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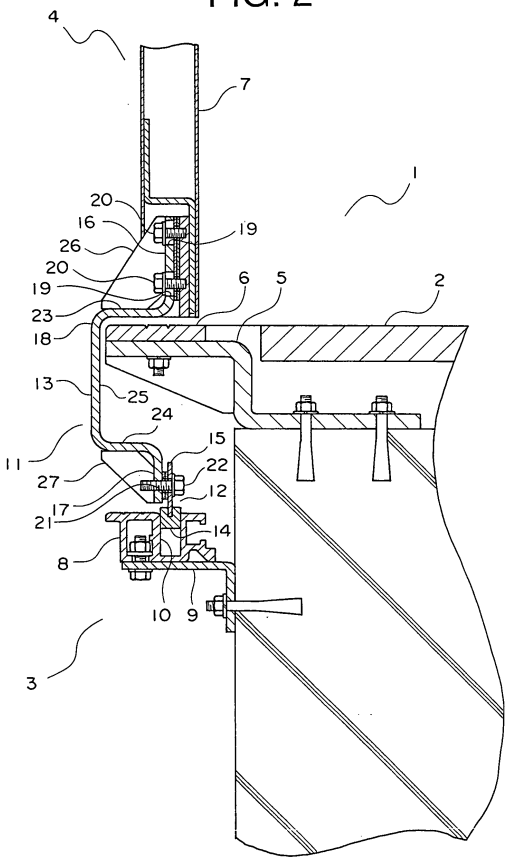
(54) **DOORWAY DEVICE FOR ELEVATOR**

(57) Provided is a doorway device for an elevator, in which a doorway floor member is provided at a lower portion of a doorway of the elevator. The doorway floor member is extended in a width direction of the doorway of the elevator. Elevator doors for opening/closing the doorway of the elevator are arranged above the doorway floor member. A sill having a groove portion extending in the width direction of the doorway is arranged below the doorway floor member. Door legs are provided at lower ends of the elevator doors. The door legs have insertion bodies inserted in the groove portion and coupling members, assuming such a shape as to straddle the doorway floor member, for coupling the elevator doors to the insertion bodies.

FIG. 2



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Description

Technical Field

[0001] The present invention relates to a doorway device for an elevator, for opening/closing a doorway of an elevator, which makes a connection between a car and a landing, by using an elevator door.

Background Art

[0002] In a conventional doorway device for an elevator, a sill frame body for guiding a door may be disposed below a surface of a floor in order to make an improvement in design. A bottom edge extending vertically downward while bypassing the floor is fixed to a lower portion of the door. A lower door guide movable in a moving direction of the door is disposed within a slot of the sill frame body. A guiding/holding bracket extending horizontally toward the bottom edge is fixed to the lower door guide. The guiding/holding bracket is connected to the bottom edge below the surface of the floor (see Patent Document 1).

[0003] Patent Document 1: JP 3061751 B

Disclosure of the Invention

Problem to be solved by the Invention

[0004] In the conventional doorway device for the elevator constructed as described above, however, the bottom edge fixed to the door extends vertically downward, so the horizontally extending guiding/holding bracket is necessary for mounting the lower door guide to the bottom edge. The number of parts is thus increased, so the cost of production cannot be reduced.

[0005] The present invention has been made to solve the problem discussed above, and it is therefore an object of the invention to obtain a doorway device for an elevator allowing an improvement in design and a reduction in the cost of production based on a reduction in the number of parts.

Means for solving the Problem

[0006] A doorway device for an elevator according to the present invention includes: a doorway floor member disposed in a lower portion of a doorway that makes a connection between a car and a landing, and extending in a width direction of the doorway; an elevator door provided above the doorway floor member, for opening/closing the doorway; a sill provided with a groove portion extending in the width direction of the doorway and provided below the doorway floor member; and a door leg having an insertion body inserted into the groove portion and a coupling member, assuming a shape in which the coupling member straddles the doorway floor member, for coupling the elevator door to the insertion body, and provided at a lower end of the elevator door.

