



(11) **EP 1 433 734 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
05.10.2011 Bulletin 2011/40

(21) Application number: **01938696.0**

(22) Date of filing: **15.06.2001**

(51) Int Cl.:
B66B 5/00 (2006.01) B66B 7/00 (2006.01)

(86) International application number:
PCT/JP2001/005134

(87) International publication number:
WO 2002/102701 (27.12.2002 Gazette 2002/52)

(54) **Machine-room-less elevator**
AUFZUG OHNE MASCHINENRAUM
Ascenseur sans salle des machines

(84) Designated Contracting States:
DE FR NL

(43) Date of publication of application:
30.06.2004 Bulletin 2004/27

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

(72) Inventor: **YOSHIKAWA, Masami**
Mitsubishi Denki KabushikiKaisha
Tokyo 100-8310 (JP)

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

(56) References cited:
EP-A- 1 031 528 JP-A- 7 237 849
JP-A- 7 237 849 JP-A- 10 231 074
JP-A- 11 139 730 JP-A- 11 139 730
JP-A- 2000 072 352 JP-A- 2000 203 774
JP-A- 2000 203 774 JP-A- 2000 233 878
JP-A- 2000 233 878 JP-Y2- 52 028 264

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

SPECIFICATION

Field of the Invention

[0001] The invention relates to a machine-room-less elevator.

Background Art

[0002] A common example of a machine-room-less elevator is an elevator in which a hoisting machine is set at the top of a hoistway. In such an elevator, a service technician performs maintenance and inspection of an elevator car while positioned on top of the car. A handrail is provided on top of the car for preventing the service technician from a falling from the car into the hoistway when performing inspection and maintenance.

[0003] As mentioned above, in relation to a related-art machine-room-less elevator, a hand rail is provided on top of an elevator car. Further, a hoisting machine disposed at the top of the hoistway determines the dimension of the space provided at the top of the elevator. This presents a problem of posing limitation on reduction in the space for installing an elevator or on effective utilization of building space.

[0004] JP-A-2000 233 878 discloses an elevator car having a drive unit located in an upper section of the hoistway. The car has a closable opening in the roof through which the drive unit is accessible. JP 11-139 730 A and JP-A-2000072352 disclose an elevator apparatus of which machine-room is eliminated.

Disclosure of the Invention

[0005] The invention has been conceived to solve such a problem and aims at providing a machine-room-less elevator in which the space provided at the top of the elevator is of small dimension.

[0006] To achieve the object, a *machine-room-less* elevator according to the invention may comprise a car having an opening formed in its wall, a sheave around which is passed a cable having at one end the car and at the other end a counterweight, and a hoisting machine having a motor for actuating the sheave. When the car remains at the top of a hoistway, the sheave may be located between the car and the wall of the hoistway. By way of the opening, the sheave may be inspected from the inside of the car.

[0007] According to one aspect of the present invention, a *machine-room-less* elevator may comprise a car having an opening section formed in its wall, a cable whose both ends are fastened within the hoistway and which is to be routed around pulleys provided on the car and the counterweight, and a hoisting machine having a sheave around which the cable is to be routed, the sheave being located between the pulleys, and a motor

for actuating the sheave. When the car is positioned at the top of the hoistway, the sheave may be located between the car and a wall of the hoistway, and inspection of the sheave may be performed from the inside of the car, by way of the opening section.

[0008] Another aspect of the present invention, in the *machine-room-less* elevator, when the car is positioned at the top of the hoistway, the motor may be placed between the car and the wall of the hoistway, and inspection of the motor may be performed from the inside of the car, by way of the opening section.

[0009] Another, aspect of the present invention, in the *machine-room-less* elevator, the opening section may be formed in a ceiling of the car.

[0010] Another aspect of the present invention, the *machine-room-less* elevator further may comprise a fixing device for fixing the car within the hoistway. The fixing device may be to be operated from the inside of the car.

[0011] Another aspect of the present invention, in the *machine-room-less* elevator, rotational motion of the motor may be decelerated and torque thereof may be transmitted to the sheave by way of a belt.

[0012] Another aspect of the present invention, a *machine-room-less* elevator, may comprise a car having an opening section formed in its wall; and a hoisting machine having a sheave around which a cable is to be wound and a motor for actuating the sheave, in which the car is fixed to one end of the cable and a counterweight is fixed to the other end of the same. When the car is positioned at the top of a hoistway, the hoisting machine may be located between the car and a wall of the hoistway, a floor of the car may extend outward toward the hoisting machine, and the hoisting machine may be inspected by a service technician positioned from the floor extending outward, by way of the opening section.

[0013] Another aspect of the present invention, a *machine-room-less* elevator, may comprise a car having an opening section formed in its wall; a cable whose both ends are fastened within the hoistway and which is to be routed around pulleys provided on the car and the counterweight; and a hoisting machine having a sheave around which the cable is to be routed, the sheave being located between the pulleys, and a motor for actuating the sheave. When the car is positioned at the top of the hoistway, the hoisting machine may be located between the car and a wall of the hoistway, a floor of the car may extend outward toward the hoisting machine, and the hoisting machine may be inspected by a service technician who has moved to the floor extending outward by way of the opening section.

Brief Description of the Drawings

[0014]

Fig. 1 is a cross-sectional view showing a *machine-room-less* elevator according to a first embodiment of the invention;

Fig. 2 is a cross-sectional view of the *machine-room-less* elevator taken along line II-II shown in Fig. 1; Fig. 3 is a cross-sectional view of the *machine-room-less* elevator taken along line III-III shown in Fig. 1; Fig. 4 is a cross-sectional view of a *machine-room-less* elevator according to a second embodiment of the invention; Fig. 5 is a cross-sectional view of the *machine-room-less* elevator taken along line V-V shown in Fig. 4; Fig. 6 is a cross-sectional view of a *machine-room-less* elevator according to a third embodiment of the invention; and Fig. 7 is a cross-sectional view of the *machine-room-less* elevator taken along line VII-VII shown in Fig. 6.

Best Modes for Implementing the Invention

[0015] Embodiments of the invention will now be described as follows.

