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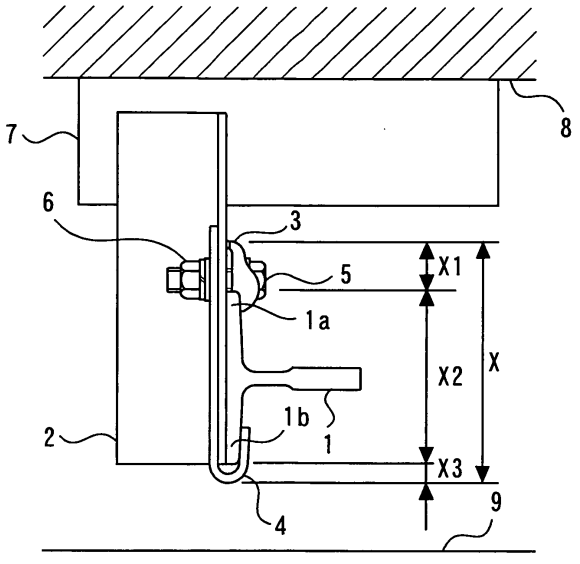
(54) **SUPPORT DEVICE FOR ELEVATOR GUIDE RAIL**

(57) In an elevator guide rail supporting device including an elevator guide rail which is erected in an elevator shaft to guide the up-and-down movement of a cab and a counterweight; a rail-side bracket for fixing the guide rail to a shaft wall; and clips for attaching and fixing flange portions at both sides of the guide rail to the rail-side bracket, the elevator guide rail supporting device includes a first rail clip which is provided on the back surface side of the rail-side bracket and is provided with a hook portion at the tip end thereof, the hook portion attaching a cab-side flange portion of the guide rail and the rail-side bracket to each other in such a manner as to hold the two elements by means of the first rail clip; and a second rail clip for fasteningly fixing a shaft wall-side flange portion of the guide rail to the rail-side bracket together with the first rail clip in the end portion on the side opposite to the hook portion at the tip end of the first rail clip. By this configuration, the plane (transverse) dimension of the rail-side bracket portion necessary for fixing the guide rail is decreased, so that the plane dimension of the shaft can be decreased.

Fig. 1



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Description

Technical Field

[0001] The present invention relates to an elevator guide rail supporting device and, more particularly, to the miniaturization of a counterweight-side guide rail supporting device.

Background Art

[0002] In recent years, the space-saving of an elevator has been demanded. In a low speed region, this demand has been met by the disuse of a machine room realized by the use of a machine room-less elevator. However, it is necessary to mount elevator equipment such as a traction machine and a control panel, which has conventionally been disposed in the machine room, in an elevator shaft. Therefore, the plane dimension of the shaft must be equal to or larger than the plane dimension of an elevator with a machine room. To solve this problem, the elevator equipment such as a traction machine and a control panel has been made small and thin to address the space-saving problem of the shaft plane. Nevertheless, in some cases, the plane dimension of shaft increases as compared with the elevator with a machine room. The machine room-less elevator is becoming the mainstream of elevators. However, the equipment configuration of elevators does not change greatly as compared with the elevator with a machine room. Therefore, in order to reduce the plane dimension of shaft in the configuration of the present machine room-less elevator, it is also indispensable to make equipment other than the traction machine and the control panel small and thin.

Conventionally, an elevator guide rail that is erected in the shaft to guide the up-and-down movement of a cab and a counterweight is generally configured as described below. As shown in Figure 5, a rail-side bracket 2 is brought into contact with the back surface of a guide rail 1 having a T-shaped cross section, rail clips 3 are pressed against a flange portion 1a on the shaft wall side and a flange portion 1b on the cab side of the guide rail 1, and the guide rail 1 is fixed by a fastening part consisting of a bolt 5 and a nut 6. In Figure 5, reference numeral 7 denotes a wall-side bracket for fixing the guide rail 1 to a shaft wall 8, and 9 denotes the cab of the elevator. In the case of such a guide rail supporting device, the plane (transverse) dimension X of the rail-side bracket 2 portion necessary for fixing the guide rail 1 is the sum of the dimension $2X_1$ of the engagement of two rail clips 3 with the rail-side bracket 2 and the width dimension X_2 of the guide rail 1: that is, $X = 2X_1 + X_2$.

