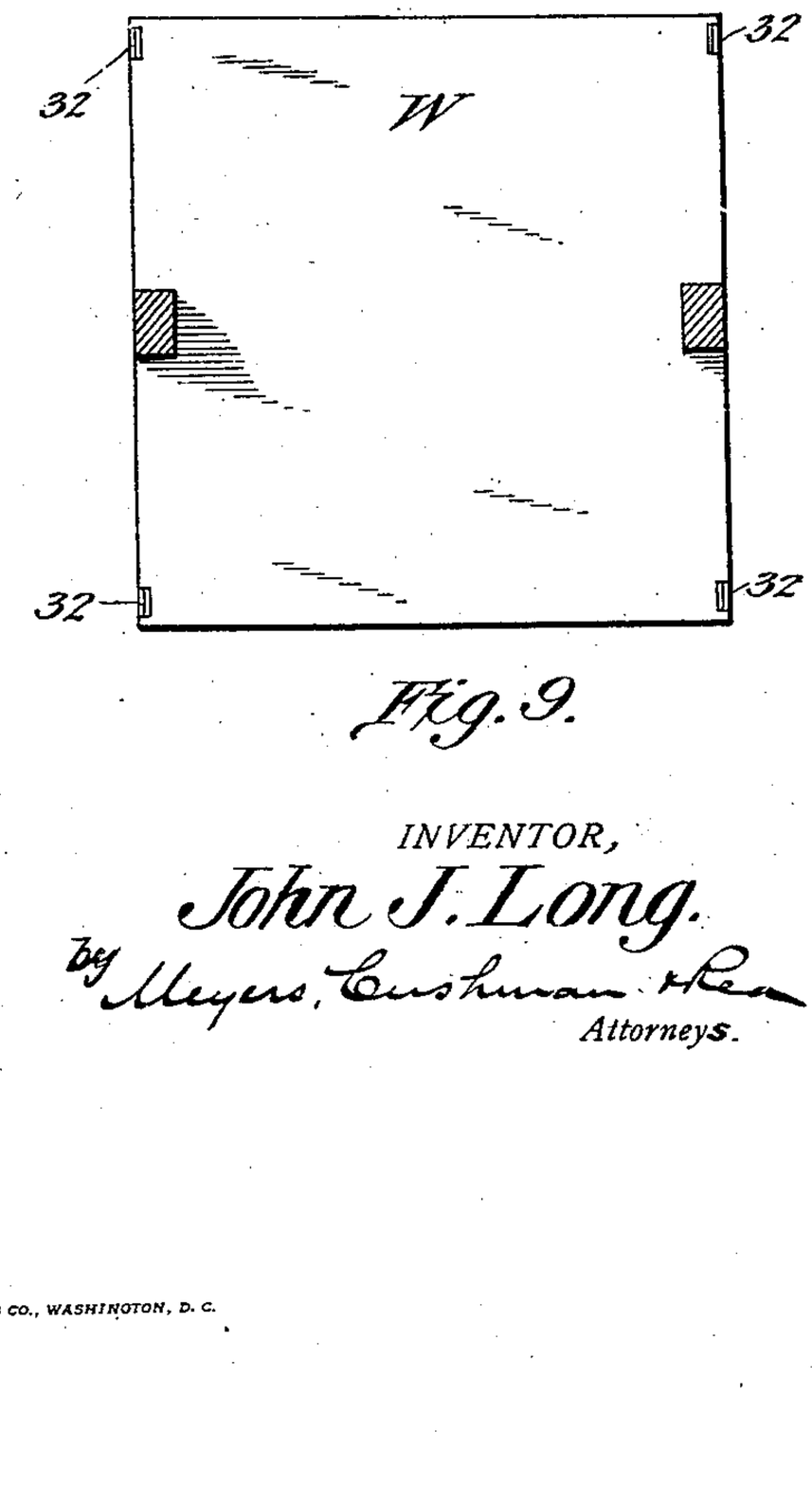

Fig. 9.

WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN J. LONG, OF NORFOLK, VIRGINIA.

DOOR-OPERATING DEVICE FOR ELEVATORS.

No. 917,880. Specification of Letters Patent. Patented April 13, 1909.

Application filed June 27, 1908. Serial No. 440,648.

To all whom it may concern:

Be it known that I, JOHN J. LONG, a citizen of the United States, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented new and useful Improvements in Door-Operating Devices for Elevators, of which the following is a specification.

My invention relates to door operating devices for elevator shafts, and more particularly to devices of this character designed for operating the pivoted hatch doors used in connection with freight elevators.

The primary object of the invention is to provide mechanism so organized and arranged that the hatch doors will be automatically opened upon the approach of the elevator car from either direction, and held open until the car has passed.

A further object of the invention is to provide means for preventing the too rapid closing of the doors after the car has passed.

A further object is to achieve the above results with the simplest mechanism possible, and by the use of a minimum number of parts.

With the above and further objects in view, and to improve generally upon the details of construction of such apparatus, my invention consists in the construction and arrangement of parts hereinafter described and illustrated in the accompanying drawings, in which,

Figure 1 is a sectional elevation of a complete elevator shaft door operating mechanism embodying my invention. Fig. 2 is an enlarged, fragmentary elevation of a portion thereof. Fig. 3 is a side elevation of one of the sliding blocks hereinafter described. Fig. 4 is a front elevation of the same. Fig. 5 is a side elevation of another form of sliding block hereinafter described. Fig. 6 is a front elevation thereof. Fig. 7 is a transverse section on an enlarged scale through the vertical posts or guides arranged on each side of the elevator shaft. Fig. 8 is a sectional elevation showing a fragment of the elevator car and one of the doors. Fig. 9 is a plan view of the floor of the car. Fig. 10 is a view similar to Fig. 3, but showing a slightly modified construction.

In freight elevators of the type to which my invention relates, it has long been customary to provide openings in the floors of ware-houses, stores and the like, and to close such openings by means of pivoted hatch doors, which are usually arranged in pairs. On either side of the doors extend vertical posts or guides having grooves in which the elevator car is adapted to slide.

Referring to the drawings in detail, and more particularly to Fig. 1 thereof, X represents a floor of a building and Y, Z, designate the usual hatch doors. Extending vertically on either side of these doors are guide posts 1, 2 each cut away as at 3 to provide a recess in which the doors Y, Z, pivoted at 4, may lie when in their open position. In order to provide means for automatically operating these doors as the car approaches from either direction, I provide sliding blocks designated in their entirety by the reference characters A, B arranged respectively above and below the level of the doors. These blocks are arranged to slide in grooves 5 formed in the posts 1, 2, and are held in position by means of strips 6, which overlie the grooves 5 so as to form a track or way.

Just above the open position of the doors a notch or pocket 7 is formed in the posts 1, 2 for the reception of the block A, in certain positions of the parts, and just below the doors a second pocket 8 is provided for the reception of the block B, when the parts occupy certain other relative positions.

Suitable guide pulleys 9, 10, 11, 12, 13 and 14 are mounted between the posts 1, 2 above and below the doors and serve to support and guide the flexible cables hereinafter described.

Referring now more particularly to Figs. 3 to 6 of the drawings, it will be seen that the block A preferably comprises a front plate 15 formed of sheet metal and having a bar 16 secured to the back thereof for the purpose of increasing the weight of the block. An eye 17 is secured to the other end of the block to receive the cables. At its lower end the plate 15 is cut so as to form a depending tongue 18 on either side of which are wedge-shaped shoulders 22. A wedge-shaped latch member 19 is secured to the tongue 18 and pivoted, as at 21, just above the member 19, is a pawl 20, which is normally adapted to rest upon the member 19 in an inclined position, as shown in Fig. 3.

