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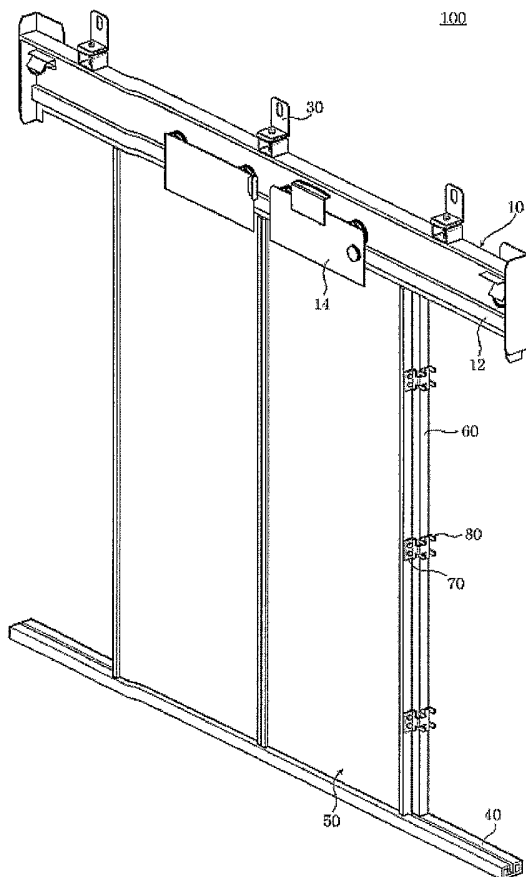
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[Continued on next page]

(54) Title: LANDING DOOR ASSEMBLY FOR USE IN AN ELEVATOR SYSTEM



(57) Abstract: A landing door assembly for use in an elevator system is provided, in which deformation of a door panel can be restricted without additional reinforcing members. The landing door assembly comprises a door panel, a jamb pole, and at least one hook and bracket for latching the door panel against the jamb pole when the door panel is in a closed-position, to prohibit the door panel from getting away from the jamb pole and going toward a hoistway. Either the hook or the bracket is mounted to the door panel, while the other is mounted to the jamb pole. When the door panel is in a closed-position, the hook is aligned with the bracket and latched thereby.



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LANDING DOOR ASSEMBLY FOR USE IN AN ELEVATOR SYSTEM

FIELD OF THE INVENTION

[0001] The present invention relates to an elevator system, and more particularly, to a landing door assembly having a structure to prevent deformation of a door panel and an operator frame.

BACKGROUND OF THE INVENTION

[0002] In a typical landing door assembly of an elevator system, an operator frame having a hanger rail is mounted to a wall of a hoistway. Door panels open and close an entrance hole in such a manner that hanger plates fixed to the door panels move along the hanger rail of the operator frame. A pair of jamb poles are mounted on left and right side portions of the entrance hole. And, a sill is positioned at the lower portion of the entrance hole to receive the lower end portions of the door panels and guide the movement of the door panels.

[0003] Generally, since the door panel and the operator frame are made of a thin board, they are good for covering relatively wide areas. However, they are easily deformed by exterior force. If the gap between the door panel and the jamb pole increases by more than an allowable value (normally 5mm) due to the deformation of the door panel, the danger that the body or clothes of a passenger, especially a child, could get caught in the gap increases. Moreover, if the door panel is deformed excessively, the door panel may break away from the sill and fall in the hoistway.

[0004] Also, the operator frame wherein both of its ends are supported by anchors on the walls of the hoistway tends to sag due to the weight of the operator frame and the door panel.

[0005] A traditional method of increasing the rigidity of a board is to install additional reinforcing members to the board.

[0006] As shown in Fig. 1, one or more reinforcing members 2 are installed on door panel 1 for increasing the rigidity of door panel 1 and preventing deformation.

However, providing additional reinforcing members on the door panel increases manufacturing costs, and makes installation difficult because of the increase in the weight of the door panel.

SUMMARY OF THE INVENTION

[0007] Exemplary embodiments of the invention include a landing door assembly for use in an elevator system, in which deformation of a door panel can be restricted without additional reinforcing members, to prevent the gap between the door panel and a jamb pole from increasing excessively.

[0008] Exemplary embodiments of the invention also include a landing door assembly for use in an elevator system, which can reduce sag of an operator frame.

