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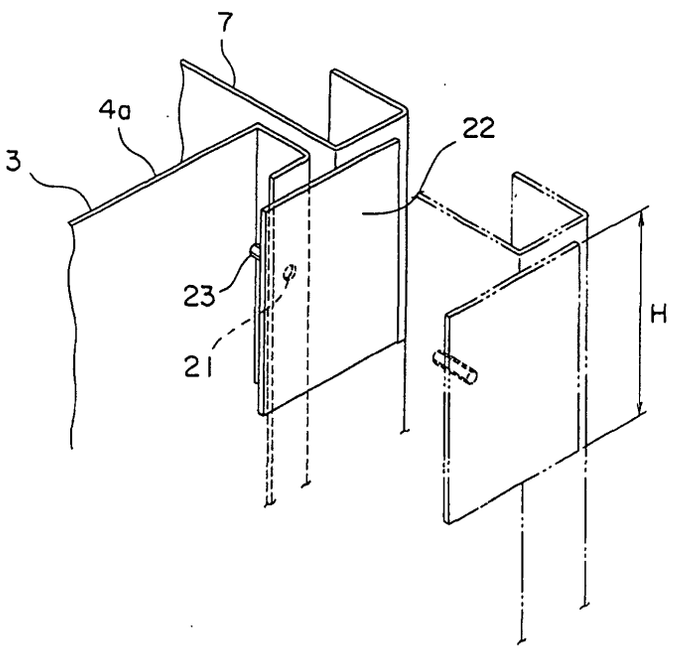
(54) LANDING STAGE DOOR OF ELEVATOR

(57) An elevator landing door apparatus is provided, in which a fire prevention member opposing a vertical frame in a door-closed state is partially disposed and secured in an upper portion of a door-opening side end portion of a landing door. A hole is provided in one of the vertical frame and the fire prevention member. An insert portion inserted into the hole in the door-closed state and restricting deformation of the landing door toward a hoistway side is provided in the other of the vertical frame and the fire prevention member.

FIG. 2



EP 1 496 005 A1

Description

Technical Field

[0001] The present invention relates to an elevator landing door apparatus having a fire prevention structure.

Background Art

[0002] Fig. 12 is a sectional view showing an example of a conventional elevator landing door apparatus, and Fig. 13 is a sectional view taken along a line XIII-XIII of Fig. 12.

[0003] In the drawing, a landing wall 1 of a building is equipped with a landing doorway 2. The landing doorway 2 is formed by a jamb 3 as a frame body. The jamb 3 has a pair of vertical frames 4a and 4b extending vertically, and a top frame 4c provided between upper portions of the vertical frames 4a and 4b and extending horizontally. A vertical frame fire prevention member 6 L-shaped in section is fixed to a hoistway 5 side end portion of each of the vertical frames 4a and 4b.

[0004] The landing doorway 2 is opened and closed by a pair of landing doors 7. Fixed to a door-opening side end portion of each landing door 7 is a door side fire prevention member 8 which opposes the vertical frame fire prevention member 6 in a door-closed state. The vertical frame fire prevention members 6 and the door side fire prevention members 8 extend vertically over the entire vertical length of the landing doors 7 (in the vertical direction of Fig. 13).

[0005] Fixed to the hoistway 5 side end portion of the top frame 4c is a top frame fire prevention member 9 L-shaped in section and extending horizontally. Fixed to an upper end portion of each landing door 7 is a door upper portion fire prevention member 10 opposing the top frame fire prevention member 9 in the door-closed state.

[0006] A landing sill 11 is provided in a floor portion of the landing doorway 2. Provided to a lower end portion of each landing door 7 is a door leg 12 inserted into the landing sill 11.

[0007] Such a landing door apparatus has a so-called ship-lap structure, in which the door side fire prevention members 8 oppose the vertical frame fire prevention members 6 and in which the door upper portion fire prevention member 10 opposes the top frame fire prevention member 9. Further, when warpage is generated in the landing doors 7 by fire, the door side fire prevention members 8 are engaged with the vertical frame fire prevention members 6, and the door upper portion fire prevention member 10 is engaged with the top frame fire prevention member 9, thereby preventing the landing doors 7 from getting out of place. Due to this construction, the requisite fire prevention performance is provided.

[0008] The above-described fire prevention structure can be easily applied to a new landing door apparatus. However, to apply the structure to an existing landing door apparatus, it is necessary to replace all of the jamb 3 and the landing doors 7 or perform a large-scale additional installation work, resulting in an increase in time, labor, and cost. Further, even when the structure is applied to a new elevator, due to the large length of the fire prevention members 8, it takes time and labor to perform installation and adjustment.

Disclosure of the Invention

[0009] The present invention has been made with a view toward solving the above problems in the prior art. It is an object of the present invention to provide an elevator landing door apparatus which easily allows addition of a fire prevention structure to landing doors.

[0010] To this end, according to one aspect of the present invention, there is provided an elevator landing door apparatus comprising:

> a frame body which has a vertical frame extending vertically and forms a landing doorway; and a landing door for opening and closing the landing doorway, wherein a fire prevention member opposing the vertical frame in a door-closed state is partially disposed and secured in an upper portion of a door-opening side end portion of the landing door, a hole is provided in one of the vertical frame and the fire prevention member, and an insert portion inserted into the hole in the door-closed state and restricting deformation of the landing door toward a hoistway side is provided in the other of the vertical frame and the fire prevention member.

[0011] According to another aspect of the present invention, there is provided an elevator landing door apparatus comprising: a frame body which has a vertical frame extending vertically and forms a landing doorway; and a landing door for opening and closing the landing doorway, wherein a door fire prevention member having a first opposing surface extending parallel to a door opening/closing direction of the landing door is partially disposed and secured in an upper portion of a door-opening side end portion of the landing door, a fixing member is fixed to the vertical frame, and a vertical frame fire prevention member is mounted to a vertical frame through the intermediation of the fixing member, the vertical frame fire prevention member has a second opposing surface, and the first opposing surface opposes the second opposing surface in a door-closed state, whereby deformation of the landing door toward a hoistway side is restricted.

