

April 18, 1933.

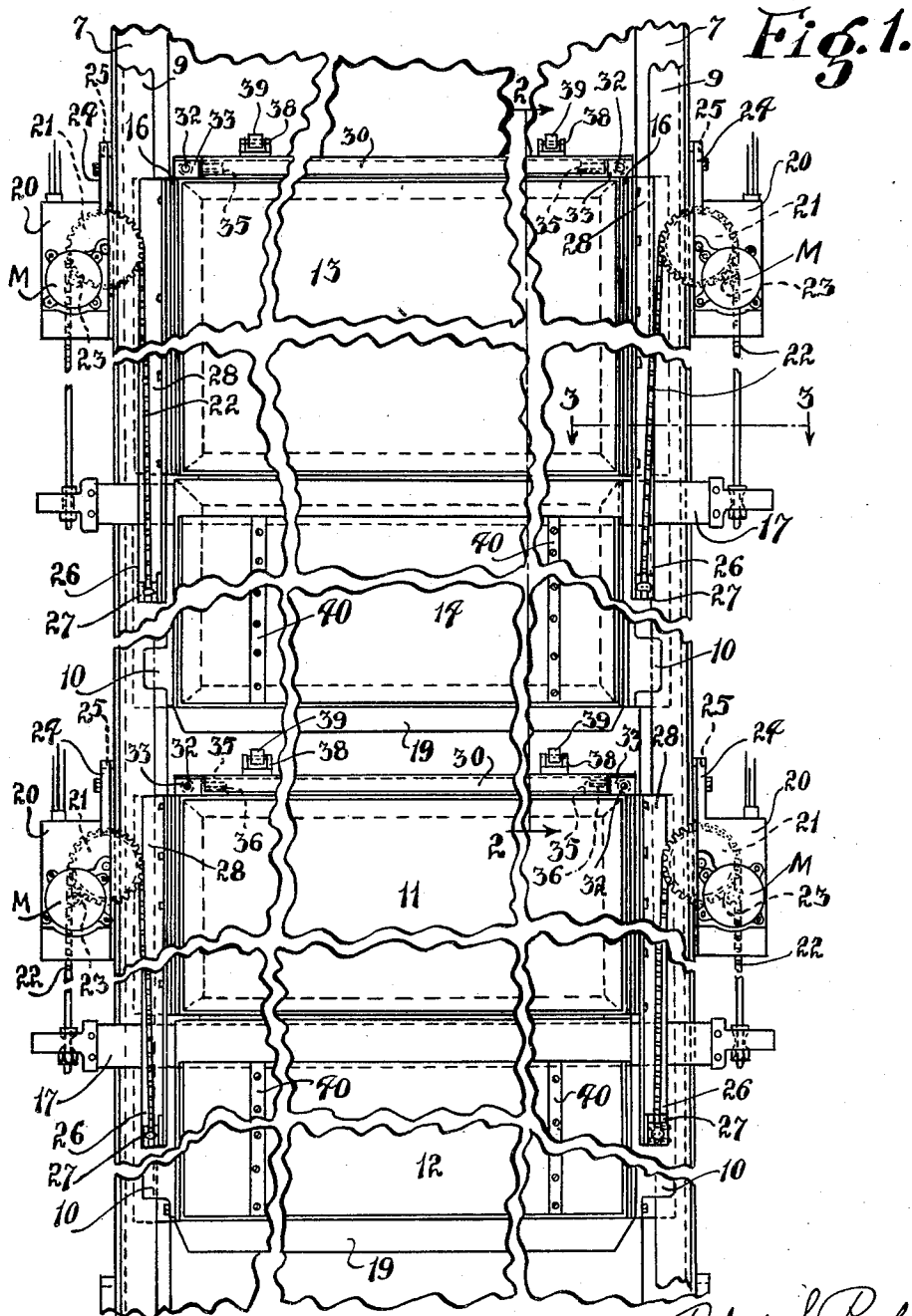
R. S. PELLE

1,904,010

PASS TYPE ELEVATOR DOOR

Filed Dec. 3, 1931

2 Sheets-Sheet 1



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INVENTOR
BY *Frank J. Westworth*
