2 Sheets—Sheet 1.

J. C. RICHARDSON.

Hatchway-Door.

No. 209,586. **Patented Nov. 5, 1878.**

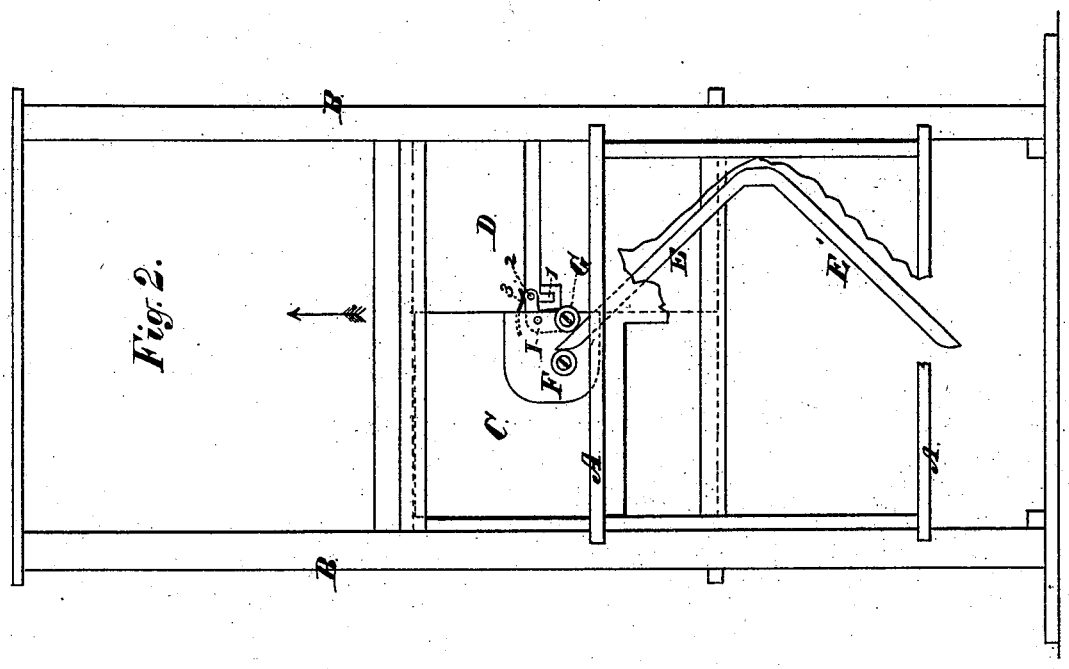

Fig. 2.

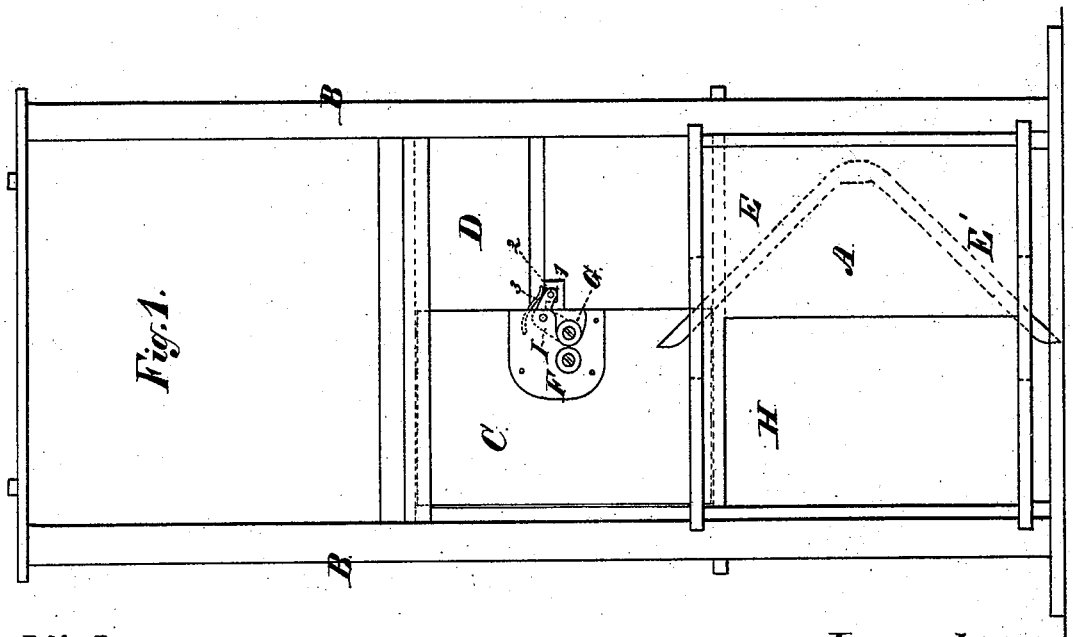

Fig. 1.

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James M. Tully.

Inventor:

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2 Sheets—Sheet 2.

