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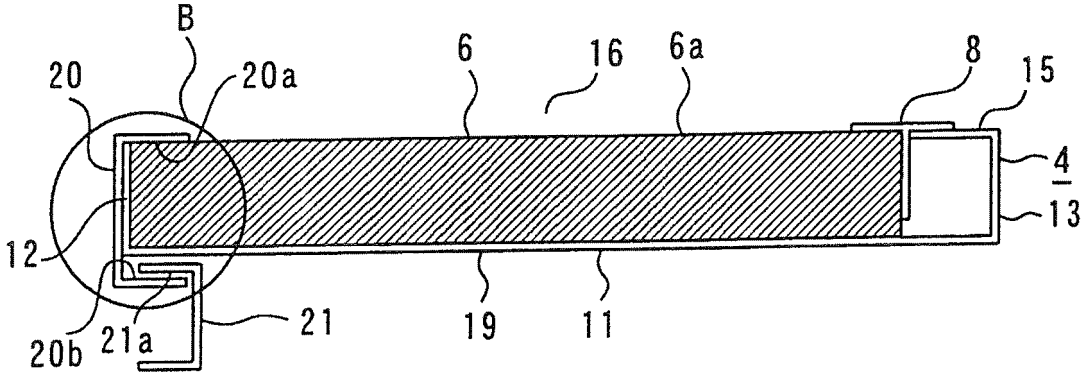
(54) HALL DOOR DEVICE FOR ELEVATOR

(57) There is provided a hall door device for an elevator, capable of restraining the rise in temperature of the back side of a hall door by a simple configuration. For this purpose, an opening having a predetermined width is formed in the back surface of a door panel forming an essential portion of the hall door, and a heat insulating material is arranged on the inside of the door panel through the opening. Both side parts of the heat insulating material are fixed by a first fixing member and a second fixing member in the state in which the back surface of the heat insulating material faces to a shaft via the opening. The first fixing member and the second fixing member each have a first facing surface facing to the end surface in the width direction of the heat insulating material and a second facing surface facing to the side part of the back surface of the heat insulating material from the shaft side, and are fixed to the door panel by welding etc. after being arranged at predetermined positions.

Fig. 4



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Description

Technical Field

[0001] The present invention relates to a hall door device provided at an elevator hall.

Background Art

[0002] A hall entrance formed by a hall jamb erected at an elevator hall and a floor surface of the hall is opened and closed by a hall door provided on the shaft side of hall entrance. Conventionally, there has been proposed a hall door device, in which the hall door is an essential portion, having improved fire resistance and heat insulating properties to prevent a fire occurring on a predetermined floor from spreading to another floor through a shaft.

[0003] Figure 12 is a plan view of a conventional hall door device for an elevator, and Figure 13 is a side view of the conventional hall door device for an elevator. These figures show the conventional hall door device having predetermined fire resistance and heat insulating properties. In Figures 12 and 13 , symbol 1 denotes a side jamb of hall jamb erected at the elevator hall, and 2 denotes an top jamb of hall jamb provided between the upper ends of the right and left side jambs 1. The hall entrance is formed by the hall jamb and a floor surface 3. A hall door 4 for opening and closing the hall entrance has an external shape formed by a door panel having a transverse section of a substantially rectangular tubular shape, and a heat insulating material 6 for improving the heat insulating properties of the hall door 4 is provided in the hollow inner part of the door panel. Also, in the side edge part and the upper edge part of the hall door 4, heat shielding plates 29 and 30 facing to the side jamb 1 and the top jamb 2 of the hall jamb are provided to improve the fire resistance of the hall door 4.

[0004] As another conventional art of the hall door device for an elevator, there has been proposed a hall door device in which heat shielding plates having the same configuration as described above are provided to improve the fire resistance of hall door, and a heat insulating material is interposed between a front plate facing to the hall side of the hall door and a back plate facing to the shaft side of the hall door to improve the heat insulating properties of hall door (for example, refer to Patent Document 1).

Patent Document 1: Japanese Patent Laid-Open No. 4-272086

Disclosure of the Invention

Problems to be Solved by the Invention

[0005] The surface temperature of the back side of hall door is determined by heat transfer in which heat is transferred linearly from the front surface (heated surface) of hall door, that is, in the conventional hall door device shown in Figures 12 and 13 , heat is transferred from the front surface of the hall door 4 to a back plate 31 on the back side via the heat insulating material 6 and heat transfer (heat bridge) in which heat is transferred to the back plate 31 via the door panel, a reinforcing plate (not shown), and the like. Therefore, in the conventional hall door device shown in Figures 12 and 13 , since the door panel forming the external shape of the hall door 4 has a transverse section of a substantially rectangular tubular shape, the heat transfer due to heat bridge cannot be restrained, which poses a problem in that the surface temperature on the back side of the hall door 4 increases.

[0006] Also, in the hall door device described in Patent Document 1, since the heat insulating material is interposed between the front plate and the back plate of hall door, the surface temperature on the back side of hall door can be restrained. However, this device has a problem in that the structure in which the heat insulating material is interposed in the intermediate part is complicated.

[0007] The present invention has been made to solve the above problems, and accordingly an object thereof is to provide a hall door device for an elevator, capable of restraining the rise in temperature on the back side of a hall door by using a simple configuration.

Means for Solving the Problems

[0008] A hall door device for an elevator of the present disclosure is a hall door device for an elevator which opens and closes a hall entrance formed at an elevator hall, comprising a door panel having a front surface part one side surface of which faces to the hall, end surface parts provided on the shaft side from both side parts of the front surface part, and a back surface part provided in at least one of the end surface parts, in which an opening having a predetermined width, which is open on the shaft side, is formed between the back surface part and the other of the end surface parts; a heat insulating material which is arranged on the back side of the front surface part of the door panel from the opening, and the back surface of which faces to the shaft via the opening; and a first fixing member which is provided in the back surface part of the door panel, and has a first facing surface facing to one end surface in the width direction of the heat insulating material and a second facing surface facing to one side part of the back surface of the heat insulating material from the shaft side.

[0009] A hall door device for an elevator of the present invention is a hall door device for an elevator as defined by the appended independent claim. The dependent claims are directed to optional features and preferred embodiments.

Effect of the Invention

[0010] The present invention provides a hall door device for an elevator which is capable of restraining the

rise in temperature on the back side of a hall door by using a simple configuration.

Brief Description of the Drawings

[0011]

Figure 1 is a front view of a hall door device for an elevator.
Figure 2 is a sectional view taken along the line A-A of Figure 1 in a first embodiment of the present invention.
Figure 3 is a detail view of an essential portion of a hall door device for an elevator in the first embodiment of the present invention.
Figure 4 is a sectional view taken along the line A-A of Figure 1 in a second embodiment of the present invention.
Figure 5 is a sectional view showing an assembling state of portion B of the hall door device for an elevator shown in Figure 4 .
Figure 6 is a sectional view taken along the line C-C of Figure 1 in a third embodiment of the present invention.
Figure 7 is a sectional view taken along the line C-C of Figure 1 in a fourth embodiment of the present invention.
Figure 8 is a sectional view taken along the line C-C of Figure 1 in a fifth embodiment of the present invention.
Figure 9 is an enlarged view of portion D in Figure 8 .
Figure 10 is a sectional view taken along the line D-D of Figure 1 in a sixth embodiment of the present invention.
Figure 11 is a sectional view taken along the line D-D of Figure 1 in a seventh embodiment of the present invention.
Figure 12 is a plan view of a conventional hall door device for an elevator.
Figure 13 is a side view of a conventional hall door device for an elevator.