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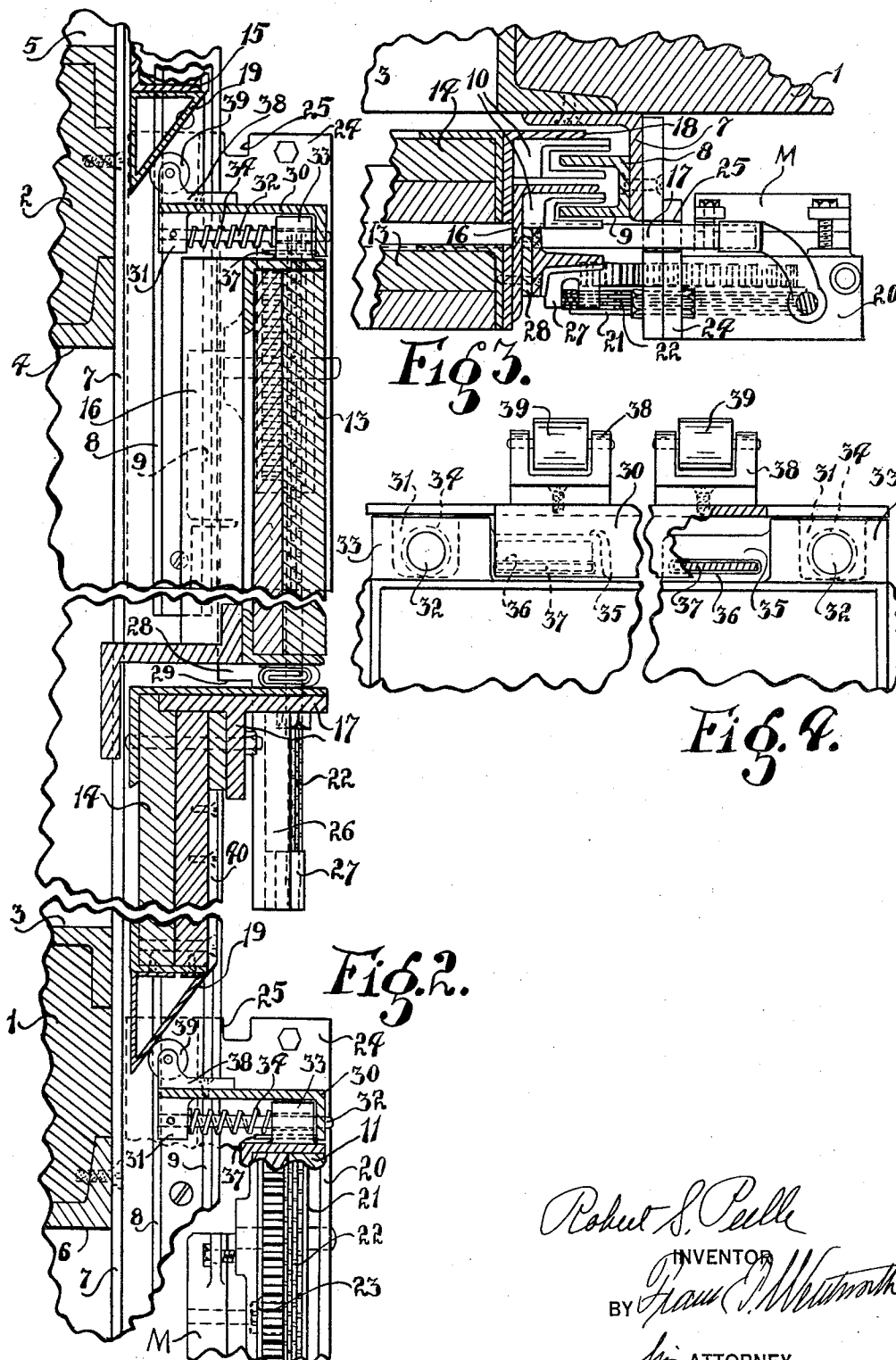
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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PASS-TYPE ELEVATOR DOOR

Application filed December 3, 1931. Serial No. 578,791.

