



(11) **EP 1 284 232 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
23.12.2009 Bulletin 2009/52

(21) Application number: **00919162.8**

(22) Date of filing: **24.04.2000**

(51) Int Cl.:
B66B 7/00 (2006.01) B66B 11/04 (2006.01)

(86) International application number:
PCT/JP2000/002668

(87) International publication number:
WO 2001/081227 (01.11.2001 Gazette 2001/44)

(54) **ELEVATOR DEVICE**

AUFZUG

ASCENSEUR

(84) Designated Contracting States:
DE FR GB NL

(43) Date of publication of application:
19.02.2003 Bulletin 2003/08

(73) Proprietor: **MITSUBISHI DENKI KABUSHIKI KAISHA**
Chiyoda-ku
Tokyo 100-8310 (JP)

(72) Inventor: **KODERA, Hideaki**
Mitsubishi Denki Kabushiki Kaisha
Tokyo 100-8310 (JP)

(74) Representative: **HOFFMANN EITLE**
Patent- und Rechtsanwälte
Arabellastrasse 4
81925 München (DE)

(56) References cited:
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JP-A- 8 208 152 JP-A- 2000 044 146
JP-A- 2000 153 973

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Description

TECHNICAL FIELD

[0001] The present invention relates to an elevator apparatus comprising: a hoistway, a plurality of guide rails installed in said hoistway, a car and a counterweight guided by said guide rails to be raised and lowered in said hoistway, a main rope suspending said car and said counterweight in said hoistway, and a hoisting machine suspended from a top portion of at least one of said guide rails to be supported by said guide rail for raising and lowering said car and said counterweight through said main rope. Such a traction elevator is known from JP 2000 044146. Embodiments of the invention provide a machine-room-less type elevator apparatus that does not have a specialized machine room for installing a driving machine where the hoisting machine is disposed in a hoistway.

BACKGROUND ART

[0002] Conventionally, for example, Japanese Patent Application Laid-Open No. Hei 8-208152 shows an elevator in which a machine base is fixed to upper portions of one or more guide rails and a hoisting machine is installed on the machine base. However, in such a construction, there is a need to provide a bracketing (bracing) for the hoisting machine between the wall of the hoistway and the hoisting machine, thereby complicating the construction and increasing the cost.

[0003] Further, although a method where the hoisting machine is attached to the middle portions of the guide rails and the bracketing is supported by portions of the guide rails extending above the hoisting machine are conceivable, this requires special processes for providing reamer bolts, knock pins or the like to the guide rails for attaching the hoisting machine to the middle portions of the guide rails, thereby increasing the cost.

[0004] US 6,193,017 discloses a traction sheave elevator, provided without a counter-weight. A rope is used to carry the car, which is guided in the elevator shaft.

[0005] EP 0 846 645 and EP 0 891 939 disclose a similar elevator.

DISCLOSURE OF THE INVENTION

[0006] The present invention according to a first aspect relates to an elevator apparatus as initially described and is characterised by: a machine base installed between the top portions of said guide rails, wherein said hoisting machine is suspended under said machine base; and a bracketing for preventing said hoisting machine from swaying by engaging with said guide rail is attached to said hoisting machine.

[0007] The present invention according to a second aspect again relates to an elevator apparatus as initially described and is **characterised in that** a bracketing for

preventing said hoisting machine from swaying by engaging with said guide rail is attached to said hoisting machine, and said hoisting machine is provided with a pair of connecting portions horizontally projected from its upper end portion, and said connecting portion is fixed to the top portion of said guide rail.

[0008] At least one embodiment of the present invention is made to solve the problems mentioned above, and at least one embodiment of the present invention is to provide an elevator apparatus, wherein a hoisting machine can be supported by guide rails with a simple construction, thereby reducing the cost.

[0009] To this end, according to one embodiment of the present invention, there is provided an elevator apparatus comprising: a hoistway; a plurality of guide rails installed in the hoistway; a car and a counterweight guided by the guide rails to be raised and lowered in the hoistway; a main rope suspending the car and the counterweight in the hoistway; and a hoisting machine suspended from a top portion of at least one of the guide rails to be supported by the guide rail for raising and lowering the car and the counterweight through the main rope.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] To enable a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made, by way of example only, to the accompanying drawings, in which:

Fig. 1 is a perspective view showing an elevator apparatus according to a first embodiment of the present invention;

Fig. 2 is a front view showing a portion in Fig. 1;

Fig. 3 is a cross-sectional view along the line III-III in Fig. 2;

Fig. 4 is a cross-sectional view along the line IV-IV in Fig. 2;

Fig. 5 is a plan view showing the bracketing in Fig. 2;

Fig. 6 is a side view showing the bracketing in Fig. 5;

Fig. 7 is a front view showing the bracketing in Fig. 5;

Fig. 8 is a front view showing a portion of an elevator apparatus according to a second embodiment of the present invention;

Fig. 9 is a cross-sectional view along the line IX-IX in Fig. 8;

Fig. 10 is a cross-sectional view along the line X-X in Fig. 8;

Fig. 11 is a front view showing a portion of an elevator apparatus according to a third embodiment of the present invention;

Fig. 12 is a cross-sectional view along the line XII-XII in Fig. 11;

Fig. 13 is a cross-sectional view along the line XIII-XIII in Fig. 11;

Fig. 14 is a front view showing a portion of an elevator apparatus according to a fourth embodiment of the present invention;

Fig. 15 is a cross-sectional view along the line XV-XV in Fig. 14;

Fig. 16 is a cross-sectional view along the line XVI-XVI in Fig. 14;

Fig. 17 is a front view showing a portion of an elevator apparatus according to a fifth embodiment of the present invention;

Fig. 18 is a cross-sectional view along the line XVIII-XVIII in Fig. 17;

Fig. 19 is a cross-sectional view along the line XIX-XIX in Fig. 17;

Fig. 20 is a front view showing a portion of an elevator apparatus according to a sixth embodiment of the present invention;

Fig. 21 is a cross-sectional view along the line XXI-XXI in Fig. 20;

Fig. 22 is a cross-sectional view along the line XXII-XXII in Fig. 20;

Fig. 23 is a front view showing a portion of an elevator apparatus according to a seventh embodiment of the present invention;

Fig. 24 is a cross-sectional view along the line XXIV-XXIV in Fig. 23;

Fig. 25 is a cross-sectional view along the line XXV-XXV in Fig. 23;

Fig. 26 is a front view showing a portion of an elevator apparatus according to an eighth embodiment of the present invention;

Fig. 27 is a cross-sectional view along the line XXVII-XXVII in Fig. 26; and

Fig. 28 is a cross-sectional view along the line XXVIII-XXVIII in Fig. 26.

BEST MODE FOR CARRYING OUT THE INVENTION

[0011] Preferred embodiments of the present invention will be described, by way of example, below with reference to the accompanying drawings.