First Embodiment

[0016] An embodiment of a *machine-room-less* elevator according to the invention will be described by reference to Fig. 1. Fig. 1 is a cross-sectional view showing a vertical cross section of a *machine-room-less* elevator according to a first embodiment of the invention.

[0017] As shown in Fig. 1, reference numeral 10 designates an elevator hoistway. Reference numeral 11 designates an elevator car located within the hoistway 10. Reference numeral 12 designates an opening section to be formed in a wall or ceiling of the car 11. The opening section 12 is embodied by integrally drawing, into the car, a portion of wall of the car and a portion of the ceiling of the car or by separately drawing the same into the car. Reference numeral 13 designates a switch which controls operation of the elevator when the opening section 12 is opened. Reference numeral 14 designates a motor disposed on top of the hoistway 10. Reference numeral 15 designates a sheave located on a wall surface of the top of the hoistway 10. When the car 11 remains at the top of the hoistway, the sheave 15 is interposed between the wall surface of the hoistway and the car 11. Reference numeral 16 designates a belt which decelerates and transmits torque of the motor 14 to the sheave 15. Reference numeral 17 designates a hoisting machine constituted of the motor 14, the sheave 15, and the belt 16. Reference numeral 18 designates a cable passed around the sheave 15. One end of the cable 18 is secured on the car 11, and the other end of the same is fastened to a counterweight 19. Reference numeral 20 designates a car guide rail. Reference numeral 21 designates a counterweight guide rail. The sheave 15 is disposed in a position above the counterweight guide rail 21.

[0018] Fig. 2 shows a cross-sectional view of the *machine-room-less* elevator taken along line II-II shown in Fig. 1. In Fig. 2, those elements which are identical with or correspond to those shown in Fig. 1 are assigned the

same reference numerals, and their repeated explanations are omitted.

[0019] Fig. 3 shows a cross-sectional view of the *machine-room-less* elevator taken along line III-III shown in Fig. 1.

[0020] As shown in Fig. 3, reference numeral 30 designates a car locking device. The car locking device 30 of the embodiment is for locking the car 11 by means of manipulating, from the inside of the car, a plate attached to the car guide rail 20 through use of a lock bar. The car locking device 30 is not limited to this example. Such a car locking device 30 is used for locking the car 11 at the time of, e.g., maintenance work.

[0021] In Fig. 3, those elements which are identical with or correspond to those shown in Fig. 1 are assigned the same reference numerals, and their repeated explanations are omitted. Explanations are given of only the features of the *machine-room-less* elevator shown in Fig. 3 and that are not shown in Fig. 1.

[0022] As mentioned above, the opening section 12 is formed in the wall or the like of the car 11, and the sheave 15 of the hoisting machine 17 or a like element which is heavily reliant on maintenance work is interposed between the car 11 and the wall of the hoistway. Hence, a service technician can readily perform maintenance of the sheave 15 or like elements from the inside of the car. During maintenance and inspection of the sheave 15 or like elements to be performed from the inside of the car, the car can be positioned at the highest floor level or at a position slightly above or below the highest floor level. Thus, positions in close proximity to the highest floor level are taken as the top. Here, movement of the car to the neighborhood of the highest floor level is performed by means of predetermined actuation of switches or like elements.

[0023] Since maintenance of the sheave 15 provided on the wall of the car 11 can be readily performed from the inside of the car, the service technician can safely perform maintenance while standing directly on the floor of the car without use of a footstool in the car.

[0024] Since the service technician can perform maintenance from the inside of the car, a necessity for climbing up on top of the car for maintenance and inspection is obviated. Hence, a handrail provided on the car can be removed.

[0025] Since the handrail provided on the car can be removed, the dimension of a space provided at the top of the elevator can be reduced.

[0026] The sheave 15 of the hoisting machine 17 and reduction gears can be placed between the car 11 and the wall of the hoistway. Parts to be placed at a position above the car and within the top of the hoistway can be minimized, thereby reducing the dimension of the space provided at the top of the elevator.

[0027] A method of reducing the dimension of the space provided at the top of an elevator can be embodied inexpensively.

[0028] If the sheave 15 and the motor 14, both belong-

ing to the hoisting machine 17, can be made slim, the space for installing an elevator can be reduced further, thereby enabling more effective utilization of a building space.

Second Embodiment

[0029] Another embodiment of the *machine-room-less* elevator according to the invention will be described by reference to Fig. 4. Fig. 4 is a cross-sectional view showing the vertical cross section of the *machine-room-less* elevator of the second embodiment.

[0030] As shown in Fig. 4, reference numeral 40 designates a car cable anchoring section provided in a hoistway 10. One end of a cable 18 is anchored to the car cable anchoring section 40. Reference numeral 41 designates car turnaround pulleys disposed on the lower surface of a car 11. Reference numeral 42 designates a counterweight turnaround pulley to be provided in a position above a counterweight 19. Reference numeral 43 designates a counterweight cable anchoring section provided on a counterweight guide rail 21 or provided in the hoistway 10. The remaining end of the cable 18 is anchored to the counterweight cable anchoring section 43.

[0031] As mentioned, in relation to the *machine-room-less* elevator of the embodiment, one end of the cable 18 is anchored to the car cable anchoring section 40 and routed around the car turnaround pulleys 41, the sheave 15, and the counterweight turnaround pulley 42. The other end of the cable 18 is anchored to the counterweight cable anchoring section 43. Such a cable arrangement is called a 2-to-1 cable arrangement.

[0032] In Fig. 4, those elements which are identical with or correspond to those shown in Fig. 1 are assigned the same reference numerals, and their repeated explanations are omitted. Explanations are given of only features of the *machine-room-less* elevator shown in Fig. 4 and those not shown in Fig. 1.

[0033] Fig. 5 shows a cross-sectional view of the *machine-room-less* elevator taken along line V-V shown in Fig. 4. As shown in Fig. 5, those elements which are identical with or correspond to those shown in Fig. 4 are assigned the same reference numerals, and their repeated explanations are omitted.