The invention relates to pass-type elevator doors, and more particularly to a construction of pass-type door wherein the distance between the lintel of a lower door opening and the sill of an upper door opening is so limited as to preclude the use of pass-type doors of ordinary construction.

A pass-type door consists of two counter-balanced sections movable in parallel vertical planes, one of these sections being positioned closely adjacent the wall of the elevator shaft, and the other section being spaced away from this wall a distance sufficient to form a pocket for the reception of a section of a door closing the opening at an adjacent landing. This type of door is old in the art and is used only when the distance between the lintel of one door opening and the sill of the opening above is insufficient to permit full opening movement of the doors closing either opening. Ordinarily, even though the distance between the lintel of one opening and the sill of the opening above is inadequate to permit the full opening movement of the door, there is sufficient space available to permit the installation of the mechanisms of a door in a manner to allow such full opening providing the section of one door is permitted to move in a plane parallel with the other. In some buildings, however, where low ceiling heights are characteristic of the architecture, the space between floors is so small as to preclude the installation of pass-type doors of the ordinary type.

The purpose of my invention is to provide a pass-type door, the construction of which is such that it may be installed in any building, irrespective of the height of the wall space between the lintel and an opening at one floor, and the sill at the opening of the floor above, the construction being such that all of the operative parts of the door installation are contained within the height of the door opening. In the development of this construction it was found necessary to materially alter the construction of the upper door section in order to secure a sufficient run of the flexible connections between the two sections

to accomplish the full opening movement of the door.

The difficulties of installing pass-type doors, when the available space is limited as above described, are more pronounced with motor operated doors and with doors embodying therein what is known as a "truck bar" or "truckable sill" feature of the type wherein the truck bar or sill is supported from the guide rail structure.

In the door of the invention, the construction and arrangement of parts is such that the operator mechanism may be utilized as a stop for arresting downward movement of the lower section of the door at an upper landing with the truck bar or truckable sill of this door substantially flush with the floor at the opening closed by that door. I also provide in the door of the invention a special construction of extension lintel normally closing a pocket between the upper door section and the wall of a shaft and operated as a result of the relative movement of the upper section of one door carrying the same and the lower section of the door closing the opening immediately above.

The invention consists primarily in a pass-type elevator door embodying therein two sections oppositely movable in parallel planes, guide rail structures upon which said sections have movement, whereby one of said sections is positioned closely adjacent the wall of an elevator shaft, and the other is spaced away from said wall to permit sections of doors at adjacent floors to pass each other when opening a door, sheaves carried by said guide rail structures at opposite sides of the door opening and below the top of the upper door section when the door is closed, legs projected downwardly from the lower edge of the upper door section, hanger fittings adjacent the top of the lower door section, and flexible connections between the lower end of each leg and one of said hanger fittings, and passing about said sheaves, whereby all parts of the door structure, including said sheaves but excluding said guide rail structure, are contained within the height of said door; 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 vertically and laterally condensed view from the shaft side showing pass-type doors embodying the invention at door openings upon succeeding floors of a building;

Fig. 2 is a section on the line 2—2 of Fig. 1 upon a larger scale;

Fig. 3 is a section on the line 3—3 of Fig. 1 upon the same scale as Fig. 2; and

Fig. 4 is a view upon a still larger scale and laterally condensed of the upper portion of the upper door section, showing details of the extension lintel.

Like numerals refer to like parts throughout the several views.

In the embodiment of the invention shown in the drawings, a lower floor is indicated at 1 and the floor immediately above at 2. The sill at the floor opening 1 is indicated at 3 and the lintel of said opening at 4. The sill of the opening 2 only is shown at 5. The lintel of the opening below the floor 1 is shown at 6.