First Embodiment

[0012] Fig. 1 is a perspective view showing an elevator apparatus according to a first embodiment of the present invention. In the figure, a pair of car guide rails 2 and a pair of counterweight guide rails 3 are installed in a hoistway 1. A car 4 is guided by the car guide rails 2 and raised and lowered in the hoistway 1. A counterweight 5 is guided by the counterweight guide rails 3 and raised and lowered in the hoistway 1.

[0013] The car 4 and the counterweight 5 are suspended in the hoistway 1 by a main rope 6. A pair of car suspending sheaves 7 around which the main rope 6 is wound are provided at a bottom portion of the car 4. A counterweight suspending sheave 8 around which the main rope 6 is wound is provided at a top portion of the counterweight 5.

[0014] One end portion of the main rope 6 is fixed to a car side rope fixing member 9 fixed to a top portion of

one of the car guide rails 2. The other end portion of the main rope 6 is fixed to a counterweight side rope fixing member 10 installed between the counterweight guide rails 3.

[0015] A machine base 11 is installed between the top portions of the pair of counterweight guide rails 3. A hoisting machine 12 for raising and lowering the car 4 and the counterweight 5 is suspended and supported by the machine base 11. A pair of bracketings 13 are fixed to the hoisting machine 12. These bracketings 13 prevent the hoisting machine 12 from swaying (swinging) in a horizontal direction by engaging with the counterweight guide rails 3.

[0016] Fig. 2 is a front view showing a portion in Fig. 1, Fig. 3 is a cross-sectional view along the line III-III in of Fig. 2, and Fig. 4 is a cross-sectional view along the line IV-IV in Fig. 2. In the figures, mounting brackets 14 are fixed to the top portions of the pair of counterweight guide rails 3, respectively. Each mounting bracket 14 has a horizontal contact portion 14a which contacts the upper end surface of the counterweight guide rail 3. Further, the mounting brackets 14 are fixed to the counterweight guide rails 3 by a plurality of nut and bolt sets 15 by using rail extension holes previously provided at the rail ends.

[0017] The machine base 11 is fixed on the pair of contact portions 14a. The hoisting machine 12 has a pair of hoisting machine suspending members 16 bolted to the machine base 11. The pair of bracketings 13 are fixed to the pair of hoisting machine suspending members 16, respectively.

[0018] Fig. 5 is a plan view showing the bracketing 13 in Fig. 2, Fig. 6 is a side view showing the bracketing 13 in Fig. 5, and Fig. 7 is a front view showing the bracketing 13 in Fig. 5. The bracketing 13 has a frame 13a made of metal and elastic members 13b adhered to the frame 13a to contact the counterweight guide rail 3.

[0019] In such an elevator apparatus, since the hoisting machine 12 is suspended from the top portions of the counterweight guide rails 3, the hoisting machine 12 can be supported with a simple construction, thereby reducing the cost. Also, since the bracketings 13 engaging with the counterweight guide rails 3 are used, installation is facilitated, and the construction can further be simplified as compared with a case where the bracketings are fixed to the wall of the hoistway 1.

[0020] Further, since the hoisting machine 12 is suspended through the machine base 11, differences in the distance between the counterweight guide rails 3 can be absorbed by the machine base 11, so that commonality in the hoisting machine 12 can be achieved.

[0021] Furthermore, since the mounting brackets 14 for fixing the machine base 11 to the counterweight guide rails 3 are fixed to the counterweight guide rails 3 by using the rail extension holes previously provided at the rail ends, there is no need to carry out a special process for providing reamer bolts, knock pins or the like to the counterweight guide rails 3, thereby reducing cost.

Second Embodiment

[0022] Next, Fig. 8 is a front view showing a portion of an elevator apparatus according to a second embodiment of the present invention, Fig. 9 is a cross-sectional view along the line IX-IX in Fig. 8, and Fig. 10 is a cross-sectional view along the line X-X in Fig. 8.

[0023] In the first embodiment, the hoisting machine 12 is suspended from the top portions of the counterweight guide rails 3 through the machine base 11. In contrast, connecting portions 12a provided at the hoisting machine 12 are fixed to the contact portions 14a of the mounting brackets 14 by a plurality of bolts 17 in the second embodiment. The connecting portions 12a are horizontally projected from the upper end portion of the hoisting machine 12. The other constructions are the same as in the first embodiment.

[0024] In such an elevator apparatus, since the connecting portions 12a of the hoisting machine 12 are directly fixed to the mounting brackets 14 without using the machine base, the construction can be simplified by reducing the number of parts, and installation can be facilitated.

Third Embodiment

[0025] It should be noted that, while, in the first embodiment, the bracketings 13 engaging with the counterweight guide rails 3 are fixed to the hoisting machine 12, the bracketings may be omitted, for example, as shown in Figs. 11 to 13 when the hoisting machine 12 is resistant to sway, for example, in the case where a relatively small sized hoisting machine 12 is used.

Fourth Embodiment

[0026] Further, for example, as shown in Figs. 14 to 16, the bracketing may be omitted with a construction similar to that in the second embodiment.

Fifth Embodiment

[0027] Next, Fig. 17 is a front view showing a portion of an elevator apparatus according to a fifth embodiment of the present invention, Fig. 18 is a cross-sectional view along the line XVIII-XVIII in Fig. 17, and Fig. 19 is a cross-sectional view along the line XIX-XIX in Fig. 17.

[0028] In this fifth embodiment, elastic members 21 are interposed between the mounting brackets 14 and the machine base 11. The other constructions are the same as in the first embodiment.

[0029] In such an elevator apparatus, vibrations from the hoisting machine 12 can be prevented by the elastic members 21 from being transmitted to the counterweight guide rails 3.

Sixth Embodiment

[0030] Next, Fig. 20 is a front view showing a portion of an elevator apparatus according to a sixth embodiment of the present invention, Fig. 21 is a cross-sectional view along the line XXI-XXI in Fig. 20, and Fig. 22 is a cross-sectional view along the line XXII-XXII in Fig. 20.

[0031] In this sixth embodiment, the elastic members 21 are interposed between the connecting portions 12a of the machine base 12 and the mounting brackets 14. The other constructions are the same as in the second embodiment.

[0032] In such an elevator apparatus, vibrations from the hoisting machine 12 can be prevented by the elastic members 21 from being transmitted to the counterweight guide rails 3.

Seventh Embodiment

[0033] It should be noted that, while, in the fifth embodiment, the bracketings 13 engaging with the counterweight guide rails 3 are fixed to the hoisting machine 12, the bracketings may be omitted, for example, as shown in Figs. 23 to 25 when the hoisting machine 12 is resistant to sway, for example, in the case where a relatively small sized hoisting machine 12 is used.

