J. B. WARING.

Mechanism for Opening and Closing Doors or Covers of Hoistways.

No. 200,112. Patented Feb. 5, 1878.

Fig. 1

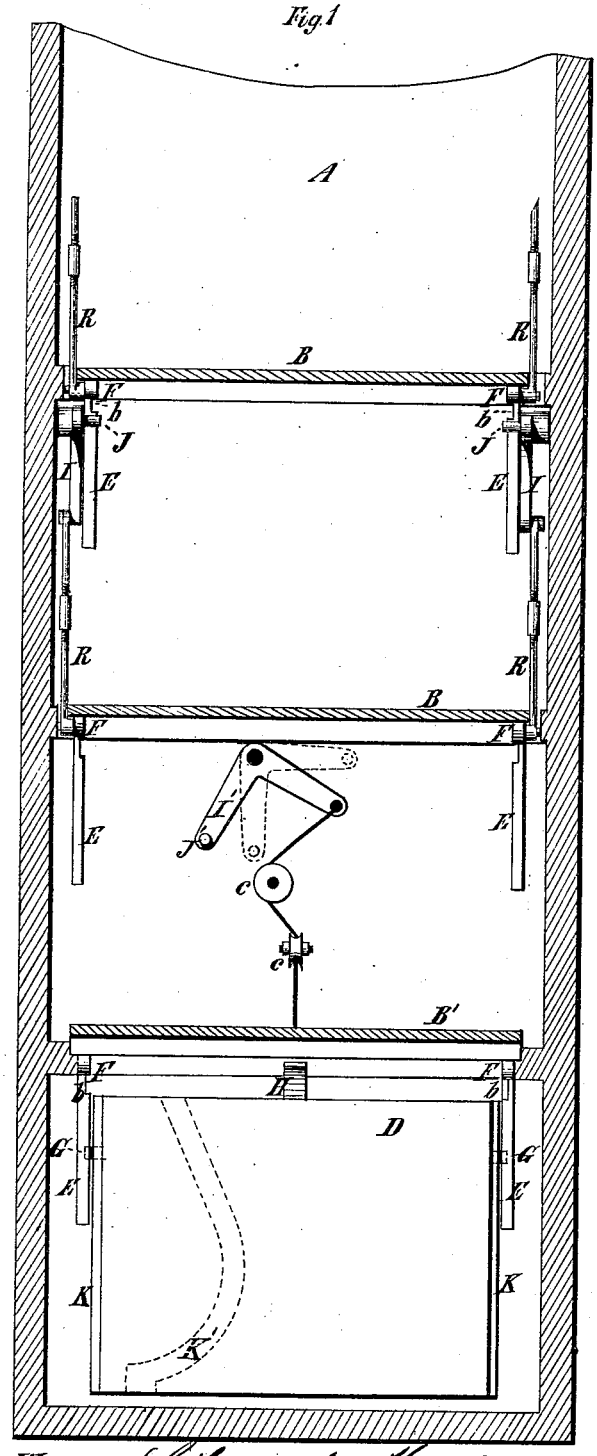
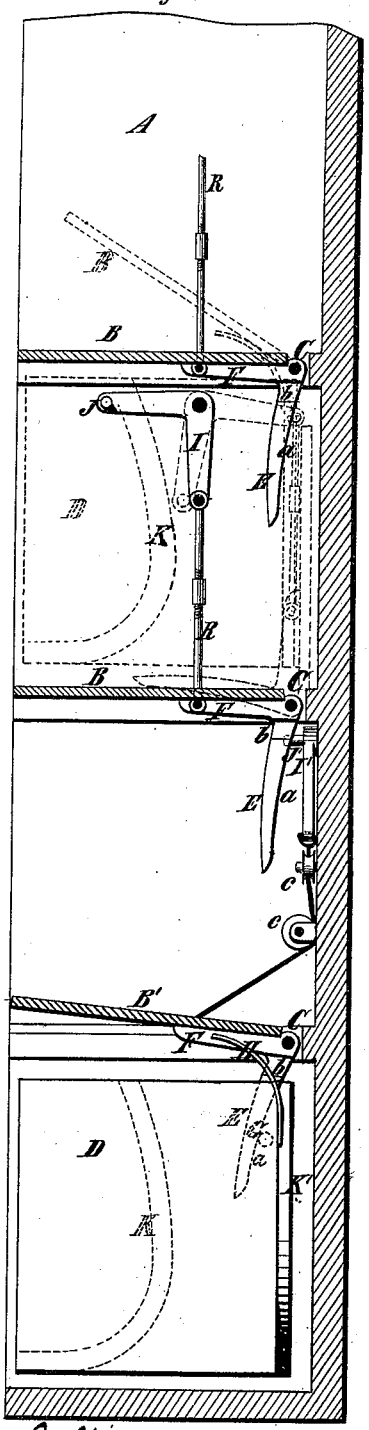


Fig. 2



Witnesses { Chandler Hall
Thomas E. Birch.

