Aug. 16, 1932. P. R. SAURER 1,872,350

PASS TYPE ELEVATOR DOOR

Filed April 5, 1930

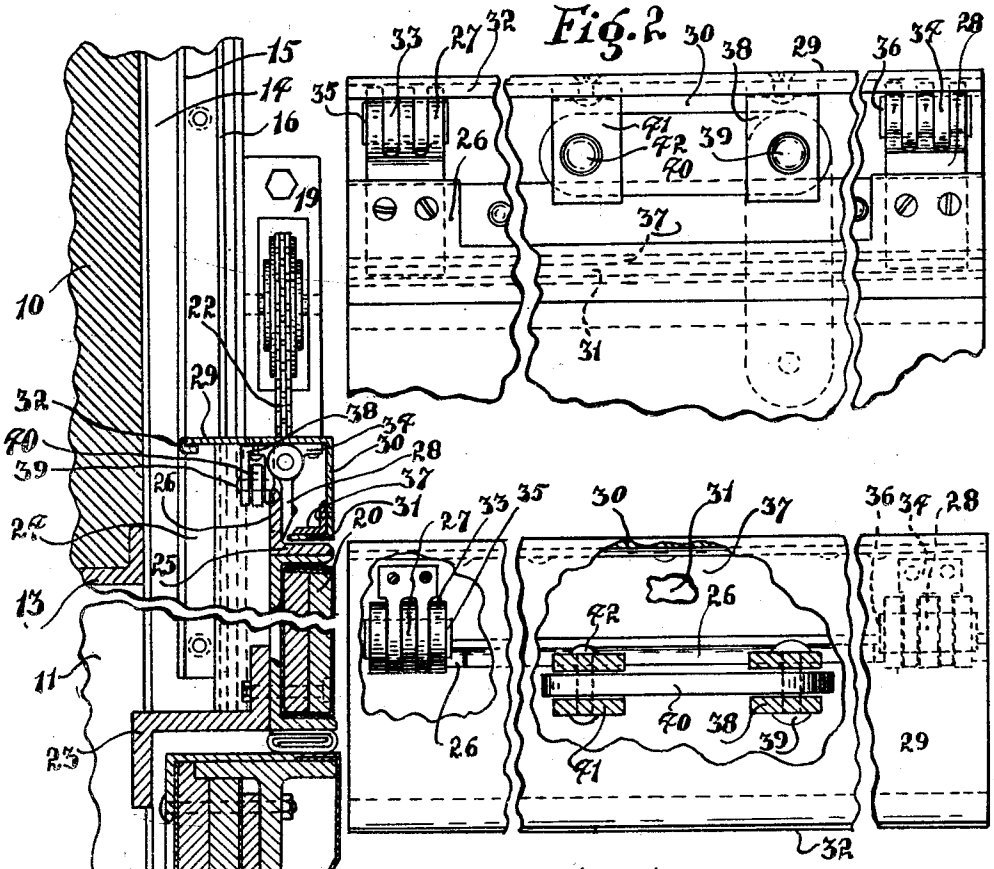


Fig. 2.

Fig. 3.

Fig. 1.

Paul R. Saurer

INVENTOR

BY Grant & Wentworth

ATTORNEY.

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UNITED STATES PATENT OFFICE

PAUL R. SAURER, OF FLORAL PARK, NEW YORK, ASSIGNOR TO THE PEELLE COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK

PASS TYPE ELEVATOR DOOR

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My invention relates to pass type elevator doors, and more particularly to pass type doors of the extension lintel type.

A pass type door consists of two oppositely movable sections, so mounted upon a guide structure as to permit either or both door sections, when passing to the fully open position, to occupy a plane parallel with the door closing an opening upon the floor above or below the opening closed by the door under consideration.

A pass type door of one type is so constructed that both sections, when the door is closed, are positioned in the same vertical plane and have a horizontal component of movement during the opening and closing movement to bring them within the shaft to an extent to pass a closed door at an adjacent opening.