On the other hand, in the case of the counterweight-side guide rail, the arrangement position of the guide rail 1 is determined by a clearance between the cab 9 and the rail-side bracket 2 of the counterweight-side guide rail 1 depending on the width of the counterweight. Therefore, if the above-described plane (transverse) dimension X of the rail-side bracket 2 portion necessary for fixing the guide rail 1 is small, the counterweight-side guide rail 1 can be arranged so as to be close to the cab 9 side, so that the plane dimension of the shaft can be reduced.

[0003] Also, as a conventional elevator guide rail supporting device, a guide rail supporting device has been known which includes a base part that is in contact with the bottom surface of a bottom flange of a guide rail, a folding back piece that is provided integral with the base part and elastically holds one side part of the bottom flange of the guide rail, and a rail clip that is fastened to the base part via a bolt to press the other side part of the bottom flange of the guide rail toward the base part, and elastically holds one side part of the bottom flange of the guide rail between the base part and the folding back piece and holds the other side part of the bottom flange of the guide rail by means of the rail clip and the base part (for example, refer to Patent Document 1).

Also, an elevator guide rail supporting device has been known which uses an L-shaped rail clip so that the projection amount of the rail clip from the guide rail side face is reduced and the interference with other equipment in the shaft is prevented (for example, refer to Patent Document 2).

[0004]

Patent Document 1: Japanese Patent Laid-Open No. 6-156925

Patent Document 2: Japanese Patent Laid-Open No. 2004-18260

Disclosure of the Invention

Problems to be Solved by the Invention

[0005] For the conventional elevator guide rail, since the plane (transverse) dimension X of the rail-side bracket 2 portion necessary for fixing the guide rail 1 is the sum of the dimension $2X_1$ of the engagement of two rail clips 3 with the rail-side bracket 2 and the width dimension X_2 of the guide rail 1: that is, $X = 2X_1 + X_2$, there arises a problem in that in the case where the arrangement of the counterweight-side guide rail 1 is considered, the plane (transverse) dimension X of the rail-side bracket 2 portion necessary for fixing the guide rail 1 is large, so that the plane dimension of the shaft cannot be decreased.

[0006] Also, in Patent Document 1, since the flange of the guide rail is elastically held by a folding back part of the base part, the base part itself must be handled when the guide rail is installed. Because the base part supports the guide rail, the base part is required to have a high strength and hence must be relatively heavy, which poses a problem of poor workability. Also, since the flange of the guide rail is elastically held by the folding back part of the base part, the work for fitting the folding back part on the flange of the guide rail provided in the height direction in a limited space of the shaft is not easy.

[0007] The present invention has been made to solve the above problems, and accordingly an object thereof is to provide an elevator guide rail supporting device in which the mounting dimension of a rail-side bracket is decreased and hence the plane dimension of an elevator shaft is decreased by changing the construction of a rail clip. Means for Solving the Problems

[0008] The present invention provides an elevator guide rail supporting device including an elevator guide rail which is erected in an elevator shaft to guide the up-and-down movement of a cab and a counterweight; a rail-side bracket for fixing the guide rail to a shaft wall; and clips for attaching and fixing flange portions at both sides of the guide rail to the rail-side bracket, characterized in that the elevator guide rail supporting device includes a first rail clip which is provided on the back surface side of the rail-side bracket and is provided with a hook portion at the tip end thereof, the hook portion attaching a cab-side flange portion of the guide rail and the rail-side bracket to each other in such a manner as to hold the two elements by means of the first rail clip; and a second rail clip for fasteningly fixing a shaft wall-side flange portion of the guide rail to the rail-side bracket together with the first rail clip in the end portion on the side opposite to the hook portion at the tip end of the first rail clip.

[0009] Also, the first rail clip has a frictional holding force increased by pressing the back surface of the guide rail using a bolt and nut at a place on the hook portion side at the tip end thereof.