Brief Description of the Drawings

[0007]

Fig. 1 is a front view showing a doorway device for an elevator according to Embodiment 1 of the present invention.

Fig. 2 is a cross-sectional view taken along the line II-II of Fig. 1.

Fig. 3 is a cross-sectional view showing an essential part of a doorway device for an elevator according to Embodiment 2 of the present invention.

Best Modes for carrying out the Invention

[0008] Preferred embodiments of the present invention will be described hereinafter with reference to the drawings.

Embodiment 1

[0009] Fig. 1 is a front view showing an essential part of a doorway device for an elevator according to Embodiment 1 of the present invention. Fig. 2 is a cross-sectional view taken along the line II-II of Fig. 1. It should be noted that Fig. 1 is a front view showing an essential part of the doorway device for the elevator when a landing side is viewed from a hoistway side. Referring to the figures, a floor of a landing 1 is provided with a floor plate 2 as a decorative laminate. A landing doorway 4 for making a connection between the landing 1 and a hoistway 3 is provided between the landing 1 and the hoistway 3 (Fig. 2).

[0010] A support member 5 extending from the landing 1 toward the hoistway 3 is fixed on the floor of the landing 1 by means of anchor bolts. A doorway floor member 6 provided in a lower portion of the landing doorway 4 is fixed to the support member 5. The doorway floor member 6 is disposed at an end of the floor plate 2. The doorway floor member 6 extends in a width direction of the landing doorway 4. The doorway floor member 6 exhibits higher rigidity than the floor plate 2. The doorway floor member 6 is rigid enough to prevent any damage thereof through a collision with a carriage or a passenger.

[0011] A pair of landing doors 7 for opening/closing the landing doorway 4 are provided above the doorway floor member 6. Each of the landing doors 7 is reciprocatingly movable in the width direction of the landing doorway 4. The landing doorway 4 is opened/closed through reciprocating movements of the landing doors 7.

[0012] A landing sill 8 extending in the width direction of the landing doorway 4 is provided below the doorway floor member 6. The landing sill 8 is supported by a support member 9, which is fixed to a lateral wall of the hoistway 3 by means of anchor bolts. The landing sill 8 is fixed to the support member 9 by means of bolts. The landing

sill 8 is provided with a groove portion 10 having an open top. The groove portion 10 extends in the width direction of the landing doorway 4.

[0013] A plurality of (two in this example) door legs 11 are provided at a lower end of each of the landing doors 7. Each of the door legs 11 has an insertion body 12 inserted into the groove portion 10, and a coupling member 13 for coupling the insertion body 12 to a corresponding one of the landing doors 7.

[0014] The insertion body 12 has a door guide shoe 14 disposed within the groove portion 10, and a shoe mounting portion 15 provided in an upper portion of the door guide shoe 14, for mounting the insertion body 12 to the coupling member 13.

[0015] The coupling member 13 assumes such a shape as to extend from the lower end of each of the landing doors 7 to the insertion body 12 so as to straddle the doorway floor member 6. In other words, the coupling member 13 assumes such a shape as to extend from a space above the doorway floor member 6 to a space below the doorway floor member 6 through the hoistway 3 side thereof while bypassing the doorway floor member 6 (Fig. 2). The coupling member 13 is molded as a single member. In addition, the coupling member 13 has an upper mounting portion 16, a lower mounting portion 17, and a joint portion 18 for joining the upper mounting portion 16 to the lower mounting portion 17 while bypassing the doorway floor member 6.

