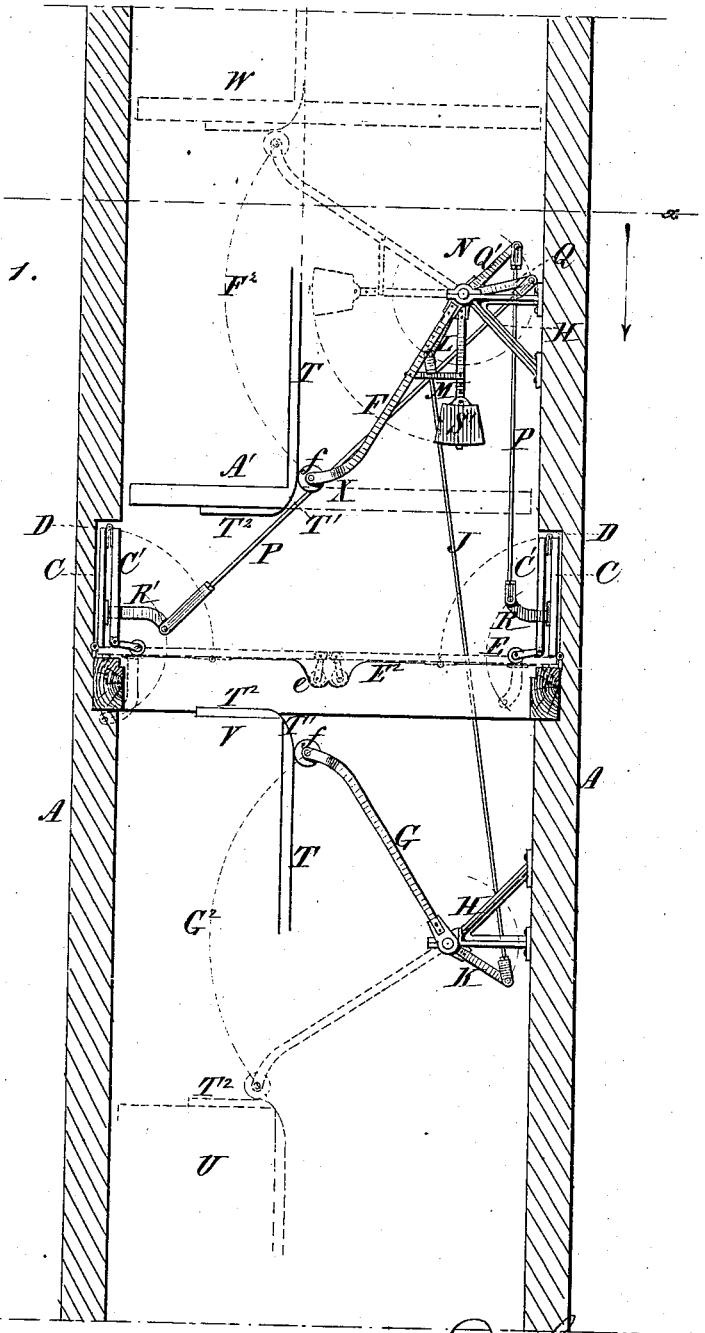
2 Sheets—Sheet 1.

J. M. VAN OSDEL.

Hatchway.

No. 207,573. Patented Aug. 27, 1878.

Fig. 1.



Attest:
H. L. Perrine
Floyd Norris

John M. Van Osdel
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By. Johnson and Johnson
Atty's.

2 Sheets—Sheet 2.

J. M. VAN OSDEL.

Hatchway.