[0010] Also, a plurality of second rail clips are installed in the up and down direction in the end portion on the side opposite to the hook portion at the tip end of the first rail clip.

[0011] Also, the first rail clip has a frictional holding force increased by pressing the back surface of the guide rail using a plurality of bolts and nuts at a place on the hook portion side at the tip end thereof.

[0012] Also, a jack bolt is provided in the shaft-side end portion of the rail-side bracket, and a bolt bearer which bears the tip end portion of the jack bolt is provided in the end portion on the side opposite to the hook portion at the tip end of the first rail clip.

[0013] Further, the elevator guide rail supporting device is used for a counterweight-side guide rail.

Advantages of the Invention

[0014] According to the present invention, since the plane (transverse) dimension X of the rail-side bracket portion necessary for fixing the guide rail is smaller than the case where two rail clips having the conventional construction are used, the counterweight-side guide rail can be moved offsetly to the cab side, so that the plane dimension of the shaft can be decreased by the offset amount.

Brief Description of the Drawings

[0015]

Figure 1 is a partial plan view of an elevator shaft, showing an elevator guide rail supporting device of embodiment 1 in accordance with the present invention;

Figure 2 is a plan view showing a difference in the plane dimension of an elevator shaft between an elevator guide rail supporting device of embodiment 1 in accordance with the present invention and a conventional elevator guide rail supporting device;

Figure 3 is a partial plan view of an elevator shaft, showing an elevator guide rail supporting device of embodiment 2 in accordance with the present invention;

Figure 4 is a partial plan view of an elevator shaft, showing an elevator guide rail supporting device of embodiment 3 in accordance with the present invention; and

Figure 5 is a partial plan view of an elevator shaft, showing a conventional elevator guide rail supporting device.

Description of Symbols

[0016]

1	counterweight-side guide rail
1a	shaft wall-side flange portion
1b	cab-side flange portion
2	rail-side bracket
3	second rail clip
4	first rail clip
4a	bolt bearer
5, 10	bolt
6, 11	nut
7	wall-side bracket
8	shaft wall
9	cab
12	jack bolt

Best Mode for Carrying Out the Invention

[0017] The present invention will now be described in more detail with reference to the accompanying drawings.

Embodiment 1

[0018]

Figure 1 is a partial plan view of an elevator shaft, showing an elevator guide rail supporting device of embodiment 1 in accordance with the present invention, and

Figure 2 is a plan view showing a difference in the

plane dimension of the elevator shaft between the elevator guide rail supporting device of embodiment 1 in accordance with the present invention and a conventional elevator guide rail supporting device.

The elevator guide rail in accordance with the present invention is installed as described below. As shown in Figure 1, a rail-side bracket 2 is brought into contact with the back surface of a counterweight-side guide rail 1 having a T-shaped cross section. First, a flange portion 1b on the cab side of the counterweight-side guide rail 1 is attached to the rail-side bracket 2 by a first rail clip 4, which is devised by the present invention. This first rail clip 4 is provided on the back surface side of the rail-side bracket 2 and is formed with a U-shaped hook portion at the tip end thereof, the hook portion hooking the flange portion 1b on the cab side of the counterweight-side guide rail 1, so that the flange portion 1b on the cab side of the counterweight-side guide rail 1 and the rail-side bracket 2 are attached to each other in such a manner as to be held by the first rail clip 4. Next, in the end portion on the side opposite to the U-shaped hook portion at the tip end of the first rail clip 4, a flange portion 1a on the shaft wall side of the counterweight-side guide rail 1 is attached to the rail-side bracket 2 by a second rail clip 3, which has the same construction as that of the conventional rail clip, using a fastening part consisting of, for example, a bolt 5 and a nut 6. In Figure 1, reference numeral 7 denotes a wall-side bracket for fixing the counterweight-side guide rail 1 to a shaft wall 8, and 9 denotes a cab. Thereby, the counterweight-side guide rail 1 is fixed to the rail-side bracket 2. At this time, since the first rail clip 4 holds the rail-side bracket 2 and the flange portion 1b of the guide rail 1 in such a manner as to nip them, the rail-side bracket 2 can be fixed in advance. Therefore, when the guide rail is installed, only the second rail clip 3 has to be handled, so that the work is relatively easy.