Brief Description of the Drawings

[0012]

Fig. 1 is a sectional view of an elevator landing door apparatus according to Embodiment Mode 1 of the present invention;
Fig. 2 is a perspective view showing a main portion of Fig. 1;
Fig. 3 is a sectional view of an elevator landing door apparatus according to Embodiment Mode 2 of the present invention;
Fig. 4 is a perspective view showing a main portion of Fig. 3;
Fig. 5 is a sectional view of an elevator landing door apparatus according to Embodiment Mode 3 of the present invention;
Fig. 6 is a perspective view showing a main portion of Fig. 5;
Fig. 7 is a sectional view of an elevator landing door apparatus according to Embodiment Mode 4 of the present invention;
Fig. 8 is a perspective view showing a main portion of Fig. 7;
Fig. 9 is a sectional view of an elevator landing door apparatus according to Embodiment Mode 5 of the present invention;
Fig. 10 is a perspective view showing a main portion of Fig. 9;
Fig. 11 is an exploded perspective view of a vertical frame and a vertical frame fire prevention member of Fig. 10;
Fig. 12 is a sectional view showing an example of a conventional elevator landing door apparatus; and
Fig. 13 is a sectional view taken along a line XIII-XIII of Fig. 12.

Best Mode for carrying out the Invention

[0013] Hereinafter, preferred embodiment modes of the present invention will be described with reference to the drawings.

Embodiment Mode 1

[0014] Fig. 1 is a sectional view of an elevator landing door apparatus according to Embodiment Mode 1 of the present invention, and Fig. 2 is a perspective view showing a main portion of Fig. 1.

[0015] In the drawings, a landing wall 1 of a building is equipped with a landing doorway 2. The landing doorway 2 is formed by a jamb 3 as a frame body. The jamb 3 has a pair of vertical frames 4a and 4b extending vertically, and a top frame 4c (Fig. 13) provided between upper portions of the vertical frames 4a and 4b and extending horizontally. A hole 21 is formed in the vicinity of an upper end portion of each of the vertical frames 4a and 4b.

[0016] The landing doorway 2 is opened and closed by a pair of landing doors 7. Fixed to an upper portion of the door-opening side end portion of each landing door 7 is a flat fire prevention member 22 opposing the vertical frame 4a, 4b in a door-closed state. Welded to the fire prevention member 22 is a pin 23 as an insert portion to be inserted into the hole 21 when closing the door to restrict deformation of the landing door 7 toward a hoistway 5 side. A bolt or the like can be used as the pin 23.

[0017] As in the case of Fig. 13, a landing sill 11 is provided in a floor portion of the landing doorway 2. Further, provided to a lower end portion of each landing door 7 is a door leg 12 inserted into the landing sill 11.

[0018] It is desirable to provide some clearance between the diameter of the hole 21 and the diameter of the pin 23. This makes it possible to absorb any play in the landing door 7 and to insert the pin 23 into the hole 21 more reliably in the door-closed state.

[0019] In this landing door apparatus, by inserting the pin 23 into the hole 21 in the door-closed state, even when being heated by fire, deformation of the landing door 7 toward the hoistway 5 side is restricted, and the landing door 7 is prevented from getting out of place. At the same time, it is possible to prevent flame and smoke from entering the hoistway 5. Further, the door fire prevention member 22 is disposed and secured only in the upper portions of the door-opening side end portion of the landing door 7. In addition, it is only necessary to provide the hole 21 to the vertical frame 4a, 4b, so that a fire prevention structure can be easily added to the landing door 7, whether it is a new or existing one.

[0020] Here, since the door leg 12 is inserted into the landing sill 11, the lower end portion of the landing door 7 is in a semi-fixed state even when the landing door 7 is heated by fire. In contrast, the upper end portion of the landing door 7 is suspended by a door hanger (not shown), so that when the landing door 7 is deformed, a gap between the landing door 7 and the jamb 3 increases.

[0021] However, in Embodiment Mode 1, the hole 21, the fire prevention member 22, and the pin 23 are provided in the vicinity of the upper end portion of the landing door 7, so that it is possible to effectively prevent an increase in the gap between the landing door 7 and the jamb 3. That is, it is possible to secure a sufficient fire prevention performance without providing the fire prevention structure over the entire vertical length of the landing door 7.

[0022] Further, in the landing door apparatus of Embodiment 1, the fire prevention member 22 is mounted only to a part of the landing door 7 with respect to the vertical direction, so that it is possible to restrain an increase in the weight of the landing door 7.

[0023] While the pin 23 is welded to the fire prevention member 22 in the above example, the method of fixing an insert member is not restricted to welding.

[0024] Further, the hole shape can be variously modified according to the sectional shape of the insert member. It may also be a square hole, or an elongated hole extending vertically.

[0025] Further, there are no particular limitations regarding the number of holes and insert members. For example, it is also possible for a plurality of insert members to be simultaneously inserted into a single elongated hole.

Embodiment Mode 2

[0026] Next, Fig. 3 is a sectional view of an elevator landing door apparatus according to Embodiment Mode 2 of the present invention, and Fig. 4 is a perspective view showing a main portion of Fig. 3.

[0027] In the drawings, a plurality of slits 24 are provided as holes in the vicinity of the upper end portion of each vertical frame 4a, 4b. Fixed to the upper portion of the door-opening side end portion of each landing door 7 is a flat fire prevention member 25 opposing the vertical frame 4a, 4b in the door-closed state.

