(19) Europäisches Patentamt
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(11) **EP 1 481 936 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
01.02.2012 Bulletin 2012/05

(21) Application number: **02703934.6**

(22) Date of filing: **07.03.2002**

(51) Int Cl.:
B66B 11/02 *(2006.01)* ***B66B 5/00*** *(2006.01)*

(86) International application number:
PCT/JP2002/002140

(87) International publication number:
WO 2003/074410 (12.09.2003 Gazette 2003/37)

(54) **ELEVATOR CAR COMPRISING A CAR TOP HANDRAIL**

AUFZUGSKABINE MIT EINEM DARAUF ANGEORDNETEN HANDLAUF

CAGE D'ASCENSEUR COMPRENANT UNE MAIN COURANTE PLACEE LA-DESSUS

(84) Designated Contracting States:
DE

(43) Date of publication of application:
01.12.2004 Bulletin 2004/49

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EP 1 481 936 B1

Printed by Jouve, 75001 PARIS (FR)

Description

Technical Field

[0001] The present invention relates to an elevator car comprising a car top handrail device, which is provided on top of the car so as to surround a working area for performing maintenance and inspection work on top of the car.

Background Art

[0002] Fig. 13 is a side view showing an example of a conventional elevator car. In the figure, a car frame 1 has a pair of vertical frames 2, a lower frame 3 provided between respective lower end portions of the vertical frames 2, and an upper frame 4 provided between respective upper end portions of the vertical frames 2. A cab 5 is supported on the lower frame 3. Arranged on the front of the cab 5 is a car door 6 for opening and closing a car doorway (not shown). A door machine 7 that drives the car door 6 is supported above the car door 6 to the upper frame 4. A car main body 8 includes the car frame 1, the cab 5, the car door 6, and the door machine 7.

[0003] Further, a handrail device 9 is fixed to the upper frame 4 through a connection member (not shown). The handrail device 9 has a plurality of fixed handrails 10. The handrail device 9 is arranged so as to surround a working area for performing maintenance or inspection work on top of the car. In the conventional elevator, however, it is necessary to secure a working space for installing the door machine 7, and thus the space above the door machine 7 cannot be surrounded by the handrail device 9.

[0004] JP-A-08-198549 describes a scaffolding device on the top of an elevator car. The scaffolding device comprises a moving mechanism which is constituted of a guide, a supporting base, a screw rod and a handle. A worker may manually operate the handle to rotate the screw rod so as to slide a footboard along the guide and to move it into a working position. A safety rope is connected between a railing and the worker to maintain safety.

Summary of the Invention

[0005] According to one aspect of the present invention, there is provided an elevator car comprising a car top handrail device, which is provided on top of the car so as to surround a working area for performing maintenance and inspection work on top of the car, the device comprising: a handrail device main body; and an extension handrail connected to the handrail device main body, the extension handrail being displaceable between a contracted position and an expanded position, wherein an enclosed area surrounded by the handrail device main body and the extension handrail is expanded by displacing the extension handrail from the contracted position to the expanded position.

[0006] An advantage obtainable with embodiments of the present invention is to obtain a car top handrail device for an elevator which is capable of surrounding a larger working area.

Brief Description of the Drawings

[0007] To enable a better understanding of the present invention, and to show how the same may be carried out into effect, reference will now be made, by way of example only, to the accompanying drawings, in which:-

Fig. 1 is a side view showing a car top handrail device for an elevator according to Embodiment 1 of the present invention;

Fig. 2 is a side view showing a state where an area surrounded by the car top handrail device of Fig. 1 is broadened;

Fig. 3 is a plan view showing the car top handrail device of Fig. 2;

Fig. 4 is a side view showing a car top handrail device for an elevator according to Embodiment 2 of the present invention;

Fig. 5 is a side view showing a state where an area surrounded by the car top handrail device of Fig. 4 is broadened;

Fig. 6 is a side view showing a car top handrail device for an elevator according to Embodiment 3 of the present invention;

Fig. 7 is a side view showing a state where an area surrounded by the car top handrail device of Fig. 6 is broadened;

Fig. 8 is a side view showing a car top handrail device for an elevator according to Embodiment 4 of the present invention;

Fig. 9 is a side view showing a state where an area surrounded by the car top handrail device of Fig. 8 is broadened;

Fig. 10 is a plan view showing the car top handrail device of Fig. 9;

Fig. 11 is a side view showing a car top handrail device for an elevator according to Embodiment 5 of the present invention;

Fig. 12 is a side view showing a state where an area surrounded by the car top handrail device of Fig. 11 is broadened; and

Fig. 13 is a side view showing an example of a conventional elevator car.

Detailed Description of Preferred Embodiments of the Invention

[0008] Hereinbelow, preferred embodiments of the present invention will be described with reference to the drawings.

Embodiment 1

[0009] Fig. 1 is a side view showing a car top handrail device for an elevator according to Embodiment 1 of the present invention, Fig. 2 is a side view showing a state where an area enclosed with the car top handrail device of Fig. 1 is broadened, and Fig. 3 is a plan view showing the car top handrail device of Fig. 2.

[0010] Referring to the figures, a car frame 1 has a pair of vertical frames 2, a lower frame 3 (see Fig. 13) provided between respective lower end portions of the vertical frames 2, and an upper frame 4 provided between respective upper end portions of the vertical frames 2. A cab 5 is supported on the lower frame 3. Arranged on the front of the cab 5 is a car door 6 for opening and closing a car doorway (not shown). A door machine 7 that drives the car door 6 is supported above the car door 6 to the upper frame 4. A car main body 8 includes the car frame 1, the cab 5, the car door 6, and the door machine 7.

[0011] A handrail device main body 11 is provided upright on the upper frame 4. The handrail device main body 11 has first to third fixed handrails 12 to 14. Connected to a front end portion of the handrail device main body 11 is an extension handrail 15 which is displaceable between its contracted position shown in Fig. 1 and its expanded position shown in Fig. 2. In Fig. 3, the expanded position is indicated by a solid line whereas the contracted position is indicated by a two-dot chain line.

[0012] By displacing the extension handrail 15 from the contracted position to the expanded position, an enclosed area surrounded by the handrail device main body 11 and the extension handrail 15 is expanded. More specifically, when the extension handrail 15 is in its contracted position, a door-machine installation space 16 located above the door machine 7 is located outside the enclosed area. By displacing the extension handrail 15 from the contracted position to the expanded position, the door-machine installation space 16 becomes included within the enclosed area.