[0016] The upper mounting portion 16 is provided with a plurality of vertically extending long holes 19. The respective long holes 19, which are arranged while being vertically spaced apart from each other, are formed through the upper mounting portion 16. The upper mounting portion 16 is fixed to the lower end of each of the landing doors 7 by means of a plurality of bolts 20 serving as fixing means, which are passed through the long holes 19, respectively. A vertical position of the coupling member 13 with respect to the each of the landing doors 7 can be adjusted through positional adjustment of the bolts 20 with respect to the long holes 19. A vertical position of the insertion body 12 with respect to the groove portion 10 can be adjusted through positional adjustment of the coupling member 13 with respect to the each of the landing doors 7.

[0017] The lower mounting portion 17 is provided with a plurality of bolt holes 21. The shoe mounting portion 15 is fixed to the lower mounting portion 17 by means of bolts 22 that are screwed into the bolt holes 21, respectively.

[0018] The joint portion 18 has an upper horizontal portion 23 extending horizontally from a lower end of the upper mounting portion 16, a lower horizontal portion 24 extending horizontally from an upper end of the lower mounting portion 17, and a vertical portion 25 connecting the upper horizontal portion 23 to the lower horizontal portion 24. The upper horizontal portion 23 is disposed above the doorway floor member 6, and the lower horizontal portion 24 is disposed below the doorway floor member 6. The vertical portion 25 is disposed on the hoistway 3 side with respect to the doorway floor member 6 (Fig. 2).

[0019] The coupling member 13 is provided, at an upper portion thereof and a lower portion thereof, with an upper reinforcing rib 26 and a lower reinforcing rib 27, respectively, for reinforcement. The upper reinforcing rib 26 is fixed between a lateral surface of the upper mounting portion 16 and an upper surface of the upper horizontal portion 23. The lower reinforcing rib 27 is fixed between a lateral surface of the lower mounting portion 17 and a lower surface of the lower horizontal portion 24.

[0020] Though not shown in the drawings, a car to be raised/lowered within the hoistway 3 is provided with a car doorway for allowing a passenger to get on and off the car. The car is mounted with car doors for opening/closing the car doorway. The car doors are driven by a motor mounted on the car, and thereby being moved reciprocatingly. The car doorway is opened/closed through reciprocating movements of the car doors. Each of the landing doors 7 is allowed to engage with a corresponding one of the car doors by an engaging device when the car is stopped at each floor. Each of the landing doors 7 can reciprocatingly move together with a corresponding one of the car doors through engagement by means of the engaging device.

[0021] The doorway for the elevator, which makes a connection between the car and the landing 1, has the car doorway and the landing doorway 4. An elevator door for opening/closing the doorway of the elevator has the car doors and the landing doors 7.

[0022] In the doorway device for the elevator constructed as described above, the landing doors 7 are provided above the doorway floor member 6, and the landing sill 8 is provided below the doorway floor member 6. Each of the door legs 11 provided at the lower end of a corresponding one of the landing doors 7 has the insertion body 12 inserted into the groove portion 10 of the landing sill 8, and the coupling member 13, that assumes such the shape as to straddle the doorway floor member 6, for coupling the insertion body 12 to the corresponding one of the landing doors 7. Therefore, the landing sill 8 as a cause of a deterioration in design can be hid by the doorway floor member 6, so an improvement in design can be achieved. The coupling member 13 assumes such the shape as to straddle the doorway floor member 6, so the number of parts for coupling each of the landing doors 7 to the insertion body 12 can be reduced. As a result, the cost of production can be reduced.

[0023] The groove portion 10 provided in the landing sill 8 has the open top, so the existing landing sill 8 can be directly disposed below the doorway floor member 6. In consequence, the present invention can be easily applied to the existing doorway device for the elevator.

[0024] Further, the position of the coupling member 13 with respect to each of the landing doors 7 can be adjusted, and the position of the insertion body 12 with respect to the groove portion 10 is adjusted through posi-

tional adjustment of the coupling member 13 with respect to each of the landing doors 7. Therefore, an amount of insertion of the insertion body 12 into the groove portion 10 can be adjusted at a position above the doorway floor member 6. Thus, an operation of adjusting the amount of insertion of the insertion body 12 into the groove portion 10 can be performed from the inside of the car or the landing 1 with ease.