J. B. Waring, Inventor
by his Atty.
Edwin H. Brown

UNITED STATES PATENT OFFICE.

JOHN B. WARING, OF STAMFORD, CONNECTICUT, ASSIGNOR OF ONE-HALF HIS RIGHT TO WILLIAM O. ALLISON, OF NEW YORK, N. Y.

IMPROVEMENT IN MECHANISMS FOR OPENING AND CLOSING DOORS OR COVERS OF HOISTWAYS.

Specification forming part of Letters Patent No. **200,112**, dated February 5, 1878; application filed July 16, 1877.

To all whom it may concern:

Be it known that I, JOHN B. WARING, of Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Mechanism for Opening and Closing Doors or Covers of Hoistways, of which the following is a description:

An important object of these improvements is to provide for effecting the opening and controlling the closing of doors, covers, or hatches in hoistways by an elevator platform, car, or cab, so that they will be operated easily and without occasioning severe strains or noise.

For opening the doors or covers during the ascent of the elevator platform, car, or cab, I employ rods, bars, or arms, extending downwardly from the doors or covers, and having inclined faces, and I furnish the elevator platform, car, or cab with tappets or projections, which, coming in contact with the inclined faces of the said rods, bars, or arms, wedge or pry the doors or covers open on their hinges with a very slow initial movement, without straining them or occasioning disagreeable noise. During the descent of the elevator platform, car, or cab, the inclined faces of the rods, bars, or arms bear against these tappets or projections, and the doors or covers are thereby supported, so that they are caused to close slowly and without noise.

For opening the doors or covers in the descent of the elevator platform, car, or cab, I employ bell-crank or bent levers, arranged some distance above the doors or covers, connected therewith at or near one end, and at or near the other furnished with projections, with which inclines carried by the elevator platform, car, or cab come in contact, and, by wedging or prying the levers aside, gradually and easily open the doors or covers, so that the said elevator platform, car, or cab may pass downwardly beyond them. These inclines, in the ascent of the elevator platform, car, or cab, bear against the projections on the said bell-crank or bent lever, and support the doors or covers just passed, and cause them to close slowly and without disagreeable noise.

In the accompanying drawing, Figure 1 is a vertical section of a hoistway and a front view of an elevator platform, car, or cab embodying my improvements; and Fig. 2 is a vertical section thereof, taken at right angles to Fig. 1.

Similar letters of reference designate corresponding parts in both figures.

A designates a hoistway, which may be of any suitable kind, and B B′ designate doors or covers, arranged in the hoistway opposite the different floors of the building in which it is located, and secured in place by hinges C, so as to open and close by swinging. D designates an elevator platform, car, or cab, designed to travel up and down the hoistway under control of any suitable mechanism.

I will first describe the mechanism whereby the doors or covers are opened during the ascent of the elevator platform, car, or cab, and supported in closing during its descent.

E designate rods, bars, or arms extending downwardly from the doors or covers B B′ when in their normal position, and located, in this example of my invention, (see Fig. 1,) one near each end of each door or cover. These rods, bars, or arms have inclined faces *a*, and are preferably formed with the hinges C, and also with supports F, extending therefrom, secured to the doors or covers B B′, and connected with the devices whereby the doors or covers are opened during the descent of the elevator platform, car, or cab, and supported in closing after it during its ascent; for when these parts are all made perfectly rigid, and receive the impulse and strain exerted and sustained in the opening and closing of the doors or covers, the latter are effectually preserved from injury.

G designates tappets or projections on the elevator platform, car, or cab, here represented as consisting of laterally-extending pins or studs located on the upper portion of its sides. In the ascent of the elevator platform, car, or cab, these tappets or projections come in contact with the inclined faces *a* of the rods, bars, or arms E of the doors or covers B B′, as may be understood by glancing at Fig. 2, and, impinging thereon, wedge or pry the said rods, bars, or arms E laterally out of the way, and thereby raise and open the doors or covers.

I desire to have it particularly understood

that the action of these tappets or projections G on the rods, bars, or arms E is such that no violent concussion occurs in the opening of the doors or covers, and consequently no disagreeable noise is occasioned.

H designates a push-piece and prop extending upwardly from the elevator. When this is employed the tappets or projections G serve only to impart the initial movement in the opening of the doors or covers, and the push-piece, subsequently coming in contact with them, completes their opening. In this way the doors may be started slowly, and subsequently opened more rapidly. The opening of the doors or covers of course occasions the raising of their rods, bars, or arms E, wherefore the latter serve as weights, tending to hold down the doors or covers, and prevent them, when opened, from being slammed against the sides of the hoistway, besides which these rods, bars, or arms impart to the doors or covers a constant tendency to close, and may take the place of the springs commonly employed for a like purpose. When by the opening of the doors or covers the rods, bars, or arms are sufficiently raised, the tappets or projections G are enabled to move beyond them by traveling through recesses *b* therein.