[0013] The handrail device main body 11 is provided with a plurality of main body side mounting holes 11a for connecting the extension handrail 15. Further, the extension handrail 15 is provided with a plurality of first mounting holes 15a that are combined with the main body side mounting holes 11a when the extension handrail 15 is in the contracted position, and a plurality of second mounting holes 15b that are combined with the main body side mounting holes 11a when the extension handrail 15 is in the expanded position. The extension handrail 15 is connected to the handrail device main body 11 by passing a fastener (not shown) through each main body side mounting hole 11a and each first mounting hole 15a or each second mounting hole 15b.

[0014] The car top handrail device, having the handrail device main body 11 and the extension handrail 15, is arranged so as to surround a working area for performing maintenance and inspection work on top of the car main body 8.

[0015] In the car top handrail device for an elevator which is constructed as described above, by causing the extension handrail 15 to be located at its contracted position, it is possible to secure a sufficient space for performing installation of the door machine 7. In addition, by causing the extension handrail 15 to be located at its expanded position after completing the installation of the door machine 7, it is possible for the car top handrail device to surround a larger working area.

Embodiment 2

[0016] Next, Fig. 4 is a side view showing a car top handrail device for an elevator according to Embodiment 2 of the present invention, and Fig. 5 is a side view showing a state where an area enclosed with the car top handrail device of Fig. 4 is broadened. Referring to the figures, connected to a front end portion of a handrail device main body 11 is an extension handrail 21 which is displaceable between its contracted position shown in Fig. 4 and its expanded position shown in Fig. 5. The extension handrail 21 is moved to slide between the expanded position and the contracted position. Fixed handrails 12 and 13 also serve as guides for sliding of the extension handrail 21. Further, the handrail device main body 11 is provided with fixtures 22 for fixing the extension handrail 21 in the expanded position and in the contracted position. Otherwise, the construction of Embodiment 2 is the same as that of Embodiment 1.

[0017] In the car top handrail device for an elevator which is constructed as described above, by causing the extension handrail 21 to be located at its contracted position, it is possible to secure a sufficient space for performing installation of the door machine 7. In addition, by causing the extension handrail 21 to be located at its expanded position after completing the installation of the door machine 7, it is possible for the car top handrail device to surround a larger working area.

Embodiment 3

[0018] Next, Fig. 6 is a side view showing a car top handrail device for an elevator according to Embodiment 3 of the present invention, and Fig. 7 is a side view showing a state where an area enclosed with the car top handrail device of Fig. 6 is broadened. Referring to the figures, connected to a front end portion of a handrail device main

body 11 is an extension handrail 23 which is displaceable between its contracted position shown in Fig. 6 and its expanded position shown in Fig. 7. The extension handrail 23 has a parallel link mechanism and is folded from its expanded position for displacement to its contracted position.

[0019] Further, the extension handrail 23 is provided with a swingable arm 24. In addition, the handrail device main body 11 is provided with an engagement portion 25 with which the arm 24 is engaged. The extension handrail 23 is retained at the expanded position by engaging the arm 24 with the engagement portion 25. Otherwise, the construction of Embodiment 3 is the same as that of Embodiment 1.

[0020] In the car top handrail device for an elevator which is constructed as described above, by causing the extension handrail 23 to be located at its contracted position, it is possible to secure a sufficient space for performing installation of the door machine 7. In addition, by causing the extension handrail 23 to be located at its expanded position after completing the installation of the door machine 7, it is possible for the car top handrail device to surround a larger working area.

Embodiment 4

[0021] Next, Fig. 8 is a side view showing a car top handrail device for an elevator according to Embodiment 4 of the present invention, Fig. 9 is a side view showing a state where an area enclosed with the car top handrail device of Fig. 8 is broadened, and Fig. 10 is a plan view showing the car top handrail device of Fig. 9.

[0022] Referring to the figures, connected to a front end portion of a handrail device main body 11 is an extension handrail 26 which is displaceable between its contracted position shown in Fig. 8 and its expanded position shown in Fig. 9. In Fig. 10, the expanded position is indicated by a solid line whereas the contracted position is indicated by a two-dot chain line.

[0023] The extension handrail 26 includes a first side handrail 27, a second side handrail 28, a first front handrail 29, and a second front handrail 30. The first side handrail 27 is connected to a first fixed rail 12 so as to be swingable about a vertical axis 27a. The second side handrail 28 is connected to a second fixed rail 13 so as to be swingable about a vertical axis 28a.

[0024] The first front handrail 29 is connected to the first side handrail 27 so as to be swingable about a vertical axis 29a. The second front handrail 30 is connected to the second side handrail 28 so as to be swingable about a vertical axis 30a. The first and second front handrails 29 and 30 are connected to each other so as to be swingable about a vertical bend axis 31.

[0025] The first and second side handrails 27 and 28 are each provided with a plurality of engagement portions 32. The first and second fixed handrails 12 and 13 are each provided with a plurality of hooks 33 that engage with the engagement portions 32.

[0026] The extension handrail 26 is displaced between its expanded position and its contracted position by swinging the first and second side handrails 27 and 28. Further, in the course of the displacement, the first and second front handrails 29 and 30 are bent along the bend axis 31. Otherwise, the construction of Embodiment 4 is the same as that of Embodiment 1.

[0027] In the car top handrail device for an elevator which is constructed as described above, by causing the extension handrail 26 to be located at its contracted position, it is possible to secure a sufficient space for performing installation of the door machine 7. In addition, by causing the extension handrail 26 to be located at its expanded position after completing the installation of the door machine 7, it is possible for the car top handrail device to surround a larger working area.

[0028] Note that it is also possible to omit the front handrails and use an extension handrail with only the side handrails.

[0029] Further, it is also possible for the front handrails to be constructed of a member having flexibility, such as a chain.

Embodiment 5

[0030] Fig. 11 is a side view showing a car top handrail device for an elevator according to Embodiment 5 of the present invention, and Fig. 12 is a side view showing a state where an area enclosed with the car top handrail device of Fig. 11 is broadened. In those examples, first to third fixed handrails 12 to 14 are each swingable about a horizontal axis 34. This allows the first to third fixed handrails 12 to 14 to be collapsed onto a car main body 8. Further, a member having flexibility, such as a chain, is used for front handrails (not shown) of the extension handrail 26. Note that the front handrails may be omitted. Otherwise, the construction of Embodiment 5 is the same as that of Embodiment 4.