No. 207,573. **Patented Aug. 27, 1878.**

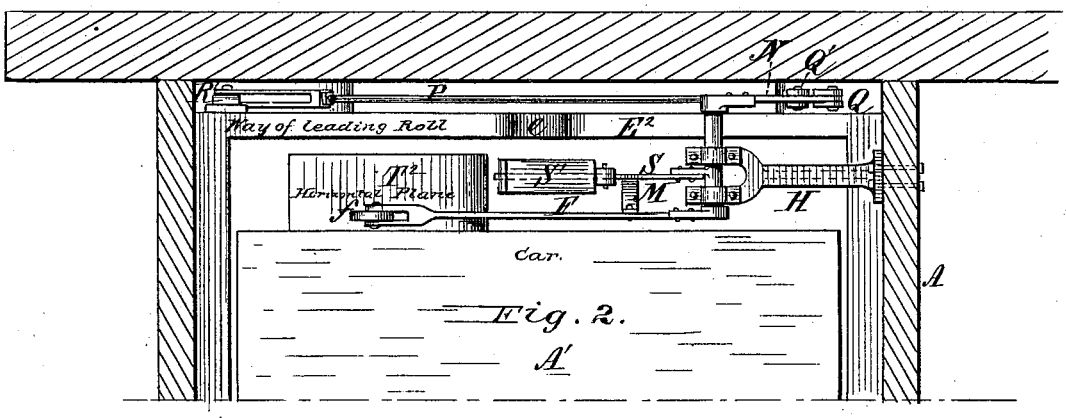

Fig. 2.

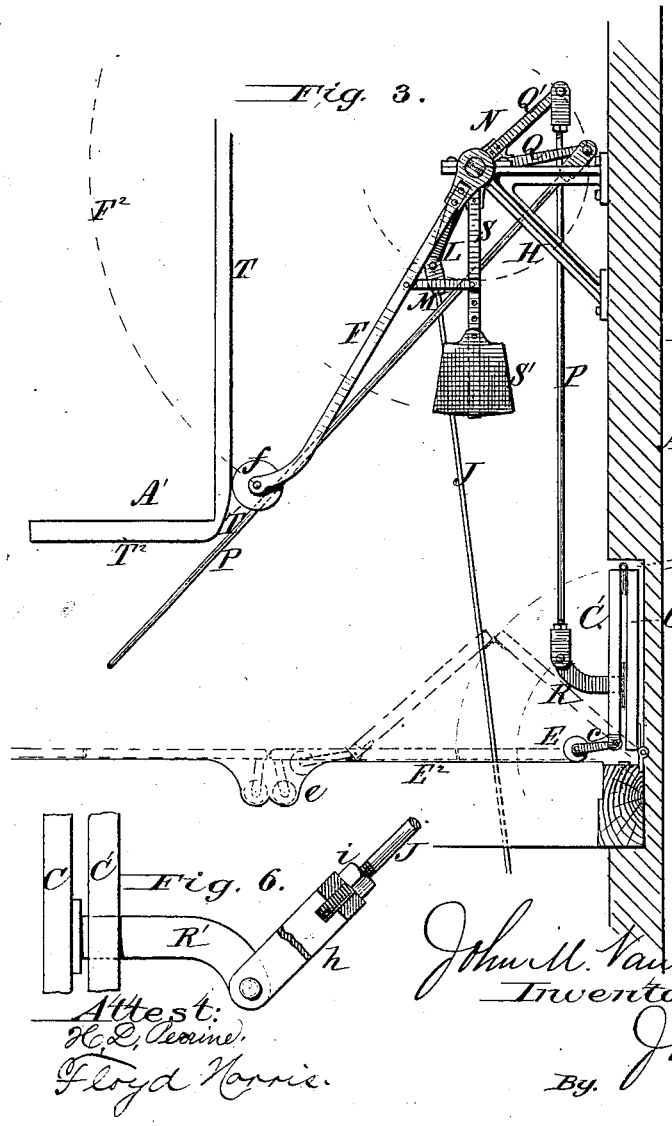

Fig. 3.

