(No Model.) 3 Sheets—Sheet 1.

W. BARDSLEY.

HATCHWAY.

No. 341,632. Patented May 11, 1886.

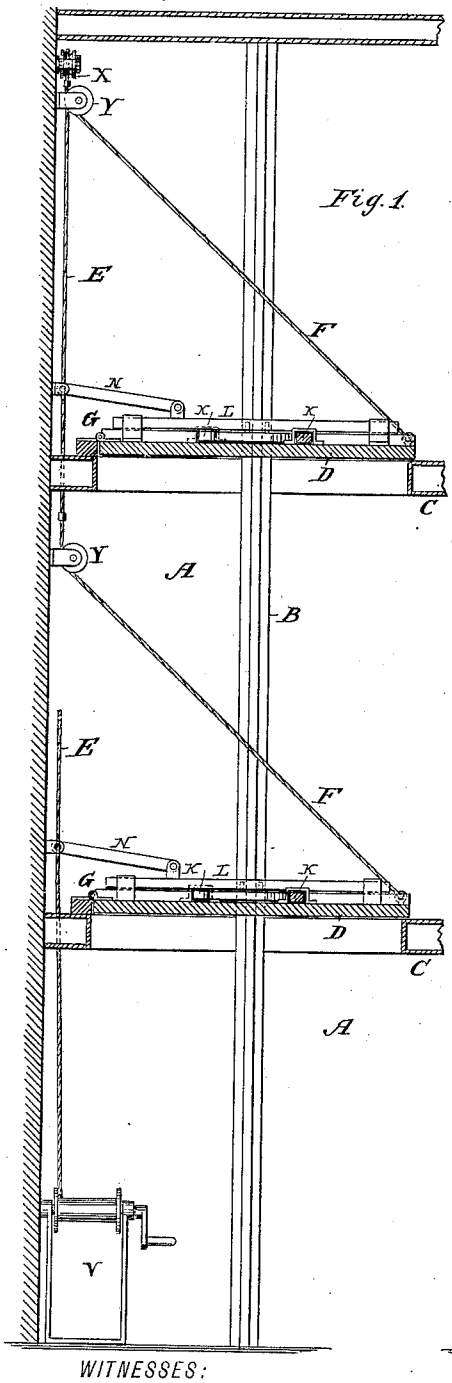


Fig. 1.

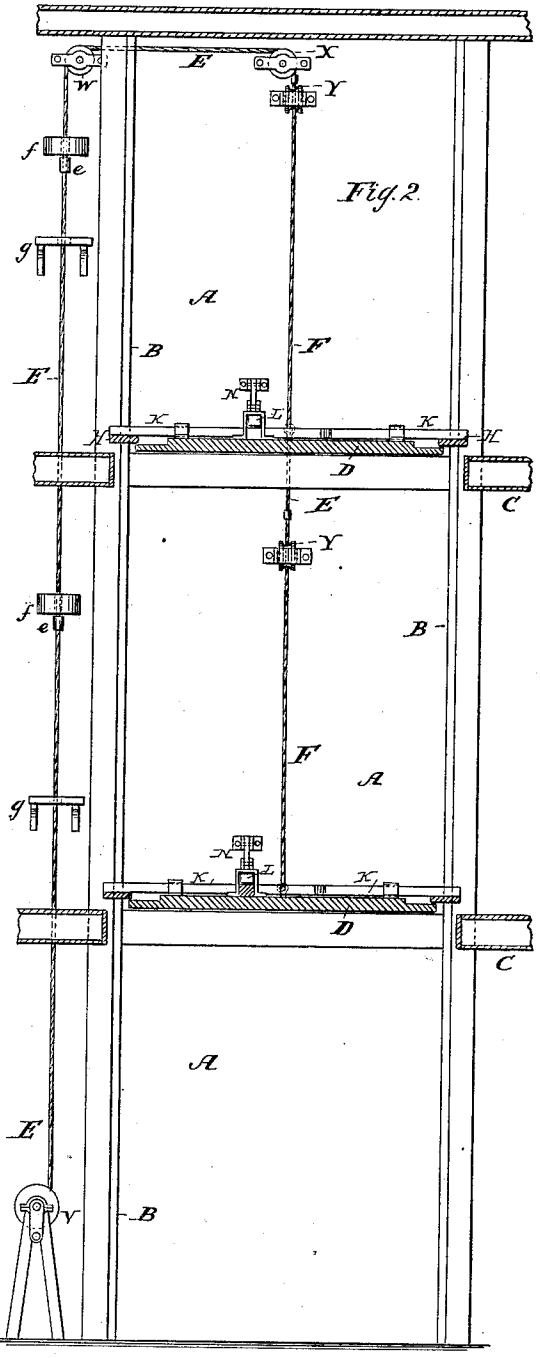


Fig. 2.