In the drawings, the space between the lintel at one opening and the floor of the opening above is about twelve or fourteen inches, this space being inadequate to permit the installation of counterbalanced doors within the shaft of any type used prior to my present invention.

Extending throughout the shaft adjacent all of the openings is a guide rail structure consisting of a wall angle 7 supporting parallel guide rails 8 and 9 which may be of the construction commonly used with pass-type doors. That is to say, the rails 8, instead of extending continuously throughout the entire height of the shaft, extend only from a point adjacent the meeting line of the door sections at one floor to adjacent the meeting line of the door section at the floor below, while the rail 9 extends from adjacent the meeting line of the doors at one floor, upwardly to adjacent the meeting line of the doors closing the opening at the floor above.

Each door section is provided with shoes 10 or other suitable means projecting laterally from the door, co-operating with the guide rails 8 and 9. This arrangement of staggered parallel guides is not essential since if such rails be made continuous throughout the shaft they would not interfere with the operation of any door.

The upper door section at one floor is shown at 11 and the lower door section of said door at 12. The upper door section on the floor above is shown at 13 and the lower section of said door at 14. In Fig. 2 I have shown at 15 a fragmentary portion of a lower door section, at a third floor. All upper door sections are guided in their movements

by the guide rail 9, and all lower door sections by the guide rail 8. The guide rail 9 is positioned inwardly of the shaft in relation to the guide rail 8 and the shoes 10, carried by the upper door section, are mounted upon an angle 16 offset from the upper door section toward the wall of the shaft so as to permit the use of a narrow guide rail structure. The details heretofore referred to were well known prior to my invention, which relates more particularly to those details of construction incidental to the mounting of the sections of each door in the shaft so that all of the working parts of each door will be contained substantially within the height of the door opening, allowing for that overlapping at the top, bottom and sides of a door opening required in fire retardant elevator doors.

The detailed construction of each door in a shaft is identical with that of every other, so that a detailed description of but one door and the manner of mounting same, is required.

The lower door section is provided with a reinforcing top bar structure 17, known in the art as a "trucking bar" or "truckable sill", this bar being provided with a top angle of a width to span the gap between the edge of the door sill and the platform of an elevator car to permit the trucking of vehicles, containing merchandise, between the elevator car and the floor of a building without likelihood of blocking the wheels of the truck. The truck bar 17 has projecting ends extending across and closely adjacent the inwardly directed flange of the wall angle 7.

Prior to my invention, the common practice was to provide the wall angle with an adjustable stop engageable by the lower edge of the truck bar, when the top angle of this bar was substantially flush with the floor of a building, so that loads passing to or from the elevator car were transmitted through the truck bar and the guide rail structure to the wall of the building in a manner to prevent the development of racking stresses upon the lower door sections.

The flexible connections between the two door sections upon opposite sides of the door are also attached to the protruding ends of the truck bar, thus permitting the truck bar to also serve as a hanger bar.

The guide rails 8 and 9, as to each door, being staggered, it follows that the guide rail 8 for the lower section of a door at an upper floor will extend parallel with the guide rail 9 for the upper section of the door on the floor below, and be co-extensive in length therewith.

Each of the door sections as shown is of the metal angle bar frame, metal sheathed wood panel type, but the detailed construction of the door sections in such respects is immaterial to the invention.

The angle 16 carried by the upper door section not only permits the offsetting of the shoes 10 which are carried by that section, but acts as a flame angle in relation to this door section. The lower door section is provided with a flame angle 18 which supports the shoes 10 for that section and also acts as a flame angle in relation thereto.

The lower door section is provided, along its lower edge, with a toeguard 19 to prevent possibility of the crushing of the foot of a person upon a car, between the car platform and the lower edge of the door. This guard is provided with an inwardly presented, upwardly inclined face from adjacent the wall of a shaft toward the inner plane of the door section, as shown more particularly in Fig. 2 of the drawings.