Description of Symbols

[0012] 1 side jamb, 2 top jamb, 3 floor surface, 4 hall door, 5 door panel, 6 heat insulating material, 6a back surface, 6b one end surface, 6c lower end surface, 7 first fixing member,
7a first facing surface, 7b second facing surface,
8 second fixing member, 9 landing sill, 10 guide element, 11 front surface part, 12 end surface part, 13 end surface part,
14 back surface part, 15 back surface part, 16 opening, 17 first plate-shaped part, 18 second plate-shaped part, 19 door panel, 20 first fixing member, 20a first facing surface,
20b second facing surface, 21 fire intercepting material, 21a end part, 22 door panel, 23 first fixing member, 23a first facing surface, 24 first fixing member, 24a first facing surface, 25 first fixing member, 25a first facing surface, 25b second facing surface, 26 fixing member, 26a first facing surface, 26b second facing surface, 27 first fixing member, 28 second fixing member, 29 heat shielding plate, 30 heat shielding plate, 31 back plate

Best Mode for Carrying Out the Invention

[0013] The present invention will now be described in more detail with reference to the accompanying drawings. In the figures, the same symbols are applied to the same or equivalent elements, and duplicate explanation is simplified or omitted appropriately.

First Embodiment

[0014] Figure 1 is a front view of a hall door device for an elevator, Figure 2 is a sectional view taken along the line A-A of Figure 1 in a first embodiment of the present invention, and Figure 3 is a detail view of an essential portion of a hall door device for an elevator in the first embodiment of the present invention. In Figures 1 to 3 , symbol 1 denotes a side jamb of a hall jamb erected at an elevator hall, and 2 denotes an top jamb of hall jamb provided between the upper ends of the right and left side jambs 1. A hall entrance is formed by the hall jamb formed by the side jambs 1, the top jamb 2, and a hall floor surface 3 on which the hall jamb is erected.

[0015] Also, symbol 4 denotes a sliding hall door that is arranged on the shaft side of the hall entrance to open and close the hall entrance. The hall door 4 includes a door panel 5 forming, for example, an essential portion of the hall door 4, a heat insulating material 6 provided on the inside of the door panel 5, a first fixing member 7 and a second fixing member 8 that are provided on the door panel 5 to arrange and fix the heat insulating material 6 at a predetermined position on the inside of the door panel 5, a door hanger (not shown) provided above the door panel 5, and a guide element 10 (not shown in Figures 1 to 3) which is provided under the door panel 5 and the lower end part of which is arranged in a guide groove of a landing sill 9 (not shown in Figures 1 to 3) to guide the opening/closing direction of the hall door 4.

[0016] The door panel 5 has a front surface part 11 one side surface of which faces to the hall and which forms the front surface of the hall door 4, end surface parts 12 and 13 which are provided from both sides of the front surface part 11 toward the shaft side and in which one side surface forms an end surface in the width direction of the hall door 4, and back surface parts 14 and 15 which are provided from the shaft side of the end surface parts 12 and 13 toward the central part side of the hall door 4 and form a part of the back surface of the hall door 4 so that one side surface thereof faces to a shaft. As shown in Figure 2 , the door panel 5 is formed into the above-described predetermined shape, for example, by bending both side parts of one plate-shaped

member substantially into a U shape in plan view. The back surface parts 14 and 15 are formed on both sides of the door panel 5 so as to have only a narrow width, and an opening 16 having a predetermined width, which is open to the shaft side, is formed between the back surface parts 14 and 15 of the door panel 5.

[0017] Also, the heat insulating material 6 takes a predetermined plate shape having a width slightly narrower than the width of the opening 16 and almost the same thickness as the thickness of the door panel 5. The heat insulating material 6 is arranged on the back side of the front surface part 11 of the door panel 5 from the opening 16, and is fixed to the other side surface of the front surface part 11 by bonding etc. A back surface 6a of the heat insulating material 6 is arranged so that almost the whole of the back surface 6a faces to the shaft via the opening 16.

[0018] Also, the first fixing member 7 is provided in one back surface part 14 of the door panel 5, and has, in a part thereof, a first facing surface 7a that faces to one end surface 6b in the width direction of the heat insulating material 6, and a second facing surface 7b that faces to one side part of the back surface 6a of the heat insulating material 6 from the shaft side. On the other hand, the second fixing member 8 is provided in the other back surface part 15 of the door panel 5, and has, in a part thereof, a first facing surface that faces to the other end surface in the width direction of the heat insulating material 6, and a second facing surface that faces to the other side part of the back surface 6a of the heat insulating material 6 from the shaft side. The first facing surface 7a formed on the first fixing member 7 makes contact with one end surface 6b of the heat insulating material 6, and the first facing surface formed on the second fixing member 8 makes contact with the other end surface of the heat insulating material 6, by which the displacement of the heat insulating material 6 in the width direction with respect to the door panel 5 is restrained. Also, the displacement of the heat insulating material 6 in the direction perpendicular to the width direction (hereinafter referred to as "the entrance direction") with respect to the door panel 5 is restrained by the second facing surface 7b formed on the first fixing member 7, the second facing surface formed on the second fixing member 8, and the other side surface of the front surface part 11.

[0019] The first fixing member 7 and the second fixing member 8 each have, for example, a first plate-shaped part 17 and a second plate-shaped part 18 projecting from the center of one side of the first plate-shaped part 17, and is configured so as to have a substantially T-shaped transverse section as a whole. Specifically, as shown in Figure 3 , the above-described predetermined shape is formed, for example, by fixing two flat plates by welding or by fixing two L-shaped plates each having a substantially L-shaped transverse section by welding the back surface to the back surface.

[0020] Also, to surely hold the heat insulating material 6 by bringing the second facing surface 7b formed on the first fixing member 7 into contact with the back surface 6a of the heat insulating material 6 from the shaft side, the configuration may be such that a part of the first fixing member 7 formed with the second facing surface 7b is provided so as to be capable of advancing and retreating in the entrance direction with respect to other parts of the first fixing member 7 fixed to the back surface part 14 so that the heat insulating material 6 having various thicknesses and the dimensional errors of the heat insulating material 6, etc. can be accommodated. The second fixing member 8 can also have the same configuration. In the case where the above-described mechanism is adopted, as an adjusting mechanism for adjusting the position of the second facing surface 7b, for example, a bolt or the like is used.