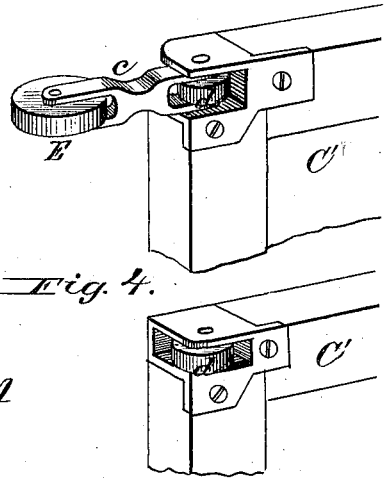

Fig. 4.

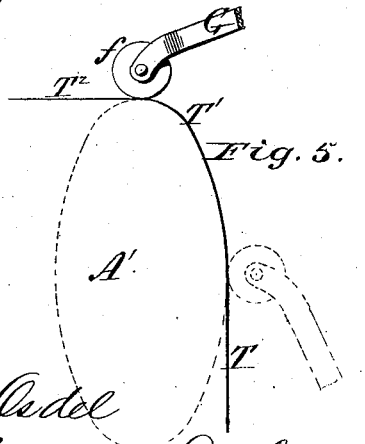

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN M. VAN OSDEL, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN HATCHWAYS.

Specification forming part of Letters Patent No. **207,573**, dated August 27, 1878; application filed July 27, 1878.

CASE B.

To all whom it may concern:

Be it known that I, JOHN M. VAN OSDEL, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Self-Closing Hatchways for Elevators; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

In a patent bearing even date herewith (Case A) I have described and shown all the working devices embraced herein under an arrangement and organization in which the primary operating-levers are mounted in bearings outside of the shaftway and have an outside connection for co-operation with a bearing-way of novel construction carried by the elevator-car.

Such construction, however, is not well adapted for use in some buildings; and my present invention consists in a reorganization and adaptation of all the working devices for operation directly within the shaftway or passage traversed by the elevator. In this new organization I use two instead of three bracket-bearings for the several connections of the operating devices, and I arrange these bearings directly within the shaftway instead of on the outside thereof, as in my said patent. This simplifies the machinery and brings the several parts into more compact relation with the doors.

The principal point of improvement is the arrangement of the primary levers, the door-operating connections, and a single counterpoise upon one and the same bracket-bearing above the doors, and the arrangement of the bearing-way in a position upon the elevator conforming to the centralization of the parts above stated, all effecting the opening and closing movements of the doors with the least possible force and noise.

I do not deem it necessary to specifically describe herein the features which distinguish the invention of my said patent, but to give only such description as will render intelligible the working of the hatchway-doors under my new organization.

Referring to the drawings, Figure 1 represents a portion of a shaftway of an elevator, showing one of a series of doors of two sections of two hinged leaves each, the operating devices connected therewith, and a part of the elevator in different positions above and below the doors; Fig. 2, a horizontal section thereof, taken on the line *x x* of Fig. 1, the upper primary lever shown as resting upon the upper horizontal plane of the elevator as descending from the point X; Fig. 3, an enlarged detail, showing one section of the doors folded open and its connections with the upper primary lever and the counterpoise, the relation of the elevator therewith being also shown; Fig. 4, a detail of the leading-roll of the flap-leaf and of the supporting-rolls thereof enlarged; Fig. 5, a detail, enlarged, of a part of the bearing-way of the elevator, showing the point of impact of the horizontal plane of said way upon the roll end of the lower primary lever to open the doors, the form of the curves of said way to give a variable movement in opening said doors, and, by dotted lines, the bearing of said lever upon the vertical plane of said bearing-way to hold the doors open; and Fig. 6, a detail of the screw-coupling lock-nut connection for the several parts for making their proper adjustments to determine the opening and closing of the doors and the equal bearing of the primary levers upon the elevator bearing-way.

The shaft A has at each floor a suitable frame-work, built in the walls thereof, to receive and support the doors C C′, which are of two sections of two leaves each, and hinged to the frame-work, so as to fold, when open, within recesses D formed in the walls, so as to give a free passage-way for the elevator-car.