[0031] In the car top handrail device which is constructed as described above, the handrail device main body 11 can be folded and collapsed on the car main body 8 except for during maintenance and inspection, and thus the overall height of the car including the car top handrail device can be made small during normal operation. Therefore, an overhead clearance in the hoistway can be made small. Furthermore, by collapsing the handrail device main body 11 in the state where the extension handrail 26 is at its contracted position, the space occupied by the car handrail device in its collapsed state can be made small.

Claims

1. An elevator car comprising a car top handrail device, which is provided on top of the car so as to surround a working area for performing maintenance and inspection work on top of the car, the device compris-

ing:

a handrail device main body (11); and
an extension handrail (15, 21, 23, 26) connected to the handrail device main body (11), the extension handrail (15, 21, 23, 26) being displaceable between a contracted position and an expanded position,
wherein an enclosed area surrounded by the handrail device main body (11) and the extension handrail (15, 21, 23, 26) is expandable by displacing the extension handrail (15, 21, 23, 26) from the contracted position to the expanded position, and when the extension handrail (15, 21, 23, 26) is in the contracted position, a door-machine installation space (16) is located above a door machine (7) that is arranged to open and close a car door (6), and which space (16) is also located outside the enclosed area, and the door-machine installation space (16) is included within the enclosed area by displacing the extension handrail (15, 21, 23, 26) from the contracted position to the expanded position.

2. An elevator car according to Claim 1, wherein the extension handrail (21) is movable to slide between the contracted position and the expanded position.

3. An elevator car according to Claim 1, wherein the extension handrail (23) has a parallel link mechanism and is displacable from the expanded position to the contracted position by folding the parallel link mechanism.

4. An elevator car according to Claim 1, wherein the extension handrail (26) is displacable between the contracted position and the expanded position by being swingable about a vertical axis.

5. An elevator car according to Claim 1, wherein the handrail device main body (11) is capable of being collapsed onto the top of the car.

Patentansprüche

1. Aufzugskabine mit einer Geländereinrichtung auf dem Kabinenoberteil, die oben auf der Kabine so vorgesehen ist, dass sie eine Arbeitsfläche umgibt, um eine Wartung und eine Inspektionsarbeit oben auf der Kabine durchzuführen, wobei die Einrichtung umfasst:

einen Hauptkörper (11) der Geländereinrichtung; und
ein Ausfahrgeländer (15, 21, 23, 26), das mit dem Hauptkörper (11) der Geländereinrichtung verbunden ist, wobei das Ausfahrgeländer (15, 21, 23, 26) zwischen einer eingefahrenen Position und einer ausgefahrenen Position bewegbar ist,
wobei eine umschlossene Fläche, die durch den Hauptkörper (11) der Geländereinrichtung und das Ausfahrgeländer (15, 21, 23, 26) umgeben wird, ausfahrbar ist, indem das Ausfahrgeländer (15, 21, 23, 26) von der eingefahrenen Position zur ausgefahrenen Position bewegt wird und wobei, wenn das Ausfahrgeländer (15, 21, 23, 26) in der eingefahrenen Position ist, ein Installationsraum (16) für den Türantrieb oberhalb eines Türantriebs (7), der dafür ausgestaltet ist, eine Kabinentür (6) zu öffnen und zu schließen, angeordnet ist, und der Raum (16) auch außerhalb der umschlossenen Fläche angeordnet ist und wobei der Installationsraum (16) für den Türantrieb in die umschlossene Fläche aufgenommen wird, indem das Ausfahrgeländer (15, 21, 23, 26) von der eingefahrenen Position zur ausgefahrenen Position bewegt wird.

2. Aufzugskabine nach Anspruch 1, bei der das Ausfahrgeländer (21) beweglich ist, um zwischen der eingefahrenen Position und der ausgefahrenen Position verschoben zu werden.

3. Aufzugskabine nach Anspruch 1, bei der das Ausfahrgeländer (23) einen Parallelstangenmechanismus aufweist und von einer ausgefahrenen Position zur eingefahrenen Position durch Falten des Parallelstangenmechanismus bewegbar ist.

4. Aufzugskabine nach Anspruch 1, bei der das Ausfahrgeländer (26) zwischen der eingefahrenen Position und der ausgefahrenen Position bewegbar ist, indem es um eine vertikale Achse schwenkbar ist.

5. Aufzugskabine nach Anspruch 1, bei welcher der Hauptkörper (11) für die Geländereinrichtung auf die Oberseite der Kabine zusammengelegt werden kann.

Revendications

1. Cabine d'ascenseur comprenant un dispositif de main courante placé sur la partie supérieure de la cabine qui est prévu sur la partie supérieure de la cabine afin d'entourer une zone de travail pour réaliser le travail d'entretien et de contrôle sur la partie supérieure de la cabine, le dispositif comprenant :

un corps principal de dispositif de main courante (11) ; et
une main courante d'extension (15, 21, 23, 26) raccordée au corps principal de dispositif de main courante (11), la main courante d'exten-

sion (15, 21, 23, 26) pouvant être déplacée entre une position contractée et une position déployée,
dans laquelle une zone fermée entourée par le corps principal de dispositif de main courante (11) et la main courante d'extension (15, 21, 23, 26) peut être déployée en déplaçant la main courante d'extension (15, 21, 23, 26) de la position contractée à la position déployée, et lorsque la main courante d'extension (15, 21, 23, 26) est dans la position contractée, un espace d'installation de machine de porte (16) est situé au-dessus d'une machine de porte (7) qui est agencée pour ouvrir et fermer une porte de cabine (6) et lequel espace (16) est également situé à l'extérieur de la zone fermée et l'espace d'installation de machine de porte (16) est inclus à l'intérieur de la zone fermée en déplaçant la main courante d'extension (15, 21, 23, 26) de la position contractée à la position déployée.

2. Cabine d'ascenseur selon la revendication 1, dans laquelle la main courante d'extension (21) est mobile pour coulisser entre la position contractée et la position déployée.

3. Cabine d'ascenseur selon la revendication 1, dans laquelle la main courante d'extension (23) a un mécanisme de liaison parallèle et est déplaçable de la position déployée à la position contractée en pliant le mécanisme de liaison parallèle.