In the case where the first rail clip 4 for attaching the flange portion 1b on the cab side of the counterweight-side guide rail 1 to the rail-side bracket 2 has a construction shown in Figure 1, the plane (transverse) dimension X of the rail-side bracket 2 portion necessary for fixing the guide rail 1 is the sum of the dimension X_1 of the engagement of the second rail clip 3 with the rail-side bracket 2, the width dimension X_2 of the guide rail 1, and the projection X_3 of the U-shaped hook portion at the tip end of the first rail clip 4 from the end of the rail-side bracket 2: that is, $X = X_1 + X_2 + X_3$. Herein, the relationship of $X_1 > X_3$ holds. Therefore, in the case where the first rail clip 4 in accordance with the present invention is used, as shown in Figure 2, the plane (transverse) dimension X of the rail-side bracket 2 portion necessary for fixing the guide rail 1 is smaller than the case where two second rail clips 3 having the conventional construction are used, so that the plane dimension of the shaft can be decreased.

The dimensions shown in Figure 2 are as described below. A1 is the dimension from the cab 9 to the end of the rail-side bracket 2, and A2 is the dimension from the cab 9 to the tip end of the first rail clip 4. The relationship therebetween is A1 = A2. Also, B1 is the dimension from the end of the rail-side bracket 2 to the center of the counterweight-side guide rail 1, and B2 is the dimension from the tip end of the first rail clip 4 to the center of the counterweight-side guide rail 1. The relationship therebetween is B1 > B2. Also, C is the dimension from the center of the counterweight-side guide rail 1 to the shaft wall 8. D1 is the dimension from the cab 9 to the shaft wall 8 in the case where two second rail clips 3 having the conventional construction are used, and D2 is the dimension from the cab 9 to the shaft wall 8 in the case where the first rail clip 4 in accordance with the present invention is used. The relationship therebetween is D1 > D2. E is the difference dimension (D1 - D2) between the elevator guide rail supporting device in accordance with the present invention and the conventional supporting device. Therefore, the counterweight-side guide rail 1 can be moved offsetly to the cab 9 side by the dimension E, so that the plane dimension of the shaft can be decreased.

[0019] As described above, according to embodiment 1 of the present invention, the plane (transverse) dimension X of the rail-side bracket portion necessary for fixing the guide rail is smaller than the case where two second rail clips having the conventional construction are used, so that the counterweight-side guide rail can be moved offsetly to the cab side. As a result, the plane dimension of the shaft can be decreased by the offset amount.

Embodiment 2

[0020] Figure 3 is a partial plan view of the elevator shaft, showing an elevator guide rail supporting device of embodiment 2 in accordance with the present invention.

In embodiment 2, as shown in Figure 3, on the U-shaped hook portion side of the tip end of the first rail clip 4, an internal thread is formed in the rail-side bracket 2, a bolt 10 and a nut 11 are supported by the internal thread portion from the back surface of the counterweight-side guide rail 1, and the first rail clip 4 is pressed by the bolt 10 and the nut 11 to increase the frictional holding force of the attachment surface between the first rail clip 4 and the rail-side bracket 2. Thereby, for example, in the case where the total mass of the counterweight is large, even if the lateral load applied to the counterweight-side guide rail 1 is high, for example, at the time of earthquake, a transverse shift of the first rail clip 4 can be prevented.

Also, in the above-described situation, further effects can be anticipated by increasing the number of places at which the counterweight-side guide rail 1 is fixed by the second rail clip 2 having the conventional construction in the up and down direction in the end portion on the side opposite to the U-shaped hook portion at the tip end of the first rail clip 4, or by increasing the number of fastening parts each consisting of the bolt 5 and the nut 6.

According to embodiment 2, it is a matter of course that the same operation and effects as those of example 1 can be obtained. Also, since the construction is such that the first rail clip 4 is pressed by the bolt 10 and the nut 11, the work for fitting the first rail clip 4 on the flange portion 1b is relatively easy, and the first rail clip 4 can be fixed more surely by the bolt and nut.