The outer leaves, C, are hinged on their outer sides, and the flap-leaves, C′, are hinged in a manner to allow them to be folded against the inner sides of the outer leaves, and to be, while so folded, supported upon leading-rolls E E, by which they are started, separated, and led out in closing by the gravity of the doors

These leading-rolls are carried by pivoted arms *c*, which allow them, after serving their purpose, to pass idly out of the way into receiving-pockets *e* in the rabbet-ways E^2, while the doors are supported in closing by anti-friction rolls *d d* in the angles of the flap-leaf.

The devices for opening and closing the doors are mounted upon two brackets, H, secured to the wall within the shaft, one above and the other below the doors. The lower bracket carries the lower primary lever, G, and the upper bracket carries the upper primary lever, F, and their axis-pins are provided respectively with secondary levers K L, which are connected by a rod, J, so that by this connection the primary levers are balanced and caused to move simultaneously in opposite directions in sweeps or arcs of ninety degrees. These primary levers carry anti-friction rolls *f* at their free ends to receive the action of the bearing-way upon the elevator-car in its upward and downward movements, as will be more fully hereinafter explained.

The axis-pin of the upper primary lever carries a two-armed secondary lever, N, to branches Q Q′ of which lifting-rods P P are connected, the lower ends of which are pivoted to arms R R′, projecting inward from the outer leaves of the doors, by which to effect their opening and closing movements. The axis-pin of this two-armed secondary lever N carries the counterpoise S′, the movements of which in a quarter of a circle are controlled by the partial rotation of said two-armed lever, while the arm S of the counterpoise connects with the upper primary lever, F, by a bar or rod, M, by which the movements of said lever are controlled by the movements of the counterpoise, by reason of said primary lever F being mounted loosely upon its axis-pin and having a fixed connection with the counterpoise. This primary lever is so connected in order to obtain a safety attachment by means of the bar M, that, in the event of the accidental falling of the elevator from any cause, one of the points of attachment of said bar will give way and free the primary lever from operating connection with the doors, and thus leave the doors closed and arrest the falling elevator; but this severance can only occur by the sudden falling of the elevator, as this bar connection is not otherwise subject to any strain or force sufficient to endanger its separation under the working of the elevator. In the contingency stated the doors will remain practically closed during the severance of the safety-connection, and, as the upper primary lever receives the whole concussion in such event, I have selected this part to make the safety-connection; but I do not wish to confine myself to any particular point of connection for this purpose. The primary levers have a long, free, and easy sweep in being operated by the elevator, which is provided with a bearing-way of vertical and horizontal planes joined by intermediate curves, arranged upon one side of the elevator at a proper distance from the axis of the primary levers and within th[illegible] wherein the operating devices work. The bearing-way consists of a long vertical plane, T, on the side of the elevator and an upper and lower curve, T^1, of the form of a quarter of an ellipse, which terminate, respectively, in top and bottom horizontal planes T^2 overlying the corresponding ends of the elevator.

The length of the vertical plane is such as to engage with one of the primary levers before the other leaves it, and its function is to hold the doors open during the passage of the elevator and free from contact with it, while the function of the curves and their terminating horizontal planes is to effect the opening and closing of the doors, to allow the doors to commence closing with a slow movement, to let them down easy, and to conclude the opening of the doors with a slow movement to prevent slamming. These matters are of great advantage in the working of an elevator with self-closing doors, and they are more specifically pointed out in my said patent, to which reference is made.