J. C. RICHARDSON.
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Fig. 5.

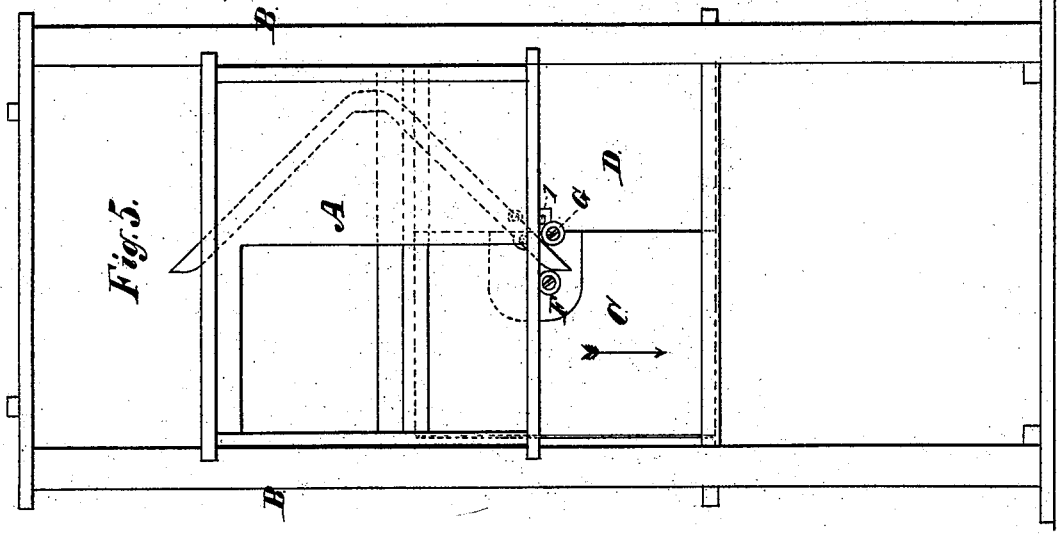


Fig. 4.

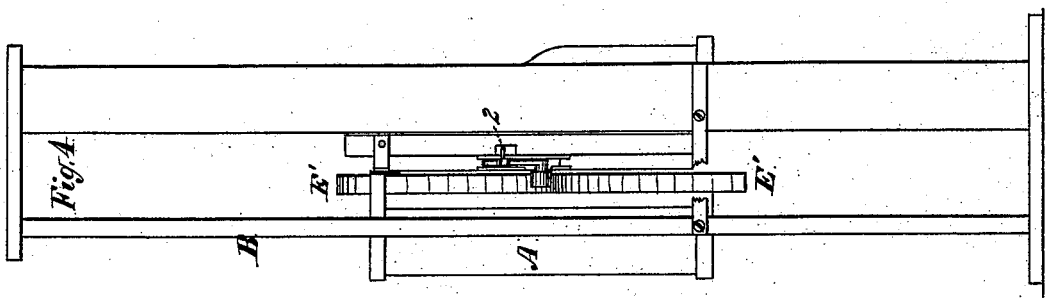
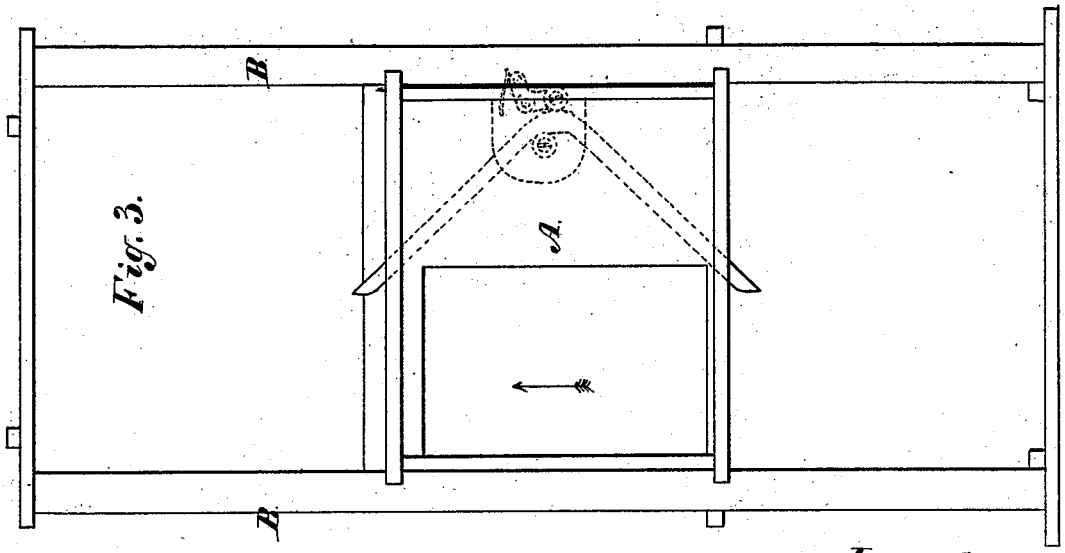


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN C. RICHARDSON, OF NEW YORK, N. Y.