[0021] For the first fixing member 7, the second plate-shaped part 18 is inserted between the back surface part 14 and one end surface 6b of the heat insulating material 6 from the shaft side, that is, the back side of the hall door 4 until one side part of the first plate-shaped part 17 comes into contact with the back surface part 14, and subsequently one side part of the first plate-shaped part 17 is fixed to the back surface part 14 by welding etc. By being fixed at the above-described position, the first fixing member 7 is arranged so that the second plate-shaped part 18 faces to one end surface 6b of the heat insulating material 6, and the other side part of the first plate-shaped part 17 faces to one side part of the back surface 6a of the heat insulating material 6 from the shaft side. On the other hand, the second fixing member 8 is also fixed in the same way as the first fixing member 7. Specifically, for the second fixing member 8, the second plate-shaped part 18 is inserted between the back surface part 15 and the other end surface of the heat insulating material 6 from the shaft side until one side part of the first plate-shaped part 17 comes into contact with the back surface part 15, and subsequently one side part of the first plate-shaped part 17 is fixed to the back surface part 15 by welding etc. By being fixed at the above-described position, the second fixing member 8 is arranged so that the second plate-shaped part 18 faces to the other end surface of the heat insulating material 6, and the other side part of the first plate-shaped part 17 faces to the other side part of the back surface 6a of the heat insulating material 6 from the shaft side.

[0022] The second plate-shaped part 18 of each of the first fixing member 7 and the second fixing member 8 has a predetermined length shorter than the thickness of the door panel 5, and a predetermined small gap is provided between the second plate-shaped part 18 and the other side surface of the front surface part 11. That is to say, the first fixing member 7 and the second fixing member 8 are fixed to the back surface parts 14 and 15, respectively, so as not to make contact with the front surface part 11 to prevent heat from being transferred directly from the front surface part 11.

[0023] According to the first embodiment of the present invention, the hall door 4 is configured so that the opening

16 is formed on the back side of the door panel 5, and the back surface 6a of the heat insulating material 6 faces directly to the shaft. Therefore, unlike the conventional example, the heat from the front surface part 11 of the door panel 5 does not reach the back surface 6a side of the heat insulating material 6 through the door panel, so that the rise in temperature of the back surface of the hall door 4 is restrained, and therefore the heat insulation effect can be improved significantly.

[0024] Also, the horizontal displacement of the heat insulating material 6 with respect to the door panel 5 can be restrained by the first fixing member 7 and the second fixing member 8. Therefore, when the hall door 4 is opened or closed, the change in arrangement of the heat insulating material 6 or the coming-off of the heat insulating material 6 from the door panel 5 can be prevented surely.

[0025] The arranging and fixing of the heat insulating material 6 are completed merely by inserting the first fixing member 7 and the second fixing member 8 at the predetermined position from the back surface side of the door panel 5 and fixing the fixing members 7 and 8 to the back surface parts 14 and 15, respectively, after the heat insulating material 6 has been arranged at the predetermined position on the inside of the door panel 5. Therefore, the above-described effect can be achieved without making the configuration of the hall door 4 complicated, and also the assembling ability of the hall door 4 can be improved.

[0026] In the first embodiment, the method for fixing both end parts in the width direction of the heat insulating material 6 by using the first fixing member 7 and the second fixing member 8 has been explained. However, if of both end parts of the heat insulating material 6, at least either one end part is fixed by the first fixing member 7 or the second fixing member 8, the same effects as described above can be achieved. For example, in the case where the heat insulating material 6 is fixed by using the second fixing member 8 only, after the heat insulating material 6 having a width slightly greater than the width of the opening 16 has been arranged in the door panel 5, the second fixing member 8 has only to be fixed to the back surface part 15 of the door panel 5 by the same fixing method as described above. In such a case, one end surface 6b of the heat insulating material 6 is arranged in a U-shaped part formed by the front surface part 11, the end surface part 12, and the back surface part 14 of the door panel 5, and is provided so as to be in contact oppositely with the other side surface of the end surface part 12.

[0027] Also, for a car door for closing a car entrance formed on an elevator car as well, the same effects can be achieved by the same configuration as described above.

Second Embodiment

[0028] Figure 4 is a sectional view taken along the line A-A of Figure 1 in a second embodiment of the present invention, and Figure 5 is a sectional view showing an assembling state of portion B of the hall door device for an elevator shown in Figure 4 . In Figures 4 and 5 , the hall door 4 includes a door panel 19 forming an essential portion of the hall door 4, the heat insulating material 6, and a first fixing member 20 and the second fixing member 8 that are provided on the door panel 19 to arrange and fix the heat insulating material 6 at a predetermined position on the inside of the door panel 19.

[0029] The door panel 19 has the front surface part 11, the end surface parts 12 and 13, and the back surface part 15 provided in one end surface part 13 only. The end surface part 12 is formed so that the thickness (the projection length to the shaft side) thereof is approximately equal to the thickness of the heat insulating material 6. Also, as shown in Figure 4 , the door panel 19 is formed into the above-described predetermined shape, for example, by bendingly forming one end part of one plate-shaped member into an L shape in plan view and the other end part thereof into a U shape in plan view. The opening 16 having a predetermined width, which is open to the shaft side, is formed between the end surface part 12 and the back surface part 15 of the door panel 19.

[0030] The heat insulating material 6 takes a predetermined plate shape having a width slightly narrower than the width of the opening 16 and almost the same thickness as the thickness of the end surface part 12. The heat insulating material 6 is arranged on the back side of the front surface part 11 of the door panel 19 from the opening 16, and is fixed to the other side surface of the front surface part 11 by bonding etc. One end surface 6b in the width direction of the heat insulating material 6 is arranged so as to face to the back side of the end surface part 12 and make contact with the other side surface, and the back surface 6a is arranged so that almost the whole of the back surface 6a faces to the shaft via the opening 16.

[0031] Also, the first fixing member 20 is provided in the other end surface part 12 of the door panel 5, and has, in a part thereof, a first facing surface 20a that makes contact opposedly with one side part of the back surface 6a of the heat insulating material 6 from the shaft side, and a second facing surface 20b that faces to a fire intercepting material 21 provided on the side jamb 1 of the hall jamb with a predetermined gap being provided when the door is closed. The displacement of the heat insulating material 6 in the width direction with respect to the door panel 5 is restrained by one side surface of the end surface part 12 and the first facing surface formed on the second fixing member 8, and the displacement of the heat insulating material 6 in the entrance direction with respect to the door panel 5 is restrained by the first facing surface 20a formed on the first fixing member 20, the second facing surface formed on the second fixing member 8, and the other side surface of the front surface part 11.

[0032] The first fixing member 20 is formed, for exam-

ple, by a plate-shaped member substantially having a U shape in plan view, and the second facing surface 20b thereof is arranged almost in parallel with one side surface of the front surface part 11 with a predetermined gap being provided. Also, the fire intercepting material 21 is bendingly formed substantially into an L shape in plan view so that an end part 21a on the hall door 4 side projects toward the anti entrance side, and the end part 21a is arranged between the second facing surface 20b formed on the first fixing member 20 and one side surface of the front surface part 11. That is to say, the hall door 4 and the side jamb 1 have a door pocket shiplap construction having predetermined heat insulating properties. Other configurations are the same as those of the first embodiment.