4. Cabine d'ascenseur selon la revendication 1, dans laquelle la main courante d'extension (26) est déplaçable entre la position contractée et la position déployée en pouvant être oscillée autour d'un axe vertical.

5. Cabine d'ascenseur selon la revendication 1, dans laquelle le corps principal de dispositif de main courante (11) peut être replié sur la partie supérieure de la cabine.

FIG. 1

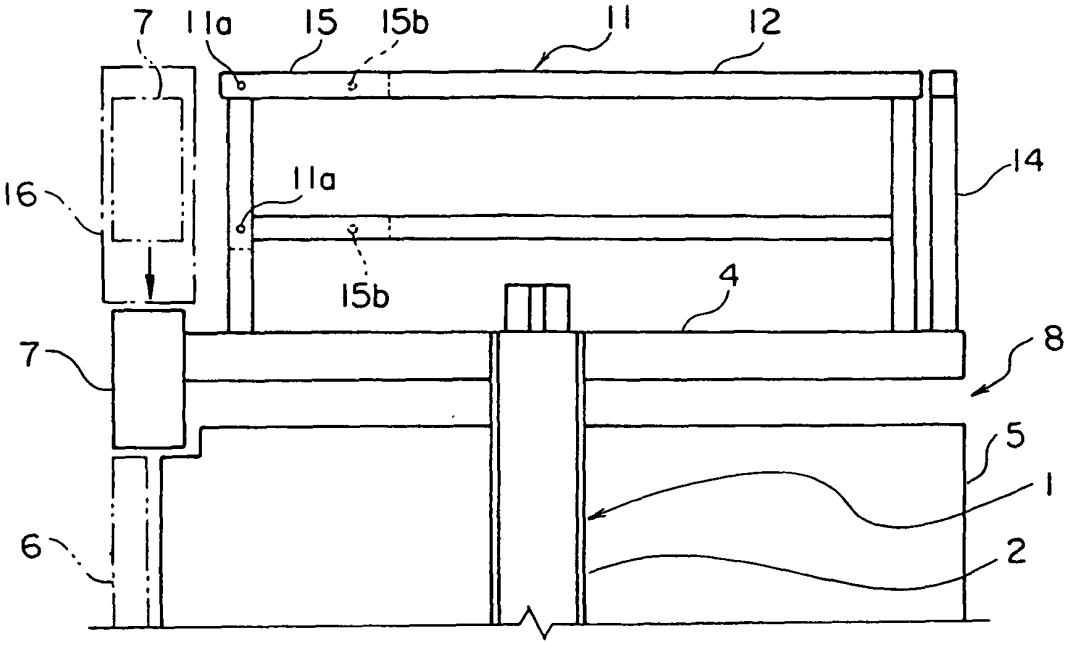

7
11a
15
15b
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12
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11a
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15b
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FIG. 2