Eighth Embodiment

[0034] Further, for example, as shown in Figs. 26 to 28, the bracketing may be omitted with a construction similar to that in the sixth embodiment.

[0035] It should be noted that, while, in the fifth to eighth embodiments, the hoisting machine 12 is supported by the counterweight guide rails 3, it is also possible for the hoisting machine 12 to be supported by the car guide rails 2 or by the car guide rails 2 and the counterweight guide rails 3 depending upon the layout.

Claims

1. An elevator apparatus comprising:
 - a hoistway (1);
 - a plurality of guide rails (2, 3) installed in said hoistway (1);
 - a car (4) and a counterweight (5) guided by said guide rails (3) to be raised and lowered in said hoistway (1);
 - a main rope (6) suspending said car (4) and said counterweight (5) in said hoistway (1);
 - a hoisting machine (12) suspended from a top portion of at least one of said guide rails (2, 3) to be supported by said guide rail (2, 3) for raising and lowering said car (4) and said counterweight (5) through said main rope (6); and
 - a machine base (11) installed between the top

- portions of said guide rails (2, 3), wherein said hoisting machine (12) is suspended under said machine base (11); **characterized in that** a bracketing (13) for preventing said hoisting machine (12) from swaying by engaging with said guide rail (2, 3) is attached to said hoisting machine (12).
2. An elevator apparatus according to claim 1, wherein said hoisting machine (12) is provided with a connecting portion (12a) horizontally projected from its upper end portion, and said connecting portion (12a) is fixed to the top portion of said guide rail (2, 3).
3. An elevator apparatus comprising:
- a hoistway (1);
 - a plurality of guide rails (2, 3) installed in said hoistway (1);
 - a car (4) and a counterweight (5) guided by said guide rails (2, 3) to be raised and lowered in said hoistway (1);
 - a main rope (6) suspending said car (4) and said counterweight (5) in said hoistway (1); and
 - a hoisting machine (12) suspended from a top portion of at least one of said guide rails (2, 3) to be supported by said guide rail (2, 3) for raising and lowering said car (4) and said counterweight (5) through said main rope (6);
- characterised in that:**
- a bracketing (13) for preventing said hoisting machine (12) from swaying by engaging with said guide rail (2, 3) is attached to said hoisting machine (12), and
 - said hoisting machine (12) is provided with a pair of connecting portions (12a) horizontally projected from its upper end portion, and said connecting portion (12a) is fixed to the top portion of said guide rail (2, 3).
4. An elevator apparatus according to any preceding claim, wherein said bracketing (13) has a frame (13a) fixed to said hoisting machine (12), and an elastic member (13b) provided at said frame (13a) to contact said guide rail (2, 3).
5. An elevator apparatus according to any preceding claim, further comprising a mounting bracket (14) fixed to the top portion of said guide rail (2, 3) by using a previously provided rail extension hole, wherein said hoisting machine (12) is suspended from the top portion of said guide rail (2, 3) through said mounting bracket (14).
6. An elevator apparatus according to any preceding claim, wherein an elastic member (21) for preventing vibrations of said hoisting machine (12) from trans-

mitting to said guide rail (2, 3) is interposed between said hoisting machine (12) and said guide rail (2, 3).

5 Patentansprüche

1. Aufzugvorrichtung, umfassend:

einen Schacht (1),
 eine Vielzahl von im Schacht (1) installierten Führungsschienen (2, 3),
 eine Kabine (4) und ein Gegengewicht (5), die durch die Führungsschienen (3) geführt werden, um im Schacht (1) angehoben und gesenkt zu werden,
 ein die Kabine und das Gegengewicht (5) im Schacht (1) aufhängendes Hauptseil (6),
 eine Hebemaschine (12), die von einem obersten Abschnitt von zumindest einer der Führungsschienen (2, 3) aufgehängt wird, um durch die Führungsschiene (2, 3) gestützt zu sein, um die Kabine (4) und das Gegengewichts (5) durch das Hauptseil (6) anzuheben und zu senken, und
 eine zwischen den obersten Abschnitten der Führungsschienen (2, 3) installierte Maschinenbasis (11), wobei die Hebemaschine (12) unter der Maschinenbasis (11) aufgehängt ist, **dadurch gekennzeichnet, dass:**

ein Halter (13) an der Hebemaschine (12) angebracht ist, um die Hebemaschine (12) daran zu hindern, durch Angreifen an der Führungsschiene (2, 3) zu schwanken.

2. Aufzugvorrichtung gemäß Anspruch 1, bei der die Hebemaschine (12) mit einem von seinem oberen Endabschnitt horizontal hervorstehenden Verbindungsabschnitt (12a) versehen ist, und der Verbindungsabschnitt (12a) am obersten Abschnitt der Führungsschiene (2, 3) fixiert ist.

3. Aufzugvorrichtung, umfassend:

einen Schacht (1),
 eine Vielzahl von im Schacht (1) installierten Führungsschienen (2, 3),
 eine Kabine (4) und ein Gegengewicht (5), die durch die Führungsschienen (3) geführt werden, um im Schacht (1) angehoben und gesenkt zu werden,
 ein die Kabine und das Gegengewicht (5) im Schacht (1) aufhängendes Hauptseil (6), und
 eine Hebemaschine (12), die von einem obersten Abschnitt von zumindest einer der Führungsschienen (2, 3) aufgehängt wird, um durch die Führungsschiene (2, 3) gestützt zu sein, um die Kabine (4) und das Gegengewichts (5) durch

- das Hauptseil (6) anzuheben und zu senken, **dadurch gekennzeichnet, dass** ein Halter (13) an der Hebemaschine (12) angebracht ist, um die Hebemaschine (12) daran zu hindern, durch Angreifen an der Führungsschiene (2, 3) zu schwanken, und die Hebemaschine (12) mit einem horizontal von ihrem oberen Endabschnitt hervorstehenden Paar Verbindungsabschnitte (12a) versehen ist, und der Verbindungsabschnitt (12a) am obersten Abschnitt der Führungsschiene (2, 3) fixiert ist.
4. Aufzugvorrichtung gemäß einem der vorangegangenen Ansprüche, bei welcher der Halter (13) einen an der Hebemaschine (12) fixierten Rahmen (13a), und ein am Rahmen (13a) vorgesehene elastisches Bauteil (13b) aufweist, um die Führungsschiene (2, 3) zu berühren.
5. Aufzugvorrichtung gemäß einem der vorangegangenen Ansprüche, weiter umfassend: einen am obersten Abschnitt der Führungsschiene (2, 3) unter Verwendung eines vorher vorgesehenen Schienen-erweiterungslochs fixierten Befestigungshalter (14), wobei die Hebemaschine (12) vom obersten Abschnitt der Führungsschiene (2, 3) durch den Befestigungshalter (14) aufgehängt ist.
6. Aufzugvorrichtung gemäß einem der vorangegangenen Ansprüche, bei der ein elastisches Bauteil (21) zwischen die Hebemaschine (12) und die Führungsschiene (2, 3) eingefügt ist, um Vibrationen der Hebemaschine (12) daran zu hindern, zur Führungsschiene (2, 3) übertragen zu werden.