Embodiment 3

[0021] Figure 4 is a partial plan view of the elevator shaft, showing an elevator guide rail supporting device of embodiment 3 in accordance with the present invention.

In embodiment 3, to secure the holding force of the first rail clip 4, as shown in Figure 4, a jack bolt 12 is installed in the end portion on the shaft wall 8 side of the rail-side bracket 2, and a bolt bearer 4a that bears the tip end portion of the jack bolt 12 is bendingly formed in the end portion on the side opposite to the U-shaped portion at the tip end of the first rail clip 4. The bolt bearer 4a in the end portion on the side opposite to the U-shaped portion at the tip end of the first rail clip 4 is pressed by the jack bolt 12, by which the holding force of the first rail clip 4 is increased. Thereby, for example, in the case where the total mass of the counterweight is large, even if the lateral load applied to the counterweight-side guide rail 1 is high, for example, at the time of earthquake, a transverse shift of the first rail clip 4 can be prevented.

Industrial Applicability

[0022] As described above, for the elevator guide rail supporting device in accordance with the present invention, the plane (transverse) dimension X of the rail-side bracket portion necessary for fixing the guide rail is small, and by offsetly moving the counterweight-side guide rail to the cab side, the plane dimension of the shaft can be decreased by the offset amount.

Claims

1. An elevator guide rail supporting device comprising an elevator guide rail which is erected in an elevator shaft to guide the up-and-down movement of a cab and a counterweight; a rail-side bracket for fixing the guide rail to a shaft wall; and clips for attaching and fixing flange portions at both sides of the guide rail to the rail-side bracket, **characterized in that** the elevator guide rail supporting device comprises:

   a first rail clip which is provided on the back surface side of the rail-side bracket and is provided with a hook portion at the tip end thereof, the hook portion attaching a cab-side flange portion of the guide rail and the rail-side bracket to each other in such a manner as to hold the two elements by means of the first rail clip; and
   a second rail clip for fasteningly fixing a shaft wall-side flange portion of the guide rail to the rail-side bracket together with the first rail clip in the end portion on the side opposite to the hook portion at the tip end of the first rail clip.

2. The elevator guide rail supporting device according to claim 1, **characterized in that** the first rail clip has a frictional holding force increased by pressing the back surface of the guide rail using a bolt and nut at a place on the hook portion side at the tip end thereof.

3. The elevator guide rail supporting device according to claim 1, **characterized in that** a plurality of second rail clips are installed in the up and down direction in the end portion on the side opposite to the hook portion at the tip end of the first rail clip.

4. The elevator guide rail supporting device according to claim 1, **characterized in that** the first rail clip has a frictional holding force increased by pressing the back surface of the guide rail using a plurality of bolts and nuts at a place on the hook portion side at the tip end thereof.

5. The elevator guide rail supporting device according to claim 1, **characterized in that** a jack bolt is provided in the shaft-side end portion of the rail-side bracket, and a bolt bearer which bears the tip end portion of the jack bolt is provided in the end portion on the side opposite to the hook portion at the tip end of the first rail clip.

6. The elevator guide rail supporting device according to any one of claims 1 to 5, **characterized in that** the elevator guide rail supporting device is used for a counterweight-side guide rail.