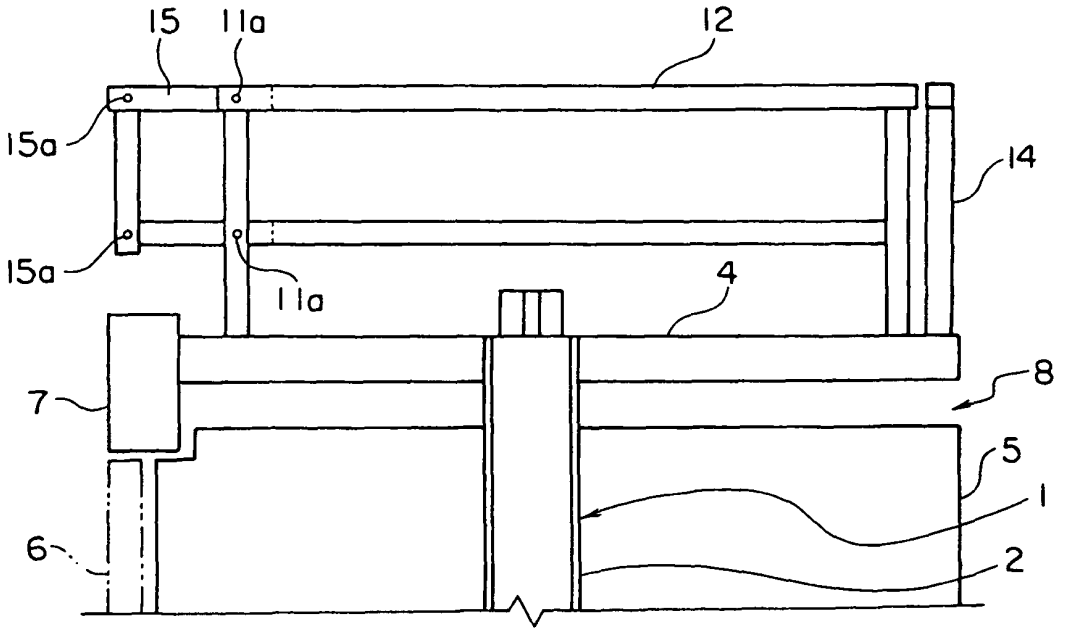

15
11a
12
15a
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FIG. 3

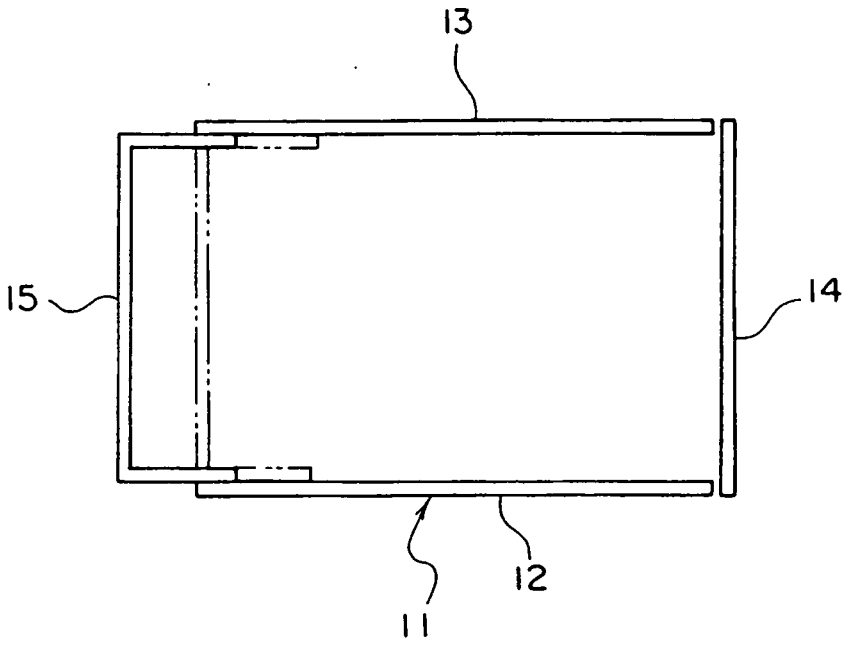


FIG. 4

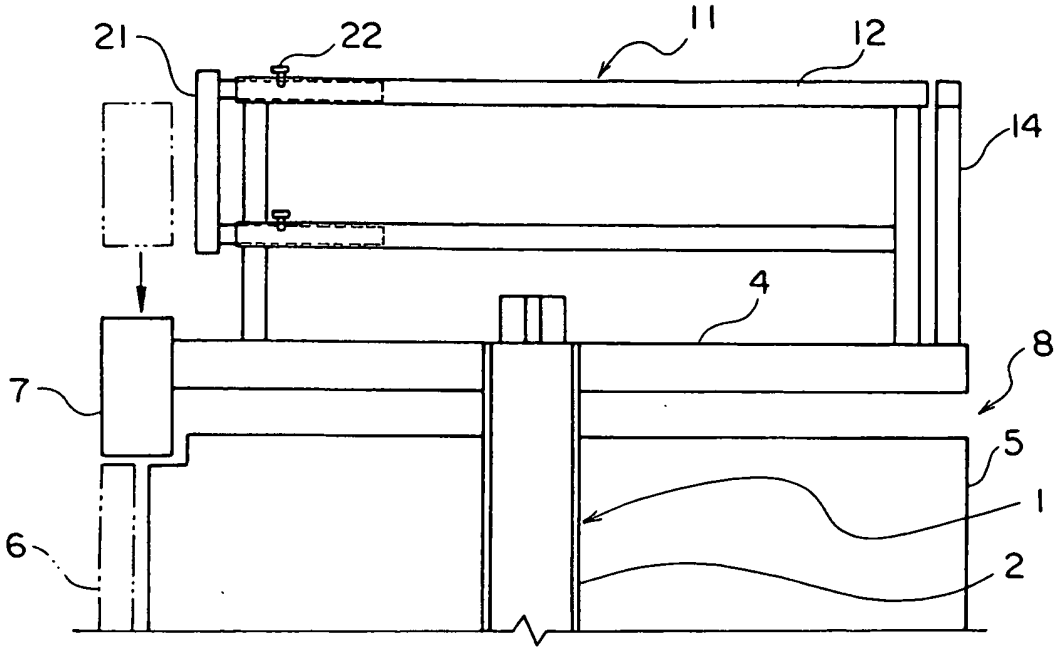


FIG. 5

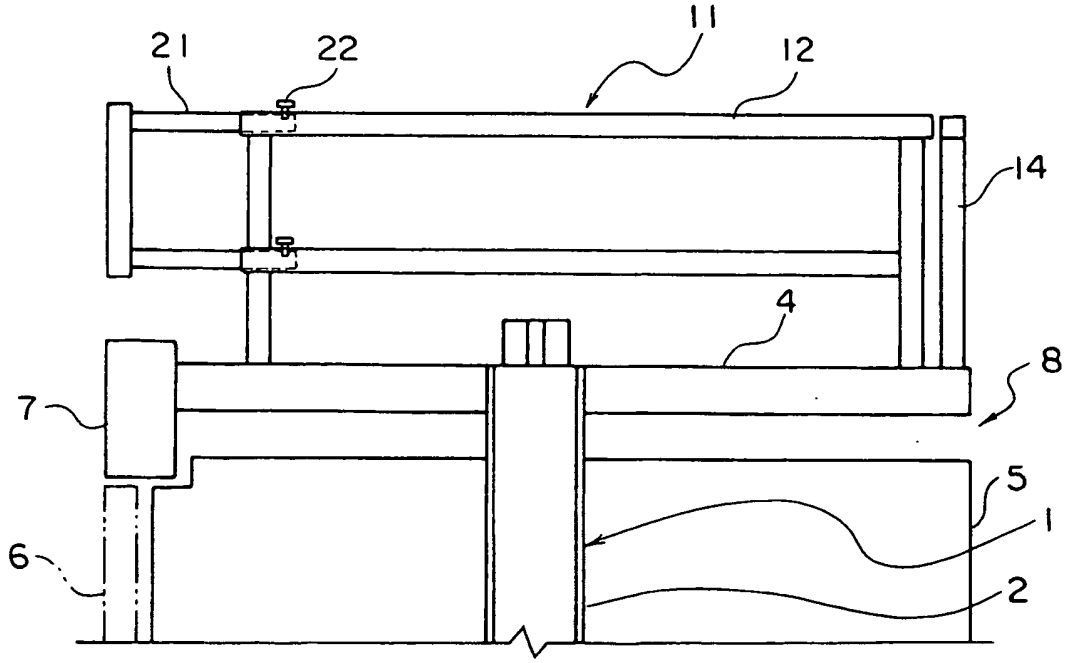