[0033] According to the second embodiment of the present invention, two functions of the fixing of the heat insulating material 6 and the door pocket shiplap construction are provided by the first fixing member 20, so that in addition to the same effects as those of the first embodiment, an effect of improving the heat insulating properties between the hall door 4 and the side jamb 1 can be achieved by the simple configuration.

Third Embodiment

[0034] Figure 6 is a sectional view taken along the line C-C of Figure 1 in a third embodiment of the present invention. In Figure 6 , the hall door 4 includes a door panel 22 forming an essential portion of the hall door 4, the heat insulating material 6, and a first fixing member 23 and the second fixing member 8 that are provided on a door panel 22 to arrange and fix the heat insulating material 6 at a predetermined position on the inside of the door panel 22.

[0035] The door panel 22 has the front surface part 11, the end surface parts 12 and 13, and the back surface parts 14 and 15, and is formed so that the thickness of the end surface part 13 is smaller than the thickness of the end surface part 12. That is to say, the third embodiment shows a case where the door thickness of the door panel 22 is different between both side parts. Also, the heat insulating material 6 takes a predetermined plate shape having a width greater than the width of the opening 16 formed between both of the back surface parts 14 and 15 and almost the same thickness as the thickness of the end surface part 13. The heat insulating material 6 is arranged on the back side of the front surface part 11 of the door panel 22 from the opening 16, and is fixed to the other side surface of the front surface part 11 by bonding etc. One end surface 6b in the width direction of the heat insulating material 6 is arranged in the U-shaped part formed by the front surface part 11, the end surface part 12, and the back surface part 14 of the door panel 5, and arranged so as to face to the back side of the end surface part 12 and make contact with the other side surface.

[0036] The first fixing member 23 is provided in the end surface part 12 and the back surface part 14 on the inside of the door panel 22, and has, in a part thereof, a first facing surface 23a that makes contact opposedly with one side part of the back surface 6a of the heat insulating material 6 from the shaft side. The deformation of the heat insulating material 6 in the width direction with respect to the door panel 22 is restrained by the other side surface of the end surface part 12 and the first facing surface formed on the second fixing member 8, and the deformation of the heat insulating material 6 in the entrance direction with respect to the door panel 22 is restrained by the first facing surface 23a formed on the first fixing member 23, the second facing surface formed on the second fixing member 8, and the other side surface of the front surface part 11.

[0037] The first fixing member 23 is formed, for example, by a plate-shaped member substantially having a U shape in plan view, and when the door is closed, the end part 21a of the fire intercepting material 21 is arranged in the U-shaped part of the first fixing member 23. That is to say, the hall door 4 and the fire intercepting material 21 arranged on the shaft side of the hall door 4 have a shiplap construction having predetermined heat insulating properties. Other configurations are the same as those of the first embodiment.

[0038] According to the third embodiment of the present invention, by providing the first fixing member 23, the heat insulating material 6 can be fixed surely even in the case where the door thickness of the door panel 22 is different between both side parts. Also, by providing the shiplap construction between the hall door 4 and the fire intercepting material 21, the heat insulating properties between the hall door 4 and the shaft-side structure can be improved by a simple configuration. Other effects achieved are the same as those of the first embodiment.

Fourth Embodiment

[0039] Figure 7 is a sectional view taken along the line C-C of Figure 1 in a fourth embodiment of the present invention. In Figure 7 , the hall door 4 includes the door panel 22 forming an essential portion of the hall door 4, the heat insulating material 6, and a first fixing member 24 and the second fixing member 8 that are provided on the door panel 22 to arrange and fix the heat insulating material 6 at a predetermined position on the inside of the door panel 22. The fourth embodiment, like the third embodiment, shows the case where the door thickness of the door panel 22 is different between both side parts.

[0040] The first fixing member 24 substantially has a Z shape in plan view, and is provided in the back surface part 14 of the door panel 22. Also, the first fixing member 24 has, in a part thereof, a first facing surface 24a that makes contact opposedly with one side part of the back surface 6a of the heat insulating material 6 from the shaft side. By providing such a configuration as well, as in the third embodiment, the heat insulating material 6 can be fixed surely by a simple configuration even in the case

where the door thickness of the door panel 22 is different between both side parts. Other configurations and effects are the same as those of the third embodiment.

Fifth Embodiment

[0041] Figure 8 is a sectional view taken along the line C-C of Figure 1 in a fifth embodiment of the present invention, and Figure 9 is an enlarged view of portion D in Figure 8 . In Figures 8 and 9 , the hall door 4 includes the door panel 22 forming an essential portion of the hall door 4, the heat insulating material 6, and a first fixing member 25 and the second fixing member 8 that are provided on the door panel 22 to arrange and fix the heat insulating material 6 at a predetermined position on the inside of the door panel 22. The fifth embodiment, like the third embodiment, shows the case where the door thickness of the door panel 22 is different between both side parts.

[0042] The heat insulating material 6 takes a predetermined plate shape having a width slightly narrower than the width of the opening 16, which is formed between the back surface parts 14 and 15, and almost the same thickness as the thickness of the end surface part 13. Also, the first fixing member 25 is provided in the back surface part 14 of the door panel 22, and has, in a portion thereof, a first facing surface 25a that makes contact opposedly with the one end surface 6b of the heat insulating material 6 and a second facing surface 25b that makes contact opposedly with one side part of the back surface 6a of the heat insulating material 6 from the shaft side. As shown in Figure 9 , the first fixing member 25 is formed into a predetermined shape, for example, by fixing a flat plate by welding onto one side surface of an L-shaped plate having an L shape in plan view or by fixing two L-shaped plates having different sizes by welding the back surface to the back surface.

[0043] Also, to surely hold the heat insulating material 6 by bringing the second facing surface 25b formed on the first fixing member 25 into contact with the back surface 6a of the heat insulating material 6 from the shaft side, the configuration may be such that a part of the first fixing member 25 formed with the second facing surface 25b is provided so as to be capable of advancing and retreating in the entrance direction with respect to other parts of the first fixing member 25 fixed to the back surface part 14 so that the heat insulating material 6 having various thicknesses and the dimensional errors of the heat insulating material 6, etc. can be accommodated. In the case where the above-described mechanism is adopted, as an adjusting mechanism for adjusting the position of the second facing surface 25b, for example, a bolt or the like is used.

[0044] By providing such a configuration, as in the third and fourth embodiments, the heat insulating material 6 can be fixed surely by a simple configuration even in the case where the door thickness of the door panel 22 is different between both side parts. Other configurations and effects are the same as those of the first embodiment.