The door of my present invention, however, is directed to a pass type door in which the two sections forming the door have movement in parallel planes, thus positioning the upper door section within the shaft to a greater extent than the lower door section, and forming a pocket, above the lower section and between the upper section and the wall of the shaft, capable of receiving the lower section closing the opening upon the floor above.

With this construction it is essential to provide what is known as an "extension lintel" closing the top of the pocket under normal conditions, this lintel, however, being yieldable so as to be displaced by the lower section of a door closing an opening immediately above the pocket with the opening of said last named door.

The extension lintel originally was mounted upon the lintel of the door opening, although the practice with a door of one manufacture, at the present time, is to mount this lintel upon the top of the upper door section.

The purpose of the lintel is to form a barrier across the pocket when the doors upon adjacent floors are in the closed position and thus prevent the passage of flames, smoke or fumes between the floors of a building and the elevator shaft. Of course this is not absolute, since certain clearances must be provided.

My invention relates to improvements in the construction of the movable or extension lintel carried by a door section so as to overcome many of the difficulties resulting from the employment, in the door structure, of such a lintel.

Prior to my invention, the lintel was formed of a rolled angle bar and possessed considerable weight. Since the two sections of the door must be of substantially the same weight, the addition of a heavy member to the upper section necessitated a corresponding addition of weight to the lower section. Furthermore, it is required that extension lintels be so constructed that in the event of fire adjacent the doors, the lintels shall be automatically locked against pivotal movement so as to minimize likelihood of water damage in the event of the direction of a stream of water against the lintel. In laboratory tests upon which the granting of the fire underwriters' labels is dependent, a door is subjected to an elevated temperature and a stream of water is then directed against the door and against the lintel when such is embodied in the door, and the approval of the door is dependent upon the extension lintel remaining immovable under this test.

With the above conditions in mind, I have provided a pass type door in which the upper section carries an extension lintel of light sheet metal construction which may not only be readily connected with the door, but which may be conveniently reinforced at essential points to impart sufficient rigidity to the lintel structure without any substantial increase in its weight.

I also mount upon the lintel a fusible link supported, stop member which, in the event of fire, will effectively prevent pivotal movement of the lintel. This stop mechanism is so located as to be exposed upon one side of the lintel so as to be immediately affected by any substantial elevation of temperature about the door, the thin metal stock forming the lintel ensuring that any heat to which the door and the lintel may be exposed upon the other side thereof will be rapidly con-

ducted to the fusible support for the lock member.

Another advantage of the construction of my invention is the elimination of unnecessary weight in the overweighting means necessary to ensure the automatic restoration of the lintel across the top of the pocket upon the closing of the door at the floor immediately above the pocket closed by the lintel.

The invention consists primarily in a pass type door embodying therein upper and lower counterweighting sections, flexible connections between said sections, and parallel guides therefor, whereby said upper section is spaced inwardly of the shaft a distance approximately equalling the thickness of the lower section, and a pocket is formed above said lower section and between said upper section and the wall of the shaft, an extension lintel formed of sheet metal bent to provide a top plate of a width substantially spanning the top of said pocket, a rear plate substantially closing the space between said top plate and the top of the upper door section, and a short counterweighting flange projecting from the bottom of said rear plate and parallel with said top plate, hinge brackets mounted upon the top of said upper door section, co-operating hinge brackets carried by said top plate, and a hinge pin co-operating with said brackets; 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 drawing,

Fig. 1 is a condensed view in vertical section of a pass type door embodying the invention;

Fig. 2 is a laterally condensed view of the upper portion of the upper section from the left of Fig. 1; and

Fig. 3 is a plan view of the upper door section with portions of the top plate and the extension lintel broken away.

Like numerals refer to like parts throughout the several views.

In the embodiment of the invention shown in the drawing, the wall of the shaft 10 has a door opening 11 therein, the sill of this opening being shown at 12 and the lintel at 13. Secured within the shaft in the usual manner is a guide rail structure of the usual construction containing a wall angle 14 and a metal channel, the side flanges 15 and 16 of which form parallel guides, one of which as 16 co-operates with the upper section of the door shown in the drawing, and the other, 15 of which, co-operates with the lower section of the door closing the opening immediately above, not shown in the drawing.

