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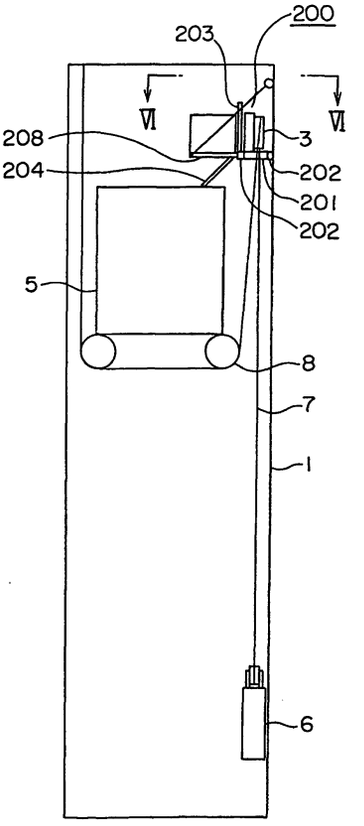
(54) ELEVATOR DEVICE

(57) An elevator system includes a machine room 200 disposed in a space which overlaps neither a space in which an elevator car 5 moves upward and downward within an elevator shaft 1 of the elevator system nor a virtual space defined in the case where the elevator car 5 has moved along an extended path in the up/down direction. The machine room 200 is comprised of a machine room floor 201 provided, protruding substantially horizontally from a wall surface of the elevator shaft 1, a shifting means 204 for allowing a maintenance person to get on the machine room floor from the elevator car or a building, and an extension floor 208 provided projectably from the machine room floor 201 in a substantially horizontal direction. The extension floor 208 is provided so as to move reciprocatively between a housed position at which the extension floor 208 is so housed as not to protrude into the space in which the elevator car 5 has moved in the up/down direction and the virtual space defined in the case where the elevator car 5 has moved along the path extended in the up/down direction and a protruding position at which the extension floor 208 is protruded from the machine room floor 201 so as to extend the machine room floor 201, and wherein heightwise distance from the machine room floor 201 and the extension floor 208 to a ceiling of the elevator shaft 1 is selected so as to allow the maintenance person to work.

FIG. 3



EP 1 486 449 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a machine room of an elevator system, which room is installed within an elevator shaft. In particular, the present invention is concerned with an elevator system in which the space required for installation of the machine room can be diminished with an advantageous result that the elevator shaft can be realized in a reduced size.

BACKGROUND TECHNIQUE

[0002] Figure 9 is a sectional view of an elevator shaft illustrating a conventional elevator system known heretofore. An elevator car 5 is adapted to move upward and downward in the up/down direction within an elevator shaft 1 which extends in the vertical direction. Disposed above the elevator shaft 1 is a machine room 2 in which a hoisting machine 3 for moving the elevator car 5 upward and downward and a control console 4 for controlling the hoisting machine 3 are installed. A rope (not shown) is wound on or around the hoisting machine 3, wherein one end portion of the rope is bound with the elevator car 5 for moving it upward and downward, while the other end portion of the rope is connected to a counterweight 6.

[0003] Heretofore, it has been proposed to dispose the machine room 2 internally of the elevator shaft 1 as indicated by a machine room 2a in phantom lines in Fig. 9 with a view to decreasing the height of the elevator shaft 1 inclusive of the machine room 2 and for the purpose of reducing the building cost or expenses. In that case, a hoisting machine 3a and a control console 4a are similarly installed within the machine room 2a.

[0004] By the way, in the elevator system, such situation often occurs that a maintenance man or operator has to perform various maintenance operations on the top of the ceiling of the elevator car 5. Consequently, a space of a predetermined height is required between the ceiling of the elevator car 5 and that of the elevator shaft 1. In other words, there is required a predetermined distance between the ceiling of the elevator car 5 stopping at the topmost floor and that of the elevator shaft 1 (or between the elevator car 5 and an obstacle existing above the elevator car 5 in more general terms.) (Hereinafter, the distance mentioned above will be referred to as the overhead height.)

[0005] In the case where the machine room 2 is installed above the elevator shaft 1, the overhead height is represented by H1 as shown in the figure. On the other hand, when the machine room is installed within the elevator shaft 1 as denoted by 2a and indicated by phantom lines, the overhead height is representedby H2. In practice, however, the overhead heights H1 and H2 are required to be substantially of a same length. Accordingly, the overall height H3 of the elevator shaft 1 inclusive of the machine room can not be decreased simply by providing the machine room 2a within the elevator shaft 1.

[0006] It can certainly be conceived to install the machine room internally of the elevator shaft 1 within a narrow space available between the elevator car 5 and a wall of the elevator shaft 1. However, for the maintenance of the hoisting machine 3 and the control console 4 within the machine room, a predetermined floor area and a maintenance space are required. In order to ensure the predetermined floor area and the maintenance space as required, the bulk of the machine room tends naturally to increase, which gives rise to a problem that effective utilization of the inner space of a relevant building is impaired.