[0025] In addition, the doorway floor member 6 exhibits higher rigidity than the floor plate 2, so the doorway floor member 6 can be prevented from being damaged etc. through a collision with a carriage or the like. As a result, the doorway device for the elevator can be prevented from deteriorating in design.

[0026] Further, the coupling member 13 is mounted to the lower end of each of the landing doors 7 by means of the plurality of the bolts 20 that are arranged while being vertically spaced apart from each other. Therefore, a portion of the coupling member 13, which is mounted to each of the landing doors 7, that is, the upper mounting portion 16 can be made less deformable.

[0027] Note that, in the foregoing example, the doorway floor member 6 is provided in the lower portion of the landing doorway 4, and each of the door legs 11, which is inserted in the groove portion 10 so as to straddle the doorway floor member 6, is provided at the lower end of a corresponding one of the landing doors 7. However, it is also appropriate that the doorway floor member 6 is provided in the lower portion of the car doorway, and that the door legs 11 are provided at the lower ends of the car doors for opening/closing the car doorway, respectively. In this case, a car sill provided with a groove portion into which the door legs 11 are inserted is disposed below the doorway floor member 6.

Embodiment 2

[0028] Fig. 3 is a cross-sectional view showing an essential part of a doorway device for an elevator according to Embodiment 2 of the present invention. Referring to the figure, a stopper 31 for restraining the coupling member 13 from being displaced away from the doorway floor member 6 toward the hoistway 3 is fixed on an upper surface of the landing sill 8 by a bolt 32. Since the stopper 31 restrains an amount of displacement of the coupling member 13, the insertion body 12 is prevented from slipping out of the groove portion 10. In this example, the stopper 31 restrains the amount of displacement of the coupling member 13 such that a gradient of the door legs 11 with respect to the landing sill 8 becomes smaller than a gradient at which the insertion body 12 slips out of the groove portion 10.

[0029] The stopper 31 has a fixed portion 33 fixed horizontally on the landing sill 8, and an abutment portion 34 extending upward from an end of the fixed portion 33 on the hoistway 3 side. The lower reinforcing rib 27 is provided with an inclined portion 35 that can come into abutment on the abutment portion 34 due to displacement of the coupling member 13 in a direction away from the doorway floor member 6. The amount of displacement of the coupling member 13 in such the direction away from the doorway floor member 6 is restrained through abutment of the inclined portion 35 on the abutment portion 34. This embodiment is identical to Embodiment 1 of the present invention in other constructional details.

[0030] In the doorway device for the elevator constructed as described above, the landing sill 8 is provided with the stopper 31 for restraining the coupling member 13 from being displaced in the direction away from the doorway floor member 6. Therefore, a gradient of the landing doors 7 can be confined within a predetermined range when the landing doors 7 are inclined with respect to the doorway floor member 6. It is thus possible to prevent, for example, slippage of the insertion body 12 out of the groove portion 10, damage to the insertion body 12, and the like.

[0031] The coupling member 13 is provided with the lower reinforcing rib 27 for reinforcing the coupling member 13, and the coupling member 13 is restrained from being displaced through abutment of the lower reinforcing rib 27 on the stopper 31. Accordingly, a strength of the coupling member 13 can be increased, and the coupling member 13 can be restrained from being displaced in the direction away from the doorway floor member 6 with a simple construction.

[0032] The landing sill 8 is provided with the stopper 31 in the foregoing example. However, the car sill may be provided with the stopper when the doorway floor member 6 is provided in the lower portion of the car doorway and the car sill is provided below the doorway floor member 6. In this case, the door legs 11, which are inserted into the groove portion of the car sill so as to straddle the doorway floor member 6, are provided at the lower ends of the car doors, respectively. In this manner as well, the door legs 11 can be prevented from slipping out of the groove portion of the car sill with a simple construction.