FIG. 6

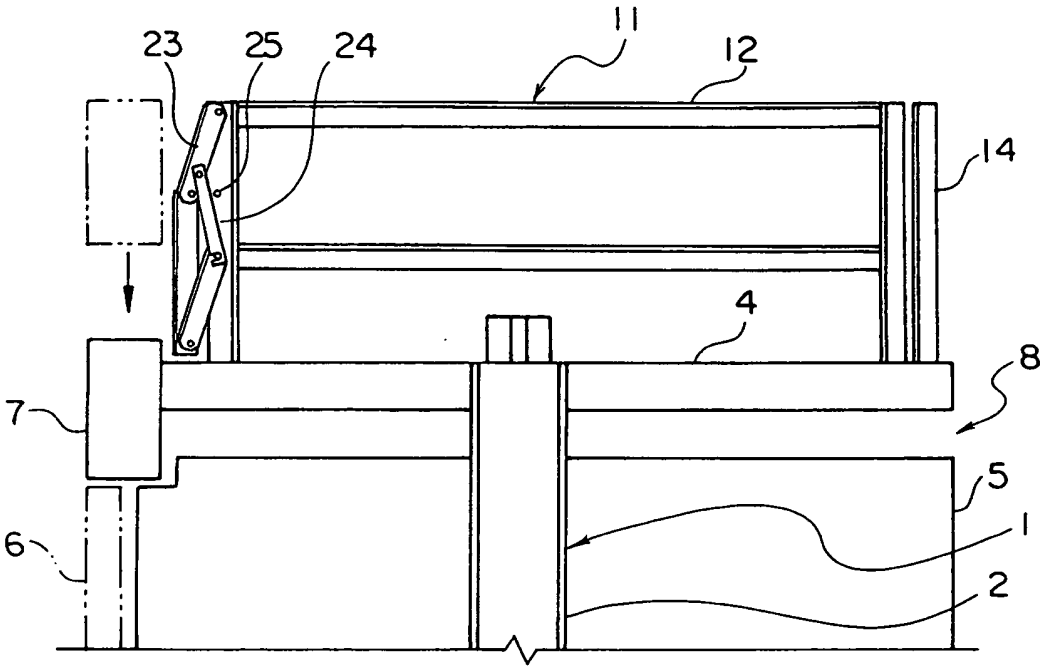


FIG. 7

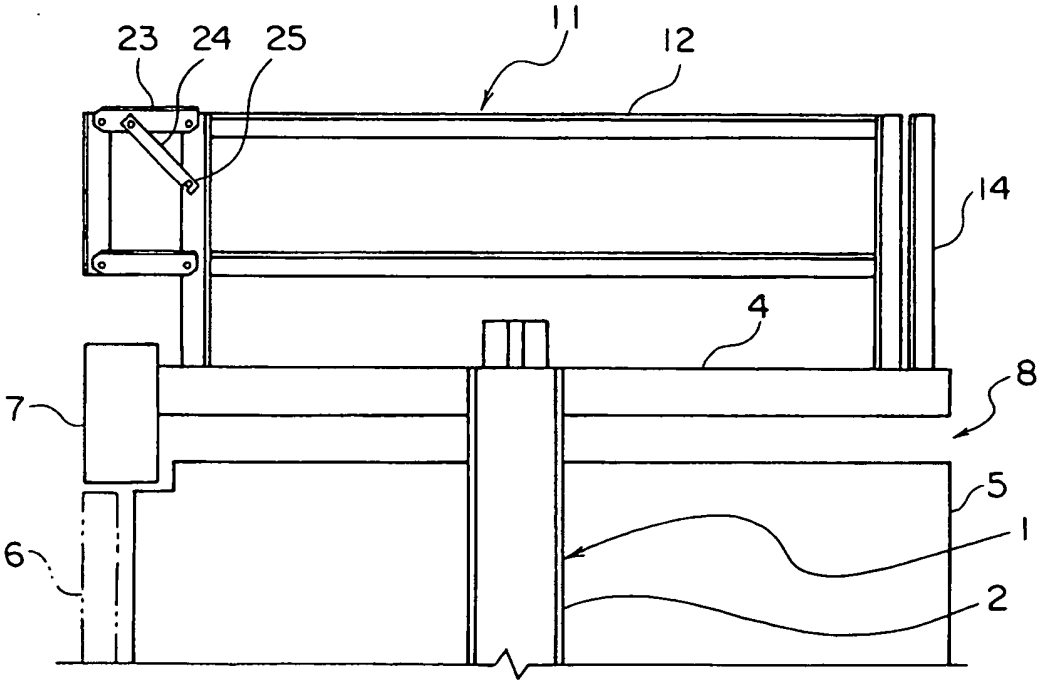


FIG. 8

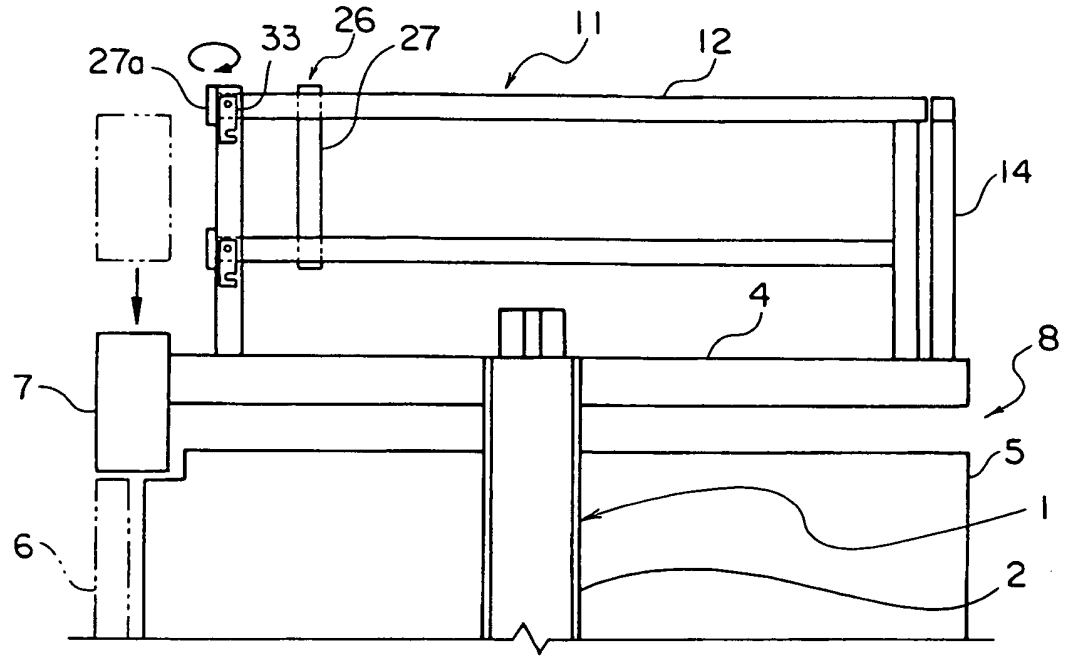


FIG. 9

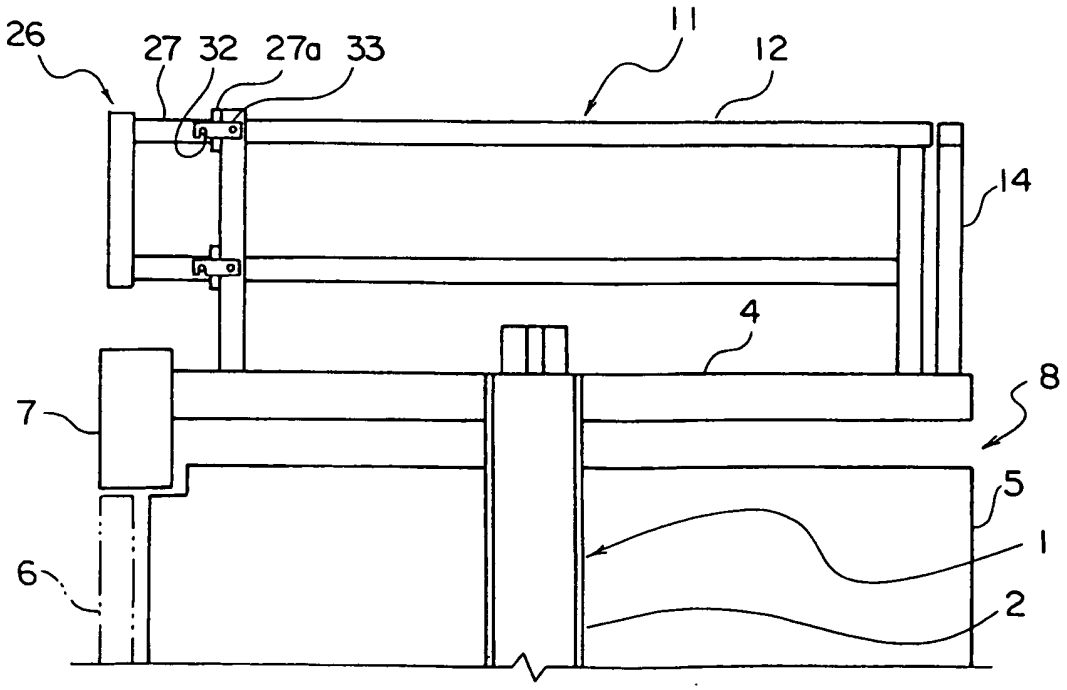


FIG.10

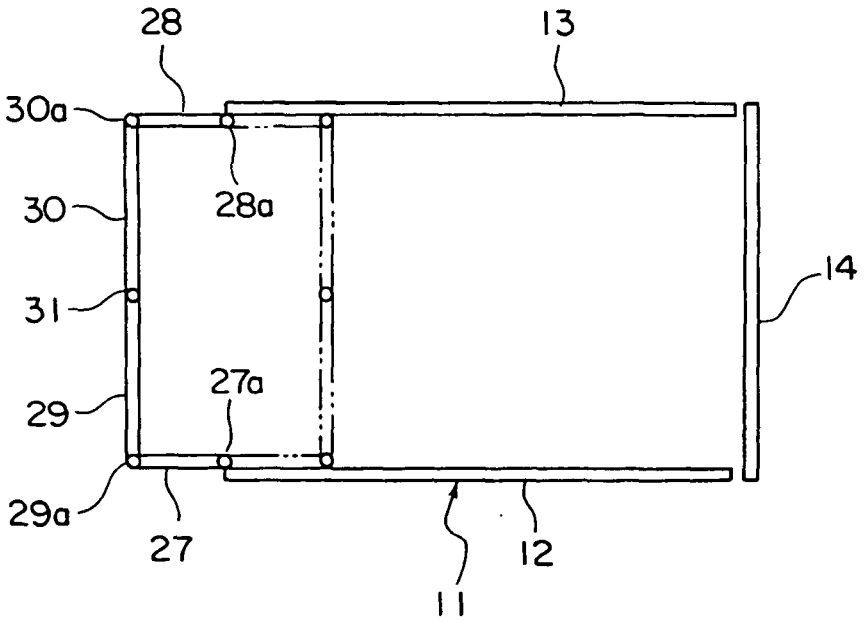