[0009] In particular, an exemplary embodiment includes a landing door assembly for use in an elevator system comprising a door panel; a jamb pole; and a latching device positioned to latch the door panel against the jamb pole when the door panel is in a closed-position, to prohibit the door panel from getting away from the jamb pole and going toward a hoistway.

[0010] The latching device includes at least one hook and at least one bracket. Either the hook or the bracket is mounted to the door panel, while the other is mounted to the jamb pole. When the door panel is in the closed-position, the hook is aligned with the bracket and latched thereby.

[0011] The hook has a base part, which is mounted to a side surface of the door panel, a neck part, which extends toward the jamb pole from the base part, and a head part, which expands from the neck part, the head part and the neck part being T-shaped, and the bracket has latching pieces. When the door panel is in the closed-position, the neck part of the hook is positioned between two adjacent latching pieces, and the head part is latched by the latching pieces.

[0012] The landing door assembly further comprises an operator frame, which is mounted to a wall of the hoistway above the door panel and has a plate lying horizontally, and at least one supporting member, which is fixed together to the plate of the operator frame and to the wall of the hoistway.

BRIEF DESCRIPTION OF DRAWINGS

[0013] Exemplary embodiments of the present invention will become more apparent from the following description of the embodiments given in conjunction with the accompanying drawings.

[0014] Fig. 1 is a cross-sectional view of a conventional door panel.

[0015] Fig. 2 is a perspective view showing a landing door assembly for use in an elevator system in accordance with the present invention.

[0016] Fig. 3 is a partial perspective view of an operator frame and a supporting member.

[0017] Fig. 4 is a perspective view of a door panel with hooks.

[0018] Fig. 5 is a perspective view of the hooks.

[0019] Fig. 6 is a perspective view of a jamb pole with brackets.

[0020] Fig. 7 is a perspective view of the bracket.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0021] Exemplary embodiments of the present invention will now be described with reference to the accompanying drawings.

[0022] Fig. 2 is a perspective view showing landing door assembly 100 for use in an elevator system in accordance with the present invention.

[0023] As shown in the drawing, operator frame 10 having hanger rail 12 is mounted to a wall of a hoistway. A pair of door panels 50 open and close an entrance hole in such a manner that hanger plates 14 fixed to door panels 50 move along hanger rail 12 of operator frame 10. A pair of jamb poles 60 are mounted on left and right side portions of the entrance hole. Sill 40 is positioned at the lower portion of the entrance hole, and receives the lower end portions of door panels 50 to guide the movement of door panels 50.

[0024] With reference to Fig. 3, operator frame 10 includes plate 13, which lies horizontally. In order to prevent sag of operator frame 10, one or more supporting members 30 are fixed together to plate 13 of operator frame 10 and to the wall of the hoistway.

[0025] Supporting member 30 includes U-shaped lower segment 34 and L-shaped upper segment 32. U-shaped lower segment 34 has a pair of extended portions 34b at its top ends, which extend in opposite direction, and screw hole 34a at its bottom. L-shaped upper segment 32 has a vertical portion, where anchor bolt hole 32a is formed, and a horizontal portion, where screw hole 32b is formed. Lower segment 34 is fixed to plate 13 of operator frame 10 by tightening a screw through screw hole 34a. First supporting piece 36 having a screw hole is disposed under extended portions 34b of lower segment 34, and the horizontal portion of upper segment 32 and second supporting piece 38 having a screw hole are stacked onto extended portions 34b in order. Then, by

tightening a screw through the screw holes of second supporting piece 38, the horizontal portion of upper segment 32 and first supporting piece 36, upper segment 32 is fixed to lower segment 34. Also, the vertical portion of upper segment 32 is fixed to the wall of the hoistway by tightening an anchor bolt to the wall of the hoistway through anchor bolt hole 32a.

[0026] According to the length of operator frame 10, such supporting member 30 may be installed at several points of plate 13 of operator frame 10.

[0027] Referring again to Fig. 2, there are provided means for latching door panel 50 when door panel 50 is in a closed-position, to prohibit door panel 50 from getting away from jamb pole 60 and going toward the hoistway. Each latching means includes hook 70, which is mounted to a side surface of door panel 50, and bracket 80, which is mounted to a side surface of jamb pole 60. Door panel 50 has first side surface 52 and second side surface 54. When door panel 50 is in the closed-position, first side surfaces 52 of two adjacent door panels contact each other. However, second side surfaces 54 are positioned adjacent to jamb poles 60. Hooks 70 are mounted to second side surface 54 of door panel 50 (see Fig. 4), and brackets 80 are mounted to the side surface of jamb pole 60 corresponding to hooks 70.