Sixth Embodiment

[0045] Figure 10 is a sectional view taken along the line D-D of Figure 1 in a sixth embodiment of the present invention. In Figure 10 , symbol 26 denotes a fixing member provided in the lower end part of the front surface part 11 of the door panel 5, which is arranged under the heat insulating material 6 arranged on the back side of the front surface part 11 of the door panel 5 through the opening 16. The fixing member 26 has, in a part thereof, a first facing surface 26a that makes contact opposedly with a lower end surface 6c of the heat insulating material 6 from the downside and a second facing surface 26b that faces to the lower end part of the back surface 6a of the heat insulating material 6 from the shaft side with a predetermined gap being provided, and is formed, for example, by a plate-shaped member substantially having a Z shape in side view.

[0046] According to the sixth embodiment of the present invention, by the simple configuration, the displacement of the heat insulating material 6 in the up and down direction with respect to the door panel 5 can be restrained in the state in which the large opening 16 is formed on the back side of the door panel 5. Other configurations and effects are the same as those of any of the first to fifth embodiments.

Seventh Embodiment

[0047] Figure 11 is a sectional view taken along the line D-D of Figure 1 in a seventh embodiment of the present invention. In Figure 11 , symbol 27 denotes a first fixing member substantially having a Z shape in side view, which is provided in the lower part of the other side surface of the front surface part 11 of the door panel 5, and 28 denotes a second fixing member substantially having an L shape in side view, which is fixed to the first fixing member 27 on the shaft side of the heat insulating material 6 and is extended to the front surface part 11 side so that the tip end part does not come into contact with the other side surface of the front surface part 11. By the first fixing member 27 and the second fixing member 28, the fixing member 26 in the sixth embodiment is formed, and the first facing surface 26a and the second facing surface 26b are formed in a part of the second fixing member 28. Also, the first fixing member 27 is provided so as to be not in contact with the heat insulating material 6.

[0048] By providing such a configuration, the heat from the front surface part 11 can be prevented from being transferred directly to the second fixing member 28 formed with the first facing surface 26a, and the heat insulating properties can be improved further. Other configurations and effects are the same as those of the sixth embodiment.

Industrial Applicability

[0049] As described above, according to the hall door device for an elevator in accordance with the present invention, the configuration is such that the opening is formed in the back surface of the hall door, and hence the heat insulating material provided on the inside of the door panel faces directly to the shaft. Therefore, the rise in temperature of the back surface of the hall door can be restrained, and the heat insulating properties can be improved. Also, since the heat insulating material can be fixed easily and surely by the fixing members each having the predetermined shape, the construction can be simplified and the assembling ability can be improved. The following numbered paragraphs also form part of the disclosure:

1. A hall door device for an elevator, which opens and closes a hall entrance formed at an elevator hall, characterized by comprising:

a door panel having a front surface part one side surface of which faces to the hall, end surface parts provided on the shaft side from both side parts of the front surface part, and a back surface part provided in at least one of the end surface parts, in which an opening having a predetermined width, which is open on the shaft side, is formed between the back surface part and the other of the end surface parts;
a heat insulating material which is arranged on the back side of the front surface part of the door panel from the opening, and the back surface of which faces to the shaft via the opening; and
a first fixing member which is provided in the back surface part of the door panel, and has a first facing surface facing to one end surface in the width direction of the heat insulating material and a second facing surface facing to one side part of the back surface of the heat insulating material from the shaft side.

2. A hall door device for an elevator, which opens and closes a hall entrance formed at an elevator hall, characterized by comprising:

a door panel having a front surface part one side surface of which faces to the hall, end surface parts provided on the shaft side from both side parts of the front surface part, and back surface parts provided in the end surface parts, in which an opening having a predetermined width, which is open on the shaft side, is formed between the back surface parts;
a heat insulating material which is arranged on the back side of the front surface part of the door panel from the opening, and the back surface of which faces to the shaft via the opening;
a first fixing member which is provided in one back surface part of the door panel, and has a first facing surface facing to one end surface in the width direction of the heat insulating material and a second facing surface facing to one side part of the back surface of the heat insulating material from the shaft side; and
a second fixing member which is provided in the other back surface part of the door panel, and has a first facing surface facing to the other end surface in the width direction of the heat insulating material and a second facing surface facing to the other side part of the back surface of the heat insulating material from the shaft side.

3. The hall door device for an elevator according to 1 or 2, characterized in that
the first fixing member and the second fixing member each have a T-shaped transverse section including:

a first plate-shaped part; and
a second plate-shaped part projecting from the center part of one side of the first plate-shaped part, and

one side part of the first plate-shaped part is provided in the back surface part of the door panel from the shaft side, the second plate-shaped part faces
to the end surface in the width direction of the heat insulating material, and the other
side part of the first plate-shaped part faces to the side part of the back surface of
the heat insulating material from the shaft side.

4. The hall door device for an elevator according to 1 or 2, characterized in that
the thickness of one of the end surface parts of the door panel is smaller than the thickness of the other of the end surface parts, and
the heat insulating material has a fixed thickness smaller than the thickness of the one of the end surface parts of the door panel.

5. A hall door device for an elevator, which opens and closes a hall entrance formed at an elevator hall, characterized by comprising:

a door panel having a front surface part one side surface of which faces to the hall, end surface parts provided on the shaft side from both side parts of the front surface part, and a back surface part provided in one end surface part, in which an opening having a predetermined width, which is open on the shaft side, is formed between the back surface part and the other end surface part;
a heat insulating material which is arranged on the back side of the front surface part of the door panel from the opening, one end surface in the

width direction of which faces to the back side of the other end surface part of the door panel, and the back surface of which faces to the shaft via the opening;

a first fixing member which is provided in the other end surface part of the door panel, and has a first facing surface facing to one side part of the back surface of the heat insulating material and a second facing surface that faces to a hall jamb with a predetermined gap being provided when the door is closed; and

a second fixing member which is provided in the back surface part of the door panel, and has a first facing surface facing to the other end surface in the width direction of the heat insulating material and a second facing surface facing to the other side part of the back surface of the heat insulating material from the shaft side.

6. A hall door device for an elevator, which opens and closes a hall entrance formed at an elevator hall, characterized by comprising:

a door panel having a front surface part one side surface of which faces to the hall, end surface parts provided on the shaft side from both side parts of the front surface part, and back surface parts provided in the end surface parts, in which an opening having a predetermined width, which is open on the shaft side, is formed between the back surface parts, and in which the thickness of one end surface part is smaller than the thickness of the other end surface part;

a heat insulating material which has a fixed thickness smaller than the thickness of the one end surface part of the door panel and is arranged on the back side of the front surface part of the door panel from the opening, one end surface in the width direction of which faces to the back side of the other end surface part of the door panel, and the back surface of which faces to the shaft via the opening;

a first fixing member which is provided in one back surface part provided in the other end surface part of the door panel, and has a first facing surface facing to one side part of the back surface of the heat insulating material from the shaft side; and

a second fixing member which is provided in the other back surface part provided in the one end surface part of the door panel, and has a first facing surface facing to the other end surface in the width direction of the heat insulating material and a second facing surface facing to the other side part of the back surface of the heat insulating material from the shaft side.