Revendications

1. Ascenseur comprenant :
- une gaine (1) ;
 - une pluralité de glissières (2, 3) installées dans ladite gaine (1) ;
 - une cabine (4) et un contrepoids (5) guidés par lesdites glissières (3) pour être levés et abaissés dans ladite gaine (1) ;
 - un câble principal (6) suspendant ladite cabine (4) et ledit contrepoids (5) dans ladite gaine (1) ;
 - une machine de levage (12) suspendue à partir d'une partie supérieure d'au moins l'une desdites glissières (2, 3) pour être supportée par ladite glissière (2, 3) afin de lever et d'abaisser ladite cabine (4) et ledit contrepoids (5) au moyen dudit câble principal (6) ; et
 - une base de machine (11) installée entre les parties supérieures desdites glissières (2, 3), ladite machine de levage (12) étant suspendue en

dessous de ladite base de machine (11) ; **caractérisé par** un support (13) pour empêcher ladite machine de levage (12) d'osciller en venant en prise avec ladite glissière (2, 3) est fixé à ladite machine de levage (12).

2. Ascenseur selon la revendication 1, dans lequel ladite machine de levage (12) est dotée d'une partie de raccordement (12a) saillante horizontalement depuis sa partie d'extrémité supérieure, et ladite partie de raccordement (12a) est fixée à la partie supérieure de ladite glissière (2, 3).
3. Ascenseur comprenant :
- une gaine (1) ;
 - une pluralité de glissières (2, 3) installées dans ladite gaine (1) ;
 - une cabine (4) et un contrepoids (5) guidés par lesdites glissières (2, 3) pour être levés et abaissés dans ladite gaine (1) ;
 - un câble principal (6) suspendant ladite cabine (4) et ledit contrepoids (5) dans ladite gaine (1) ; et
 - une machine de levage (12) suspendue à partir d'une partie supérieure d'au moins l'une desdites glissières (2, 3) pour être supportée par ladite glissière (2, 3) afin de lever et d'abaisser ladite cabine (4) et ledit contrepoids (5) au moyen dudit câble principal (6) ;
- caractérisé en ce que :**
- un support (13) pour empêcher ladite machine de levage (12) d'osciller en venant en prise avec ladite glissière (2, 3) est fixé à ladite machine de levage (12), et
 - ladite machine de levage (12) est dotée d'une paire de parties de raccordement (12a) saillantes horizontalement depuis sa partie d'extrémité supérieure, et ladite partie de raccordement (12a) est fixée à la partie supérieure de ladite glissière (2, 3).
4. Ascenseur selon l'une quelconque des revendications précédentes, dans lequel ledit support (13) comprend une structure (13a) fixée à ladite machine de levage (12), et un élément élastique (13b) disposé sur ladite structure (13a) pour entrer en contact avec ladite glissière (2, 3).
5. Ascenseur selon l'une quelconque des revendications précédentes, comprenant également un support de montage (14) fixé à la partie supérieure de ladite glissière (2, 3) en utilisant un trou d'extension de glissière précédemment agencé, dans lequel ladite machine de levage (12) est suspendue depuis la partie supérieure de ladite glissière (2, 3) par ledit support de montage (14).

6. Ascenseur selon l'une quelconque des revendications précédentes, dans lequel un élément élastique (21) destiné à empêcher que les vibrations de ladite machine de levage (12) soient transmises à ladite glissière (2, 3) est intercalé entre ladite machine de levage (12) et ladite glissière (2, 3).

