June 17, 1930. J. W. PEELLE 1,763,858

ELEVATOR DOOR

Filed Dec. 12, 1924

Fig. 1.

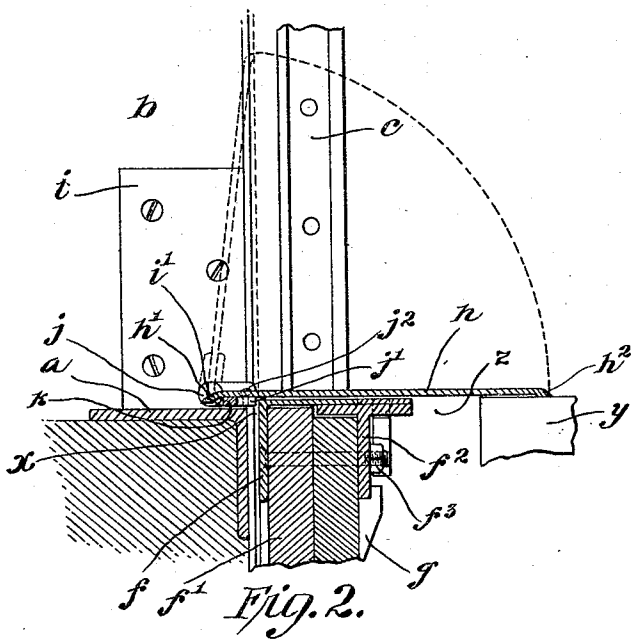
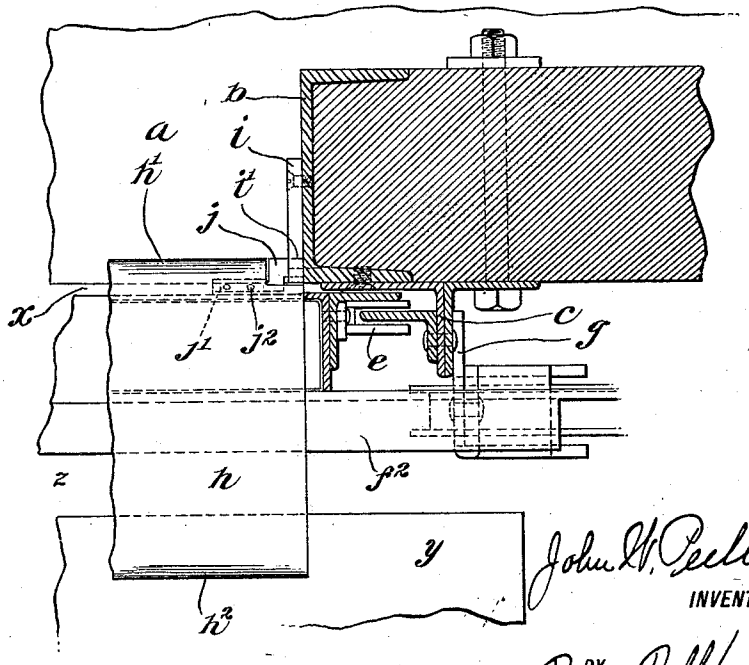


Fig. 2.



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UNITED STATES PATENT OFFICE

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ELEVATOR DOOR

Application filed December 12, 1924. Serial No. 755,446.

My invention relates to elevator doors, and more particularly to elevator doors of the counterbalanced, and related types, in which an elevator door section in its opening movement passes downwardly of the sill at the door opening closed thereby, and is arrested in its downward movement and supported in this position in a manner to be capable of utilization for the supporting of loads passing between the floor of a building and the elevator car.

In elevator doors of this type, it has heretofore been the practice to utilize the top bar of the lower door section for sufficiently closing the gap between the edge of the sill of the door opening and the edge of the elevator car, to permit ordinary wheeled vehicles to pass from the building sill to the car, or vice versa, without such jarring and jolting as would tend to disturb, or spill, the load upon such vehicles.

Structural limitations in this type of door necessitate the positioning of the door sections away from the door sill and the elevator shaft adjacent thereto, from one-quarter to one-half an inch, and the positioning of the edge of the elevator car presented toward the wall of the elevator shaft a distance of from an inch and a quarter to an inch and a half from the innermost portion of the door structure, these space allowances sometimes being arbitrarily fixed by building department officials, and being required to compensate for irregularities in the elevator, the door and the elevator shaft construction.