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N. PETERS. Photo-Lithographer, Washington, D. C

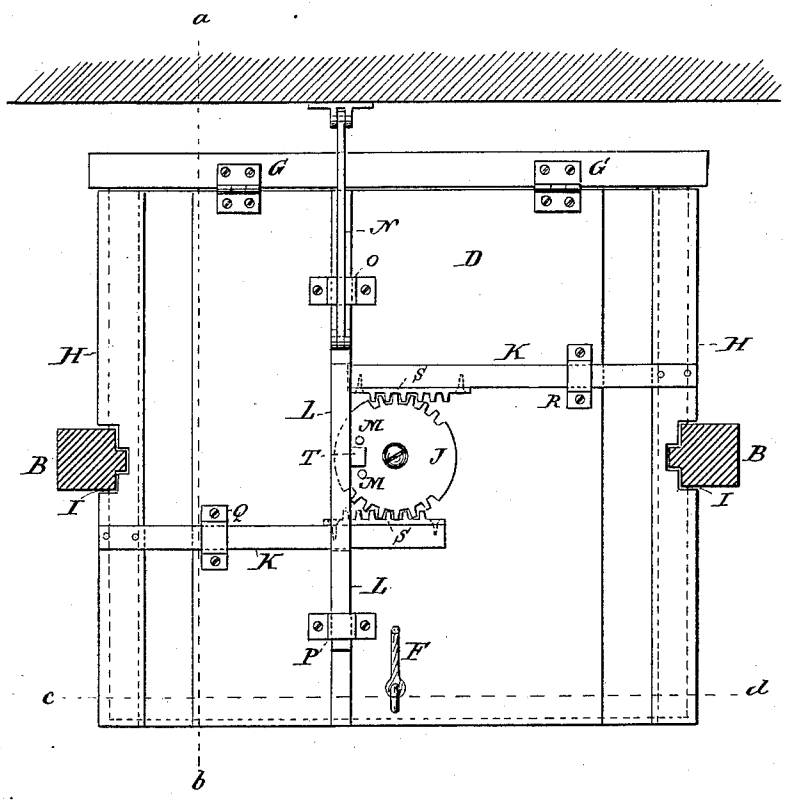
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HATCHWAY.

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Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

W. BARDSLEY.

HATCHWAY.

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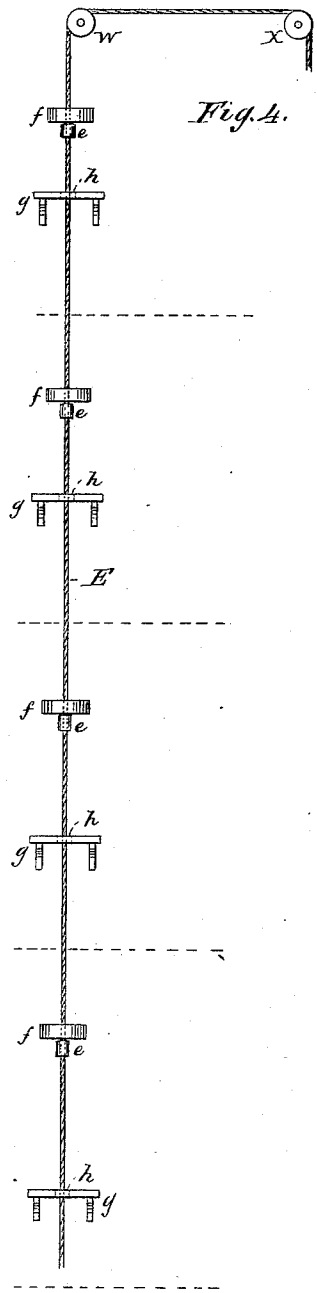


Fig. 4.

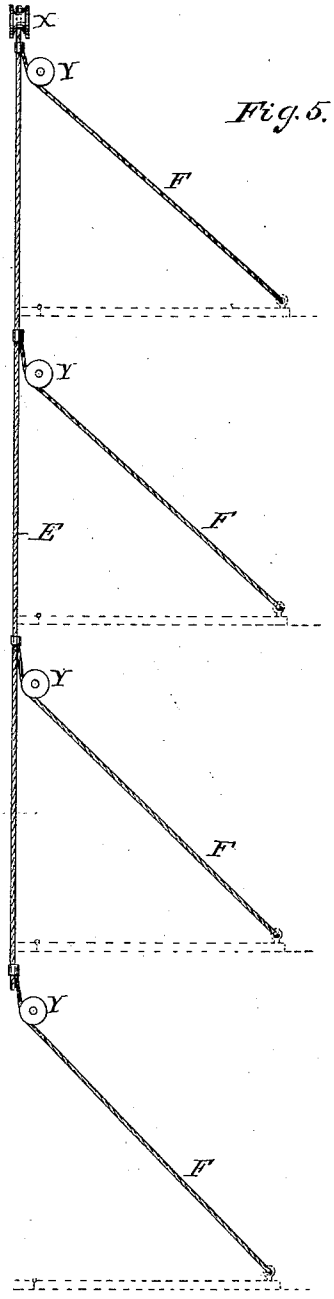


Fig. 5.