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FIG. 1

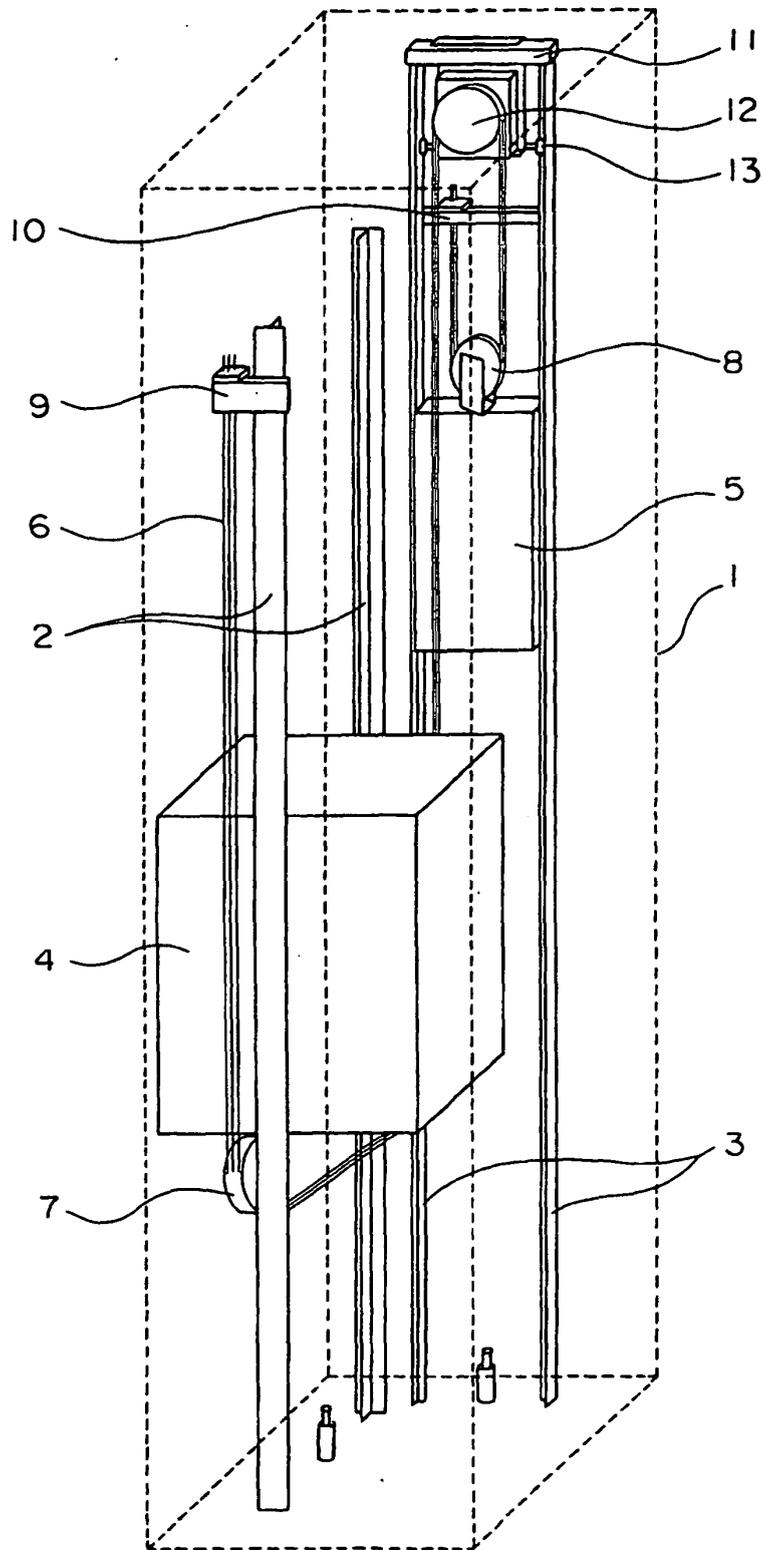


FIG. 2

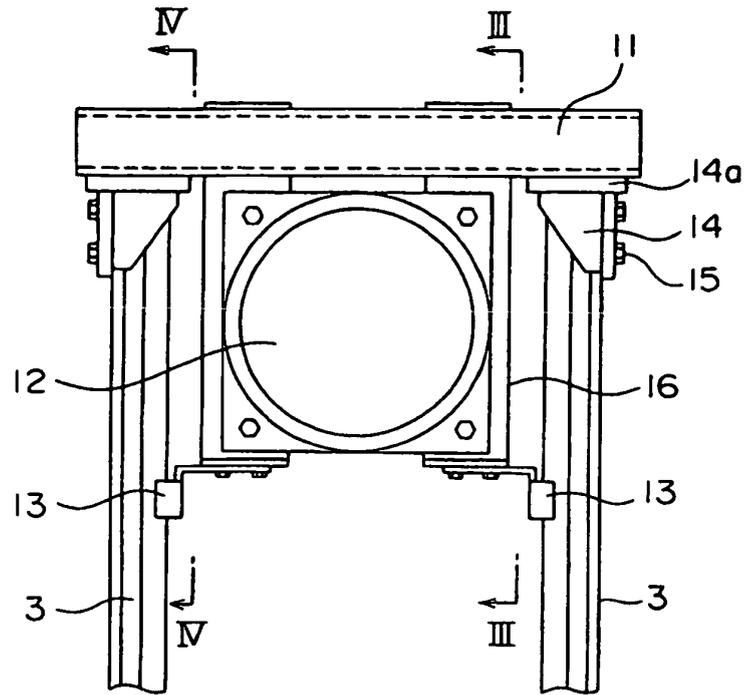


FIG. 3

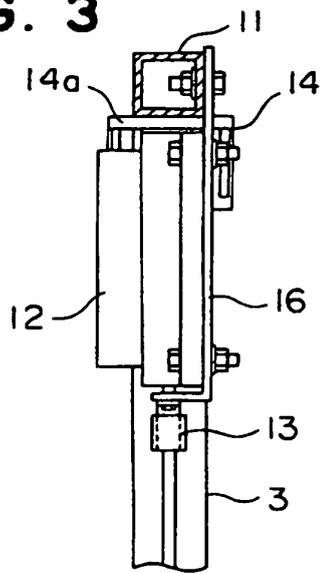


FIG. 4

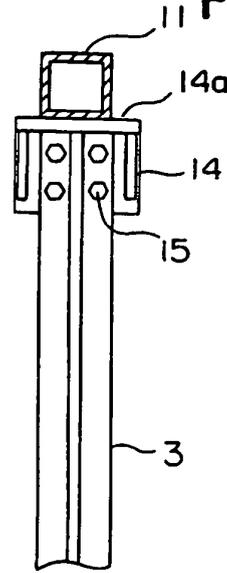


FIG. 5

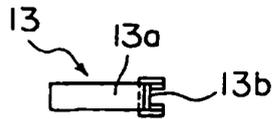


FIG. 6

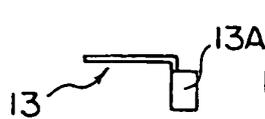


FIG. 7