Fig. 1

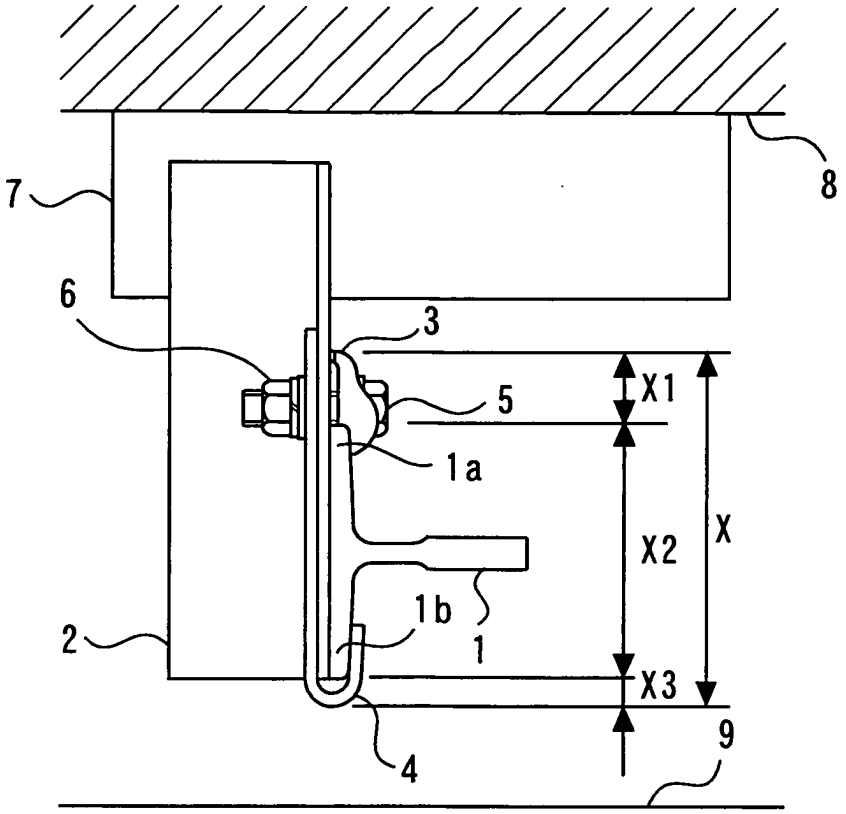


Fig. 2

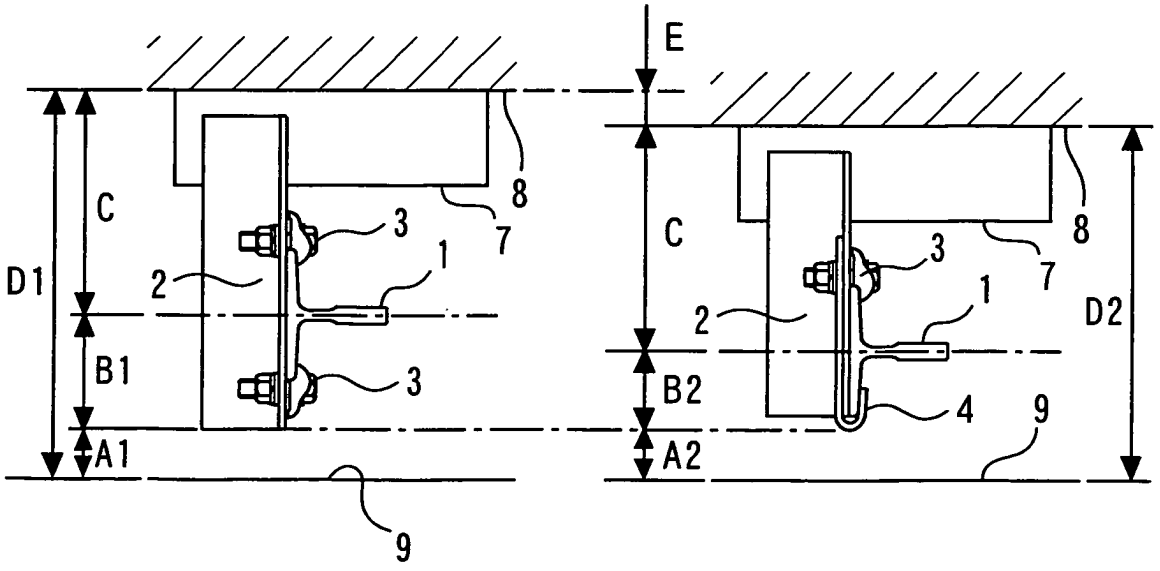


Fig. 3

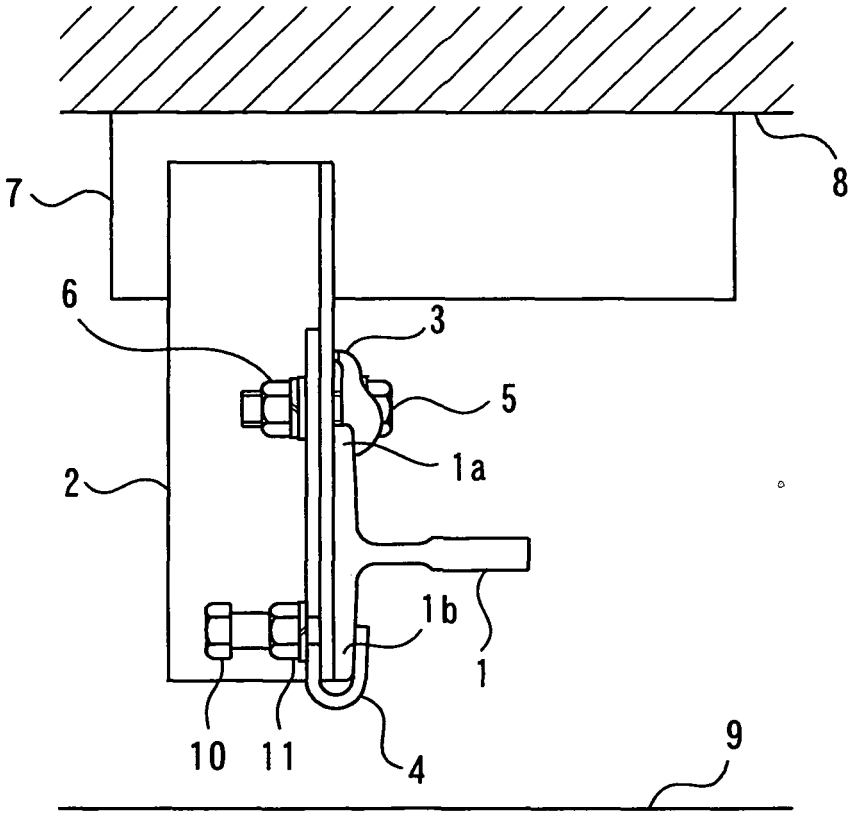


Fig. 4

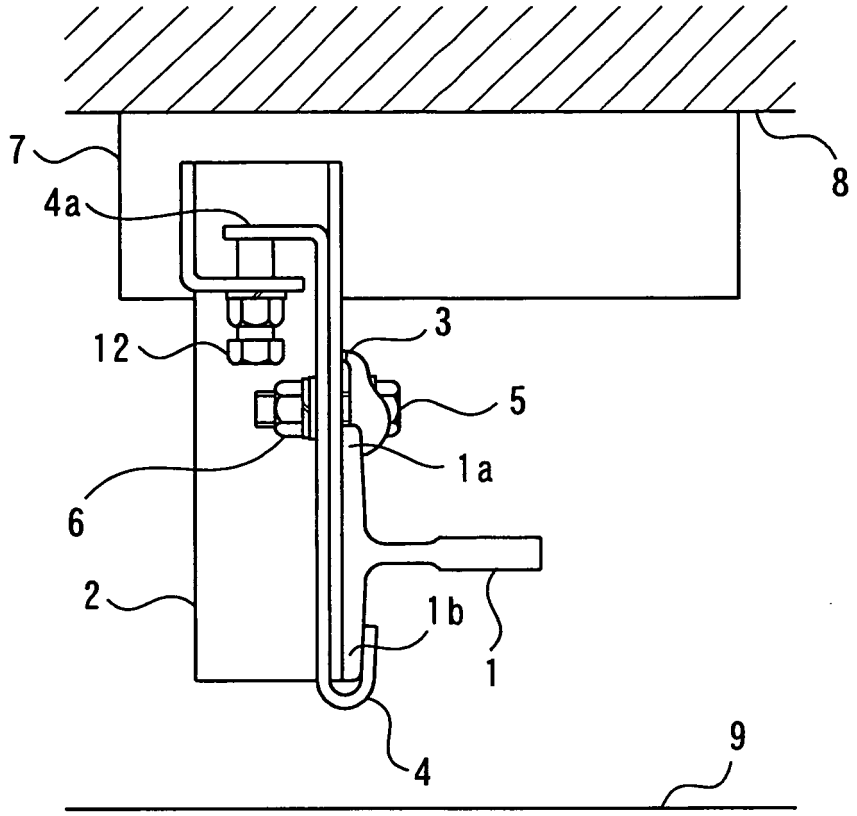
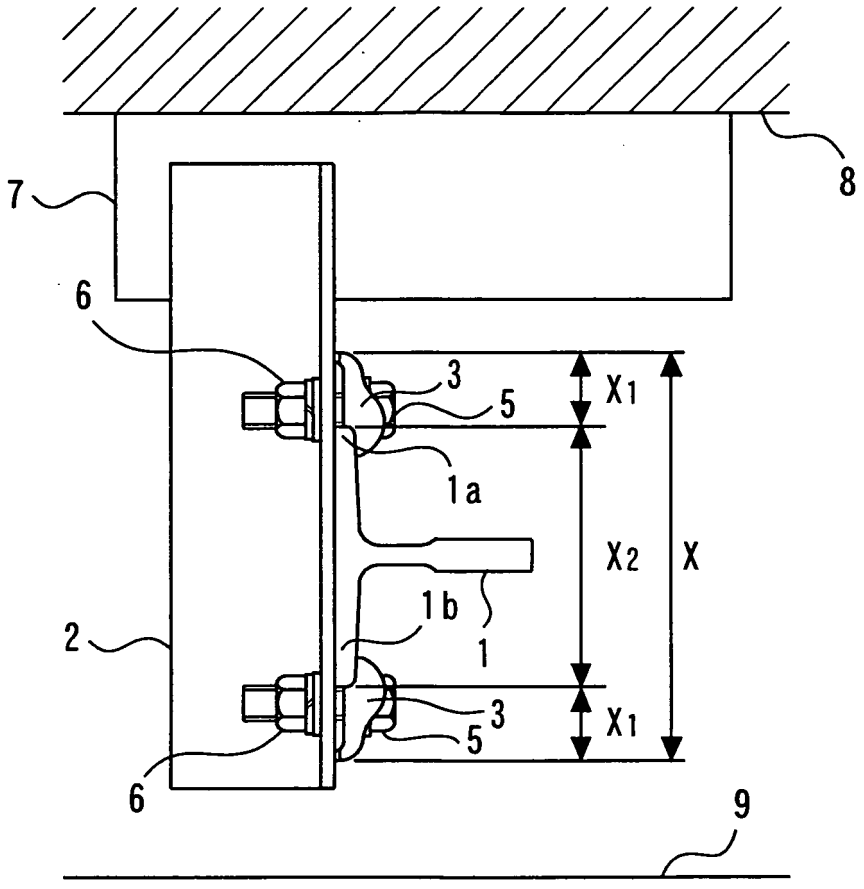


Fig. 5



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2006/305681

A. CLASSIFICATION OF SUBJECT MATTER
B66B7/02(2006.01)i

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)
B66B7/02

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 1996-2006
Kokai Jitsuyo Shinan Koho 1971-2006 Toroku Jitsuyo Shinan Koho 1994-2006

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.
A	JP 06-156925 A (Kabushiki Kaisha Hitachi Building System Service), 03 June, 1994 (03.06.94), (Family: none)	1-6
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 037937/1989(Laid-open No. 129375/1990) (Hitachi Elevator Service Kabushiki Kaisha), 25 October, 1990 (25.10.90), (Family: none)	1-6
A	JP 2004-018260 A (Mitsubishi Electric Corp.), 22 January, 2004 (22.01.04), (Family: none)	2,4

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 December, 2006 (14.12.06)	26 December, 2006 (26.12.06)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2006/305681

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 002549/1975(Laid-open No. 084063/1976) (Mitsubishi Electric Corp.), 06 July, 1976 (06.07.76), (Family: none)	2,4

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 6156925 A **[0004]**
- JP 2004018260 A **[0004]**