[0028] As shown in Fig. 5, hook 70 includes base part 72, which is fixed to second side surface 54 of door panel 50, connecting part 74, which extends perpendicular to base part 72, neck part 76, which extends perpendicular to connecting part 74 toward jamb pole 60, and head part 78, which expands from neck part 76. Head part 78 and neck part 76 are substantially T-shaped.

[0029] As shown in Figs. 6 and 7, bracket 80 includes base part 82, which is fixed to the side surface of jamb pole 60, and latching pieces 84, which protrude perpendicularly from four corners of base part 82.

[0030] When door panel 50 is in the closed-position, neck part 76 of hook 70 is positioned between two adjacent latching pieces 84, and head part 78 is seated in a space defined by four latching pieces 84. Although exterior force is applied to door panel 50 in the direction toward the hoistway, door panel 50 is prohibited from getting away from jamb pole 60, because head part 78 is latched by latching pieces 84. Accordingly, the gap between door panel 50 and jamb pole 60 is prevented from increasing excessively.

[0031] As described above, a landing door assembly for use in an elevator system of the present invention can restrict deformation of a door panel without additional reinforcing members, thereby preventing the gap between the door panel and a jamb pole from increasing excessively.

[0032] The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims, rather than by the foregoing description. All changes, which come within the equivalent meaning and range of the claims, are to be embraced within their scope.

What is claimed is:

1. A landing door assembly for use in an elevator system, comprising:
a door panel;
a jamb pole; and
a latching device positioned to latch the door panel against the jamb pole when the door panel is in a closed-position, to prohibit the door panel from getting away from the jamb pole and going toward a hoistway.
2. The landing door assembly of claim 1, wherein the latching device includes at least one hook and at least one bracket, either the hook or the bracket being mounted to the door panel, while the other being mounted to the jamb pole,
whereby when the door panel is in a closed-position, the hook is aligned with the bracket and latched thereby.
3. The landing door assembly of claim 2, wherein the hook has a base part, which is mounted to a side surface of the door panel, a neck part, which extends toward the jamb pole from the base part, and a head part, which expands from the neck part, the head part and the neck part being T-shaped, and
the bracket has latching pieces,
whereby when the door panel is in a closed-position, the neck part of the hook is positioned between two adjacent latching pieces, and the head part is latched by the latching pieces.

4. The landing door assembly as in one of claims 1-3, wherein the landing door assembly further comprises an operator frame, which is mounted to a wall of the hoistway above the door panel and has a plate lying horizontally, and at least one supporting member, which is fixed together to the plate of the operator frame and to the wall of the hoistway.

Fig. 1
(Prior Art)