The block B comprises merely a plate 23, provided with a cable attaching eye 27, and having secured to its lower end a latch member 24. This member 24 is provided with inclined faces 25 and 26 which meet and form a ridge. The member 24 is somewhat narrower than the plate 23, so as to provide

a space 28 for the engagement of the plate with the said strips 6.

Referring again to Fig. 1, it will be seen that to each pivoted door near its end I secure two flexible cables 29 and 30. Each cable 29 passes upwardly over the pulleys 10 and 9 and is secured to one of the blocks A. The cable 30 passes over the pulleys 11 and 14 and is secured to one of the blocks B. A third cable 31 is secured at one end to the block A and passes thence over the pulleys 9, 12 and 13, and is secured at its other end to the block B, and the arrangement will best be understood from a description of the operation. It will first be assumed that the elevator car, the floor of which is designated by the reference character W, is descending, and occupies the uppermost position indicated by full lines in Fig. 1. As it reaches this point the lower corners of the car engage the upper faces of the pawls 20, and upon the further downward movement of the car, the blocks A are forced to slide downward in the grooves 5. This downward movement of the blocks A results in pulling on the cables 29 and in hoisting the doors Y, Z to their open position. Just before the bottom of the car reaches the upper edge of the doors, the blocks A come opposite the pockets 7 in the posts, and are forced or deflected into these pockets, in such a manner as to allow the car to slide past them. As the car descends, its side posts will continue to engage the blocks A and maintain them within the pockets 7.

It will be observed that at the same time that the doors were raised by the descent of the blocks A, the blocks B were also raised by means of the cables 31, and brought to occupy the position indicated in dotted lines, which position, it will be observed, is adjacent the pockets 8. As now the car continues to descend and passes through the open doors, it will engage these blocks B and force them into the pockets 8. It will thus be seen that the doors Y, Z cannot fall shut, after the car has passed, for the reason that they are maintained in their open position by means of the cables 30 secured to the blocks B, which blocks are being maintained in their pockets by the car and held against movement. When, however, the upper edge of the car has reached, in its downward journey, the position indicated by the reference character W′, the blocks B swing outwardly in such position that the faces 26 thereof engage the upper corners of the car. The weight of the pivoted doors acting through the cables 30 tends to drag the blocks B downward and, as the car descends, the blocks B are permitted to move downward under the influence of this weight. This arrangement, therefore, constitutes means for retarding the movement of the doors and preventing them from slamming, or closing rapidly. Finally, when the blocks B have moved downward to their position shown in full lines, the doors are entirely closed. Upon the approach of an ascending car, the upper corners thereof (as indicated by broken lines at W′), engage the faces 26 of the blocks B and push them upward. This, acting through the cables 30, serves to hoist the doors to their open position, and at the same time the blocks A are lowered to their dotted line position adjacent the pockets 7. As the upper edge of the car passes the doors, it will engage the inclined faces of the latch members 19 carried by the blocks A and force them into their respective pockets, thus maintaining the doors in open position. As the car continues to rise the pawls 20 will be lifted toward their dotted line position (see Fig. 3) and the car will slide past the blocks A until the lower edge W thereof has passed the latch members 19. At this point the blocks will swing outwardly from their pockets and engage the lower edge of the car. Then as the car continues to ascend the blocks A will be permitted to rise under the influence of the weight of the doors, and thus allow the doors to gently close.

Instead of arranging the entire block A to swing into the pocket, the lower end thereof may be made resilient so as to be capable of deflection, or may be hinged as shown in Fig. 10 at 21^a. In this case the pockets 7 need only be large enough to accommodate the lower end of the block A.

With the arrangement so far described, trouble is apt to arise from the jamming of the pawl 20 against the lower edge of the elevator car during the last of the above described operations. In order to prevent this, I preferably arrange at each corner of the elevator car a hinge member 32 having a rule joint 33, as clearly shown in Fig. 8. When the car is descending the joint 33 will permit the door snapping past the member 32, but when the car is ascending the door will catch and rest against the member 32 as shown in Fig. 8 until the lower edge of the car has moved far enough above the pawl 20 to allow it to drop to its full line or normal position, before bringing it to bear against the edge of the car. In this way smooth and regular operation is assured.