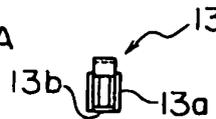


FIG. 8

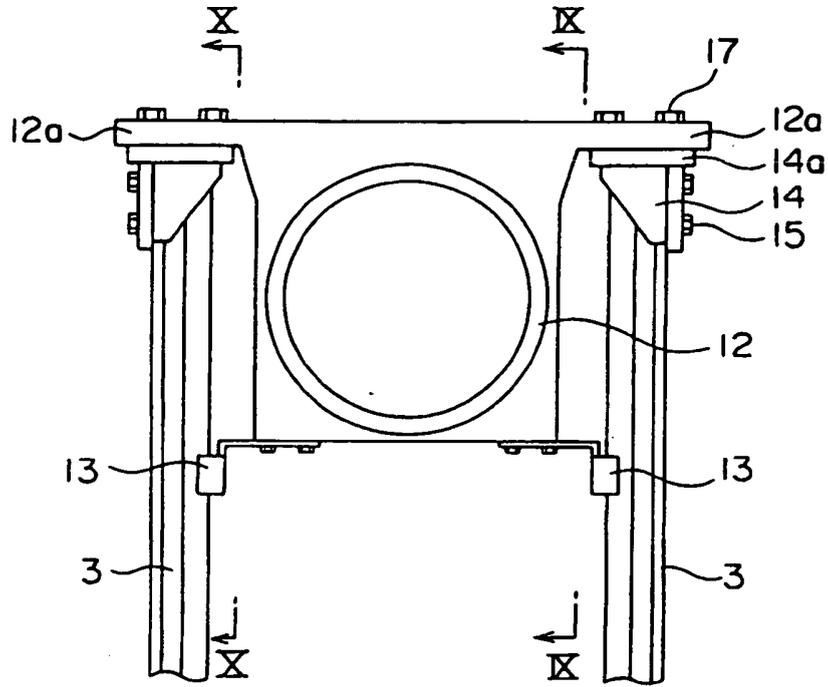


FIG. 9

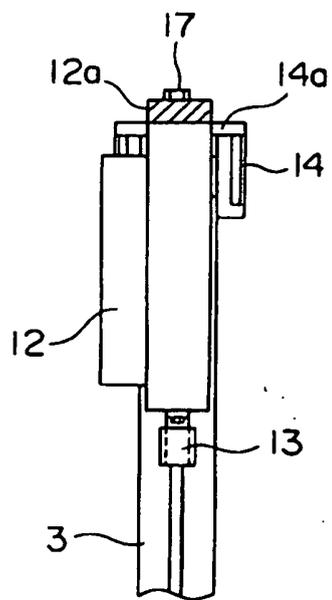


FIG. 10

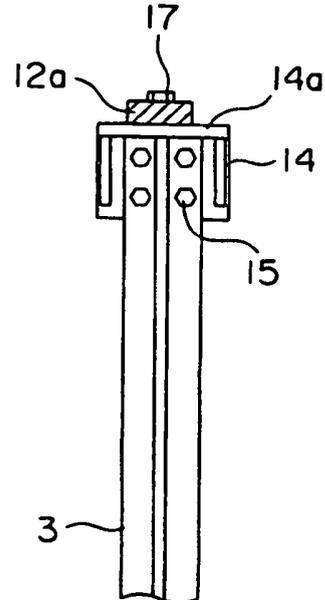


FIG. 11

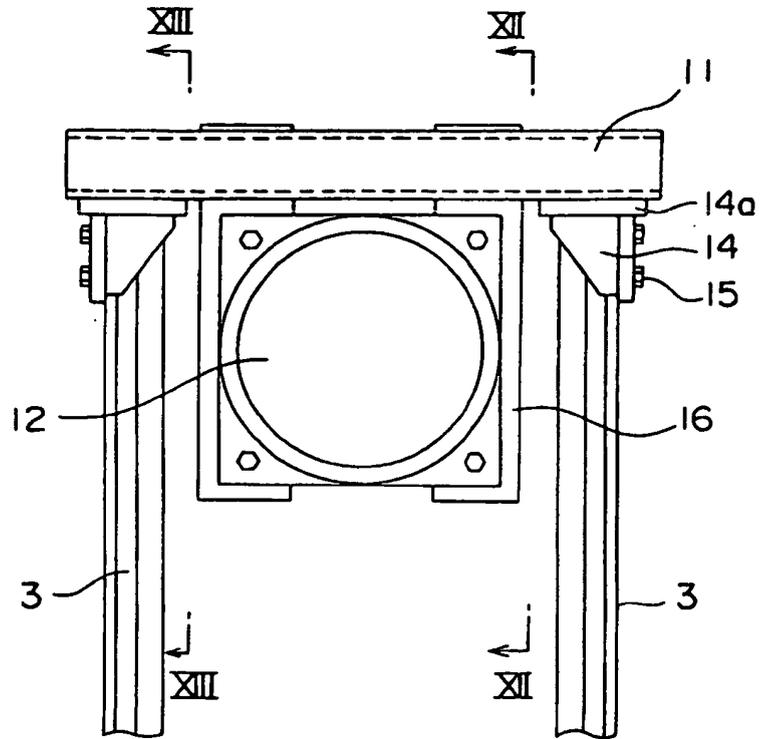


FIG. 12

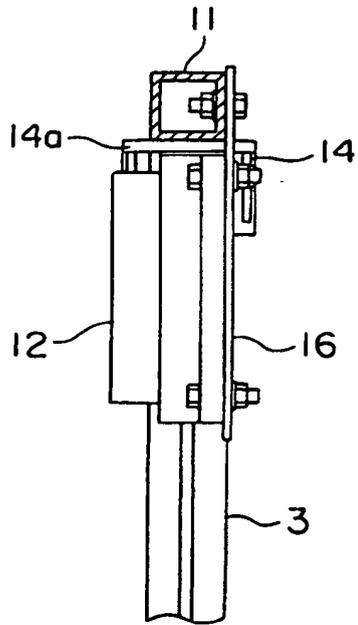


FIG. 13

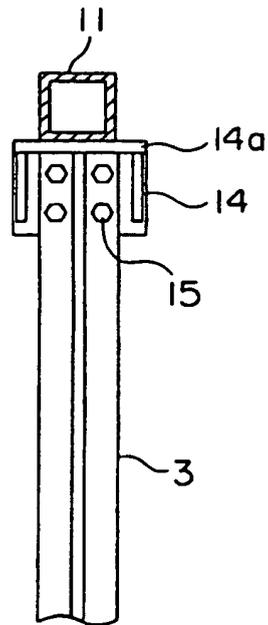


FIG. 14

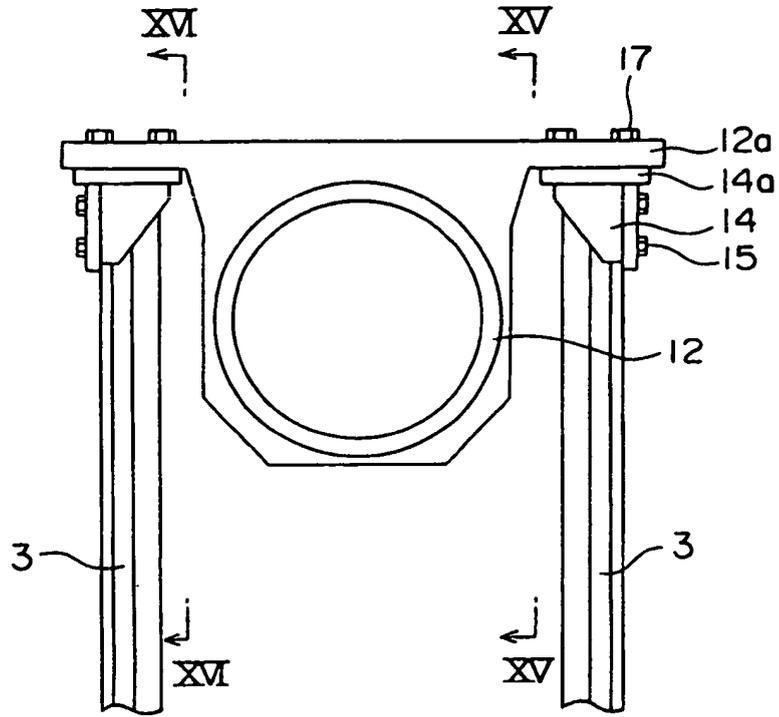