Mounted upon each guide rail structure is a housing 20, having mounted therein a sheave 21 over which the flexible connection 22, between the two door sections, passes. One end of this flexible connection is secured in the usual manner to the hanger bar 17, and the other end thereof is secured to the lower door section in a manner to be more fully described hereinafter, the construction permitting this manner of attachment being one of the essential characteristics of the present invention. Also carried by the housing 20 is an electric motor M geared to the sheave by means of enmeshed gears 23, said doors being opened and closed by means of said motor and said gearing.

The housing 20 is so positioned that the top thereof is located below the sill of the adjacent door opening a distance approximating the depth of the vertical flange of the hanger bar, so that when a door closing an opening at an upper floor is in its lowermost position, said hanger bar engages the top of this sheave and motor housing 20 and maintains the upper surface of the truck bar structure on a plane with the sill of said upper door opening. The upper portion of the housing 20 is provided with an upwardly extending flange 24, notched at 25 as shown more particularly in Fig. 2. The flange of the truck bar entering the notch 25 relieves the door structure from stresses inwardly of the shaft from loads passing over the truck bar.

The overall height of the housing 20 is approximately eighteen inches, so that it is necessary to locate the major portion of this housing below the lintel of the door opening in order to permit a full opening movement of the door at a floor at the opening of a floor immediately above. It is essential, however, that the lower edge of the upper door section, when a door is fully open, be brought in substantially the plane of the lintel of the opening closed thereby.

Prior to my invention the practice was to connect the chain or other flexible connection

22 adjacent the lower edge of the upper door section, the practice with pass-type doors not differing from that followed with the standard type of counterbalanced doors, in which both doors have movement in the same vertical plane but in opposite directions.

With the motor and sheave housing 20 located mainly below the lintel, however, this practice is impossible, since the housing will prevent the full opening movement of the door.

In pass-type doors, prior to my invention, the floor thickness, or the space between the lintel at one floor and the sill at the floor above, had to be sufficient to permit the sheave housing to be located, in its entirety, well above the lintel and still have space above the housing sufficient to permit the full opening movement of the door above. With the tendency toward a reduction of the space between floors, this old construction is impossible to use, and even with a greater space it is impossible to install an electric motor operated sheave within this space, since even though the sheave and its motor could be located so as not to interfere with the opening of the door at an upper landing, the height of the sheave housing is such that the upper section of the door, of which it forms a part of the operating mechanism, could not be fully opened. In fact, a motor operated sheave structure cannot be used where the available space between floors is adequate to accommodate the running gear for a manually operative pass-type door.

To overcome the above difficulties, I provide each side of the upper door section with a downwardly extending leg 26 projecting well below the bottom edge of the upper door section. Toward the bottom of this leg is a fitting 27 to which the lower end of the chain or other flexible connection 22 is attached. The leg 26 forms a part of a T-bar 28 firmly secured to the side edge of the upper door section throughout its entire length, one flange of the head of this T-bar being cut away toward the lower portion thereof, as shown at 29, for permitting the leg 26 to pass the vertical flange of the truck bar of the lower door section (see Fig. 2). The leg 26 is of a length substantially equalling the height of the housing 20, so that when the door is fully open the point of attachment of the chain or other flexible connection 22 with the leg will be well below the horizontal center of the sheave 21, thus avoiding any possible interference between the lower door section and the housing 20, or the parts carried thereby.

By this construction the lower edge of the upper door section may be brought to or even above the lintel of the door opening, notwithstanding that the space between the lintel at one floor and the sill at the floor above

is only twelve or fourteen inches. The construction heretofore described would permit the installation of pass-type doors even though the floor thickness was less than that specified. With the construction described, all of the operating parts of a door may be brought within the height dimensions of that door, so that no restrictions whatever are placed upon the use of pass-type doors irrespective of the space available above the lintel of the door.

It is necessary, in all fire retardant freight elevator doors that the door lap the opening in accordance with the requirements of various fire ordinances, so that in referring to bringing all of the parts of the door within the height of a door opening is meant bringing all these parts within the height required for the installation of the door sections at the door opening.