[0028] Provided to an end portion of the fire prevention member 25 are bent portions 25a as insert portions to be inserted into the slits 24 in the door-closed state to restrict deformation of the landing door 7 toward the hoistway 5 side. The bent portions 25a are formed by partially bending the fire prevention member 25. Otherwise, this embodiment mode is of the same construction as Embodiment Mode 1.

[0029] In this landing door apparatus, by inserting the bent portions 25a into the slits 24 in the door-closed state, even when being heated by fire, deformation of the landing door 7 toward the hoistway 5 side is restricted, and the landing door 7 is prevented from getting out of place. At the same time, it is possible to prevent flame and smoke from entering the hoistway 5. Further, the door fire prevention member 2 5 is disposed and secured only in the upper portions of the door-opening end portion of the landing door 7. In addition, it is only necessary to provide the slits 24 to the vertical frame 4a, 4b, so that the fire prevention structure can be easily added to the landing door 7, whether it is a new or existing one.

[0030] Further, since the bent portions 25a are formed integrally with the fire prevention member 25, it is possible to reduce the number of parts and to further facilitate the installation.

Embodiment Mode 3

[0031] Next, Fig. 5 is a sectional view of an elevator landing door apparatus according to Embodiment Mode 3 of the present invention, and Fig. 6 is a perspective view showing a main portion of Fig. 5. In this example, a pin 26 as the insert portion is welded at a position in the vicinity of the upper end portion of the vertical frame 4a, 4b. Fixed to the upper portion of the door-opening side end portion of each landing door 7 is a flat fire prevention member 27 opposing the vertical frame 4a, 4b in the door-closed state. The fire prevention member 27 is equipped with a hole 27a into which the pin 26 is inserted in the door-closed state.

[0032] In this landing door apparatus, by inserting the pin 26 into the hole 27a in the door-closed state, deformation of the landing door 7 toward the hoistway 5 side is restricted. That is, conversely to Embodiment Mode 1, the pin 26 is provided on the vertical frame 4a, 4b, and the hole 27a is provided in the fire prevention member 27. Also in this case, the same effect as that of Embodiment Mode 1 can be obtained.

Embodiment Mode 4

[0033] Next, Fig. 7 is a sectional view of an elevator landing door apparatus according to Embodiment Mode 4 of the present invention, and Fig. 8 is a perspective view showing a main portion of Fig. 7. Fixed to the upper portion of the door-opening side end portion of each landing door 7 is a door fire prevention member 33 having a first opposing surface 33a extending parallel to the opening/closing direction (the horizontal direction of Fig. 7) of the landing door 7.

[0034] Welded to the vertical frame 4a, 4b is a clip 32 as a fixing member. A vertical frame fire prevention member 31 L-shaped in section is held between the clip 32 and the vertical frame 4a, 4b. The vertical frame fire prevention member 31 has a second opposing surface 31a parallel to the first opposing surface 33a.

[0035] In mounting the vertical frame fire prevention member 31, the clip 32 is first fixed to the vertical frame 4a, 4b. Then, the vertical frame fire prevention member 31 is forced between the clip 32 and the vertical frame 4a, 4b. A claw is provided at a forward end portion of the clip 32, and the vertical frame fire prevention member 31 is equipped with a groove into which the claw is inserted.

[0036] In the door-closed state, the first opposing surface 33a opposes a second opposing surface 31a, so that deformation of the landing door 7 toward the hoistway 5 side is restricted. That is, the door fire prevention member 33 has a portion bent into a U-shaped groove, into which a part of the vertical fire prevention member 31 is inserted in the door-closed state. Otherwise, this embodiment mode is of the same construction as Embodiment Mode 1.

[0037] In this landing door apparatus, the first opposing surface 33a opposes the second opposing surface 31a in the door-closed state, so that deformation of the landing door 7 toward the hoistway 5 side is restricted, and the landing door 7 is prevented from getting out of place. At the same time, it is possible to prevent flame and smoke from entering the hoistway 5. Further, the door fire prevention member 33 and the vertical frame fire prevention member 31 are disposed and secured only in the upper portions of the landing door 7 and the

vertical frame 4a, 4b. In addition, it is only necessary to fix the clip 32 to the vertical frame 4a, 4b and force in the vertical frame fire prevention member 31, so that the fire prevention structure can be easily added to the landing door 7, whether it is a new or existing one.

Embodiment Mode 5

[0038] Next, Fig. 9 is a sectional view of an elevator landing door apparatus according to Embodiment Mode 5 of the present invention, and Fig. 10 is a perspective view showing a main portion of Fig. 9. Fixed to the upper portion of the door-opening side end portion of each landing door 7 is a door fire prevention member 37 having a first opposing surface 37a extending parallel to the opening/closing direction (the horizontal direction of Fig. 9) of the landing door 7.

[0039] Welded to the vertical frame 4a, 4b is a hook 35 as the fixing member. A vertical frame fire prevention member 36 L-shaped in section is mounted to the vertical frame 4a, 4b through the intermediation of the hook 35. The vertical frame fire prevention member 36 has a second opposing surface 36a parallel to the first opposing surface 37a, and a hole 36b into which the hook 35 is inserted. For example, a bolt is used as the hook 35, and a snap hole is used as the hole 36b. Fig. 11 is an exploded perspective view of the vertical frame 4a, 4b and the vertical frame fire prevention member 36 of Fig. 10.

[0040] In the door-closed state, the first opposing surface 37a opposes the second opposing surface 36a, so that deformation of the landing door 7 toward the hoistway 5 side is restricted. That is, the door fire prevention member 37 has a portion bent into a U-shaped groove, into which a part of the vertical fire prevention member 36 is inserted in the door-closed state. Otherwise, this embodiment mode is of the same construction as Embodiment Mode 1.