7. The hall door device for an elevator according to 5 or 6, characterized in that
the second fixing member has a T-shaped transverse section including:

a first plate-shaped part; and

a second plate-shaped part projecting from the center part of one side of the first plate-shaped part, and

one side part of the first plate-shaped part is provided in the back surface part
of the door panel from the shaft side, the second plate-shaped part faces to the end surface in the width direction of the heat insulating material, and the other side part of the first plate-shaped part faces to the side part of the back surface of the heat insulating material from the shaft side.

8. The hall door device for an elevator according to any one of 1 to 7,
characterized in that
the first fixing member and the second fixing member each have a predetermined gap between the fixing member and the front surface part of the door panel, and are not in contact with the front surface part.

9. A hall door device for an elevator, which opens and closes a hall entrance formed at an elevator hall, characterized by comprising:

a door panel having a front surface part one side surface of which faces to the hall, end surface parts provided on the shaft side from both side parts of the front surface part, and a back surface part provided in at least one of the end surface parts, in which an opening having a predetermined width, which is open on the shaft side, is formed between the back surface part and the other of the end surface parts;

a heat insulating material which is arranged on the back side of the front surface part of the door panel from the opening, and the back surface of which faces to the shaft via the opening; and

a fixing member which is provided in the lower part of the other side surface of the front surface part of the door panel, and has a first facing surface facing to the lower end surface of the heat insulating material and a second facing surface facing to the lower end part of the back surface of the heat insulating material from the shaft side.

10. The hall door device for an elevator according to 9, characterized in that the fixing member comprises:

a first fixing member provided in the lower part of the other side surface of the front surface part of the door panel; and

a second fixing member which is provided on the first fixing member so as not to be in contact with the front surface part of the door panel, and

has at least a first facing surface.

Claims

1. A hall door device for an elevator, which opens and closes a hall entrance formed at an elevator hall, **characterized by** comprising:

a door panel (5) having a front surface part (11) one side surface of which faces to the hall, end surface parts (12, 13) provided on the shaft side from both side parts of the front surface part (11), and a back surface part (14 or 15) provided in at least one of the end surface parts (12,13), in which an opening (16) having a predetermined width, which is open on the shaft side, is formed between the back surface part (14 or 15) and the other of the end surface parts (12,13);
a heat insulating material (6) which is arranged on the back side of the front surface part (11) of the door panel (5) from the opening (16), and the back surface (6a) of which faces to the shaft via the opening (16); and
a fixing member (26) which is provided in the lower part of the other side surface of the front surface part (11) of the door panel (5), and has a first facing surface (26a) facing to the lower end surface (6c) of the heat insulating material (6) and a second facing surface (26b) facing to the lower end part of the back surface (6a) of the heat insulating material (6) from the shaft side.

2. The hall door device for an elevator according to claim 1, **characterized in that** the fixing member (26) comprises:

a first fixing member (27) provided in the lower part of the other side surface of the front surface part (11) of the door panel (5); and
a second fixing member (28) which is provided on the first fixing member (27) so as not to be in contact with the front surface part (11) of the door panel (5), and has at least a first facing surface (26a).