The guides 15 and 16 extend substantially to the meeting line of the two door sections, a similar guide structure, including guide rails 17 and 18, extending downwardly from adjacent said meeting line and co-operating respectively with the upper section of the door closing the opening at the floor below and the lower section of the door shown in the drawing. Carried by the guide rail structure in the usual manner is a sheave box 19 of the usual construction.

Mounted upon the guides 16 and 18 are the two sections 20 and 21 of a door closing the opening 11, which sections are connected by the chain 22 passing over the sheave in the box 19. The detailed construction of the lower door section 21 is old and well known and is irrelevant to the present invention. The upper door section 20, as to all details thereof excepting those to be hereinafter described, is also old and well known and need not be described. Each of these sections includes a metal sheathed, wooden panel mounted within an angle metal frame.

The panel in the upper door section 20 above the astragal 23 is located in its entirety within the shaft a distance such as to form, between it and above the section 21, a pocket indicated at 24 of sufficient width to receive the lower part of the panel of a door section like 21 closing the door opening immediately above that shown in the drawing and indicated in dotted lines in Fig. 1.

Secured to the top bar of the angle metal frame of the section 20 is an angle bar, one flange 25 of which seats upon said top bar, and the other flange 26 of which projects upwardly of said top bar in substantially the same plane as the inwardly projected angle of said frame. The flange 26, in order to reduce the weight of the upper door section, is cut away as shown more particularly in Fig. 2, only sufficient of this flange remaining to provide suitable means for mounting an extension sill structure upon the door section and to afford stops for limiting the amount of pivotal movement of this lintel, and maintaining it upon a substantially horizontal plane, as shown in Figs. 1 and 2. Clearance must be provided adjacent the flange 25 to permit the free swinging movement of this extension sill.

Riveted or otherwise secured to the retained portions of the flange 26 are hinge fittings 27 and 28, by means of which and the angle bar 25—26 the extension sill may be attached to the top bar of the upper section 20.

This extension sill is made of heavy gauge sheet metal, so bent as to provide a top plate 29, a rear plate 30 and a counterweighting flange 31 extending toward the flange 26 and parallel with the top plate 29. The free edge of the plate 29 is bent upon itself, as shown at 32, to reinforce said plate at this point.

Riveted or otherwise secured to the top plate 29, adjacent the rear plate 30, are hinge fittings 33 and 34, complementary to the hinge fittings 27 and 28, said sections being

united by hinge pins 35 and 36 respectively.

Secured to the rear plate 30 is a sheet metal strip 37 extending throughout the entire length of said plate and seating upon the counterweighting flange 31, this metal strip not only stiffening the flange 31 and the rear plate at this point, but also adding sufficient weight to overbalance the plate 29 at all times and thus normally maintain said plate in a substantially horizontal position, as shown in Fig. 1, and extending substantially across the top of the pocket 24 where it may be engaged by the lower section of the door closing the opening immediately above that shown in the drawing.

With the above construction, the extension lintel possesses sufficient rigidity to meet all of the conditions required in a pass type door while adding a minimum of weight to the upper door section 20. An angle, similar to that having the flanges 25 and 26, is commonly used in freight elevator doors, and serves as a flame angle. With the construction shown in the drawing, however, the weight of metal removed from the flange 26 is sufficiently great to compensate, in large measure, for the weight of the metal in the extension sill itself, and this cutting away of the flange is permitted since the rear plate 30 of the extension lintel structure performs all of the functions heretofore performed by a continuous flange 26, excepting the reinforcement of the top bar of the door section 20, which is effected by the flange 25 in the construction shown.

Hence, by the use of sheet metal formed and reinforced in the manner described, an extension lintel may be incorporated in the door section with the addition of very little weight as compared with a standard counterbalanced door structure of the same dimensions.

It is required, in labelled doors, that the extension lintel shall be provided with means, responsive to an elevated temperature, by which the extension lintel may be locked against pivotal movement when occasion requires. To meet this condition, I mount upon the top plate 29, a forked fitting 38 in which is mounted, by means of a pivot 39, a lock member or link 40. Also carried by the top plate 29 is a second forked fitting 41 adapted to receive one end of the link 40. This fitting 41 has openings therein adapted to receive a rivet 42 formed of metal fusible at a low temperature, and generally known as a fusible link, the lock member or link 40 having an opening therethrough for receiving said rivet 42.