FIG.11

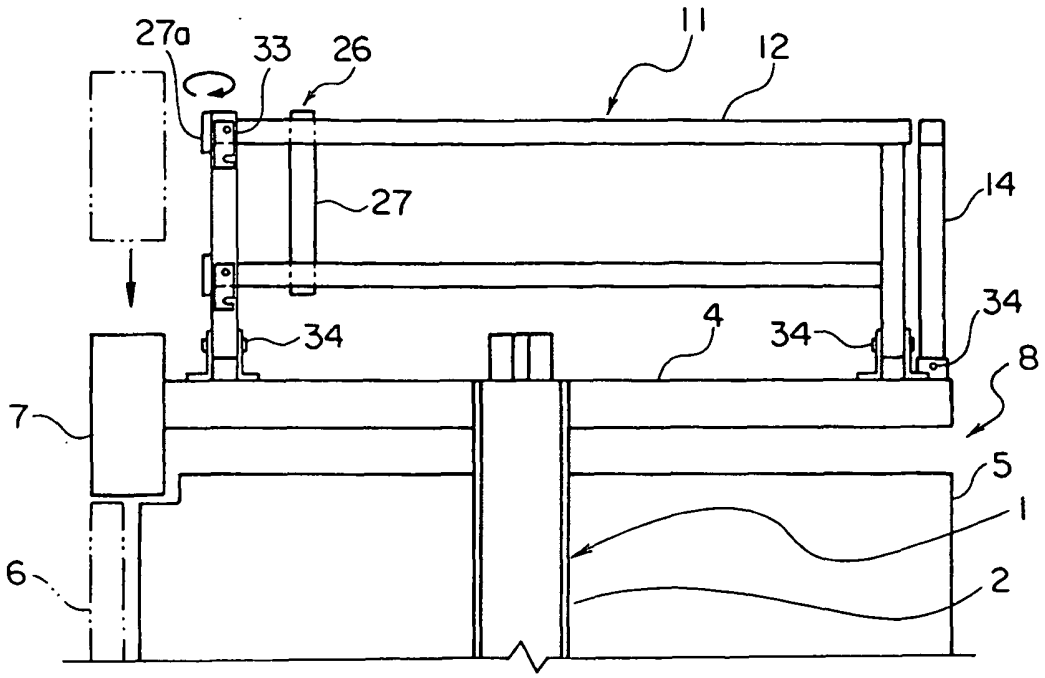

27a
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12
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14
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FIG.12