[0007] Further, such a proposal is also known that the hoisting machine and the control console are directly disposed internally of the elevator shaft 1, as is disclosed in Japanese Patent No. 2593288. In this case, however, work efficiency of the maintenance operations is remarkably degraded because of absence of the machine room.

[0008] The present invention has been made with a view to solving the problems described above, and it is an object of the present invention to provide an elevator system in which the machine room can be provided within the elevator shaft without increasing the overall height of the elevator shaft and in which a sufficient workspace can be ensured for the machine room.

DISCLOSURE OF THE INVENTION

[0009] An elevator system according to this invention includes a machine room disposed in a space which overlaps neither a space in which an elevator car moves upward and downward within an elevator shaft of the elevator system nor a virtual space defined in the assumed case where the elevator car has moved along an extended path in the up/down direction. The machine room is comprised of a machine room floor provided, protruding from a wall surface of the elevator shaft substantially in a horizontal direction, a shifting means for allowing a maintenance man or woman to get on the machine room floor from the elevator car or a building, and an extension floor provided projectably from the machine room floor substantially in a horizontal direction. The extension floor is provided so as to move reciprocatively between a housed position at which the extension floor is so stored or housed as not to protrude into the space in which the elevator car moves in the up/down direction and the virtual space defined in the assumed case where the elevator car has moved along a path extended in the up/down direction and a protruding position at which the extension floor is protruded from the machine room floor so as to expand or extend the machine room floor, and wherein heightwise distance from the machine room floor and the extension floor to a ceiling of the elevator shaft is selected so as to allow

the maintenance person to work.

[0010] The machine room floor mentioned above may be equipped with an upstanding machine room wall along an outer peripheral edge for the dropping preventing purpose.

[0011] Further, the machine room floor may be disposed on beams spanned between inner walls of the elevator shaft.

[0012] Furthermore, the extension floor may be realized so as to constitute a part of a wall of the machine room at the housed position with a lower end portion of the extension floor being rotatably connected to the machine room floor so that the extension floor can be fallen toward the shaft space of the elevator car to be thereby set to the protruding position.

[0013] The extension floor mentioned above may be provided with an extension floor dropping-preventing wall (wall for preventing dropping from the extension floor) along an outer peripheral edge thereof for the dropping-preventing purpose.

[0014] Moreover, the extension floor projecting to the protruding position may be supported by a wire spanned between the extension floor and the elevator shaft.

[0015] Besides, the extension floor may be substantially of a rectangular shape and rotatably connected to the machine room floor along one side thereof while the extension floor dropping-preventing walls may be provided along the other three sides, respectively, wherein adjacent ones of the extension floor dropping-preventing walls and the machine room walls are mutually interconnected.

[0016] Further, the shifting means may be constituted by a ladder capable of moving to the machine room floor by way of the ceiling of the elevator car.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017]

Figure 1 is a sectional view of an elevator system according to a first embodiment of this invention.

Figure 2 is a sectional view taken along a line II-II shown in Fig. 1, as viewed in the direction indicated by arrows.

Figure 3 is a vertical sectional view of the elevator system in the case where an extension floor and an extension floor dropping-preventing wall are extended.

Figure 4 is a cross sectional view of the elevator system in the case where the extension floor and the extension floor dropping-preventing wall are extended.

Figure 5 is a sectional view taken along a line V-V in Fig. 4 in the direction indicated by arrows for illustrating in what manner a machine room is extended.

Figure 6 is a sectional view taken along a line VI-VI in Fig. 3 in the direction indicated by arrows for illustrating in what manner the machine room is extended.

Figure 7 is a vertical sectional view of another example of the elevator system according to a second embodiment of this invention.

Figure 8 is a cross sectional view of the elevator system shown in Fig. 7.

Figure 9 is a sectional viewof an elevator shaft for illustrating a conventional elevator system known heretofore.

BEST MODES FOR CARRYING OUT THE INVENTION

Embodiment 1

[0018] Figure 1 is a sectional view of an example of an elevator system according to a first exemplary embodiment of the present invention (i.e., first mode for carrying out the invention). Figure 2 is a sectional view taken along a line II-II shown in Fig. 1, as viewed in the direction indicated by attached arrows. An elevator car 5 is adapted to move reciprocatively upward and downward, i.e., in the up/down directions, within a vertically extending elevator shaft 1. In the elevator shaft 1, a machine room 200 is installed within a space which overlaps neither a space in which the elevator car 5 moves reciprocatively upward and downward nor a virtual space defined in the assumed case where the elevator car 5 has moved along a path further extended in the up/down direction. To say in another way, assuming that the elevator car 5 moves further upwardly in the up/down direction, the elevator car 5 moves as indicated by a broken line in Fig. 1. The machine room 200 of the elevator system according to the instant embodiment of the invention is provided in a space defined between a surface indicated by the broken line and a wall surface of the elevator shaft.