With the construction of the invention, the housing 20, in its entirety, might be positioned entirely below the lintel, but in order to utilize this housing as a stop for the truckable bar of the door above, the construction described is resorted to.

The offsetting of the rail 9 in relation to the rail 8 and the wall of the shaft in the manner described, brings the upper door section 11 to a position where a pocket is formed between this section and the wall of the shaft suitable to receive the lower door section of a door at the floor above. To reduce the fire hazard it has long been the practice to close the upper portion of this pocket, when all doors are closed, by what is known as an "extension lintel". This lintel has taken different forms at different times. In connection with the construction described, I provide an extension lintel consisting of an angle plate 30 slidably mounted upon the top of the upper door section 11. This angle plate 30 is provided with downwardly projecting lugs 31 at the edge thereof presented toward the wall of the shaft.

Secured in these lugs are rods 32 passing through bearing blocks 33 carried by the top of the upper door section. Between the blocks 33 and the lugs 31 are springs 34 having a normal tendency to thrust the angle plate 30 toward the wall of the shaft.

The blocks 33 have lateral extensions having a slot 36 therein for the reception of a tongue 37 carried by the angle plate 30.

Carried by the top of the angle 29 are bearing fittings 38 having mounted therein anti-friction rollers 39 in a position to maintain them in engageable relation with the toeguard 19 of the lower section of the door at the floor above.

Each lower door section is provided with wear straps 40 along which the anti-friction rollers 39 may travel during the opening and closing movement of the door.

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

When installing doors embodying the invention, the housing 20 is located with its flange 24 so positioned as to properly locate the truck bar or truckable sill of the lower door section of the door above in relation to the sill 5 of the upper door opening (see Fig. 2). No attention whatever need be paid to the location of other parts carried by the housing, the leg 26 upon that side of the door, projecting below the bottom of the upper door section with which the sheave and motor of the housing co-operate, to ensure the full opening movement of that section irrespective of the position of the sheave. The two sections of the door associated with each housing are then mounted upon the guide rails 8 and 9, the former of which extends downwardly, and the latter of which extends upwardly from adjacent the meeting line of the door sections in the usual manner, and the chain 22 is connected at one end with the offset end of the hanger or truck bar 17, and the other end thereof attached to the fittings 27 at the bottom of the leg 26.

When the parts have been properly assembled in the structure in the manner above described, the upper section of one door, when the door is closed, may be so positioned that the rollers 39 thereon may be in actual engaging relation with the toeguard 19 of the lower section of the door immediately above, as shown in Fig. 2. When it is desired to open a door, power is applied to the motor M, thus rotating the sheave 21, applying lifting stresses through the chain or other flexible connection 22 to the upper door section and permitting the lower door section to descend by gravity.

Since the means of controlling the application of power and the duration of run of said motor is immaterial to the invention, such has not been shown and will not be described.

As the upper door section 11 ascends, the leg 26 will permit it, in its entirety, to pass the sheave 21 until the lower edge of said upper section is approximately at, or has passed the lintel 4, at which time the fitting 27 will be well below the horizontal diameter of the sheave.

As the door begins its ascent, the anti-friction rollers 39, in their effort to pass along the inclined face of the toeguard 19, will force the extension lintel angle plate 30 in a right line inwardly of the shaft against the tension of the springs 34, thus enabling the upper section 11 to pass the lower section of the door above, as 14 shown in Fig. 1, and 15 shown in Fig. 2.

The straps 40, extending along the inner face of the lower section of each door protect the metal sheathing of that door from undue wear.

When the lower section 12 or 14 reaches the fully open position, each projecting end of the hanger or truck bar 17, by engagement with a notch 25 in the flange 24 of a motor housing 20, will arrest downward movement of the lower door section, and upward movement of the upper door section as a result of slippage between the sheave and the chain or other flexible connection 22.

When the lower door section is thus brought to rest, the truck bar thereof will be on the plane of the sill of the door opening, or approximately so.

When it is desired to close the door, the motor M is operated in the reverse direction, thus raising the lower door section and permitting the upper door section to descend by gravity.