[0034] As mentioned above, use of the 2-to-1 cable arrangement enables reduction of the load exerted on the hoisting machine 17 to one-half, so that a motor or like elements can be made compact. Therefore, the dimension of the space provided at the top of the elevator can be reduced by means of the layout of the hoisting machine 17 of the embodiment.

[0035] Since the opening section 12 is formed in the wall of the car 11, maintenance of a sheave 15 or like elements interposed between the wall of the hoistway and the car 11 can be carried out readily and safely.

[0036] Since a necessity for the service technician to climb up onto the car 11 and to perform maintenance is obviated, the handrail provided on the car can be re-

moved, thereby curtailing the dimension of the space provided at the top of the elevator.

Third Embodiment

[0037] Yet another embodiment of a machine-room-less elevator according to the invention will be described by reference to Fig. 6. Fig. 6 is a cross-sectional view showing the vertical cross section of a *machine-room-less* elevator according to a third embodiment of the invention.

[0038] As shown in Fig. 6, reference numeral 50 designates a floor of a car. Reference numeral 51 designates a handrail. The handrail 51 is provided on the floor 50 extending to the outside of a car 11. The handrail 51 is for enabling the service technician to safely perform work while positioned on the floor 50. Reference numeral 52 designates a door (opening section) provided in the wall of the car 11. By opening the door 52, the service technician can move to the portion of the floor 50 extending outside the car 11. Reference numeral 53 designates a switch. When the door 52 is opened, the operation of the elevator is controlled by means of the switch. Reference numeral 54 designates a controller provided on the wall of the hoistway.

[0039] As mentioned above, in relation to the machine-room-less elevator of the embodiment, a sheave and a motor, both belonging to a hoisting machine, and like elements are disposed on the wall surface of the top of the hoistway 10 and in positions in close proximity to the portion of the floor 50 extending outside the car 11. Hence, nothing is disposed between the ceiling of the hoistway 10 and that of the car 11. Therefore, the service technician opens the door 52 of the wall of the car and performs maintenance and inspection of the sheave 15 and the motor 14, both belonging to the hoisting machine 17 and disposed in positions above the portion of the floor extending outside the car.

[0040] In Fig. 6, those elements which are identical with or correspond to those shown in Fig. 1 are assigned the same reference numerals, and their repeated explanations are omitted. Explanations are given of only features of the *machine-room-less* elevator shown in Fig. 6 and those not shown in Fig. 1.

[0041] Fig. 7 shows a cross-sectional view of the *machine-room-less* elevator taken along line VII-VII shown in Fig. 6. In Fig. 7, those elements which are identical with or correspond to those shown in Fig. 6 are assigned the same reference numerals, and their repeated explanations are omitted.

[0042] As mentioned above, the service technician can perform a maintenance operation outside the car. Hence, the range of action of the service technician is broadened, thereby enabling maintenance of a controller provided on the wall of the hoistway.

[0043] The sheave and the motor, both belonging to the hoisting machine, and like elements are disposed in positions above the portion of the floor extending outside

the car, and maintenance is performed on that floor. Hence, a necessity for performing maintenance on the top of the car 11 is obviated, thereby enabling removal of the handrail provided on the upper surface of the car 11 and reducing the dimension of the space provided at the top of the elevator.

[0044] Fig. 6 shows an example of *machine-room-less* elevator having a 1-to-1 cable arrangement. However, even when there is employed a *machine-room-less* elevator having a 2-to-1 cable arrangement, there is also yielded the same advantage.

[0045] As has been described, a *machine-room-less* elevator of the invention includes a car having an opening section formed in its wall; and a hoisting machine having a sheave around which a cable is to be wound and a motor for actuating the sheave, in which the car is fixed to one end of the cable and a counterweight is fixed to the other end of the same, wherein, when the car is positioned at the top of a hoistway, the sheave is located between the car and a wall of the hoistway; and the sheave can be inspected from the inside of the car, by way of the opening section. Since a service technician can perform maintenance from the inside of the car, a necessity for climbing up on top of the car for maintenance and inspection is obviated. Hence, a handrail provided on the car can be removed. Since the handrail provided on the car can be removed, the dimension of a space provided at the top of the elevator can be reduced. Space for installing an elevator can be reduced, and more effective utilization of a building space can be realized.

[0046] A *machine-room-less* elevator of the invention includes a car having an opening section formed in its wall; a cable whose both ends are fastened within the hoistway and which is to be routed around pulleys provided on the car and the counterweight; and a hoisting machine having a sheave around which the cable is to be routed, the sheave being located between the pulleys, and a motor for actuating the sheave, wherein, when the car is positioned at the top of the hoistway, the sheave is located between the car and a wall of the hoistway, and inspection of the sheave can be performed from the inside of the car, by way of the opening section. Since a service technician can perform maintenance from the inside of the car, a necessity for climbing up on top of the car for maintenance and inspection is obviated. Hence, a handrail provided on the car can be removed. Since the handrail provided on the car can be removed, the dimension of a space provided at the top of the elevator top can be reduced. A space for installing an elevator can be reduced, and more effective utilization of a building space can be realized.

[0047] A *machine-room-less* elevator of the invention includes a car having an opening section formed in its wall; and a hoisting machine having a sheave around which a cable is to be wound and a motor for actuating the sheave, in which the car is fixed to one end of the cable and a counterweight is fixed to the other end of the same, wherein, when the car is positioned at the top of

a hoistway, the hoisting machine is located between the car and a wall of the hoistway; a floor of the car extends outward toward the hoisting machine; and the hoisting machine can be inspected on the floor extending outward by way of the opening section. Since a service technician can perform maintenance from the inside of the car, a necessity for climbing up on top of the car for maintenance and inspection is obviated. Hence, a handrail provided on the car can be removed. Since the handrail provided on the car can be removed, the dimension of a space provided at the top of the elevator can be reduced. A space for installing an elevator can be reduced, and more effective utilization of a building space can be realized.