In the descent of the elevator platform, car, or cab, the doors or covers, after the push-piece and prop H leave them, are supported by their rods, bars, or arms bearing against the tappets or projections G of the elevator platform, car, or cab; and as these tappets or projections, moving downward, allow the rods, bars, or arms to gradually and slowly resume their normal position, the doors or covers are caused to close easily and without disagreeable noise.

I will now describe the mechanism for opening the doors or covers B in the descent of the elevator platform, car, or cab, and for controlling their closing during the ascent of the elevator platform, car, or cab.

I designate bell-cranks or bent levers, (see particularly Fig. 2,) represented as arranged in pairs, one on each side of the hoistway, connected at one end, (which constitutes the lower when they occupy their normal position,) preferably by rods R, furnished with turn-buckles for shortening or lengthening them, with the supports F of the doors or covers B, and provided at the other end with inwardly-extending projections J, which may consist of pins or studs.

K designate projecting inclines located on the sides of the elevator platform, car, or cab, and so shaped that they will, on coming into contact with the projections J in descending, operate on them with a cam-like action, (see dotted outline in Fig. 2,) and wedge or pry them aside, thereby opening the doors or covers connected with them. Preferably these inclines are shaped so that they will start the doors or covers with a very slow and gradually-increasing movement.

In the ascent of the elevator platform, car, or cab, after passing any doors or covers, its projecting inclines K come in contact with the projections J of the bell-crank or bent levers connected with such doors or covers, and, supporting them, cause them to close gradually and without disagreeable noise.

Turning, now, to the means for effecting the opening and controlling the closing of the door or cover B′, I′ designates a bell-crank or bent lever pivoted to the back of the hoistway, and connected by a flexible connection, such as a cord or rope passing through suitable guide-pulleys *c*, with the door or cover B′ at some distance from its hinges. This lever is provided on one arm with a projection, J′, and the back of the elevator platform, car, or cab is furnished with an incline, K′, for acting on the projection J′, with the same results as the inclines K act on the projections J of the bell-crank or bent levers I.

The arms of the bell-crank or bent levers I I′ may abut against stops to support the doors or covers B B′ when closed, and if such stops are properly cushioned the closing of the doors or covers may be effected very gently.

It will have been seen from the foregoing description that I provide for opening and closing the doors or covers of hoistways with initial and final slow movements, without shock or noise; that for this reason I remove the objections hitherto experienced with doors or covers employed in hoistways, and, by enabling them to be used, afford additional safety to buildings provided with hoistways; and that I accomplish all this with mechanism which is so simple and compact that it may be applied to almost any ordinary hoistway without necessitating much alteration thereof.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with a swinging door or cover provided with a downwardly-extending rod, bar, or arm having an inclined face, of an elevator platform, car, or cab provided with a tappet or projection, whereby, during the ascent of said platform, car, or cab, the said door or cover is opened with a slow initial movement, to permit the passage of the said platform, car, or cab, and during the descent of said platform, car, or cab the door or cover is supported in closing, so that it will not slam noisily.

2. The combination, with a swinging door or cover provided with a downwardly-extending rod, bar, or arm having an inclined face, and an elevator platform, car, or cab provided with a tappet or projection for acting on the inclined face of the said rod, bar, or arm, of a push-piece and prop mounted on the elevator platform, car, or cab, whereby the door or cover may be opened by the action of the tappet or projection on the rod, bar, or arm with a slow initial movement, and subsequently by the action of the push-piece with a more rapid movement.

3. The combination, with a swinging door

or cover provided with a downwardly-extending rod, bar, or arm having an inclined face, and an elevator platform, car, or cab provided with a tappet or projection for operating on the inclined face of the rod, bar, or arm, of a recess in said rod, bar, or arm, to permit the passage of the tappet or projection beyond it after performing its work.

4. The combination, with a swinging door or cover, of a rod, bar, or arm attached rigidly thereto, extending therefrom, and having an inclined face to be operated upon by a tappet or projection on an elevator platform, car, or cab, and serving as a weight for effecting the closing of the door or cover, and preventing it from being slammed against the side of the hoistway during its opening.

5. The combination, with a swinging door or cover, of a hinge, a support, and a rod, bar, or arm to be operated upon by a tappet or projection on an elevator platform, car, or cab, all made in one piece, whereby rigidity and firmness are secured.

6. The combination, with a swinging door or cover, of a bell-crank or bent lever pivoted in a hoistway some distance above the said door or cover, a connection between said door or cover and one arm of said lever, a projection extending from the other arm, and an incline carried by an elevator platform, car, or cab, whereby, during the descent of the said platform, car, or cab, the door or cover will be opened to permit its passage, and during the ascent of the platform, car, or cab above it the door or cover will be supported, so that it will not slam noisily.

7. The combination of a door, B, support F, hinge C, and rod, bar, or arm E, made in one piece, a bell-crank or bent lever, I, a connection between the latter and the said support F of the door or cover B, the tappet or projection G, and incline K on the elevator platform, car, or cab D, substantially as and for the purposes set forth.

J. B. WARING.

Witnesses:
CHANDLER HALL,
EDWIN H. BROWN.