The cutaway portion of the flange 26 affords clearance for the passage of the fittings 38 and 41 and the link 40, so that this flange does not interfere with the free pivotal movement of the extension lintel.

The fittings 38 and 41 are pendant from the top plate 29 and located closely adjacent the axis of the hinge pins 35 and 36 where they are fully exposed within the pocket 24. The small volume of metal in the top plate 29 will cause it to heat up rapidly in the event of the exposure of the top of this plate, or of the rear plate 30, to an elevated temperature, thus permitting a rapid conduction of heat to the bracket 41 and bolt 42 in the event of fire within a shaft so as to quickly fuse the material of the rivet 42.

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

Pass type doors are used to close door openings, the lintels of which are close to the ceiling, there sometimes being only 18 or 20 inches, or even less, between the lintel at one door opening and the sill at the opening immediately above. Where this distance, however, is less than the height of a door section, the ordinary counterbalanced type of door cannot be used and a pass type door is usually employed. In fact, the pass type door meets conditions where other types of doors cannot be used. It is essentially what is known as a freight elevator door, not being suitable for use in shafts for ordinary passenger elevators.

In the construction of door herein described, the use of sheet metal in the extension lintel not only reduces the weight of metal necessary in the production of the upper door section, but ensures, under normal conditions, great ease of movement of the lintel when necessary because of the opening of the door carrying same or a door at the floor immediately above. As compared with the ordinary counterbalanced door, the lintel structure does not materially increase the weight of the door since the weight of the cutout portion of the angle 26 will almost equal that of the entire extension lintel structure. The dimensions of the top plate 29 and rear plate 30 may be such as to afford a very effective barrier about the top of the upper door section without adding materially to the weight of the structure.

Under normal working conditions, the extension lintel and the parts appurtenant thereto will be in the position as shown more particularly in Fig. 1 of the drawing, the top plate 29 being positioned at right angles to the plane of movement of the door sections and extending toward the shaft to a point adjacent the wall so as to substantially close the top of the pocket 24. When the top flange 29 is in this position, the back flange 30 will extend downwardly close to the flange 26 of the flame angle 25—26 so as to effectively close the space below the top plate 29 and the flange 25. Under normal conditions, the lock member or link 40 will be held by the fusible rivet or link 42 below and closely adjacent the top plate 29 between the axis of the hinge pins

35 and 36 upon which said plate turns and the wall of the shaft.

In opening the door shown in the drawing, the section 20 ascends and the section 21 descends, the former moving along the guide or track 16, and the latter along the guide or track 18. Following the initial upward movement of the section 20, the top plate 29 will engage the bottom of the lower door section at the floor above, thus causing the extension lintel to rotate about the hinge pins 35 and 36 with the continued upward movement of the door section.

If the door above be opened, the lower door section, corresponding with the section 21, in its descent will engage the top plate 29 and operate it in the manner above described, this section entering the pocket 24 and passing the extension lintel when so entering the pocket. Hence, the extension lintel normally closes the top of the pocket 24 when the door with which it is associated is closed, but during the opening movement of this door, or of the door at the floor above, has a swinging movement to permit the two sections to pass each other. Upon the closing of either section, the overweight of the flange 30 will restore the extension lintel to its normal position.

By supporting the link 40 in brackets depending from the top plate 29 closely adjacent the axis of the hinge pins 35 and 36, and between same and the wall of the shaft, the weight of these parts is no material factor in the operation of the extensible lintel. This locating of the stop member or link 40 brings it close to the face of the door section 20 presented toward the wall of the shaft, so that in the event of the fusing of the rivet 42, the lock member or link 40 will turn upon the pivot 39 and drop to the position shown in dotted lines in Fig. 2 where the lower portion of the link will be closely adjacent the top, or the face of the angle metal frame, of the door section 20 presented towards the wall of the shaft. As stated, the cutaway portion of the flange 26 will afford clearance for the brackets 38 and 41 and for the link 40 supported thereby.