Industrial Applicability

[0048] As has been described, a *machine-room-less* elevator of the invention includes a car having an opening section formed in its wall; and a hoisting machine having a sheave around which a cable is to be wound and a motor for actuating the sheave, in which the car is fixed to one end of the cable and a counterweight is fixed to the other end of the same, wherein, when the car is positioned at the top of a hoistway, the sheave is located between the car and a wall of the hoistway; and the sheave can be inspected from the inside of the car, by way of the opening section. Since a service technician can perform maintenance from the inside of the car, a necessity for climbing up on top of the car for maintenance and inspection is obviated. Hence, a handrail provided on the car can be removed. Since the handrail provided on the car can be removed, the dimension of a space provided at the top of the elevator can be reduced. Space for installing an elevator can be reduced, and more effective utilization of a building space can be realized.

Claims

1. A machine-room-less elevator comprising:

a car (11) and a counterweight (19); and
a hoisting machine (17) having a sheave (15)
around which a cable (18) is wound and a motor
(14) for actuating the sheave, wherein when the
car is positioned at the top of a hoistway, the
sheave is located between the wall of the car
and a wall of the hoistway; **characterized in
that**
the car has an opening section formed in a por-
tion of a wall of the car and a portion of a ceiling
of the car,
and
the sheave can be inspected from the inside of
the car, by way of the opening section.

2. The machine-room-less elevator of claim 1 wherein:

both ends of the cable are fastened within the hoistway and the cable is routed around pulleys provided on the car and the counterweight; and the sheave is located between the pulleys.

3. The machine-room-less elevator of claim 1 wherein:

the car is fixed to one end of the cable and the counterweight is fixed to the other end of the same.

4. The machine-room-less elevator according to any one of claims 1 to 3, wherein, when the car is positioned at the top of the hoistway, the motor is placed between the car and the wall of the hoistway, and inspection of the motor can be performed from the inside of the car, by way of the opening section.

5. The machine-room-less elevator according to any one of claims 1 to 3, further comprising a fixing device (30) for fixing the car within the hoistway, wherein the fixing device is to be operated from the inside of the car.

6. The machine-room-less elevator according to any one of claims 1 to 3, wherein rotational motion of the motor is decelerated and torque thereof is transmitted to the sheave by way of a belt (16).

7. A machine-room-less elevator comprising:

a car (11) and a counterweight (19), the car has an opening section (12) formed in its wall; and a hoisting machine (17) having a sheave (15) around which a cable (18) is wound and a motor (14) for actuating the sheave, wherein when the car is positioned at the top of a hoistway, the hoisting machine is located between the wall of the car and a wall of the hoistway; **characterized in that** a floor of the car (50) extends outward toward the hoisting machine; and the hoisting machine can be inspected by a service technician positioned from the floor extending outward, by way of the opening section.

8. The machine-room-less elevator of claim 7 wherein:

both ends of the cable are fastened within the hoistway and the cable is routed around pulleys provided on the car and the counterweight; and the sheave is located between the pulleys.

9. The machine-room-less elevator of claim 7 wherein:

the car is fixed to one end of the cable and the counterweight is fixed to the other end of the same.

Patentansprüche

1. Aufzug ohne Maschinenraum mit:

einer Kabine (11) und einem Gegengewicht (19) und einer Hubmaschine (17) mit einer Seilrolle (15), um welche ein Kabel (18) gewickelt ist, und mit einem Motor (14) zum Antreiben der Seilrolle, wobei, wenn die Kabine am oberen Ende eines Aufzugschachts angeordnet ist, die Seilrolle zwischen der Kabinenwand und einer Wand des Schachts angeordnet ist, **dadurch gekennzeichnet, dass** die Kabine einen Öffnungsabschnitt aufweist, der in einem Abschnitt einer Kabinenwand und einem Abschnitt eines Kabinendachs ausgebildet ist, und die Seilrolle von dem Inneren der Kabine aus mittels des Öffnungsabschnitts inspiziert werden kann.

2. Aufzug ohne Maschinenraum nach Anspruch 1, bei dem

beide Enden des Kabels innerhalb des Schachts befestigt sind und das Kabel um Rollen geführt ist, die an der Kabine und dem Gegengewicht vorgesehen sind und die Seilrolle zwischen den Rollen angeordnet ist.

3. Aufzug ohne Maschinenraum nach Anspruch 1, bei dem

die Kabine an einem Ende des Kabels befestigt ist und das Gegengewicht an dem anderen Ende davon befestigt ist.

4. Aufzug ohne Maschinenraum nach einem der Ansprüche 1 bis 3, bei dem, wenn die Kabine am oberen Ende des Schachts angeordnet ist, der Motor zwischen der Kabine und der Wand des Schachts angeordnet ist und eine Inspektion des Motors vom Inneren der Kabine aus mittels des Öffnungsabschnitts durchgeführt werden kann.

5. Aufzug ohne Maschinenraum nach einem der Ansprüche 1 bis 3, ferner mit einer Befestigungseinrichtung (30) zum Befestigen der Kabine innerhalb des Schachts, wobei die Befestigungseinrichtung vom Inneren der Kabine aus zu betätigen ist.

6. Aufzug ohne Maschinenraum nach einem der Ansprüche 1 bis 3, bei dem eine Drehbewegung des Motors entschleunigt und ein Drehmoment davon zu der Seilrolle mittels eines Riemens (16) übertragen wird.