Fig. 1

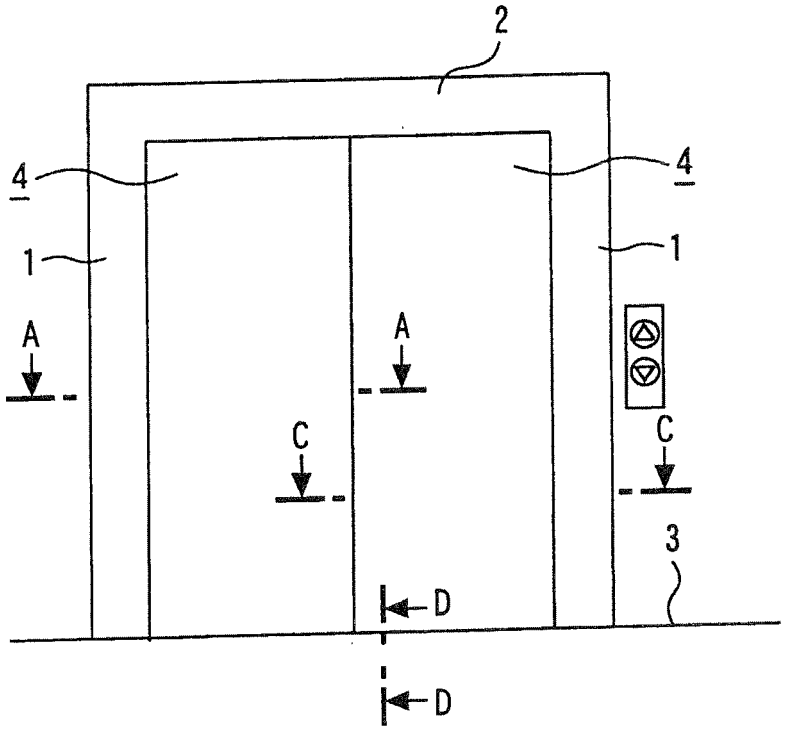


Fig. 2

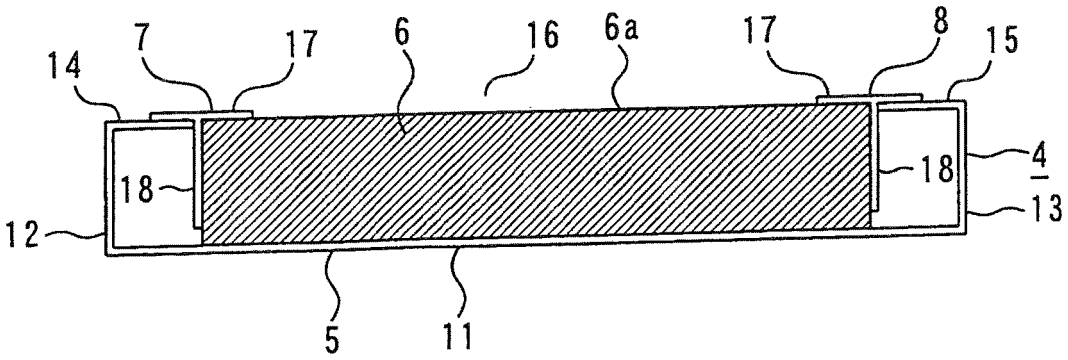


Fig. 3

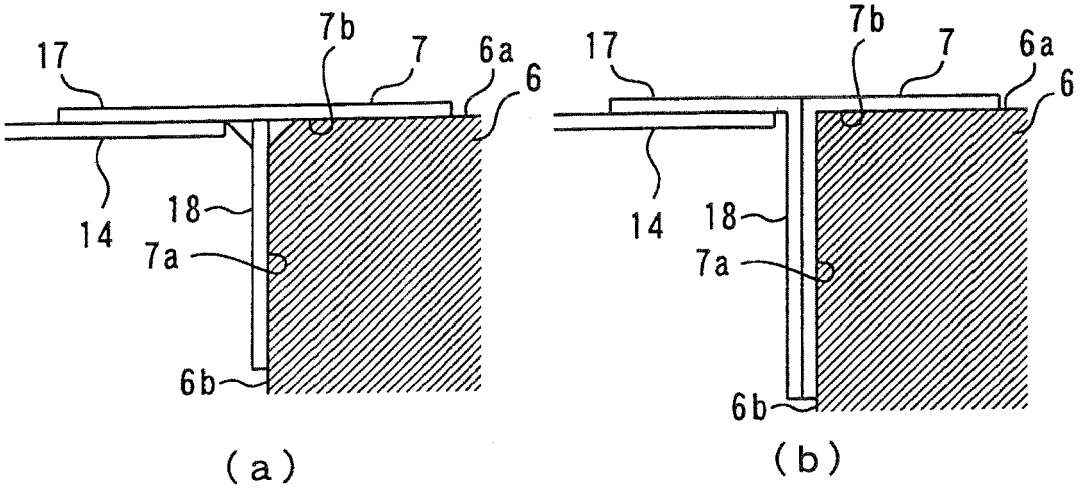


Fig. 4

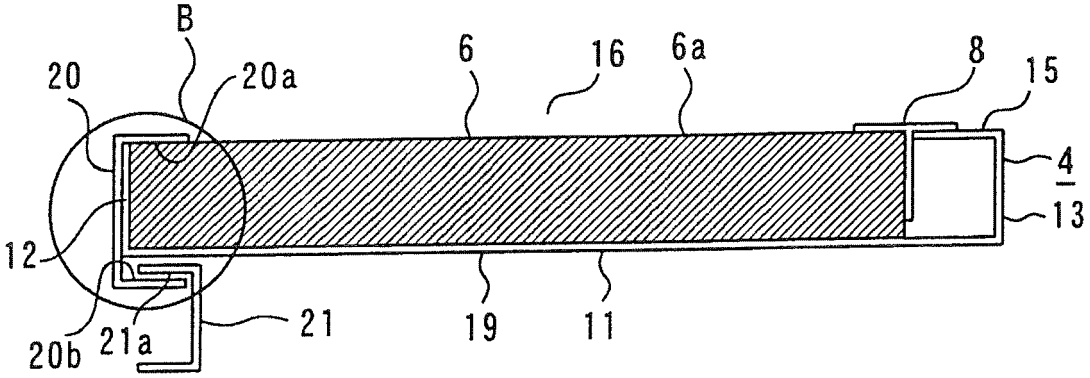


Fig. 5

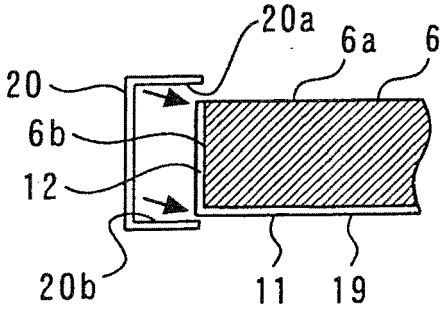


Fig. 6

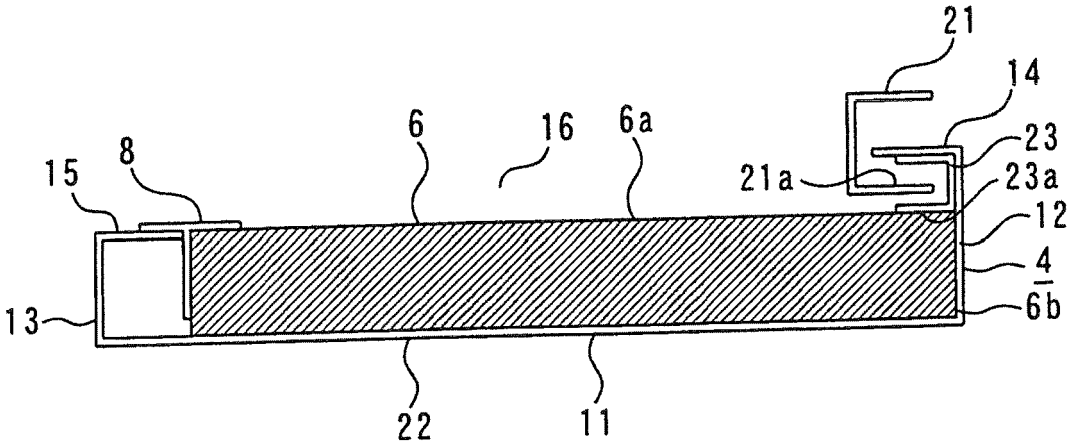

21
14
6
16
6a
23
15
8
21a
23a
12
4
13
6b
22
11

Fig. 7

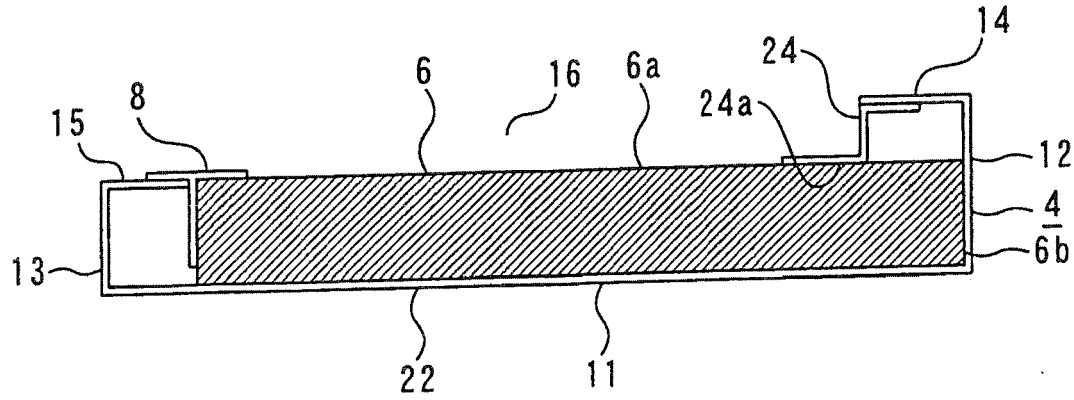

14
24
6
16
6a
8
24a
15
12
4
13
6b
22
11

Fig. 8

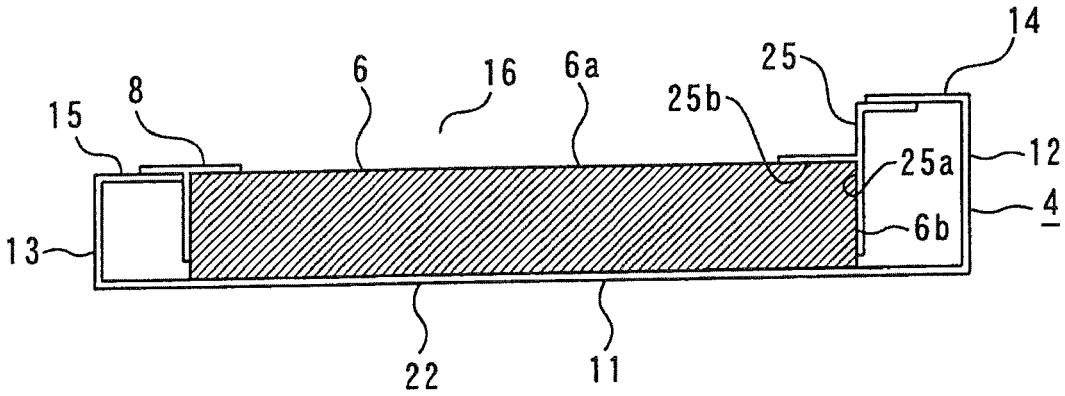
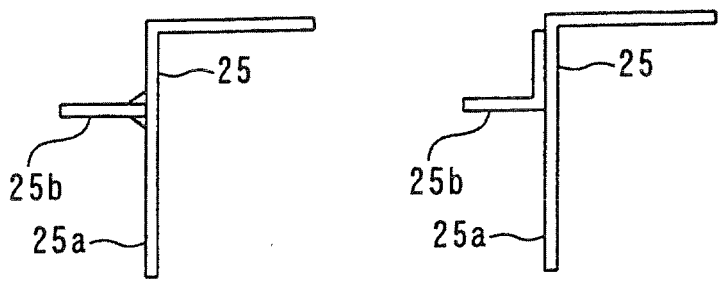


Fig. 9



(a) (b)

Fig. 10

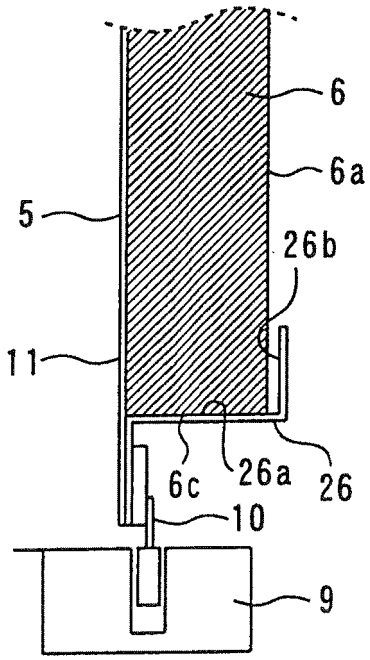


Fig. 11