[0033] In the foregoing embodiments of the present invention, while the insertion body 12 is fixed to the coupling member 13 by means of the bolts 22, the position of the coupling member 13 with respect to the elevator door can be adjusted. Therefore, it is also appropriate that the coupling member 13 and the shoe mounting portion 15 are provided as an integral member (i.e., single member), and the coupling member 13 is integrated with the insertion body 12.

Claims

1. A doorway device for an elevator, **characterized by** comprising:

   a doorway floor member disposed in a lower portion of a doorway that makes a connection be-

tween a car and a landing, and extending in a width direction of the doorway;
an elevator door provided above the doorway floor member, for opening/closing the doorway;
a sill provided with a groove portion extending in the width direction of the doorway and provided below the doorway floor member; and
a door leg having an insertion body inserted into the groove portion and a coupling member, assuming a shape in which the coupling member straddles the doorway floor member, for coupling the elevator door to the insertion body, and provided at a lower end of the elevator door.

2. The doorway device for the elevator according to Claim 1, **characterized in that** the coupling member can be adj usted in position with respect to the elevator door, and
that the insertion body is adjusted in position with respect to the groove portion through positional adjustment of the coupling member with respect to the elevator door.

3. The doorway device for the elevator according to Claim 1 or 2, **characterized in that** the doorway floor member exhibits higher rigidity than at least one of a floor of the car and a floor of the landing.

4. The doorway device for the elevator according to any one of Claims 1 to 3, **characterized in that** the coupling member is mounted to the elevator door by fixing means that are disposed while being vertically spaced apart from each other.

5. The doorway device for the elevator according to any one of Claims 1 to 4, **characterized in that** the sill is provided with a stopper for restraining the coupling member from being displaced in a direction away from the doorway floor member.

6. The doorway device for the elevator according to Claim 5, **characterized in that** the coupling member is provided with a reinforcing rib for the coupling member, and
that the coupling member is restrained from being displaced due to abutment of the reinforcing rib on the stopper.