FIG. 15

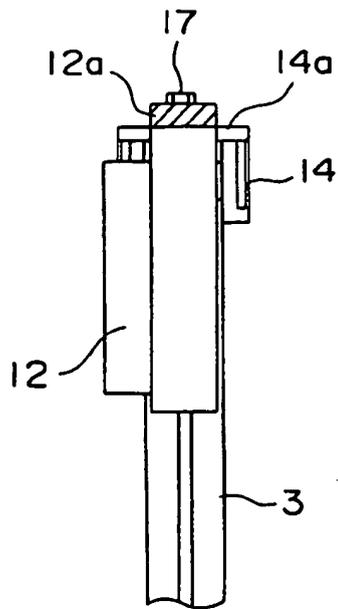


FIG. 16

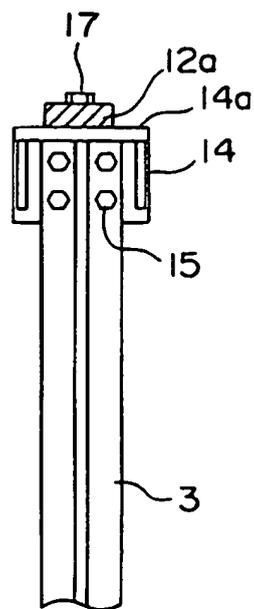


FIG. 17

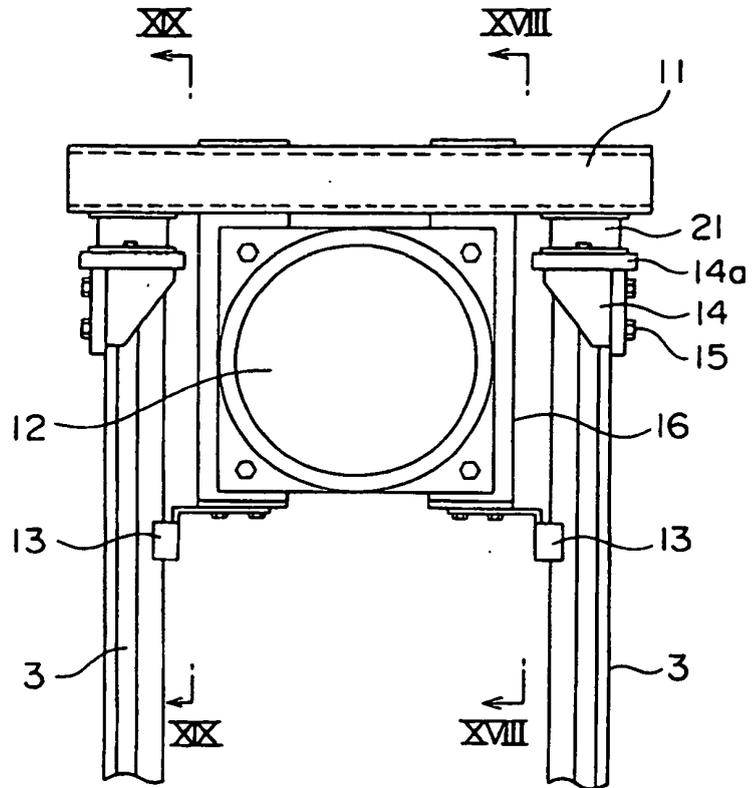


FIG. 18

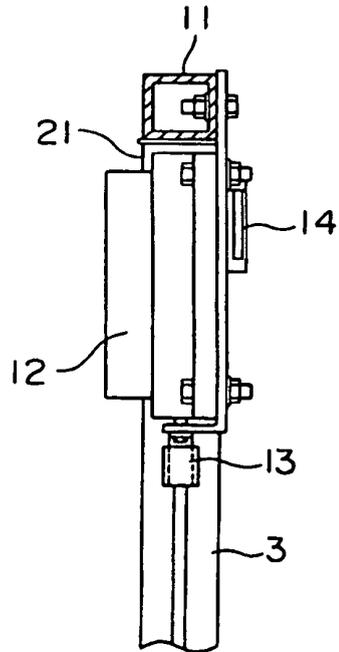


FIG. 19

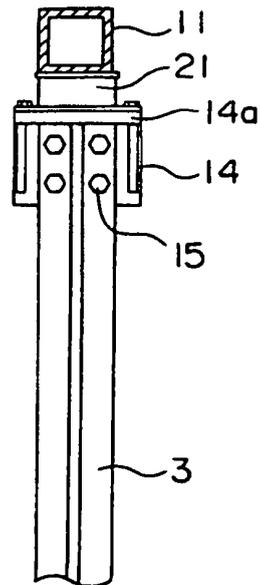


FIG. 20

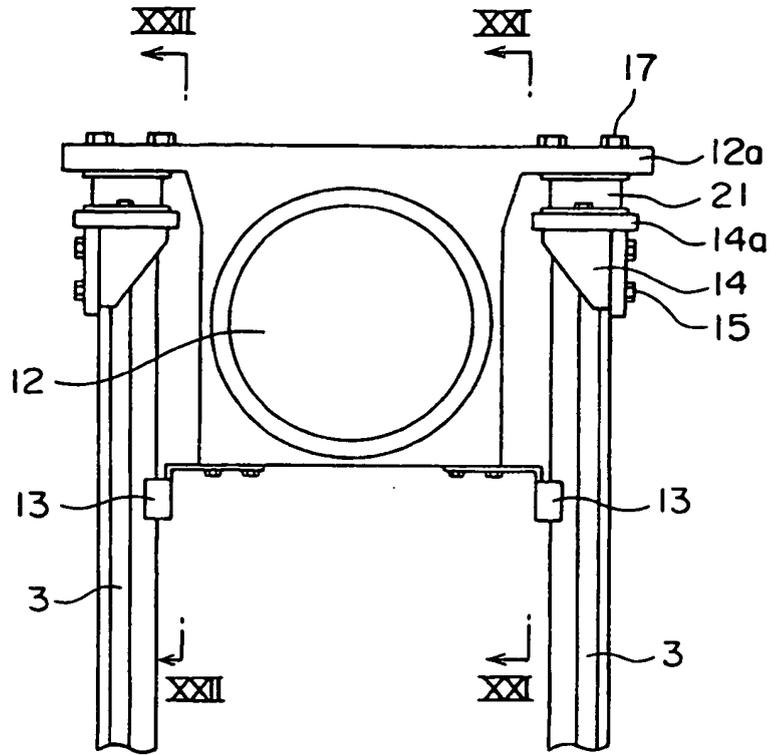


FIG. 21

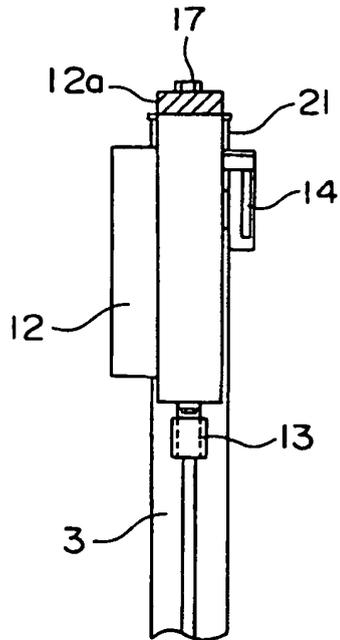


FIG. 22