IMPROVEMENT IN HATCHWAY-DOORS.

Specification forming part of Letters Patent No. **209,586**, dated November 5, 1878; application filed July 31, 1878.

To all whom it may concern:

Be it known that I, JOHN C. RICHARDSON, of the city, county, and State of New York, have invented certain new and useful Improvements in Opening and Closing Elevator-Doors, whereof the following is a specification:

The invention relates to the opening and closing of the entrance-doors to the elevator carriage or car by means of the ascending and descending motion of such car.

It consists in having a rib placed obliquely with respect to the ascent and descent of the elevator-car, arranged to act in connection with certain projections upon the door which closes the entrance to the car, so as to open and close the door, and also to bolt and unbolt the same as the elevator-car ascends and descends.

The drawings annexed show the cam-rib as attached to the car and the projections it acts upon as attached to the door; but this arrangement may be reversed within the scope of the invention. But one door is shown; but it will be understood that there is one at every floor served by the car.

Figure 1 shows the car as below the door, which is closed and bolted. Fig. 2 shows the car as ascending and the cam in the act of opening or raising the bolt or latch preparatory to opening the door. Fig. 3 shows the door as fully open. Fig. 4 is a side view of Fig. 3. Fig. 5 shows the car in the act of unbolting the door preparatory to opening it on the descent of the car.

The letters of reference correspond in all figures.

A is an elevator carriage or car. B B are the ways or guides which guide it as it is raised and lowered. H is an opening in one side of the car. C is a door, arranged to slide behind a partition, D, or side of the shaft or well in which the car moves.

Permanently affixed to the side of the car there is a rib, E E′, which is shown as beginning at a point near and above the opening H in the car and running obliquely to a point near the side of the car, and thence returning in a like direction to a point near and below said opening H, producing an outline resembling a >, which acts as a cam for unlocking and for sliding back the door.

I do not, however, confine myself strictly to the above form of cam, but shall vary it as circumstances may require.

F G are projections, one of which is affixed to the door and the other to one branch of a bell-crank lever, I, also attached to the door, and the other branch of which lever is a latch for securing the door, and serves the purpose of a bolt, being on the inside beyond reach of persons not in the elevator. Said lever has a small pin or projection, 2, Fig. 4, which engages in a notch, 1, Fig. 1, fastening the door when closed, and is held in said notch by a spring, 3.

As the car in ascending reaches the door C the extremity of the upper lobe of the cam-rib E enters between the projections F G, whereupon G, being movable, yields, moving away from F and undoing the latch I, when, G coming to a stop and the cam-rib continuing to advance, the upper surface of the cam, still impinging against G, causes the door to slide open laterally until the bottom of the car arrives at the level of a floor in the building, at which point the oblique direction of the cam ceases. (See Figs. 3 and 4.)

I prefer so to form the cam that the door may be opened, and when opened may remain at rest a moment before beginning to close, the car continuing its motion; and for this purpose a part of the cam at the junction of the ribs E E′ is made straight, as shown.

As the upward movement of the car is continued the inner side of the cam-rib impinges against the projection F, closing the door by a lateral movement thereof, and when closed, as the cam retires from between the projections F and G, the latter follows the cam until the pin 2 of the latch or bolt falls into its notch, when the door is securely locked, as seen in Fig. 1.

Fig. 5 shows the car in the act of descending, and of undoing the latch or bolt by means of the lower lobe of the cam-rib, the operation being the same as before described in the ascent of the car.

From the foregoing description it will be seen that the invention consists of a combination of cam-surfaces—affixed to the car, for example—operating in connection with suitable projections on the door. A similar result

may be attained by affixing the cam to the door and arranging it for operation in connection with stationary projections on the wall of the elevator shaft or well.

The projection F G (shown in the drawing) consists of studs encircled by friction-rollers, to reduce wear. To prevent noise, such rollers may have their peripheries covered with some elastic substance, such as india-rubber.

The opening and closing of the door may be effected without the use of the latch, in which case the position of the two projections F G will be stationary with respect to each other, and will occupy the position relatively shown in Figs. 2, 3, and 5. The means of securing the door may therefore be used or not, at pleasure.

In the above invention no combination of rocking shaft and levers is used for operating a door or doors that are closed by gravity, nor does the said invention refer to or embrace the closing and opening of hatches and hatch-doors.

What I claim as my invention is—

1. The combination, with the elevator-car A, of the cam-rib E E′ and projections on the door C, said rib being arranged to engage immediately on the projections, all arranged and operating substantially as specified.

2. The combination, with the door to an elevator and a cam-rib for operating the same by the ascent and descent of the elevator-car, of two projections to be operated on by said cam-rib, one of which projections is affixed to the door and the other to a latch or bolt, which is released by the cam before opening the door, as set forth.

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Witnesses:
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JAMES M. TULLY.