As a result of the locking member or link 40 falling into this engaging position with the top bar of the section 20, rocking movement of the lintel, in the manner above described, is prevented, and the long leverage at which this locking member or link acts in relation to said top bar will resist the force of any stream of water which may be directed against the top plate 29.

The upwardly projecting flange portions 26 will ordinarily be located closely adjacent the opposite end of the extension lintel, although with wide doors additional hinge connections may be used to afford a support for the lintel intermediate its ends.

By making the extension lintel of sheet metal, as described, not only is the manufacture of the door very much simplified, but greater accuracy can be secured since the lintel may be bent to form, trued up and produced with any desired length by a simple welding and grinding operation. The attachment of the hinge members 33 and 34 to the lintel is very much simplified, and this is also true of the attachment of the hinge fittings 27 and 28 to the door structure. The simplification of the manufacturing problems and the saving of weight, not only in the lintel itself but in the lower door section, are matters of great moment. Furthermore, the use of sheet metal greatly facilitates the mounting of the locking member or link 40 upon the top plate 29, and a relation of parts is secured which has been found to give highly satisfactory results.

It is not my intention to limit the invention to the precise details of construction shown in the accompanying drawing, it being apparent that such may be departed from while still preserving all of the desirable characteristics of the structure shown in the drawing.

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

1. A pass type elevator door embodying therein upper and lower counterweighting sections, flexible connections between said sections, and parallel guides therefor, whereby said upper section is spaced inwardly of the shaft a distance approximately equalling the thickness of the lower section, and a pocket is formed above said lower section and between said upper section and the wall of the shaft, an extension lintel formed of sheet metal bent to provide a top plate of a width substantially spanning the top of said pocket, a rear plate substantially closing the space between said top plate and the top of the upper door section, and a short counterweighting flange projecting from the bottom of said rear plate and parallel with said top plate, hinge brackets mounted upon the top of said upper door section, co-operating hinge brackets carried by said top plate, and a hinge pin co-operating with said brackets.

2. A pass type elevator door embodying therein upper and lower counterweighting sections, flexible connections between said sections, and parallel guides therefor, whereby said upper section is spaced inwardly of the shaft a distance approximately equalling the thickness of the lower section, and a pocket is formed above said lower section and between said upper section and the wall of the shaft, an angle metal frame for said upper door section, an angle bar having one flange secured to the top bar of said angle metal frame, and a second flange projecting upwardly therefrom and having a cutout portion, an extension lintel formed of sheet metal bent to provide a top plate of a width sub-

stantially spanning the top of said pocket, a rear plate substantially closing the space between said top plate and the top of the upper door section, and a short counterweighting flange projecting from the bottom of said rear plate and parallel with said top plate, hinge brackets mounted upon said upwardly extending flange adjacent the cutout portion thereof, co-operating hinge brackets carried by said top plate, and a hinge pin co-operating with said brackets.

3. A pass type elevator door embodying therein upper and lower counterweighting sections, flexible connections between said sections, and parallel guides therefor, whereby said upper section is spaced inwardly of the shaft a distance approximately equalling the thickness of the lower section, and a pocket is formed above said lower section and between said upper section and the wall of the shaft, an angle metal frame for said upper door section, an angle bar having one flange secured to the top bar of said angle metal frame, and a second flange projecting upwardly therefrom and having a cutout portion, an extension lintel formed of sheet metal bent to provide a top plate of a width substantially spanning the top of said pocket, a rear plate substantially closing the space between said top plate and the top of the upper door section, and a short counterweighting flange projecting from the bottom of said rear plate and parallel with said top plate, hinge brackets mounted upon said upwardly extending flange adjacent the cutout portion thereof, co-operating hinge brackets carried by said top plate, a hinge pin co-operating with said brackets, a forked fitting carried by said top plate, a stop member pivotally mounted in said fitting and of a length to engage the face of said upper door section, a second forked fitting adapted to receive said stop member, and fusible means retaining said stop member in said bracket and out of engaging relation with the door.