FIG. 1

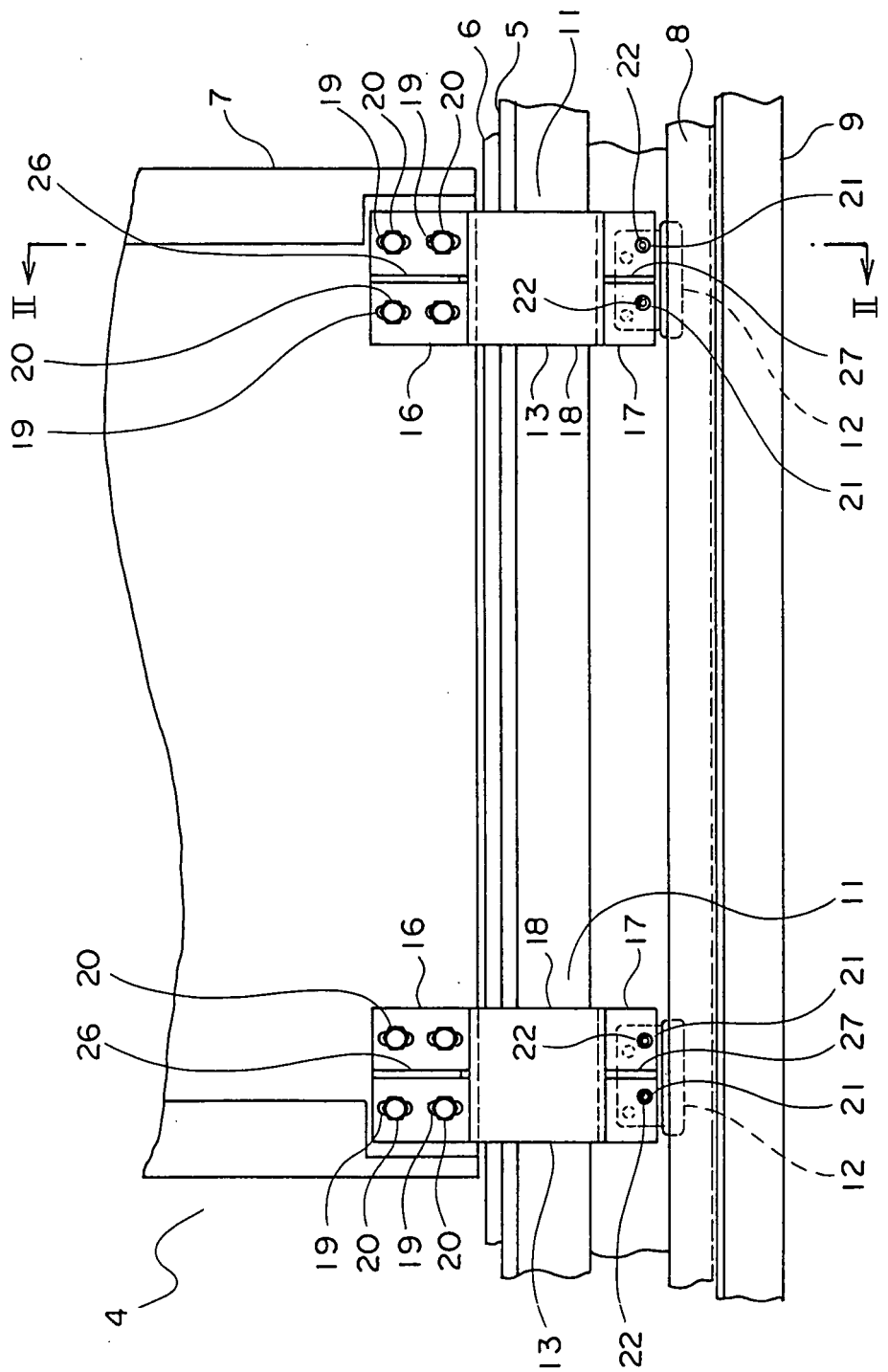
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FIG. 2