7. Aufzug ohne Maschinenraum mit:

- einer Kabine (11) und einem Gegengewicht (19), wobei der Aufzug einen Öffnungsabschnitt (12) aufweist, der in dessen Wand ausgebildet ist, und
 einer Hubmaschine (17) mit einer Seilrolle (15),
 um die ein Kabel (18) gewickelt ist, und mit einem Motor (14) zum Antreiben der Seilrolle,
 wobei, wenn die Kabine am oberen Ende des Schachts angeordnet ist, die Hubmaschine zwischen der Wand der Kabine und einer Wand des Schachts angeordnet ist, **dadurch gekennzeichnet, dass**
 sich ein Boden der Kabine (50) nach außen zu der Hubmaschine hin erstreckt und
 die Hubmaschine durch einen Servicetechniker,
 der auf dem Boden, der sich nach außen erstreckt, positioniert ist, mittels des Öffnungsabschnitts inspiziert werden kann.
8. Aufzug ohne Maschinenraum nach Anspruch 7, bei dem
 beide Enden des Kabels innerhalb des Schachts fest befestigt sind und das Kabel um Rollen gelenkt ist, die an der Kabine und dem Gegengewicht vorgesehen sind und
 die Seilrolle zwischen den Rollen angeordnet ist.
9. Aufzug ohne Maschinenraum nach Anspruch 7, bei dem
 die Kabine an einem Ende des Kabels befestigt ist und das Gegengewicht an dem anderen Ende davon befestigt ist.
- Revendications**
1. Ascenseur sans salle des machines comprenant :
- une cabine (11) et un contrepoids (19) ; et
 une machine de levage (17) ayant un réa (15) autour duquel un câble (18) est enroulé et un moteur (14) pour actionner le réa, dans laquelle lorsque la cabine est positionnée au sommet d'une cage d'ascenseur, le réa est situé entre la paroi de la cabine et une paroi de la cage d'ascenseur ; **caractérisé en ce que**
 la cabine a une section ouvrante formée dans une partie d'une paroi de la cabine et une partie d'un plafond de la cabine, et
 le réa peut être inspecté à partir de l'intérieur de la cabine, à l'aide de la section ouvrante.
2. Ascenseur sans salle des machines selon la revendication 1, dans lequel :
- les deux extrémités du câble sont attachées à l'intérieur de la cage d'ascenseur et le câble est acheminé autour de poulies disposées sur la cabine et le contrepoids ; et
 le réa est situé entre les poulies.
3. Ascenseur sans salle des machines selon la revendication 1, dans lequel :
- la cabine est fixée à une extrémité du câble et le contrepoids est fixé à l'autre extrémité de celui-ci.
4. Ascenseur sans salle des machines selon l'une quelconque des revendications 1 à 3, dans lequel, lorsque la cabine est positionnée au sommet de la cage d'ascenseur, le moteur est placé entre la cabine et la paroi de la cage d'ascenseur, et une inspection du moteur peut être effectuée à partir de l'intérieur de la cabine, au moyen de la section ouvrante.
5. Ascenseur sans salle des machines selon l'une quelconque des revendications 1 à 3, comprenant en outre un dispositif de fixation (30) pour fixer la cabine à l'intérieur de la cage d'ascenseur, dans lequel le dispositif de fixation doit être mis en oeuvre à partir de l'intérieur de la cabine.
6. Ascenseur sans salle des machines selon l'une quelconque des revendications 1 à 3, dans lequel un mouvement de rotation du moteur est ralenti et un couple de celui-ci est transmis au réa au moyen d'une courroie (16).
7. Ascenseur sans salle des machines comprenant :
- une cabine (11) et un contrepoids (19), la cabine a une section ouvrante (12) formée dans sa paroi ; et
 une machine de levage (17) ayant un réa (15) autour duquel un câble (18) est enroulé et un moteur (14) pour actionner le réa,
 dans lequel, lorsque la cabine est positionnée au sommet d'une cage d'ascenseur, la machine de levage est située entre la paroi de la cabine et une paroi de la cage d'ascenseur ; **caractérisé en ce que**
 un plancher de la cabine (50) s'étend à l'extérieur vers la machine de levage ; et
 la machine de levage peut être inspectée par un technicien de maintenance positionné depuis le plancher s'étendant vers l'extérieur, au moyen de la section ouvrante.
8. Ascenseur sans salle des machines selon la revendication 7, dans lequel :
- les deux extrémités du câble sont attachées à l'intérieur de la cage d'ascenseur et le câble est acheminé autour de poulies disposées sur la cabine et le contrepoids ; et

le réa est situé entre les poulies.

9. Ascenseur sans salle des machines selon la revendication 7, dans lequel :

5

la cabine est fixée à une extrémité du câble et le contrepoids est fixé à l'autre extrémité de celui-ci.