Notwithstanding the presence of these spaces, the old type of counterbalanced door, in which the lower door section is stopped and supported with the upper face of its top bar substantially flush with the sill of the door opening, has gone into extensive use and has proved highly satisfactory, notwithstanding that by reason of the aforesaid gaps perfectly smooth trucking has not been secured, and that where articles such as hand trucks, pianos or similar heavy articles having small wheels or rollers were to be moved across such doors, a specially designed construction of door was required.

With the above conditions in mind I have produced an elevator door by which, when the door is in the open position, a continuous smooth trucking surface will be presented from the sill of the door opening to upon the elevator car, the plate forming this surface being brought into and out of the operative relation as a result of the opening or closing movement of the lower door section and being supported when in its operative position by the rigid top bar structure of this door section and the supporting means cooperating therewith, so that the weight of loads passing between the floor of a building and the elevator car will be transmitted in large measure to the elevator door and through the supports therefor to the wall of the building forming the shaft.

By this construction the plate spanning the space between the door sill and the elevator car may be made of fairly light metal stock, since it is supported for substantially the entire width of the door opening and for the major portion of the space between the edge of the sill and the elevator car by the lower door section itself, the car itself also assisting in giving support to this plate.

To avoid an unnecessary increase in the weight of the upper door section for counterbalanced purposes, the plate, or truckable sill, is pivotally supported from the wall of the elevator shaft within the door opening, this arrangement also permitting the automatic positioning of the plate as a result of the downward movement of the lower door section when opening the door, and the moving of the plate from within the shaft automatically as a result of the upward, closing movement of this door section.

When the doors are in the closed position, this plate will be so overbalanced as to in-

cline toward, and lean against, the door section, the width of the plate being such that it will bear against the inwardly directed flanges of the metal angle bars forming the frame of this door section. Means are also provided by which the plate is not permitted to overrun its normal position when the door is being closed.

The plate, forming the "truckable sill", is connected with suitable pivotal members which must be spaced above the floor of a building sufficiently to permit the edge of the plate to be brought sufficiently close to the floor of a building to ensure smooth trucking thereto and therefrom, the construction being such that the plate is so supported adjacent these pivots as to relieve them from the weight of the load upon said plate. Such plates are sometimes required to receive loads running into the tons and the various supporting members, such as the means last referred to, the lower section itself and the elevator car all contribute toward the support of this load in large measure, and are merely relieved from the jars and jolts from the vehicles carrying such loads, by the presence of the plate itself.

The invention consists primarily in an elevator door having a vertically and downwardly movable section, a trucking plate, pivotal supports adjacent the sill of a door opening and adjacent one edge of said plate whereby said plate will be normally overbalanced toward said door, said plate being of a length to project across the top of said door section and engage the floor of an elevator car, whereby said plate will completely close all gaps between the sill and the car and be moved into or out of the operative relation to the car by the opening and closing movement of said door section, and means affording support for said trucking plate intermediate its point of pivotal support and the elevator car, whereby the major portion of the weight of a load passing upon said plate will be transmitted to the wall of the elevator shaft; and in such other novel features of construction and combination of parts as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawings,

Fig. 1 is a vertical section of the upper part of the lower door section when in the open position, of the adjacent portion of the wall of the elevator shaft, and of the platform of an elevator car, a door in the closed position, and the position of the trucking plate when the door is so closed being shown in dotted lines; and

Fig. 2 is a condensed plan view of the invention as shown in Fig. 1.

Like letters refer to like parts in both of said views.

Elevator doors of the type to which my invention relates usually are composed of an upper and a lower section connected by flexible chains passing over sheaves, these two sections when the door is in the closed position meeting at a point substantially midway of the height of the door opening. Rail structures for such doors differ in their construction according to whether the door sections are to have movement in the same vertical plane or in parallel vertical planes, or pass during their opening or closing movement from one vertical plane to a parallel vertical plane. In the accompanying drawings I have illustrated only a portion of the lower section of a door, since the scale of the completed structure will be so small as to be of little assistance in understanding the drawing, and unnecessary to an understanding of the invention. The rail structure shown, is that used when both door sections have movement in the same vertical plane, it being understood that the use of other types of rail structures do not in any way change the construction or mode of operation as to those characteristics of the door, to which my invention relates, to wit: the truckable sill feature.

In the drawings, *a* indicates the sill at a door opening, and *b* the jambs of this door opening. The rail structure as shown at *c* and with the co-operating shoes *e* upon the door section, is of a well known construction. The door proper has an angle metal frame *f*, and a panel *f'* which may be of corrugated metal or metal sheathed wood, as desired. The top bar of the angle metal frame *f* is reinforced by a T-bar f^2 securely bolted to the top angle bar of the frame *f* by a plurality of bolts f^3, so as to incorporate this T-bar in the top bar structure of the door section, and impart sufficient rigidity thereto to sustain any loads to which the door may be subjected when in the open position.