[0041] In this landing door apparatus, the first opposing surface 37a opposes the second opposing surface 36a in the door-closed state, so that deformation of the landing door 7 toward the hoistway 5 side is restricted, and the landing door 7 is prevented from getting out of place. At the same time, it is possible to prevent flame and smoke from entering the hoistway 5. Further, the door fire prevention member 37 and the vertical frame fire prevention member 36 are disposed only in the upper portions of the landing door 7 and the vertical frame 4a, 4b. In addition, it is only necessary to fix the clip 32 to the vertical frame 4a, 4b and engage the vertical frame fire prevention member 36, so that the fire prevention structure can be easily added to the landing door 7, whether it is a new or existing one.

[0042] Note that while in the above example only one hook 35 is provided, it is also possible to provide two or more hooks 35. Further, the number of holes 36b may be determined in correspondence with the hooks 35, and it is possible to provide two or more holes.

[0043] Here, it is possible to secure a sufficient fire prevention performance even if a vertical dimension H of the fire prevention member 22, 25, 27, 33, 37 on the landing door 7 side in Embodiment Modes 1 through 5 is 1/3 or less of a vertical dimension of the landing door 7. That is, it is possible to obtain a sufficient fire prevention performance by providing the fire prevention member 22, 25, 27, 33, 37 only within a range of 1/3 or less of the vertical dimension of the landing doorway 2 as measured from the upper end of the landing door way 2.

[0044] In an experiment, a sufficient fire prevention performance was obtained by providing the fire prevention member 22, 25, 27, 33, 37 only within a range of 1/10 or less of the vertical dimension of the landing doorway 2 as measured from the upper end of the landing doorway 2 (vertical dimension of the landing doorway: 2200 mm, and vertical dimension of the fire prevention member: 200 mm).

Claims

1. An elevator landing door apparatus comprising:

a frame body which has a vertical frame extending vertically and forms a landing doorway; and a landing door for opening and closing the landing doorway,

wherein a fire prevention member opposing the vertical frame in a door-closed state is partially disposed and secured in an upper portion of a door-opening side end portion of the landing door,

a hole is provided in one of the vertical frame and the fire prevention member, and

an insert portion inserted into the hole in the door-closed state and restricting deformation of the landing door toward a hoistway side is provided in the other of the vertical frame and the fire prevention member.

2. An elevator landing door apparatus according to Claim 1, wherein the fire prevention member is disposed within a range of 1/3 or less of a vertical dimension of the landing doorway as measured from an upper end of the landing doorway.

3. An elevator landing door apparatus according to Claim 1, wherein the insert portion is formed by bending a part of the fire prevention member.

4. An elevator landing door apparatus comprising:

a frame body which has a vertical frame extending vertically and forms a landing doorway; and a landing door for opening and closing the landing doorway,

wherein a door fire prevention member

having a first opposing surface extending parallel to a door opening/closing direction of the landing door is partially disposed and secured in an upper portion of a door-opening side end portion of the landing door,
a fixing member is fixed to the vertical frame, and a vertical frame fire prevention member is mounted to a vertical frame through the intermediation of the fixing member,
the vertical frame fire prevention member has a second opposing surface, and
the first opposing surface opposes the second opposing surface in a door-closed state, whereby deformation of the landing door toward a hoistway side is restricted.

5. An elevator landing door apparatus according to Claim 4, wherein the fixing member is a clip, with the vertical frame fire prevention member being held between the clip and the vertical frame.

6. An elevator landing door apparatus according to Claim 4, wherein the fixing member is a hook, and wherein the vertical frame fire prevention member is equipped with a hole into which the hook is inserted.

7. An elevator landing door apparatus according to Claim 1, wherein the door fire prevention member and the vertical frame fire prevention member are disposed within a range of 1/3 or less of a vertical dimension of the landing doorway as measured from an upper end of the landing doorway.