10

15

20

25

30

35

40

45

50

55

FIG. 1

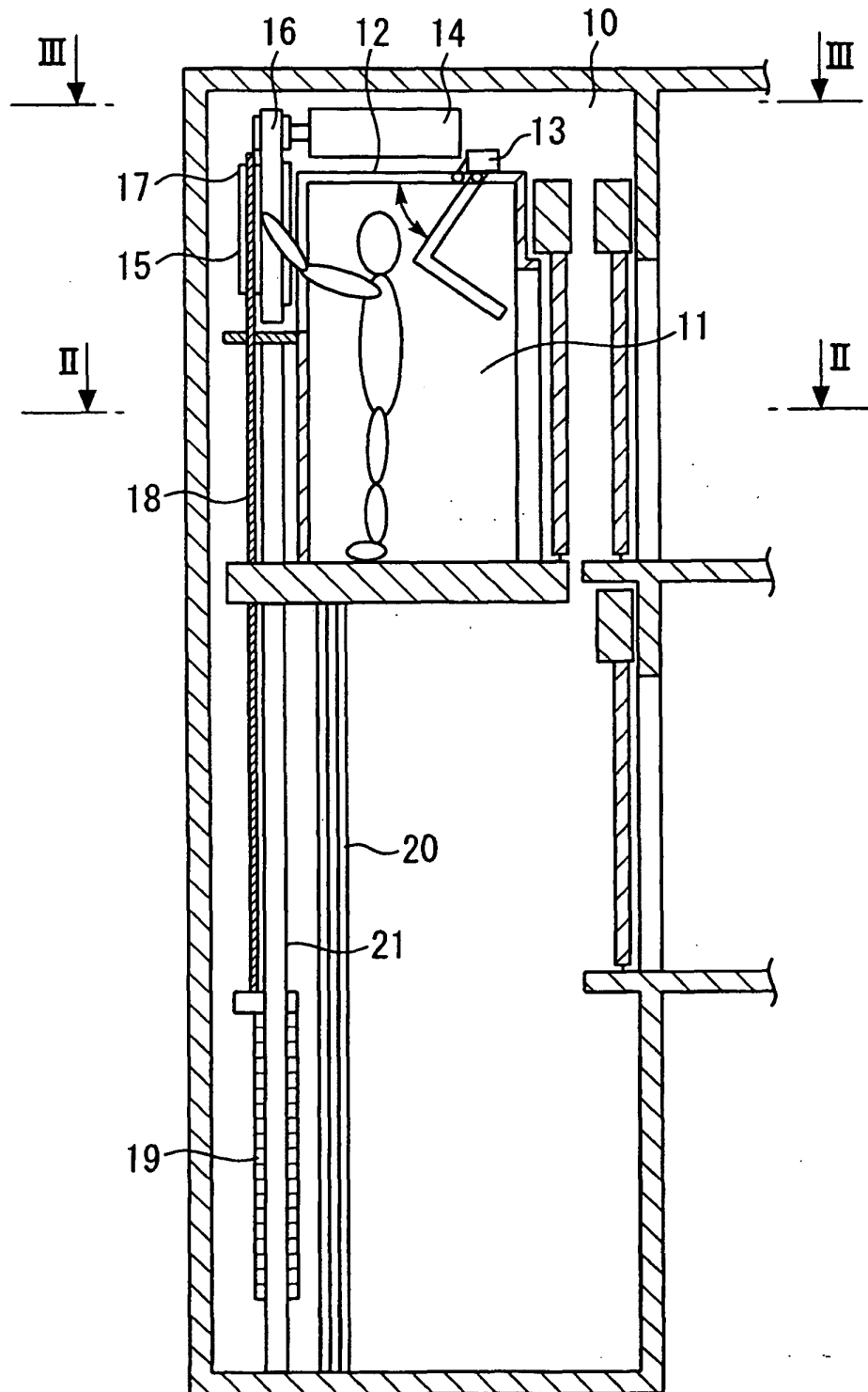


FIG. 2

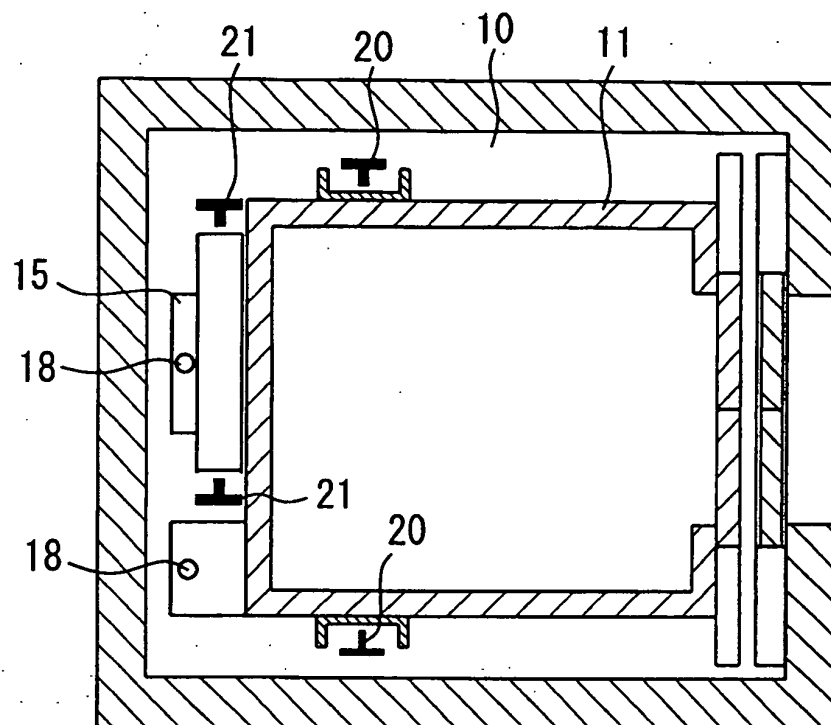


FIG. 3

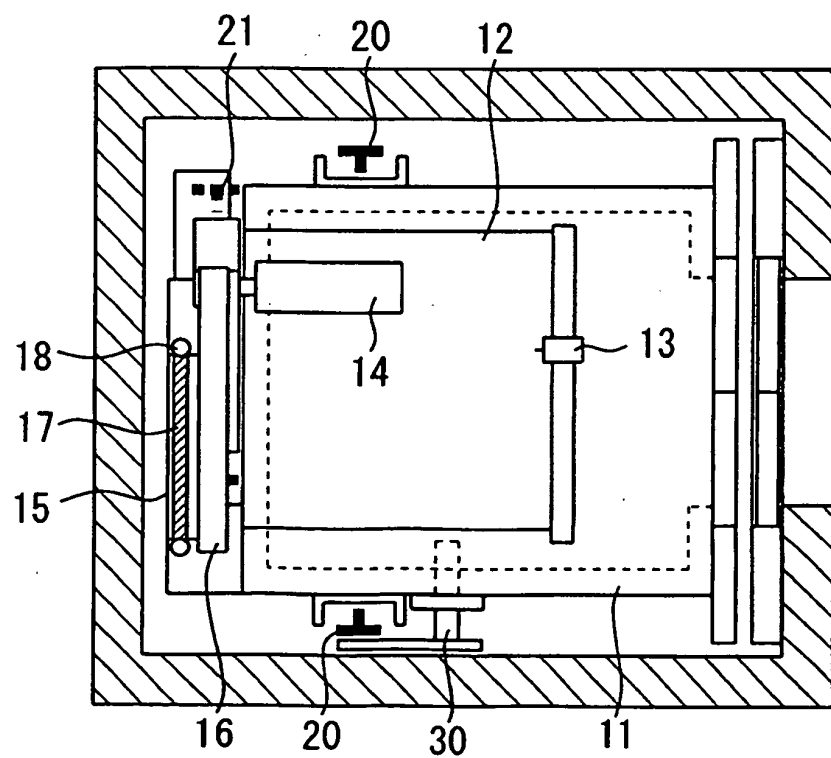