Secured to the guide rail structure at opposite sides of the door, are stops *g* adapted to receive projecting ends by the T-bar f^2, these stops ordinarily being adjustable, and being so positioned as to support the lower door section with the upper face to its top bar, substantially flush with the sill *a*. These stops transmit the loads imposed upon the top bar of the door section to the wall of the shaft, and thus relieve all portions of the door section below this top bar from the stresses or strains of such loads. The projecting ends of the T-bar f^2 are also ordinarily used as a hanger bar to which the flexible connections are attached, so that the support of this hanger bar in addition to relieving the door from the effects of strains and stresses from the load upon the top bar of the door, also relieves the connecting chains from such load.

The general construction above referred to has heretofore been used extensively in

this art, my invention relating more particularly to an improvement in this construction of door by which the gap between the lower door section and the sill, indicated at x, and the gap between the inner face of the door and the platform v of the elevator car, indicated at z, will be completely closed when the door is in the open position, by a plate h constituting a truckable sill and forming a continuous surface extending from the sill a to the platform v, over which, loaded trucks may pass without receiving jars or jolts irrespective of the size of the wheels upon said trucks. This plate is supported intermediate its forward and rear edges by the top bar of the door, thus utilizing said top bar structure, and its stops for supporting the major portion of the load passing over said plate.

The manner of mounting said truckable sill or plate h is such that it will not only be actuated automatically as a result of the opening or closing movement of the door section, but will not interfere with the free initiation of the closing movement of said door section.

Secured to each jamb b of the door opening adjacent the sill a, is a jamb plate i having a bearing opening i' therein. This bearing is positioned slightly above the sill a and within the door opening from the shaft sufficiently to secure a leverage at which the lower door section acts, upon this plate, during its closing and opening movements, to not only ensure a fairly rapid movement of the plate h, but avoid any substantial resistance to the starting of the closing movement of the door. The plate h is pivotally mounted in relation to the jamb plates i by means of fittings having trunnions j and extensions j' extending inwardly of the sides of the plate, these extensions being of a thickness to engage the sill a when the plate h is in its lowered position, and of a width if desired, to project beyond the sill into the shaft, thus utilizing the extension j' of the trunnion fittings to support the plate at the edge of the sill, and relieve the trunnions j and the jamb plates i from the stresses or strains from loads passing over the plate h. The primary object of these extensions j' is to relieve the trunnions j from the effects of such loads through the support of the plate from the sill, adjacent said trunnions when the sill plate is lowered, although this support may be extended to any desired point laterally of the plate by elongating said extensions j'.

The sill plate h is secured to the extensions j' by means of rivets or in any other desired manner, as indicated at j^2.

Secured to the sill a between the axis of the trunnions j and the edge of the sill is a stop k for limiting the upward movement of the sill plate h, the rear edge of said plate h extending beyond said axis away from the shaft to an extent not to interfere with the free pivotal movement of the plate but to engage said stop k when it has been raised sufficiently to permit the free passage of the door section. This rear edge of the plate is beveled, or formed downwardly, as shown at h' to ensure smooth trucking as a vehicle passes to or from the plate, the forward edge of said plate being similarly beveled or formed downwardly as indicated at h^2.

The operation of the herein described elevator door is substantially as follows:—

When the door is in the closed position as indicated in dotted lines, Fig. 1, the sill plate h will be raised as indicated, the forward beveled edge h^2 thereof engaging the side bars of the angle metal frame f of the lower door section, and the rear edge h' of said plate substantially abutting against the stop bar k secured to the sill a. When the plate is in this position, while the plate will be so overbalanced as to lean against the door section, the gap x will be protected by said plate h so that no small objects can pass between the edge of the sill and the door section when the door is closed. At the same time said plate h will serve as a "kick" plate, which will protect the door not only from blows from the foot of a warehouse man, but, under some conditions, from impact of loaded trucks therewith. Of course the distance between the rear and forward edges of this plate will vary with different widths of doors, and when narrow doors are used the total span of the plate is only about six or eight inches, and no substantial protection from impact of trucks with the door is afforded. With thicker doors, however, where the plate may require to be ten to fifteen inches from the forward to the rear edge, such protection will be afforded.