In the drawings, the elevator A′ is shown in different positions in its ascent and descent. For instance, in the ascent of the elevator, U represents the upper curve, terminating in the horizontal plane T^2, with the primary lever in position as having just received the impact of the elevator to commence the opening of the doors. The ascent of the elevator moving the primary lever from U to V, as shown by the dotted curved line G^2, both commences and completes the opening of the doors, while the primary lever shown in black lines resting against the vertical plane T holds the doors open through the intervention of the rod J, connecting with the mechanism above the doors. This movement of the lower primary lever, G, brings the upper primary lever, F, down to the point X, in position to pass on and traverse the vertical plane of the elevator as it passes through the doorway. The continued ascent of the elevator brings the lower end of the vertical plane at X in position to commence closing the doors. The further ascent of the elevator allows the roll end of the upper primary lever F to pass around the curve and rest against the lower horizontal plane T^2, and in this position follows the elevator upward, as indicated by the curved dotted line F^2, to the point W, and by this movement of said primary lever F the doors are allowed to close by a regulated movement to let them down easy. The descending movement of the elevator effects the same operation, only the action of the primary levers is reversed, the upper one opening the doors, and the lower one, by its action upon the curve and upper plane, allowing the doors to close, which is accomplished at the point U, the starting-point in describing the first-above movements.

In the drawings, A′ represents the platform of the elevator.

In my said patent the upper primary lever

is fixed upon its axis, and the safety attachment is with one of the branches of the secondary lever N, whereas in this improvement the upper primary lever is hung loosely upon the axis of the counterpoise, and the two are connected by the safety-bar M, giving the same result with a two-armed instead of a tri-armed lever, as used in my said patent.

The rod J is connected to arms K and L on the axis-pins of the primary levers, so as to operate the primary levers simultaneously toward and from each other, and with equal movements.

All the operating parts above the hatchway are hung upon the same bracket and upon the same axis-bearing within the space between the wall and the side of the elevator which carries the bearing-way, as shown in Fig. 2, so that there are no projections outside of the shaftway, which is not only a very advantageous arrangement for some buildings, but such projections are inadmissible in some buildings.

The quarter-ellipse form of the curves of the bearing-way slows the final movement of the doors in opening, and allows the doors to commence their closing movement with a slow speed, and thereby maintain the proper contact of the roll ends of the primary levers with the bearing-way, and prevent the elevator from running away from them.

The several connecting-rods are made adjustable to effect the exact arrival of the doors to their stationary points simultaneously, while the primary levers should be adjusted to give equal bearing upon the bearing-way of the elevator. This is obtained by right and left screw-threads on the ends of the several connecting-rods adapted to fit into screw-couplings *h*, and, when so adjusted, to be locked by nuts *i*, as shown in Fig. 6.

If the elevator is arranged for a fast movement, the primary levers are made of greater length than is required for a slow-moving elevator.

The doors are adapted for either a side or corner post elevator; and the guideways are arranged in the frame-work in the usual manner.

The several dotted curves show the equal arcs described by all the parts indicated in the opening and closing movements of the doors.

The counterpoise is made adjustable upon its arm to effect the perfect closing of the doors. The door-flaps are provided with notches, to allow the elevator-cable to pass between them when closed.

In the operation of the primary levers it will be noticed that one of the horizontal planes acts first upon one of said levers to open the doors, while the action of both of said levers upon the vertical plane holds the doors open with the ends of said levers at the limit of their movement toward each other. The counterpoise balances the movements of all the doors by positive connections.

I claim—

1. In self-closing doors for elevator-hatchways, the upper primary lever, F, the secondary lever N, connecting with the door-lifting rods P P, the arm L, jointed to rod J, and the counterpoise connected with said primary lever by the rod M, all arranged for co-operative action upon one and the same axis-bearing within the shaftway above the door, substantially as described.

2. The counterpoise fixed upon its axis-pin and connected with the upper primary lever, F, mounted loosely upon said axis-pin, by the rod M, having a safety connection direct with said lever, substantially as and for the purpose described.

In testimony that I claim the foregoing I have affixed my signature in the presence of two witnesses.

JOHN M. VAN OSDEL.

Witnesses:
A. E. H. JOHNSON,
J. W. HAMILTON JOHNSON.