The legs 26, at opposite sides of the upper door section may project below that section to any desired extent so as to ensure the point of connection of the chain or flexible connection 22 with the door section to be so located as to ensure a free running of the chain about the sheave 21 until the lower edge of the upper door section is adjacent the lintel of the door opening. The length of such legs is therefore subject to considerable variation, it being desirable, however, to make the leg as short as possible in order to avoid unnecessary weight in the upper door section which must be compensated for by added weight in the lower door section.

Since the legs 26 are positioned at one side of the door opening and, when the door is closed, are spaced well away from the housing 20 of the door mechanism at the floor below, there is no possibility of any interference of parts which will prevent free opening and closing movement of the door at all times.

It is customary to form the hanger or truck bar mechanism 17 of a T-bar, the top flanges of the T-bar being cut away closely adjacent the side bars of the door so that only the stem of the bar projects laterally of the door. This construction is shown in Fig. 3 of the drawings. In this construction the legs 26 pass the stem of the T-bar of the hanger or truck bar inwardly of the shaft in relation to the lower door section, which is shown in Fig. 2, the cut-away portion shown at 29 permitting this positioning of parts.

While in the drawings I have shown a sliding extension lintel upon the upper door section, it is not my intention to limit myself to this particular construction since any other form of extension lintel may be employed if desired.

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. A pass-type elevator door embodying therein two sections oppositely movable in parallel planes, guide rail structures upon which said sections have movement, whereby one of said sections is positioned closely adjacent the wall of an elevator shaft, and the other is spaced away from said wall to permit sections of doors at adjacent floors to pass each other when opening a door, sheaves carried by said guide rail structures at opposite sides of the door opening and below the top of the upper door section when the door is closed, legs projected downwardly from the lower edge of the upper door section, hanger fittings adjacent the top of the lower door section, and flexible connections between the lower end of each leg and one of said fittings, and passing about said sheaves, whereby all parts of the door structure, including said sheaves but excluding said guide rail structure, are contained within the height of said door.

2. A pass-type elevator door embodying therein two sections oppositely movable in parallel planes, guide rail structures upon which said sections have movement, whereby one of said sections is positioned closely adjacent the wall of an elevator shaft, and the other is spaced away from said wall to permit sections of doors at adjacent floors to pass each other when opening a door, sheaves carried by said guide rail structures at opposite sides of the door opening and below the top of the upper door section when the door is closed, legs projected downwardly from the lower edge of the upper door section, hanger fittings adjacent the top of the lower door section, flexible connections between the lower end of each leg and one of said fittings, and passing about said sheaves, whereby all parts of the door structure, including said sheaves but excluding said guide rail structure, are contained within the height of said door, an extension lintel, and means whereby said lintel is normally positioned with one edge adjacent the wall of the shaft but is permitted to have movement away from said wall.

3. A pass-type elevator door embodying therein two sections oppositely movable in parallel planes, guide rail structures upon which said sections have movement, whereby one of said sections is positioned closely adjacent the wall of an elevator shaft and the other is spaced away from said wall to permit sections of doors at adjacent floors to pass each other when opening a door, a housing, a sheave rotatably mounted therein, a motor carried thereby, a gear train connecting said motor with said sheave, said housing being positioned below the top of the upper door section when the door is closed,

legs projected downwardly, from the lower edge of the upper door section, hanger fittings adjacent the top of the lower door section, and flexible connections between the lower end of each leg and one of said fittings, and passing about said sheaves, whereby all parts of the door structure, including said sheaves and said housing but excluding said guide rail structure, are contained within the height of said door.