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UNITED STATES PATENT OFFICE.

WILLIAM BARDSLEY, OF KEARNEY, HUDSON COUNTY, NEW JERSEY.

HATCHWAY.

SPECIFICATION forming part of Letters Patent No. 341,632, dated May 11, 1886.

Application filed January 4, 1886. Serial No. 187,757. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BARDSLEY, a citizen of the United States, and a resident of Kearney township, in the county of Hudson and State of New Jersey, have invented certain new and useful Improved Apparatus for Opening and Closing Hatchways, of which the following is a specification.

The invention relates to improvements in apparatus for opening and closing elevator shafts or hatchways; and it consists of the elements hereinafter described, and particularly pointed out in the claims.

The invention is illustrated in the accompanying drawings, forming a part of this application, in which Figure 1 is a vertical section of an elevator-shaft, taken on the dotted line *a b* of Fig. 3; Fig. 2, a vertical section of same, taken on the dotted line *c d* of Fig. 3. Fig. 3 is an enlarged top view of one of the hatchway-doors. Fig. 4 is a detached view of the main cable of the apparatus, illustrating the series of counterbalancing-weights applied thereto, the horizontal dotted lines denoting the floors of the building; and Fig. 5 is a detached view of that part of the main cable of the apparatus located within the elevator-shaft, showing the separate auxiliary cables passing from the main cable to the hatchway-doors.

In the drawings, A designates the hoistway or elevator shaft; B B, the ratchet-standards on either side thereof, projecting into the hoistway; C, the different floors of the building; D, the hinged doors or covers adapted to open or close the hoistway at the different floors; E, the main cable for operating said doors, and F the auxiliary cables passing from the respective doors to the main cable.

The doors D are hinged at G, and have on their opposite side edges the laterally-adjustable slides or sections H, which are supplied with notches I, to fit around the inwardly-projecting portion of the standards B B, and the purpose of which is to cover the space between the body of the doors and the sides of the hoistway when the doors are closed. The devices for moving the sections H H outward when the doors are closed, and inward when the doors are opened, are located preferably upon the upper face of the door, and consist of the rotating toothed disk or plate J, placed centrally on the door, the transverse arms K K, connected at one end to the slides or sections H, and at the other engaging the disk J, the sliding bar L, engaging pins M M on the disk, and the link N, secured at one end to the bar L, and pivoted at the other against the wall of the building in rear of the door. The bar L is adapted to move in guides O P, and the transverse arms K K to have a movement in guides Q R and beneath the bar L.

The arms K K and bar L will preferably be of wood, and upon the inner facing ends of the said arms are secured cast toothed racks S, which mesh with the toothed disk or plate J, and thus bring the arms into engagement therewith, as above described.

When the door D is closed over the shaft A, the sections H H will be in their outward position, as shown in Fig. 3, and upon the opening of the door the bar L will be moved forward by the link N, which movement has the effect of bringing the lug T on the bar against the forward pin M, and thereby of rotating the disk J in a direction to draw the racks S, arms K, and slides H inward, thus permitting the elevation of the door without interfering with the standards B B. When the door is closed, the link N will draw the bar L rearward toward the hinged edge of the door and bring the lug T against the rear pin M, whereby the disk J will be caused to rotate in a contrary direction, and force the arms K and slides or sections H outward around the inwardly-projecting portions of the standards B B. While the door is being opened the movement of the disk J carries the forward pin M away from contact with the lug after the bar L has made a sufficient movement to draw the sections H inward, and while the door is being closed the rotation of the disk moves the rear pin M from contact with the lug upon the bar, having had sufficient movement to force the sections H outward.

The action of the lug T on the pins M occurs only during the first part of the movement of the door on the hinges while being opened, and the last part of its movement while being closed, and hence the sections H have a positive automatic quick parallel motion when the door is adjacent to its lowest

point of movement, being stationary during the balance of the movement of same.

The doors will be opened and closed by means of the main cable E and auxiliary cables F, hereinbefore mentioned, the former being preferably of wire, and the latter of cordage.