[0019] In Fig. 1, the elevator car 5 is shown in the state in which it stops at a hall 9 of the top floor. In this conjunction, it should be noted that in the elevator system according to the instant embodiment of the invention, the elevator car 5 can practically move further upwardly, as indicated by the broken line. However, the elevator system according to the invention conceptionally encompasses the elevator system in which the elevator car 5 does not move up to the position just beside the machine room 200, as is apparent from the description that the machine room 200 is installed within the space which overlaps neither the space in which the elevator car 5 moves in the up/down direction nor the virtual space defined in the assumed case where the elevator car 5 has moved along the path extended in the up/down direction.

[0020] A machine room floor 201 of the machine room 200 is supported on beams 202 spanned between two opposite walls of the elevator shaft 1. The machine room floor 201 has to be implemented with sufficiently high strength so as to be capable of withstanding the loads

of the elevator car 5 and the counterweight 6, to say nothing of the loads of the hoisting machine 3 and the control console 4. This can be realized by supporting the machine room floor 201 on the beams 202 as mentioned above.

[0021] A machine room wall 203 is mounted in an upstanding state on and along an outer peripheral edge of the machine room floor 201 located adjacent to the elevator car 5. In this conjunction, the machine room wall 203 may be constituted by a fence of a simple structure composed of e.g. pipes. The space enclosed by the machine room floor 201 and the machine room wall 203 forms the machine room 200 in the elevator system according to the instant embodiment of the invention.

[0022] Disposed within the machine room 200 are the hoisting machine 3 for moving the elevator car 5 reciprocatively upward and downward and the control console 4 for controlling the hoisting machine 3. A rope 7 is wound around the hoisting machine 3, wherein one end portion of the rope 7 is connected to a ceiling of the elevator shaft 1, being spanned around turning guide rollers 7 mounted under the elevator car, while the other end portion of the rope 7 is connected to the counterweight 6. A pair of rope holes 205 through which the rope 7 extends are formed in the machine room floor 201. Disposed between the machine room floor 201 and the ceiling of the elevator car 5 is a ladder 204 serving as a shifting means for allowing a maintenance man or woman to get on the machine room floor 201. The ladder 204 is removably mounted so that the ladder can be set to the state operating as the shifting means when it becomes necessary.

[0023] With the structure of the elevator system described above, there exists no obstacle in the space S which extends from the top of the elevator car 5 to the ceiling of the elevator shaft 1. Consequently, as the overhead height, there can be realized the same height H1 as in the case of the system shown in Fig. 9 where the machine room 2 is provided outside of the elevator shaft 1. Thus, the overall height of the elevator shaft inclusive of the machine room is substantially what is required for the elevator car to move upward/downward and is lower than the overall height in the conventional elevator system.

[0024] Figure 3 is a vertical sectional view showing the elevator system in the state where the extension floor and the extension floor dropping-preventing wall (wall for preventing dropping from the extension floor) are spread out. Figure 4 is a horizontal sectional view showing the elevator system in the state where the extension floor and the extension floor dropping-preventing wall are spread out. The machine room 200 has an extension floor 208 which is so disposed that it can protrude substantially horizontally from the machine room floor 201. More specifically, the extension floor 208 is installed so as to be reciprocatively movable between the position where the extension floor 208 is so retracted or stored as not to protrude into the space in which the elevator car 5 moves in the up/down direction as well as the virtual space defined in the assumed case where the elevator car 5 has moved along the path extended in the up/down direction and the protruding position where the extension floor 208 is protruded from the machine room floor 201 so as to extend the machine room floor 201. The distance or height of the ceiling of the elevator shaft 1 from the machine room floor 201 and the extension floor 208 is selected to be sufficiently high for the maintenance man or woman to work.

[0025] Next, description will be made in detail of the structure of the machine room 200 which can be expanded or extended in view of the working procedure of the maintenance man or woman. Figure 5 shows sectional views taken along a line V-V in Fig. 4 in the direction indicated by arrows for the purpose of illustrating in what manner the machine room is extended. Figure 6 shows a sectional views taken along a line VI-VI in Fig. 3 in the direction indicated by arrows for illustrating in what manner the machine room can be expanded or extended. Referring to Fig. 5 at (a) and Fig. 6 at (a), the machine room 200 is shown in the state where the extension floor 208 is at the retracted or stored position. As can be seen, at the retracted or stored position, the extension floor 208 constitutes a part of the machine room wall 203 with a lower end portion thereof being rotatably connected to the machine room floor 201 by means of hinge 209 so that it can protrude toward the up/down space, being fallen substantially horizontally to the protruding position. In Fig. 5 at (d) and Fig. 6 at (d), there is shown the state in which the extension floor 208 is at the protruding position.