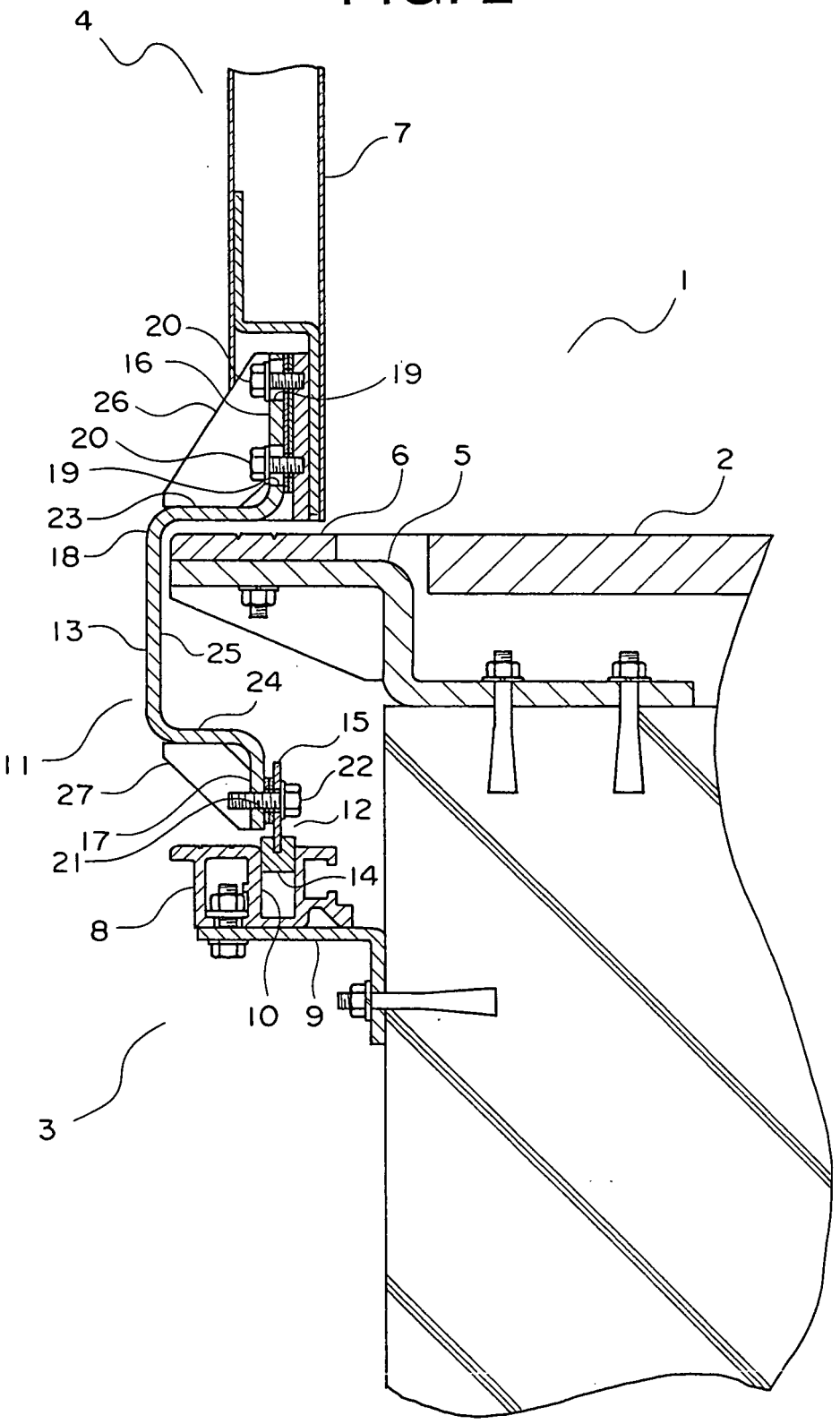
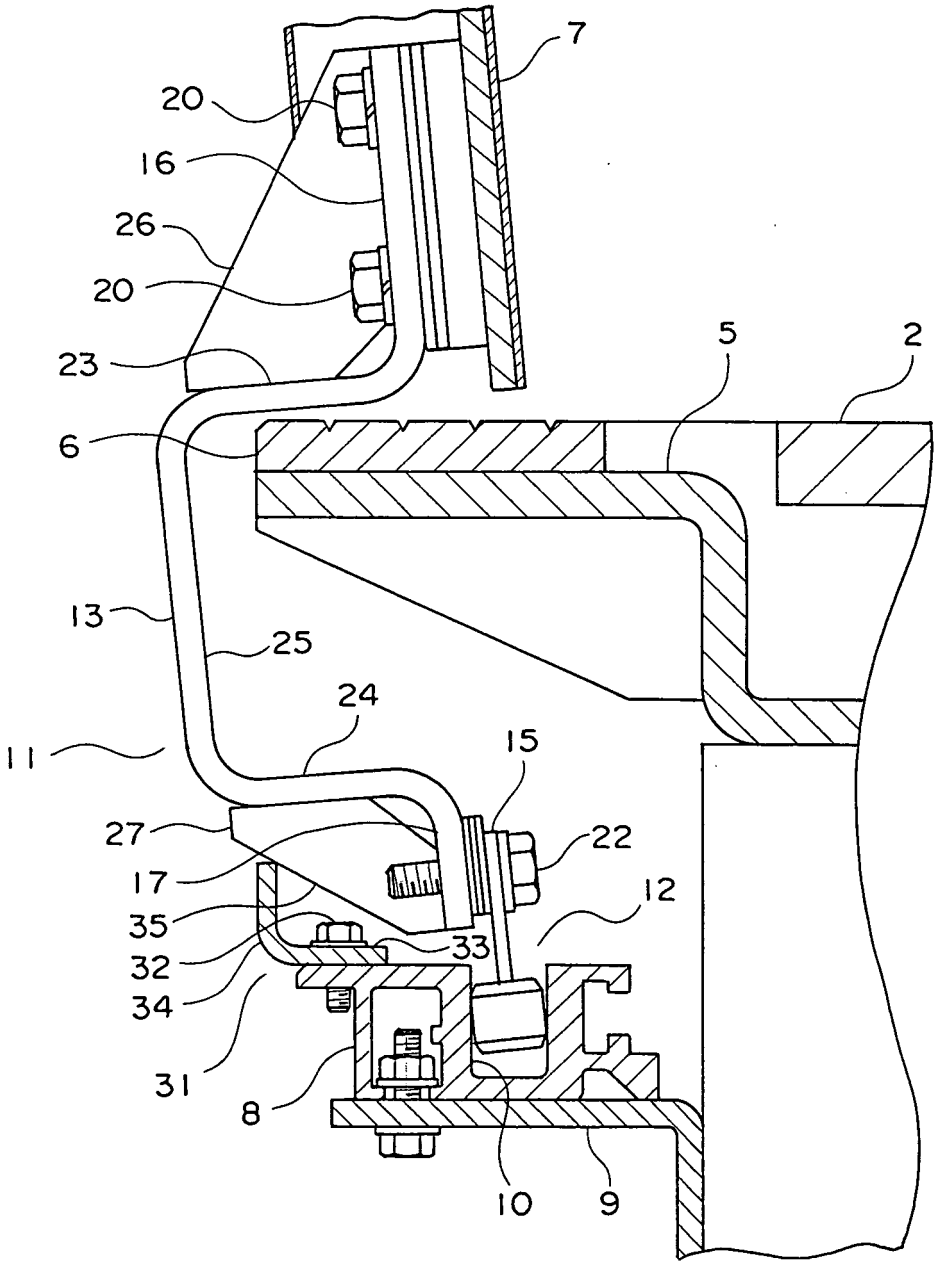