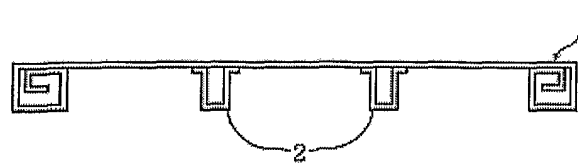


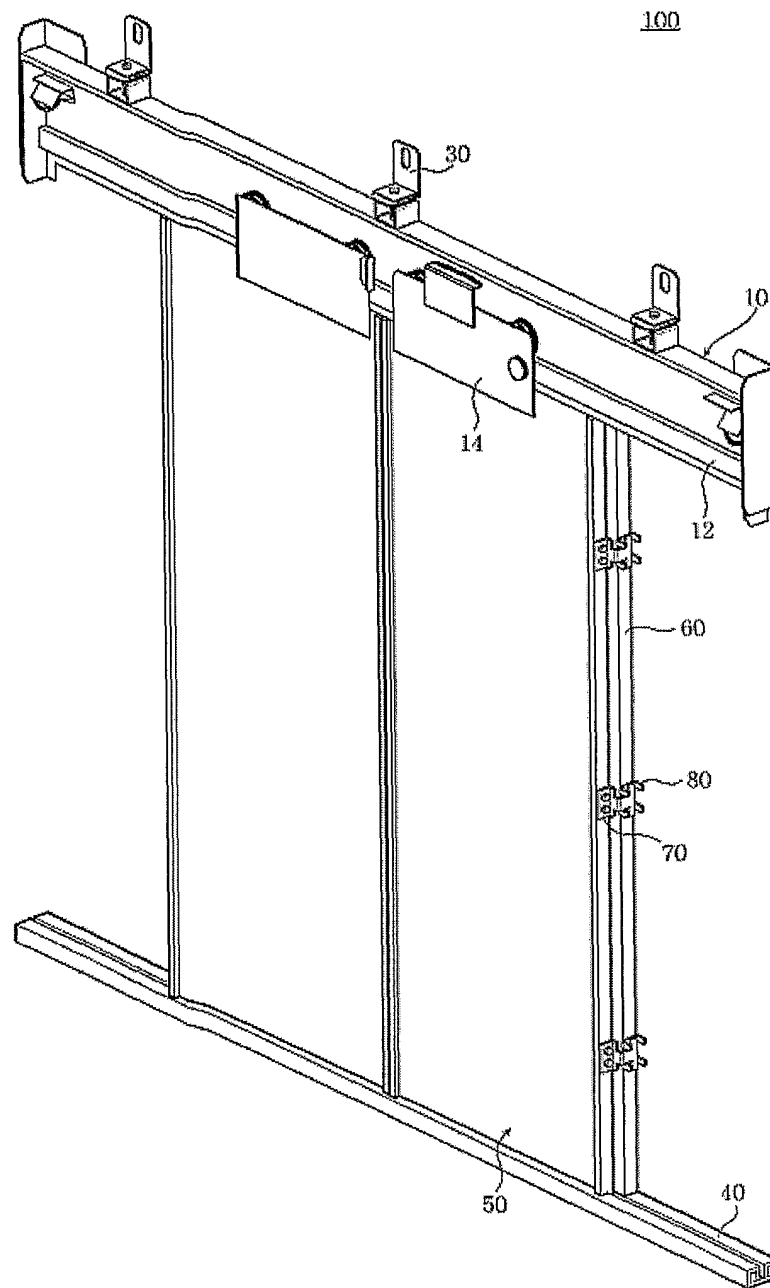
Fig. 2

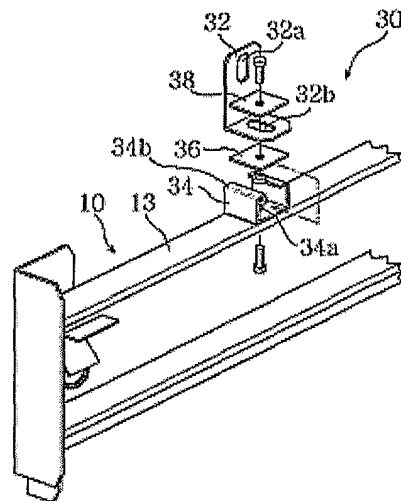
Fig. 3

Fig. 4

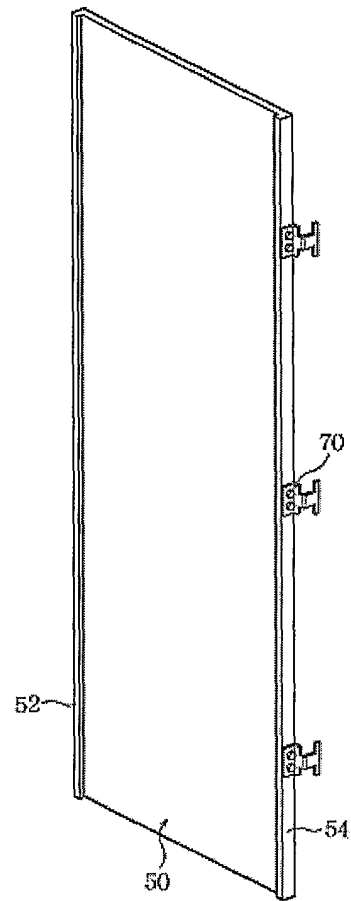


Fig. 5

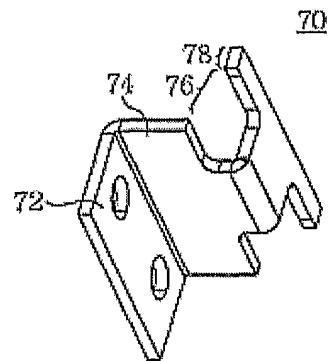


Fig. 6

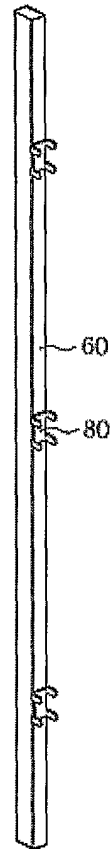


Fig. 7