As a door is opened, when the top bar of the lower door section passes the edge h^2, the normally overbalanced sill plate h will descend with the door at a progressively increasing speed until the top bar structure of the door engages the stops for supporting the lower door section in its fully open position, consisting in the form of the invention shown of the stops g and the co-operating ends of the T-bar f^3. The position in which the door is thus supported should be such as will bring it slightly above the sill a so as to bring the upper face of the top bar into substantial engagement with the plate h, any load upon this plate being thus transmitted to the door. Slight clearance may be allowed to compensate for irregularities in the material of the co-operating parts, since the plate h will have sufficient spring under heavier loads to close the slight space afforded by this clearance, and still have the door proper sustain the load for substantially the entire width of the door. The sill plate will be unsupported only for the short gap x between

the door and the wall of the shaft, and the longer gap z between the edge of the top bar of the door and the edge of the elevator car v.

The distance between the edges h' and h^2 of the sill plate h is sufficiently great to cause the portion of the plate adjacent the latter or forward edge h^2 to lap the edge of the car platform v for a sufficient distance to afford ample support for the plate at this point. If the operator should stop the car a trifle high, the cables of the car will ordinarily have sufficient spring to cause the car to adjust itself to a load moving over the plate. However, the car is ordinarily stopped with sufficient accuracy to ensure the effective functioning of the sill plate and the door co-operating therewith.

As herein stated, the extensions j' support the sill plate adjacent the edge of the sill and relieve the trunnions j from any loads to which the plate h is subjected. The stop k may also be made of a height to afford a similar support adjacent the edge of the sill. The importance of supporting the sill plate intermediate the door sill and its point of engagement with the elevator car platform, and of relieving the trunnions from the weight of loads upon said sill plate, is due to the fact that loads of several tons frequently have to be borne by this plate, and the available space is not such as to permit said plate to have sufficient inherent strength to sustain such heavy loads.

The positioning of the trunnions within the opening from the edge of the sill will afford ample leverage at which the top bar of the door may act upon the sill plate to avoid any material increase of effort required of the elevator operator when starting the closing movement of the door. When the door has received its initial impulse, the plate h will offer no resistance to a continued movement of the door as the leverage constantly increases and the weight of the plate is not sufficient to make the effort in closing the door appreciably greater than that of an ordinary counterbalanced door.

By mounting the truckable sill plate within each door opening, not only is the lower door section relieved from the weight of this structure, but the necessity for providing additional counterbalancing weight for the upper door section is avoided.

As illustrated clearly in Fig. 1 of the drawings, when the door is in the open position, the entire space between a point of the sill within the edge thereof at the shaft, and of the elevator car, for substantially the entire width of the door opening, is completely closed, and a continuous smooth trucking surface is afforded. All weight of moving loads not capable of support by the sill plate h itself, will be transmitted to the top bar of the lower door section and therethrough to the wall of the shaft, excepting that portion of the load which is supported by the extensions j', or said extensions and the stop k, the load upon which is also transmitted to the wall of a shaft, thus relieving the trunnions j from such loads.

By the construction described, not only is every portion of the door structure below the top bar thereof and the chains connecting the door sections, relieved from the racking strains and stresses from loads passing to and from an elevator car, but small articles are prevented at all times from falling to within the shaft from any floor at which a door may be opened.

While elevator doors of the type to which my invention relates, are supposed to be kept closed except when a car is at a door opening, at times such doors are left open by the operator. Freight elevators, however, are ordinarily so constructed that even if this be the case, an elevator may descend without interfering with the plate, and may impart movement to the plate if the elevator ascends. However, when descending, in the event of a lower door being left open, it will be necessary for the operator to partially close this door as the car approaches the floor, only slight movement of the door, however, being required to remove the plate from a position where the elevator car will engage same.

It is not my intention to limit the invention to the precise details of construction shown in the drawings, it being apparent that such may be varied without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. An elevator door having a vertically and downwardly movable section, a trucking plate, said plate being of a length to project across the top of said door section and engage the floor of an elevator car, bearing plates on the jambs of the door opening adjacent the sill thereof, trunnion fittings secured to said plate and co-operating with said bearing plates respectively, whereby said plate will completely close all gaps between the sill and the car and be moved into or out of the operative relation to the car by the opening and closing movement of said door section, extensions upon said trunnions fittings of a height to engage the sill when the door is open, whereby said trunnions are relieved from all stresses from loads upon said plate, and means affording support for said trucking plate intermediate its point of pivotal support and the elevator car, whereby the major portion of the weight of a load passing upon said plate will be transmitted to the wall of the elevator shaft.