It has been found that the pawls or guards 20 are an important feature of the construction, since, without these pawls, the blocks are liable to bind. As the car is descending, a wide bearing surface on the blocks A is desirable, on account of the blocks being deflected into the pockets 7, but as the car ascends there would be a tendency to jam the blocks A in the narrow part of the pockets 7, were the members 19 made too wide. The pawls 20, therefore, projecting beyond the edge of the members 19, serve to form a wide bearing, upon the descent of the car,

but upon its ascent, they are lifted up out of the way, and thus prevented from binding.

It will thus be seen that I have provided a simple and efficient mechanism for automatically operating hatch doors upon the approach of a car in either direction, and it is thought that the numerous advantages of my invention will be readily appreciated by those skilled in the art.

What I claim is:—

1. In elevator door mechanism, a pivoted door, a post or support provided with a vertically extending groove adjacent said door, a pair of blocks adapted to slide in said groove and arranged one above and the other below said door, a cable attached at one end to the door, and at the other end to one of said blocks, and a second cable connecting said blocks, said post having a plurality of pockets in which said blocks are adapted to lie at times.

2. In elevator door mechanism a pivoted door, a post or support provided with a vertically extending groove adjacent said door, a pair of blocks adapted to slide in said groove and arranged one above, and the other below said door, a cable attached at one end to said door, and at its other end to the upper one of said blocks, and a second cable connecting said block with the lower block, said post being further provided with pockets into which said blocks are alternately forced after having been engaged and moved a predetermined distance by said car.

3. In elevator door mechanism, the combination with a pivoted, gravity actuated hatch door, of means located above the same for opening the door upon the approach of the car, and means located below and detached from the door adapted to engage the car as the latter descends, and prevent the too rapid closing of the door.

4. In elevator door mechanism, the combination with a gravity actuated, pivoted hatch door, of means for automatically opening the door upon the descent of the car, and a sliding block connected with the door, and adapted to engage and follow along with the car after it has passed, to retard the falling of the door.

5. In elevator door mechanism, a car, a gravity actuated, pivoted hatch door, a vertical guide post extending on both sides thereof, and provided with a pocket, means carried by said post operated by the car for opening the door upon the approach of a descending car, and a sliding block disposed below said door and connected thereto, said block being arranged to lie within said pocket as the car passes, and to bear against and follow said car as it continues to descend.

6. In elevator door mechanism, the combination with a gravity actuated, pivoted hatch door, of guide posts adjacent thereto, a sliding block associated with one of said posts, and suitable flexible cables, connecting said block with said door, said block adapted, upon the ascent of the car, to be engaged by the same and moved to open the door, and upon the descent of the car, to engage with and follow the same, to prevent the too sudden closing of the doors.

7. In elevator door mechanism, the combination with a pivoted hatch door, of a guide post adjacent the same, and sliding blocks adapted to be guided by said post, arranged one above and one below said door in vertical alinement, and connected therewith, said blocks being disposed within the path of the car and adapted to be moved thereby, one of said blocks being arranged to engage the lower edge only of said car, and the other block being arranged to engage the upper edge only.

8. In elevator door mechanism, a car, a pivoted hatch door, means controlled by the car when ascending for automatically opening said door, and a hinged member depending from the car for engaging and holding open said door for a predetermined time after said car has passed, said member being yieldable in one direction to permit the opening of the door when the car is descending.

9. In a door operating device for elevators, a vertical post having a guiding groove and pocket, a block adapted to slide in said groove and be deflected into said pocket at times, a bevel faced latch member secured to said block and a pawl pivoted to said block so as to rest against such latch member and adapted to be engaged by the car.

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

JOHN J. LONG.

Witnesses:
Z. A. GAY,
W. M. PRENTIS.