FIG. 4

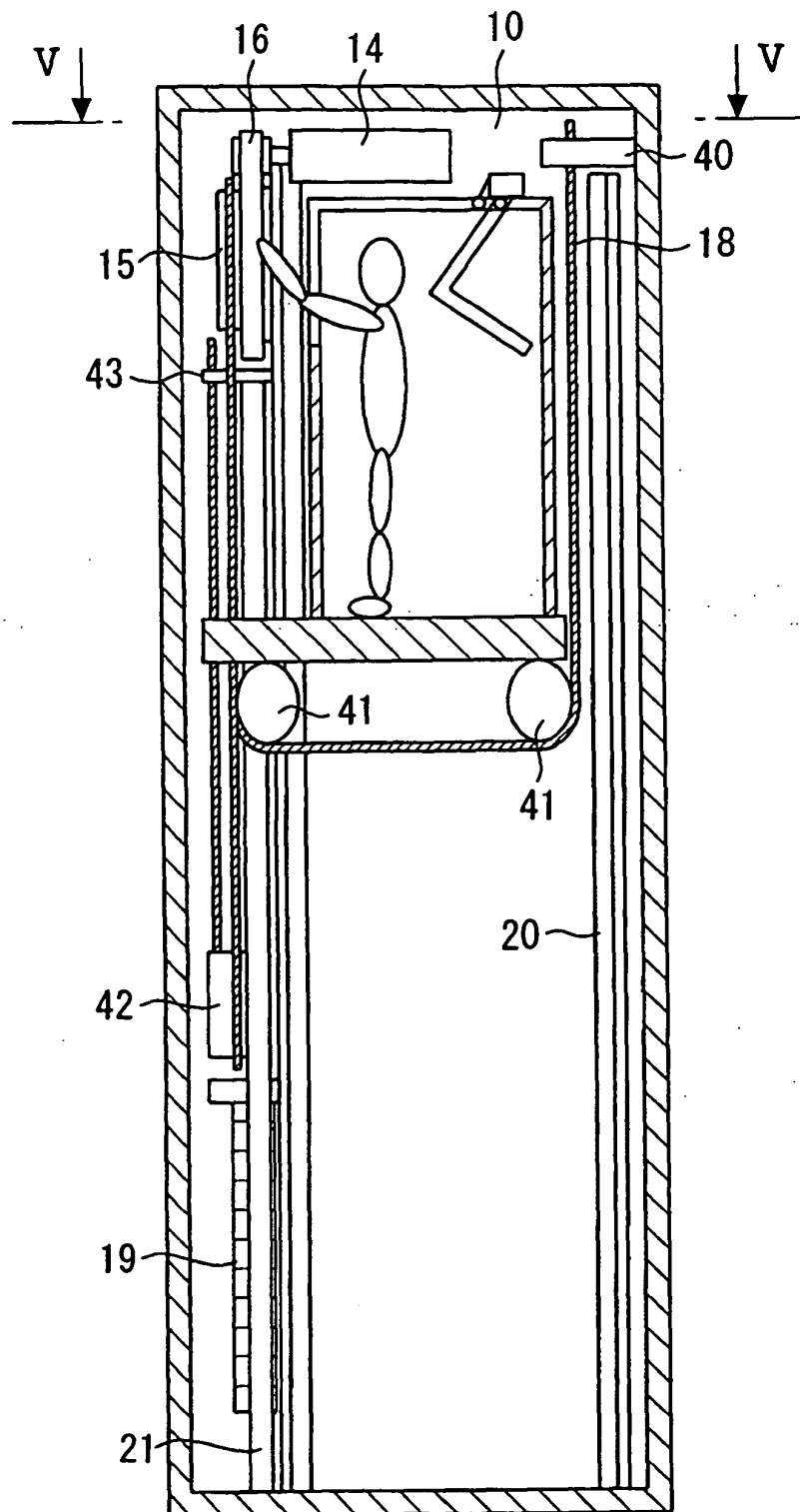


FIG. 5

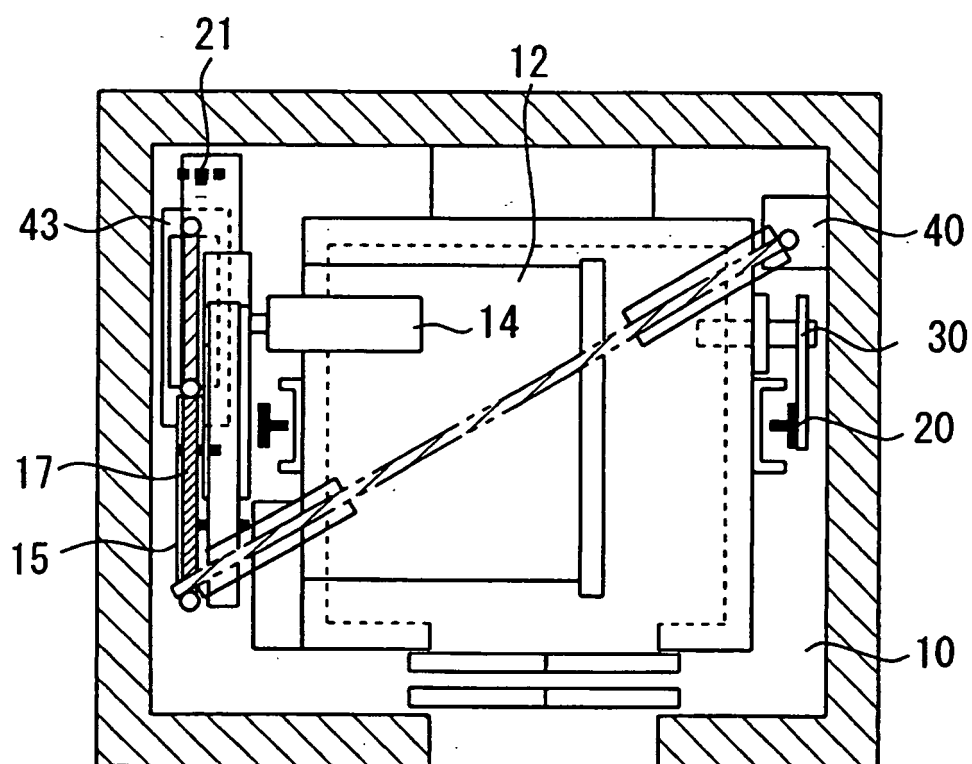


FIG. 6

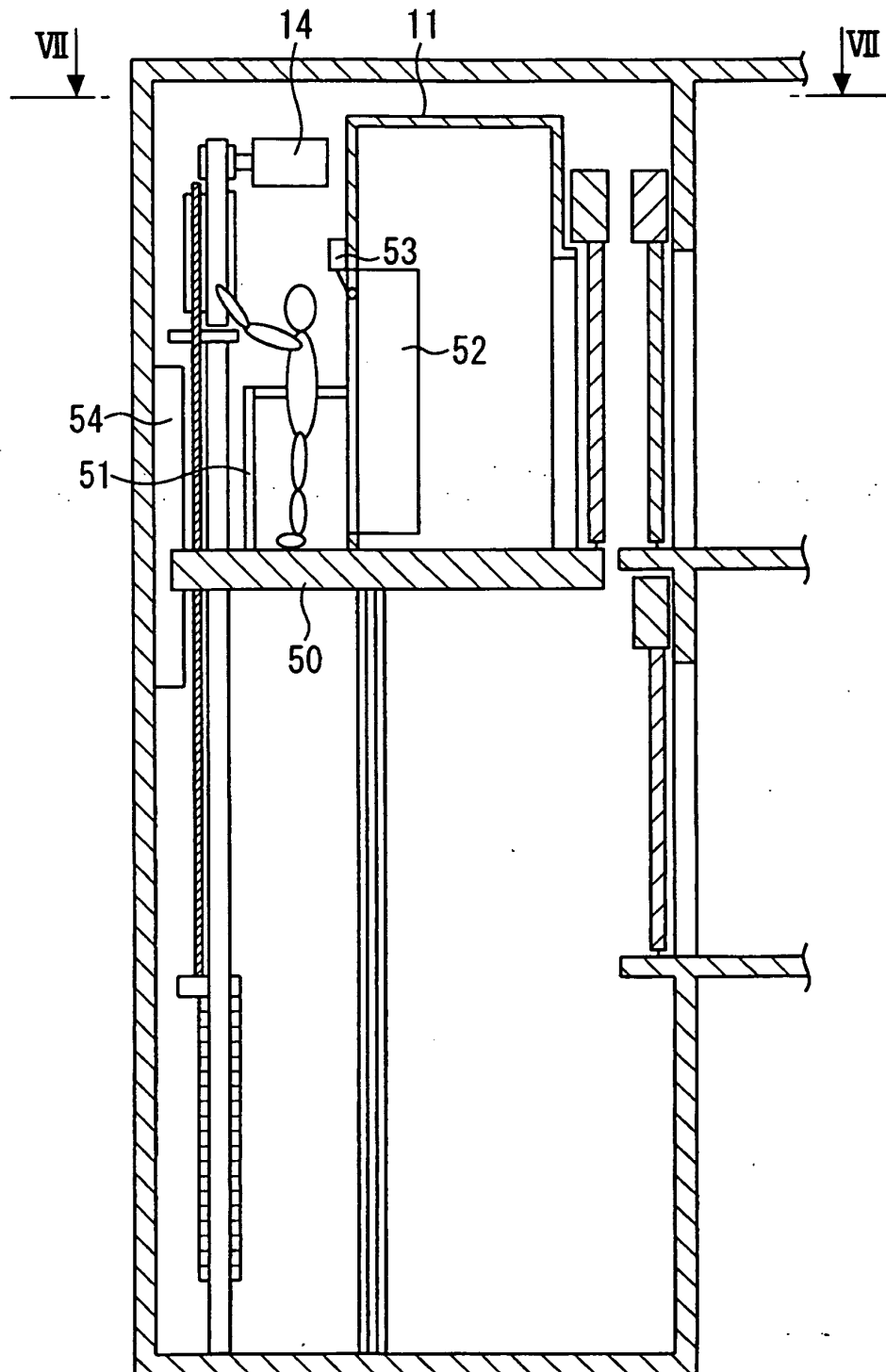