FIG. 3



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2004/016304

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] B66B13/30

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 1996-2005
Kokai Jitsuyo Shinan Koho 1971-2005 Toroku Jitsuyo Shinan Koho 1994-2005

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 A	JP 60-80672 A (Hitachi, Ltd.), 08 May, 1985 (08.05.85), Page 2, upper right column, line 18 to lower left column, line 17; Figs. 6 to 7 (Family: none)	1,3 2,4-5 6
Y	JP 2-282182 A (Mitsubishi Electric Corp.), 19 November, 1990 (19.11.90), Page 2, upper left column, line 17 to upper right column, line 14; Figs. 1 to 2 (Family: none)	2,4
Y A	JP 3061751 B2 (Kone Corp.), 10 July, 2000 (10.07.00), Par. No. [0007]; Fig. 2 & US 5715913 A1 & EP 0708052 A2 & FI 944979 A	5 1

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

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Date of the actual completion of the international search	Date of mailing of the international search report
29 July, 2005 (29.07.05)	16 August, 2005 (16.08.05)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2004/016304

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CD-ROM of the specification and drawings annexed to the request of Japanese Utility Model Application No. 28511/1992(Laid-open No. 86973/1993) (Hitachi Building System Eng. & Service Co., Ltd.), 22 November, 1993 (22.11.93), Par. No. [0008]; Figs. 1 to 3 (Family: none)	1
A	US 5706913 A (OTIS ELEVATOR CO.), 13 January, 1998 (13.01.98), Abstract; Fig. 3 & EP 0771755 A2	

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 3061751 B **[0003]**