4. A pass type elevator door embodying therein upper and lower counterweighting sections, flexible connections between said sections, and parallel guides therefor, whereby said upper section is spaced inwardly of the shaft a distance approximately equalling the thickness of the lower section, and a pocket is formed above said lower section and between said upper section and the wall of the shaft, an angle metal frame for said upper door section, an angle bar having one flange secured to the top bar of said angle metal frame, and a second flange projecting upwardly therefrom and having a cutout portion, an extension lintel formed of sheet metal bent to provide a top plate of a width substantially spanning the top of said pocket, a rear plate substantially closing the space between said top plate and the top of the upper door section, and a short counterweighting flange projecting from the bottom of said rear plate and parallel with said top plate, hinge brackets mounted upon said upwardly extending flange adjacent the cutout portion thereof, co-operating hinge brackets carried by said top plate, a hinge pin co-operating with said brackets, a forked fitting carried by said top plate between the plane of the axis of said hinge pins and the wall of the shaft, and adjacent the cutout portion of said upwardly extending flange, a stop member pivotally mounted in said fitting and of a length to engage the face of said upper door section, a second forked fitting adapted to receive said stop member, and fusible means retaining said stop member in said bracket and out of engaging relation with the door.

5. A pass type elevator door embodying therein upper and lower counterweighting sections, flexible connections between said sections, and parallel guides therefor, whereby said upper section is spaced inwardly of the shaft a distance approximately equalling the thickness of the lower section, and a pocket is formed above said lower section and between said upper section and the wall of the shaft, an extension lintel formed of sheet metal bent to provide a top plate of a width substantially spanning the top of said pocket, a rear plate substantially closing the space between said top plate and the top of the upper door section, a short counterweighting flange projecting from the bottom of said rear plate and parallel with said top plate, and a stiffening strip secured to adjacent portions of said rear plate and said counterweighting flange, hinge brackets mounted upon the top of said upper door section, co-operating hinge brackets carried by said top plate, and a hinge pin co-operating with said brackets.

6. A pass type elevator door embodying therein upper and lower counterweighting sections, flexible connections between said sections, and parallel guides therefor, whereby said upper section is spaced inwardly of the shaft a distance approximately equalling the thickness of the lower section, and a pocket is formed above said lower section and between said upper section and the wall of the shaft, an angle metal frame for said upper door section, an angle bar having one flange secured to the top bar of said angle metal frame, and a second flange projecting upwardly therefrom and having a cutout portion, an extension lintel formed of sheet metal bent to provide a top plate of a width substantially spanning the top of said pocket, a rear plate substantially closing the space between said top plate and the top of the upper door section, a short counterweighting flange projecting from the bottom of said rear plate and parallel with said top plate, and a stiffening strip secured to adjacent portions of said rear plate and said counter-

weighting flange, hinge brackets mounted upon said upwardly extending flange adjacent the cutout portion thereof, co-operating hinge brackets carried by said top plate, a hinge pin co-operating with said brackets, a forked fitting carried by said top plate between the plane of the axis of said hinge pins and the wall of the shaft, and adjacent the cutout portion of said upwardly extending flange, a lock member pivotally mounted in said fitting and of a length to engage the face of said upper door section, a second forked fitting adapted to receive said stop member, and fusible means retaining said stop member in said bracket and out of engaging relation with the door.

7. A pass type elevator door embodying therein upper and lower counterweighting sections, flexible connections between said sections, and parallel guides therefor, whereby said upper section is spaced inwardly of the shaft a distance approximately equalling the thickness of the lower section, and a pocket is formed above said lower section and between said upper section and the wall of the shaft, an extension lintel formed of sheet metal bent to provide a top plate of a width substantially spanning the top of said pocket and having its free edge formed to reinforce said top plate, a rear plate substantially closing the space between said top plate and the top of the upper door section, and a short counterweighting flange projecting from the bottom of said rear plate and parallel with said top plate, hinge brackets mounted upon the top of said upper door section, co-operating hinge brackets carried by said top plate, and a hinge pin co-operating with said brackets.

In witness whereof I have hereunto affixed my signature this 31st day of March, 1930.

PAUL R. SAURER.