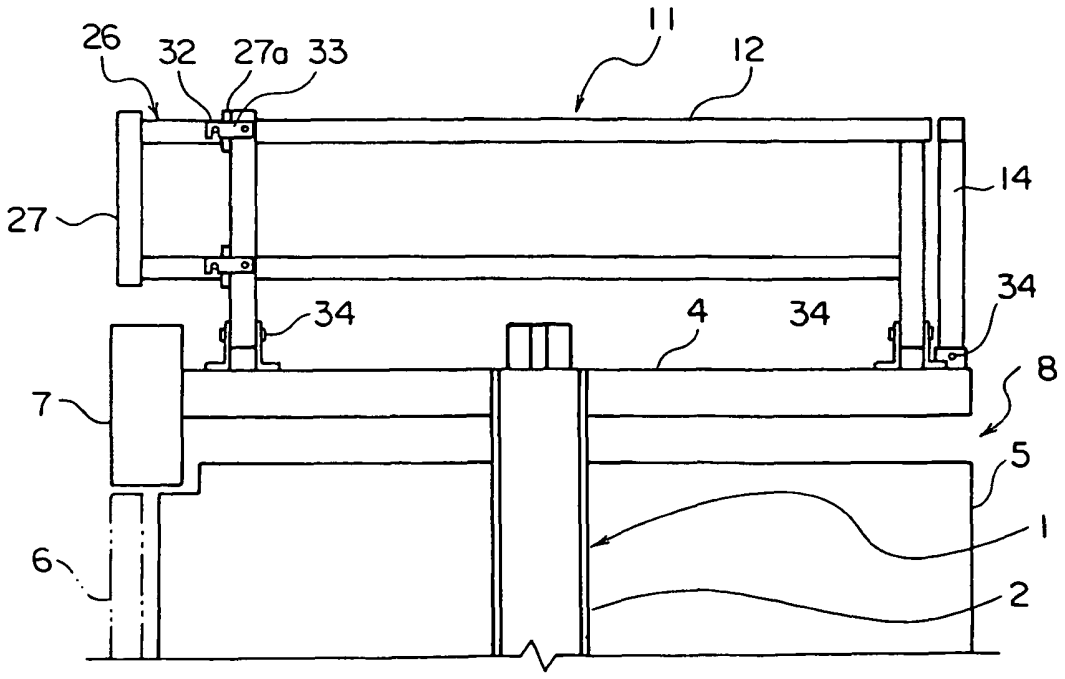
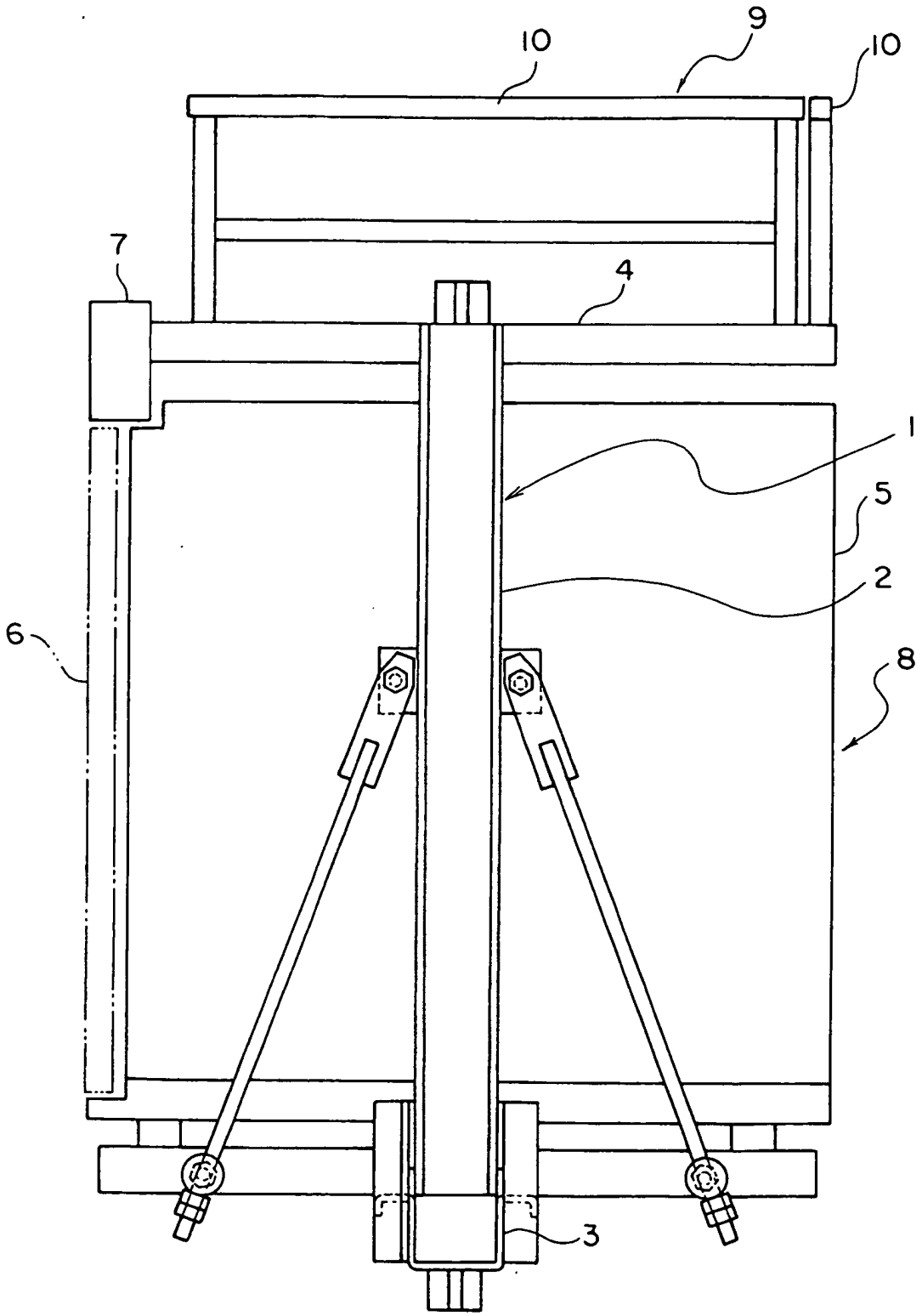

26
32
27a
33
11
12
14
27
34
4
34
34
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1
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2

FIG.13



REFERENCES CITED IN THE DESCRIPTION

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