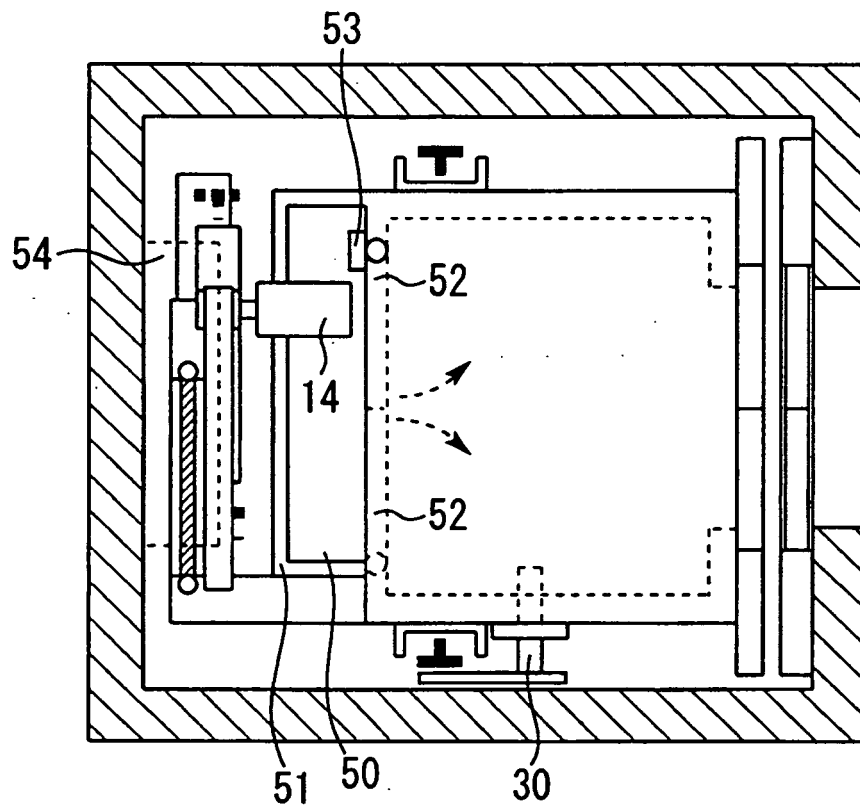


FIG. 7



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2000233878 A [0004]
- JP 11139730 A [0004]
- JP 2000072352 A [0004]