The main cable E passes from a windlass, V, upward at one side of the shaft A, over a pulley, W, thence inward to about the center of the shaft, adjacent to the rear wall of same, where it passes over the pulley X, and then downward in rear of the doors D and behind the pulleys Y, the lower end of the cable terminating at about the point where the lower auxiliary cable F is clamped to it, as shown in Fig. 5. The auxiliary cables are respectively clamped at their upper end to the main cable at a point just above the pulleys Y when the doors are closed, and at their lower end to the doors D adjacent to their forward edge, being that farthest removed from the hinges G. Upon the main cable are a series of clamps, *e*, supporting a series of loose counterbalance-weights, *f*, as illustrated in Figs. 2 and 4, and below said weights are supplied a series of brackets, *g*, secured to the wall, and having a vertical opening, *h*, through which the cable and clamps may move, but which is too small to admit the weights *f*. The brackets *g* are arranged at varying distances from the weights *f*, the upper bracket being but a short distance from the upper weight, and the other brackets being at gradually-increasing distances from the weights they are respectively to support during the opening and closing of the doors D.

The object of the weights *f* is to counterbalance the weight of the doors while they are in motion, and the purpose of the arrangement of the brackets *g* with relation to the weights as above described is to provide a means whereby the effect of the weights on the cable may gradually lessen as the door is raised, and likewise increase as the door is closed. The maximum effort is required during the first movement upward of the door, and hence at this time all of the weights should act on the cable. As the door gradually assumes an upright position, the force applied to the cable may be correspondingly diminished, and hence the weights one after another should be rendered idle. The reverse of this is true during the closing of the door, since at that time the strain of the door on the cable gradually increases as the door approaches its lowest point of movement, and hence instead of the weights one after another being rendered idle, as during the opening of the door, they should one after another be brought into service.

By the arrangement of the weights *f* and brackets *g* (shown in Figs. 2 and 4) the results just above specified with regard to the strain on the cable during the opening and closing of the door are effectually accomplished. After the door has been moved upward a short distance the top clamp *e* will pass through the opening in the top bracket *g*, leaving the top weight *f* idle upon the latter and relieving the cable of its force, and as the door gradually assumes a vertical position the weights *f* below the top weight will successively become idle. During the closing of the door the lower weight will first be taken up by its clamp *e*, and then the other weights will successively be brought into service, until during the last part of the movement of the door all the weights will exert a downward tension on the cable and serve to counterbalance the weight of the door.

It is important to note that the auxiliary cables F form no part of the cable E, and hence should one auxiliary cable break, that fact would not interfere with the regular operation of all the other auxiliary cables or that of the main cable E.

I reserve the right to vary the construction and arrangement of the parts of the apparatus sought to be protected hereby within the scope of my invention as claimed.

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

1. The elevator shaft or hoistway having a series of horizontal doors adapted to be simultaneously opened and closed and arranged at the different floors of the building, combined with the main or power cable for simultaneously operating said doors, and a series of counterbalance-weights in connection with said cable, the combined force of all the weights being on the cable when said doors are closed, and their arrangement being such that they, one following another in succession, become idle and relieve the cable of their force during the simultaneous opening of the doors, and likewise resume their force upon said cable during the simultaneous closing of the doors, substantially as and for the purposes set forth.

2. The elevator shaft or hoistway having a series of horizontal doors adapted to be simultaneously opened and closed and arranged at the different floors of the building, combined with the main or power cable for simultaneously operating said doors, a series of counterbalance-weights, whose combined force is on said cable while said doors are closed, and a support for the weights as they are successively relieved from the said cable, the arrangement of the weights being such that they, one following another in succession, cease to act on the cable and rest idle on said support during the simultaneous opening of the doors, and likewise resume their force on said cable and rise from said support during the simultaneous closing of the doors, substantially as and for the purposes set forth.

3. In combination with an elevator shaft or hoistway having doors at the different floors of the building, the main or power cable, the auxiliary cables, a series of weights, *f*, resting on clamps *e*, and a series of supports, *g*, to successively receive the weights or give them up, substantially as set forth.

4. In combination with an elevator or hoist-

way shaft and operating-cables, the hinged door having laterally-sliding sections H, the arms K, carrying racks S, and connected with said sections, the toothed disk or plate J, engaging the said racks, the bar L, for rotating the disk, and the link N, hinged at one end to the wall and at the other to the bar L, substantially as set forth.

5. In combination with an elevator or hoist-way shaft and operating-cables, the hinged door having the sections H, the arms K, carrying racks S and connected with said sections, the toothed disk or plate J, engaging the racks, the bar L, having lug T, the pins M M on the disk, and the link N, hinged at one end to the wall and at the other to the bar L, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 31st day of December, A. D. 1885.

WILLIAM BARDSLEY.

Witnesses:
CHAS. C. GILL,
JOSEPH BARDSLEY.