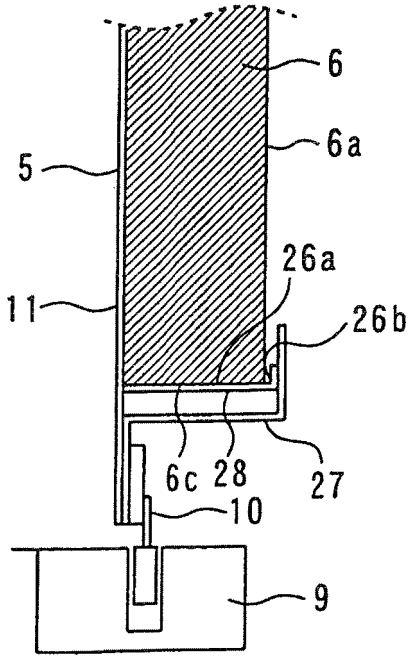


Fig. 12

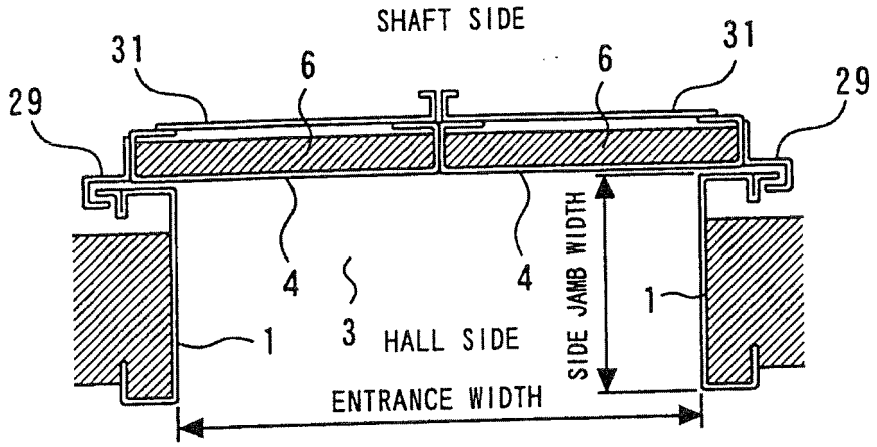
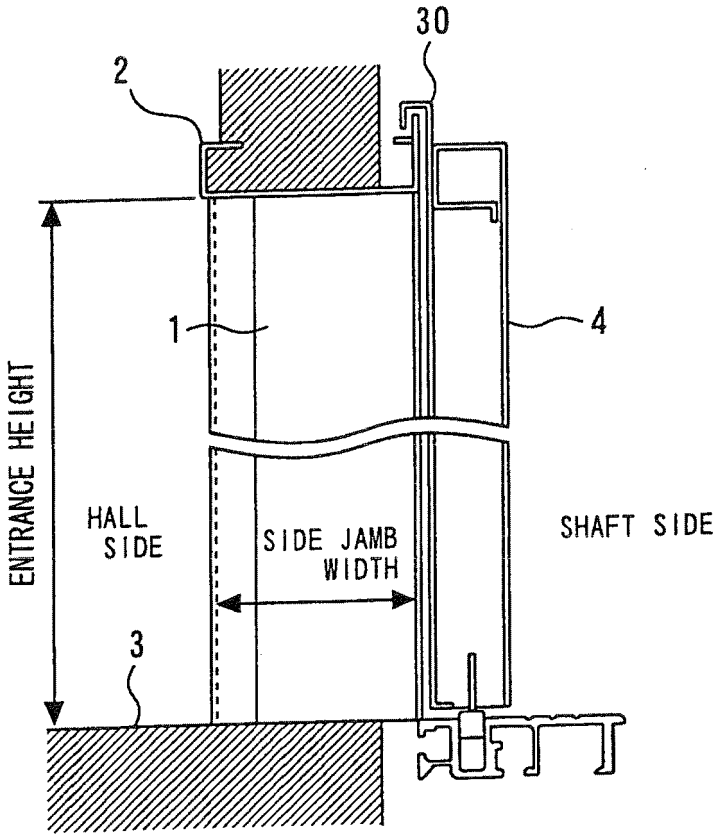

SHAFT SIDE
31
6
6
31
29
29
4
4
3
HALL SIDE
SIDE JAMB WIDTH
1
1
ENTRANCE WIDTH

Fig. 13


30
2
1
4
ENTRANCE HEIGHT
HALL SIDE
SIDE JAMB WIDTH
SHAFT SIDE
3

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EUROPEAN SEARCH REPORT

Application Number
EP 18 16 3305

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TECHNICAL FIELDS SEARCHED (IPC)
B66B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	31 May 2018	Nelis, Yves

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