4. A pass-type elevator door embodying therein two sections oppositely movable in parallel planes, guide rail structures upon which said sections have movement, whereby one of said sections is positioned closely adjacent the wall of an elevator shaft and the other is spaced away from said wall to permit sections of doors at adjacent floors to pass each other when opening a door, a housing, a sheave rotatably mounted therein, a motor carried thereby, a gear train connecting said motor with said sheave, said housing being positioned below the top of the upper door section when the door is closed, an upwardly directed flange upon said housing positioned below the sill of the door opening immediately above, legs projected downwardly from the lower edge of the upper door section, a hanger bar adjacent the top of the lower door section adapted to engage the upwardly directed flange upon the housing of the door at a lower landing, and flexible connections between the lower end of each leg and an end of said hanger bar, and passing about said housing, whereby all parts of the door structure and said upwardly directed flange, are contained within the height of said door.

5. A pass-type elevator door embodying therein two sections oppositely movable in parallel planes, guide rail structures upon which said sections have movement, whereby one of said sections is positioned closely adjacent the wall of an elevator shaft, and the other is spaced away from said wall to permit sections of doors at adjacent floors to pass each other when opening a door, sheaves carried by said guide rail structures at opposite sides of the door opening and below the top of the upper door section when the door is closed, legs projected downwardly from the lower edge of the upper door section, hanger fittings adjacent the top of the lower door section, flexible connections between the lower end of each leg and one of said fittings, and passing about said sheaves, whereby all parts of the door structure, including said sheaves but excluding said guide rail structure, are contained within the height of said door, a horizontally slidable extension lintel, fittings carried thereby, guide rods secured to said fittings, bearing fittings carried by the top of the upper door section, said rods being slidably mounted in said bearing fitting, and springs acting to normally position said

lintel with one edge adjacent the wall of the shaft but permitting it to have movement away from said wall.

6. A pass-type elevator door embodying therein two sections oppositely movable in parallel planes, guide rail structures upon which said sections have movement, whereby one of said sections is positioned closely adjacent the wall of an elevator shaft, and the other is spaced away from said wall to permit sections of doors at adjacent floors to pass each other when opening a door, sheaves carried by said guide rail structures at opposite sides of the door opening and below the top of the upper door section when the door is closed, legs projected downwardly from the lower edge of the upper door section, hanger fittings adjacent the top of the lower door section, flexible connections between the lower end of each leg and one of said fittings, and passing about said sheaves, whereby all parts of the door structure, including said sheaves but excluding said guide rail structure, are contained within the height of said door, a horizontally slidable extension lintel, fittings carried thereby, guide rods secured to said fittings, bearing fittings carried by the top of the upper door section, said rods being slidably mounted in said bearing fitting, springs acting to normally position said lintel with one edge adjacent the wall of the shaft but permitting it to have movement away from said wall, bearing fittings carried by said extension lintel adjacent the edge thereof toward the wall of the shaft, an anti-friction roller carried by each said fitting, a toeguard carried by the lower door section having a surface upwardly inclined away from the wall of the shaft, and wear straps upon the lower door section in engageable relation with said anti-friction rollers, whereby with movement of a door at any floor the lower section thereof will move the extension lintel upon the upper section of the floor below away from the wall of the shaft, and the extension lintel upon the upper section of the door being opened, will be moved away from the wall of the shaft by engagement of said anti-friction rollers and the lower section of the door immediately above.

7. A pass-type elevator door embodying therein two sections oppositely movable in parallel planes, guide rail structures upon which said sections have movement, whereby one of said sections is positioned closely adjacent the wall of an elevator shaft, and the other is spaced away from said wall to permit sections of doors at adjacent floors to pass each other when opening a door, sheaves carried by said guide rail structures at opposite sides of the door opening and below the top of the upper door section when the door is closed, T-bars extending along opposite edges and terminating in legs projected downwardly from the lower edge of the up-

per door section, hanger fittings adjacent the top of the lower door section, one flange of the head of said T-bar throughout the leg portion thereof being cut away to permit said
5 leg to pass said hanger fitting, and flexible connections between the lower end of each leg and one of said fittings, and passing about said sheaves, whereby all parts of the door structure, including said sheaves but ex-
10 cluding said guide rail structure, are contained within the height of said door.

In witness whereof I have hereunto affixed my signature, this 2nd day of December, 1931.

15 ROBERT S. PEELLE.

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