2. An elevator door having a vertically and downwardly movable section, a trucking plate, said plate being of a length to project across the top of said door section and engage

the floor of an elevator car, bearing plates on the jambs of the door opening adjacent the sill thereof, trunnion fittings secured to said plate and co-operating with said bearing plates respectively, whereby said plate will completely close all gaps between the sill and the car and be moved into or out of the operative relation to the car by the opening and closing movement of said door section, extensions upon said trunnion fittings of a height to engage the sill when the door is open, whereby said trunnions are relieved from all stresses from loads upon said plate, and means whereby downward movement of said door section is arrested with the top bar thereof supported substantially at the level of the floor of a building adjacent the sill of a door opening and in engaging relation with said trucking plate, so that the major portion of the weight of a load passing upon said plate will be transmitted through said top bar to the wall of the elevator shaft.

3. An elevator door having a vertically and downwardly movable section, a trucking plate, said plate being of a length to project across the top of said door section and engage the floor of an elevator car, whereby said plate will completely close all gaps between the sill and the car and be moved into or out of the operative relation to the car by the opening and closing movement of said door section, bearing plates on the jambs of the door opening adjacent the sill thereof, trunnion plates secured forwardly of the rear edge of said plate co-operating with said bearing plates respectively, the trunnions being so positioned with relation to said rear edge as to permit the free upward turning movement of said plate, a stop upon the sill of the door opening adapted to be engaged by the rear edge of said plate when it is moved upwardly, whereby said plate will be held in an inclined position and be caused to engage said door section to form a barrier to protect the gap between the sill and the door section when the door is in the closed position, and means whereby downward movement of said door section is arrested with the top bar thereof supported substantially at the level of the floor of the building adjacent the sill of the door opening and in engaging relation with said plate so that the major portion of the weight of the load passing upon said plate will be transmitted through said top bar to the wall of the elevator shaft.

4. An elevator door having a vertically and downwardly movable section, a trucking plate, pivotal supports therefor adjacent the sill of a door opening, said plate being of a length to project across the top of said door section and engage the floor of an elevator car, said pivotal supports being so located as to cause said plate to be normally overbalanced toward said door section, a stop engaging said plate and holding it at an incline toward said door section, whereby said plate will completely close all gaps between the sill and the car and be moved into or out of the operative relation to the car by the opening and closing movement of said door section, and means affording support for said trucking plate intermediate its point of pivotal support and the elevator car, whereby the major portion of the weight of a load passing upon said plate will be transmitted to the wall of the elevator shaft.

5. An elevator door having a vertically and downwardly movable section, a trucking plate, pivotal supports therefor adjacent the sill of a door opening, said plate being of a length to project across the top of said door section and engage the floor of an elevator car, and having its forward and rear edges inclined downwardly, the rear edge being positioned inwardly of the shaft with relation to said point of pivotal support, said pivotal supports being so located as to cause said plate to be normally overbalanced toward said door section, a stop engaging said plate and holding it at an incline toward said door section, whereby said plate will completely close all gaps between the sill and the car and be moved into or out of the operative relation to the car by the opening and closing movement of said door section, and means affording support for said trucking plate intermediate its point of pivotal support and the elevator car, whereby the major portion of the weight of a load passing upon said plate will be transmitted to the wall of the elevator shaft.

6. An elevator door having a vertically and downwardly movable section, a trucking plate, said plate being of a length to project across the top of said door section and engage the floor of an elevator car, whereby said plate will completely close all gaps between the sill and the car and be moved into or out of the operative relation to the car by the opening and closing movement of said door section, bearing plates on the jambs of the door opening adjacent the sill thereof, trunnion plates secured forwardly of the rear edge of said plate co-operating with said bearing plates respectively, the trunnions being so positioned with relation to said rear edge as to permit the free upward turning movement of said plate, the forward and rear edges of said plate being downwardly inclined, a stop upon the sill of the door opening adapted to be engaged by the rear edge of said plate when it is moved upwardly, whereby said plate will be held in an inclined position and be caused to engage said door section to form a barrier to protect the gap between the sill and the door section when the door is in the closed position, and means whereby downward movement of said door section is arrested with the top bar thereof supported substantially at the level of the floor of the build-

ing adjacent the sill of the door opening and in engaging relation with said plate so that the major portion of the weight of the load passing upon said plate will be transmitted through said top bar to the wall of the elevator shaft.

In witness whereof I have hereunto affixed my signature this 11th day of December, 1924.

JOHN W. PEELLE.