FIG. 1

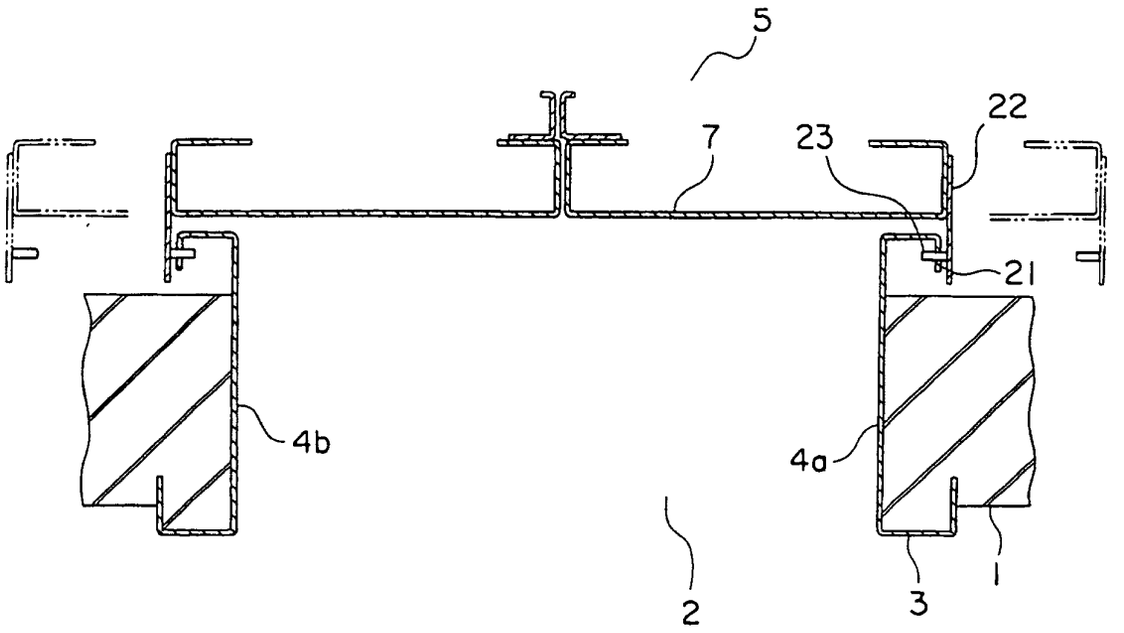


FIG. 2

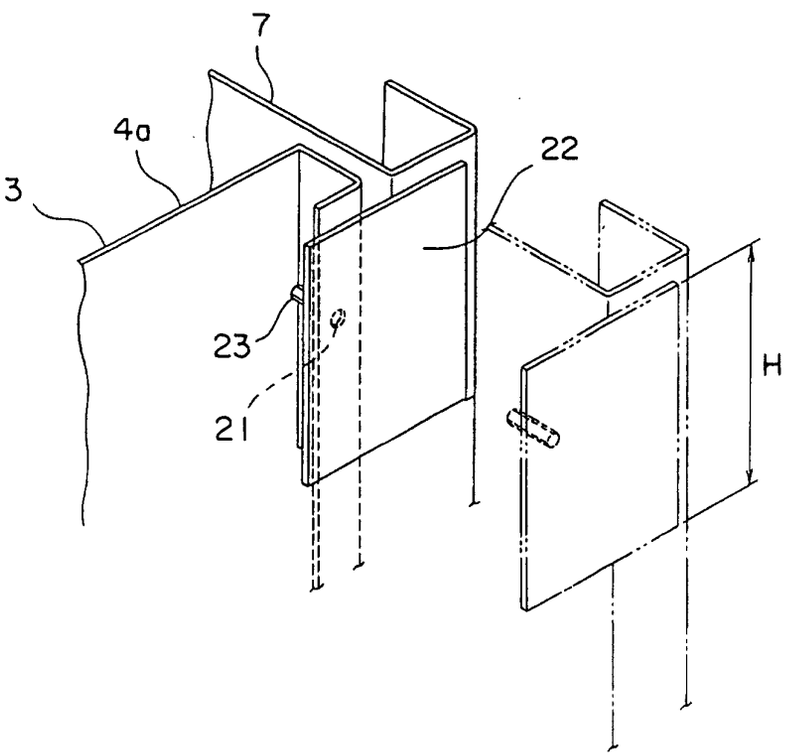


FIG. 3

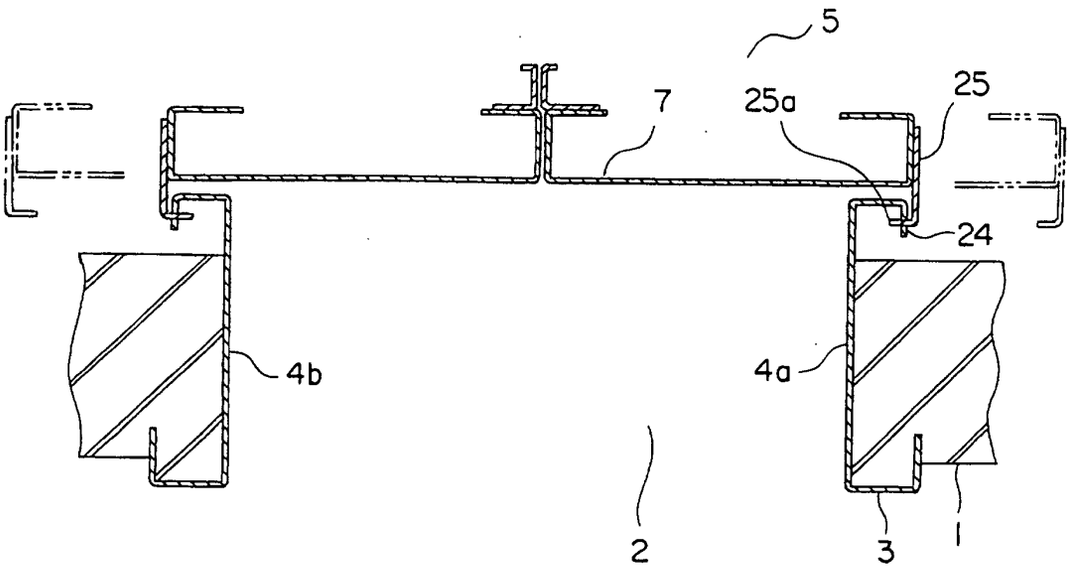


FIG. 4

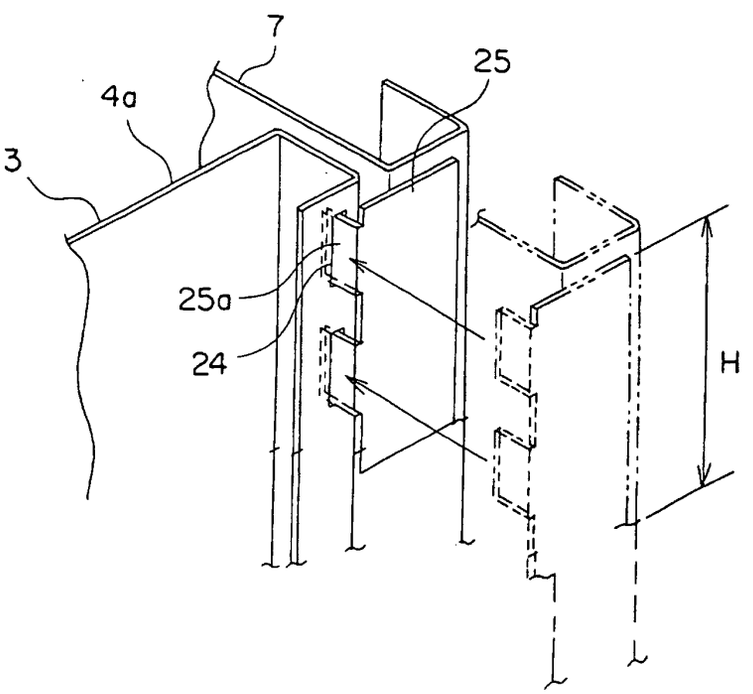


FIG. 5

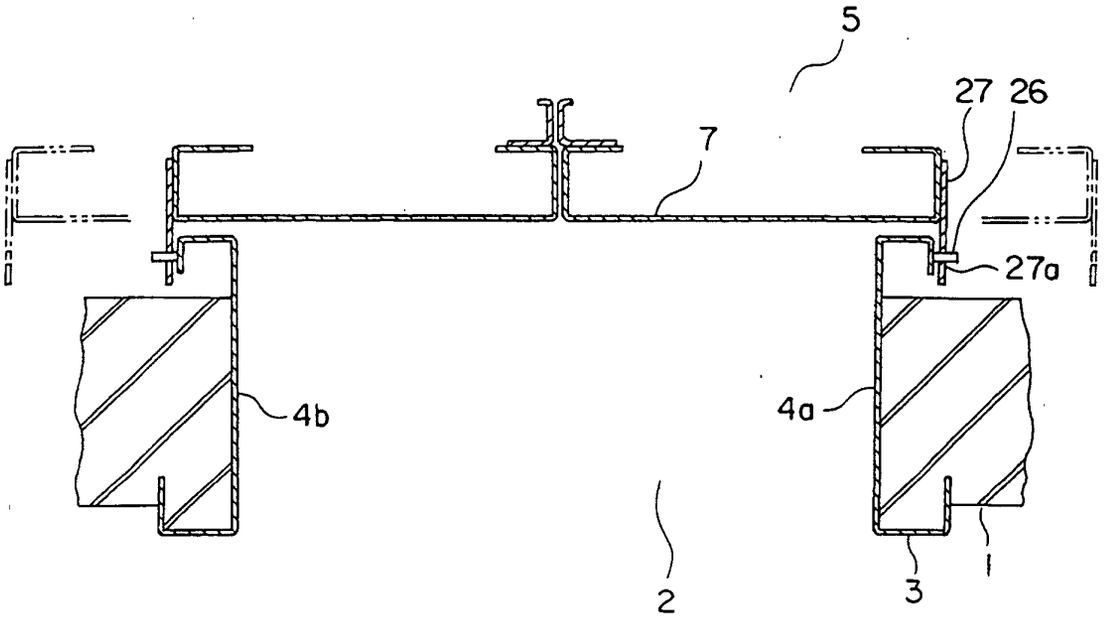


FIG. 6

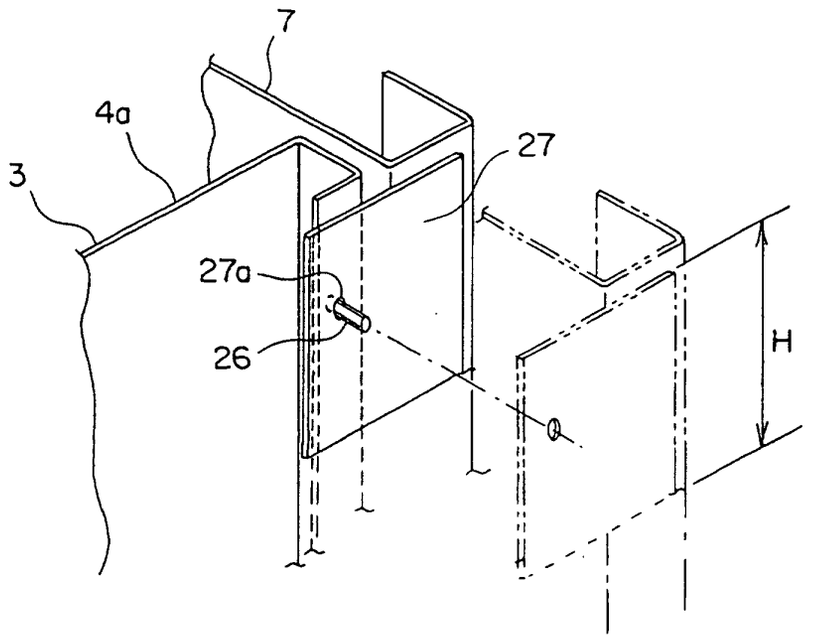


FIG. 7

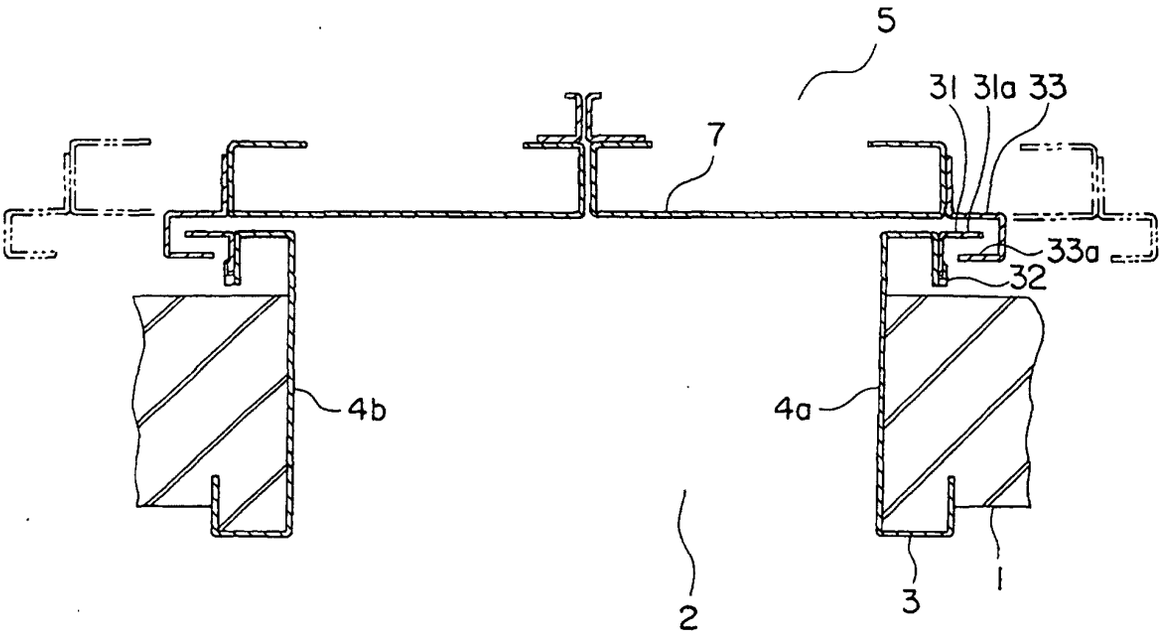


FIG. 8

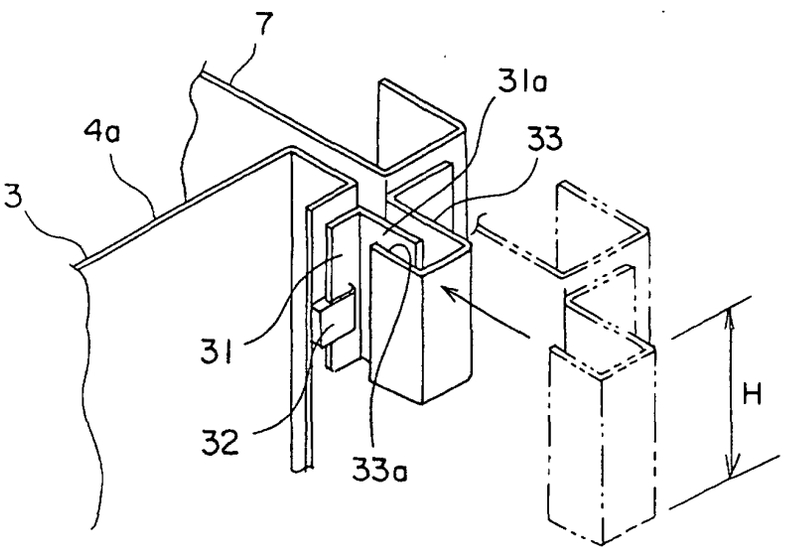


FIG. 9