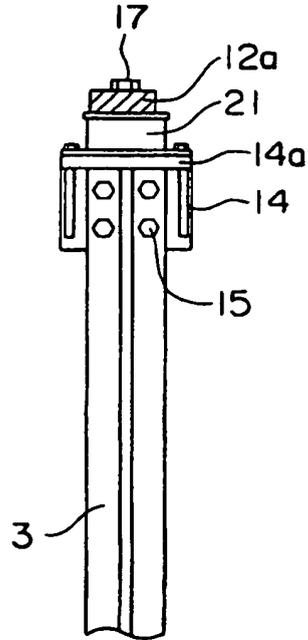


FIG. 23

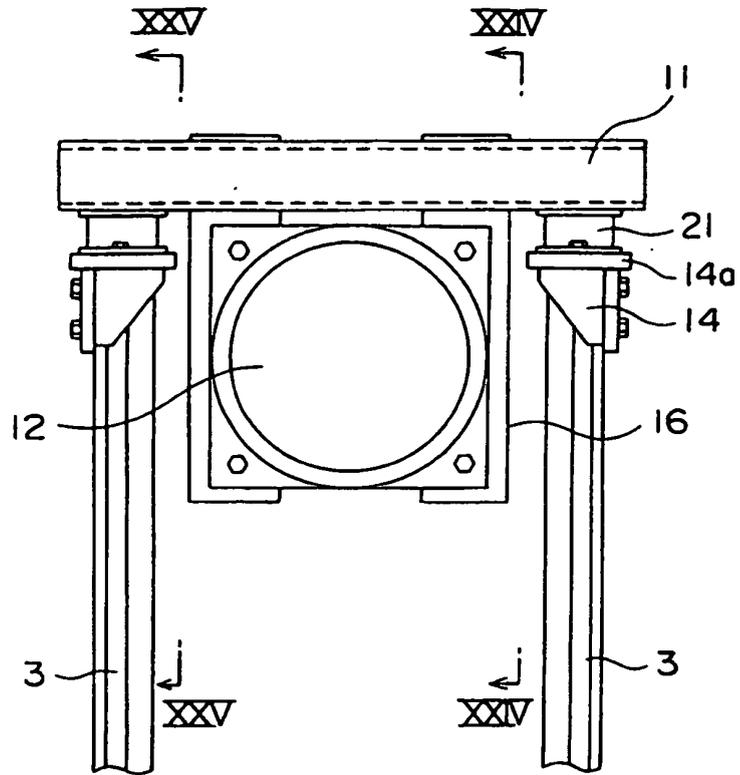


FIG. 24

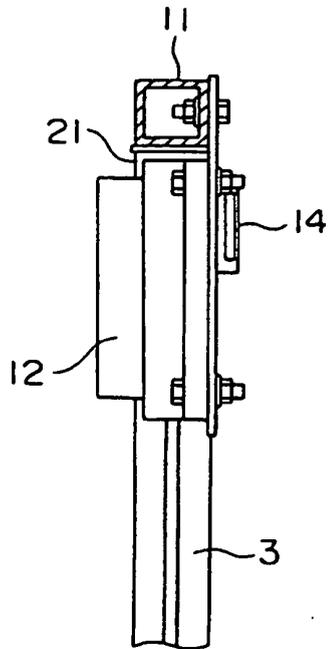


FIG. 25

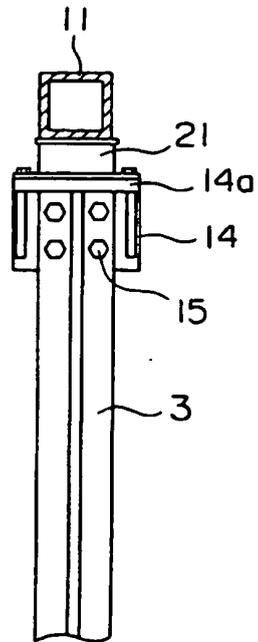


FIG. 26

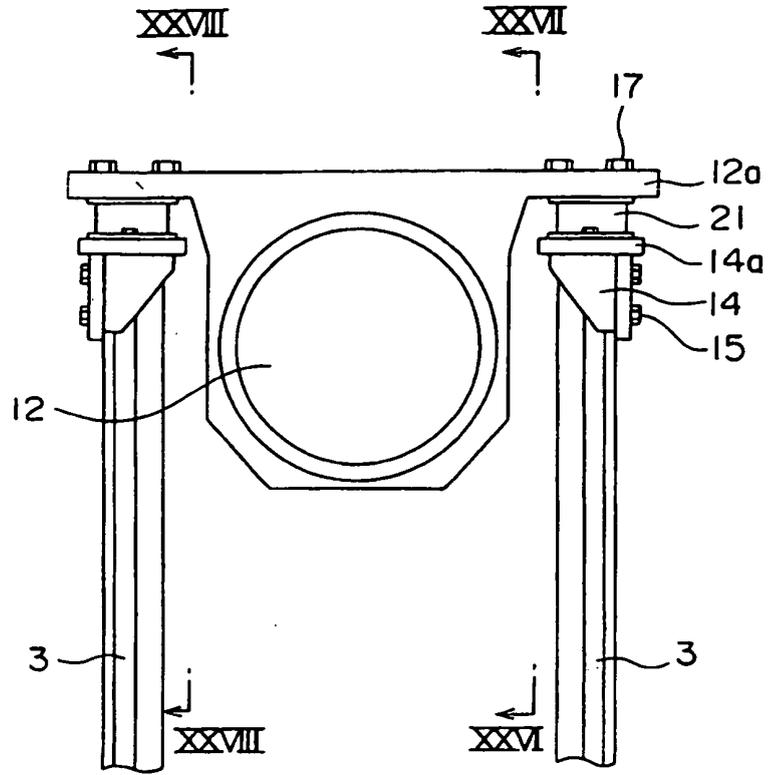


FIG. 27

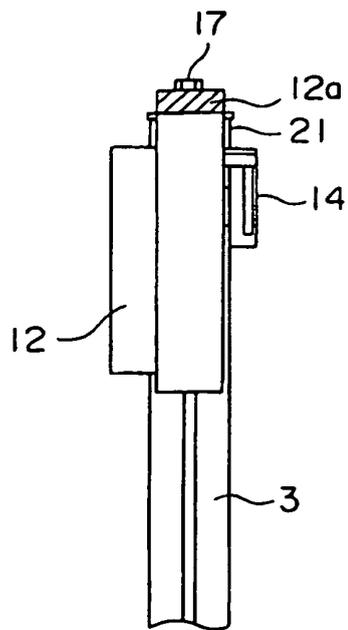
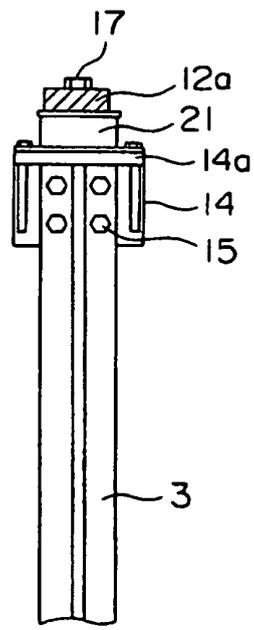


FIG. 28



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