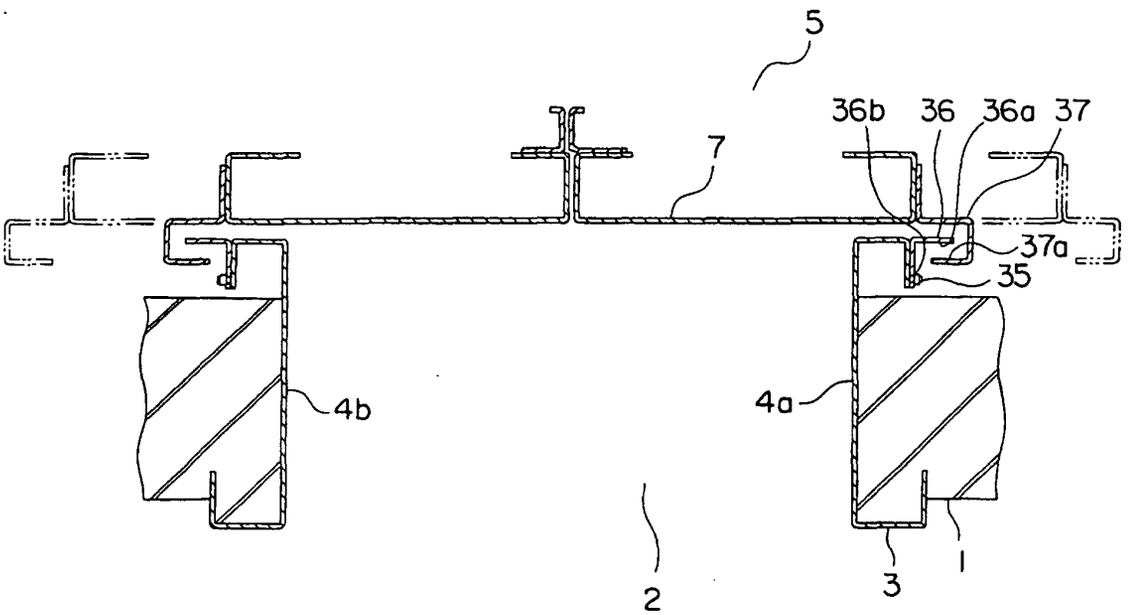


FIG.10

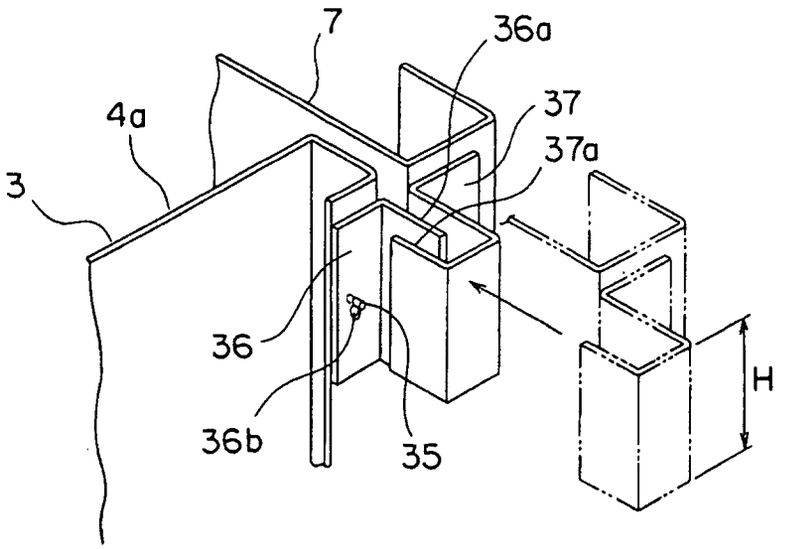


FIG.11

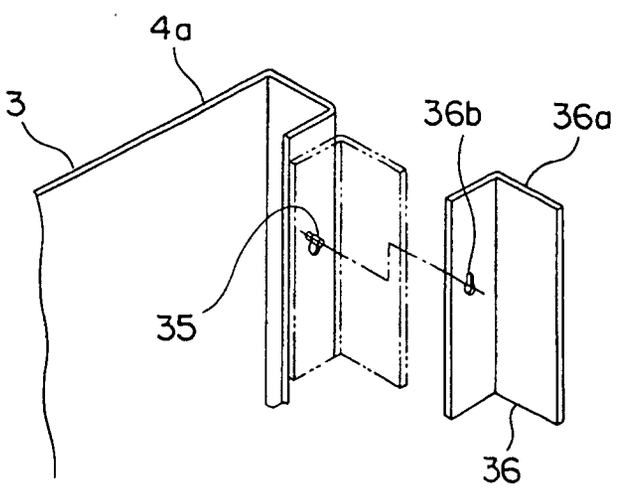


FIG.12

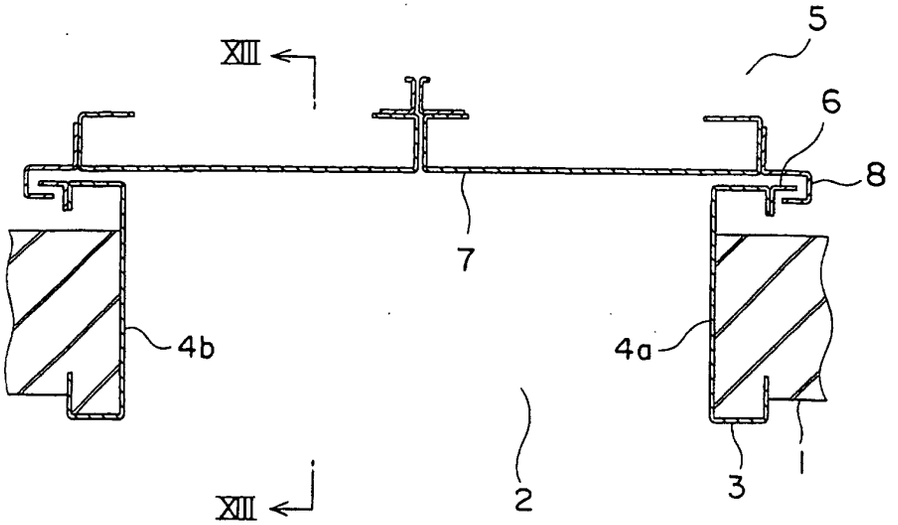
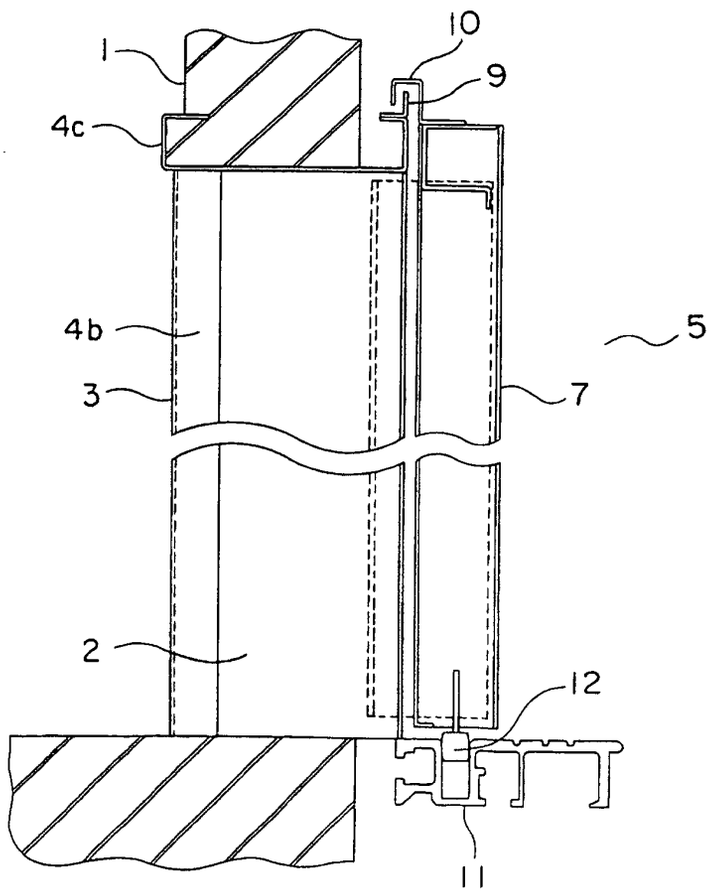


FIG.13



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP02/03774

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] B66B13/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[7] B33B13/00-13/30

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2003
Kokai Jitsuyo Shinan Koho	1971-2003	Toroku Jitsuyo Shinan Koho	1994-2003

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 11-130366 A (Mitsubishi Electric Corp.), 18 May, 1999 (18.05.99), & NL 1008737 C & CN 1215691 A & US 5988321 A	1-3 4,7
Y	JP 2001-199660 A (Mitsubishi Electric Corp.), 24 July, 2001 (24.07.01), (Family: none)	4,7
E,X	JP 2003-12258 A (Mitsubishi Electric Corp.), 15 January, 2003 (15.01.03), (Family: none)	1,3,4-6

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
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Date of the actual completion of the international search	Date of mailing of the international search report
15 January, 2003 (15.01.03)	28 January, 2003 (28.01.03)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1998)