[0026] At first, the maintenance man or woman gets on the machine room 200 from the ceiling of the elevator car 5 by making use of the ladder 204. Then, he or she interconnects the extension floor 208 and a hook 206 by means of a wire 207 (see Fig. 5 at (a)). Subsequently, the extension floor 208 is fallen or set to the position protruding toward the up/down space of the elevator car 5. The extension floor 208 projecting at the protruding position is supported by the wire 207 spanned between the extension floor and the elevator shaft 1 to lie horizontally (see Fig. 5 at (b)).

[0027] In succession, the maintenance man or woman erects a first extension floor dropping-preventing wall 210 on the side facing the up/down space of the elevator car 5. The first extension floor dropping-preventing wall 210 has a lower end portion at which it is rotatably connected to the extension floor 208 at the outer peripheral edge thereof by means of hinge 212 so that the first extension floor dropping-preventing wall 210 can be folded for storage while it can be erected when the maintenance operation is to be carried out (see Fig. 5 at (c) and Fig. 6 at (c)).

[0028] In addition, the maintenance man or woman erects a pair of second extension floor dropping-preventing walls 211 provided along both the lateral side edges of the extension floor 208, respectively. Each of

the second extension floor dropping-preventing walls 211 is rotatably connected to the lateral edge of the extension floor 208 by means of hinges as in the case of the first extension floor dropping-preventing wall 210. Thus, the second extension floor dropping-preventing wall 211 can be erected for performing the maintenance operation while being folded for housing or storage (see Fig. 5 at (d) and Fig. 6 at (d)).

[0029] Finally, the maintenance man or woman interconnects the first extension floor dropping-preventing wall 210, the second extension floor dropping-preventing walls 211 and the machine room wall 203, respectively, by using fastener fittings 213. The fastener fitting 213 is implemented substantially in an inverted-C-like shape. By inserting two parallel leg portions of the fastener fitting into insertion holes (not shown) formed at upper corners of adjacent walls, the first extension floor dropping-preventing wall 210, the second extension floor dropping-preventing wall 211 and the wall 203 can be interconnected. The first extension floor dropping-preventing wall 210 and the second extension floor dropping-preventing walls 211 are implemented in a plate-like shape with high rigidity in the case of the instant embodiment of the invention. It should however be understood that they may be implemented as a fence formed of e.g. pipes in a simplified structure.

[0030] The elevator system implemented in the structure described above includes the machine room 200 disposed in the space which does not overlap the elevator car 5 in the up/down direction thereof within the elevator shaft 1. The machine room 200 is comprised of the machine room floor 201 protruding substantially horizontally from the wall surface of the elevator shaft 1, the shifting means 204 for allowing the maintenance man or woman to get on the machine room floor and the extension floor 208 provided so as to be capable of protruding from the machine room floor 201 in a substantially horizontal direction. The extension floor 208 is provided so as to move reciprocatively between the storage position where the extension floor 208 is so stored or housed as not to protrude into the space which overlaps the elevator car 5 in the up/down direction and the protruding position at which the extension floor 208 is protruded from the machine room floor 201 so as to extend the machine room floor 201. Thus, the heightwise distance from the machine room floor 201 and the extension floor 208 to the ceiling of the elevator shaft 1 can ensure the height for allowing the maintenance man or woman to work. In this manner, the machine room 200 can be installed internally of the elevator shaft 1 without need for increasing the overall height of the elevator shaft 1, while ensuring a sufficiently large workspace within the machine room 200.

[0031] Incidentally, although the shifting means is constituted by the ladder 204 spanned between the ceiling of the elevator car 5 and the machine room floor 201 in the elevator system according to the instant embodiment of the invention, the shifting means is never restricted to the ladder 204 but may be constituted, for example, by an entrance port from the exterior provided in the elevator shaft 1.

Embodiment 2

[0032] Figure 7 is a vertical sectional view showing another exemplary embodiment of the elevator system according to this invention. Figure 8 is a horizontal sectional view of the elevator system shown in Fig. 7. In the case of the elevator system according to the first embodiment of the invention, the hoisting machine 3 is installed internally of the machine room 200. However, the invention is never restricted to such disposition of the hoisting machine. By way of example, the teaching of the present invention can find application to such an arrangement that a hoisting machine 3a of a large size protrudes exteriorly from the machine room 200, as shown in Figs. 7 and 8. In the case of the elevator system according to the instant embodiment of the invention, the hoisting machine 3a is disposed at the topmost of the machine room 200 and overlaps the space defined when the elevator car 5 moves along the extended path. Accordingly, the overhead height in this case is represented by the distance H4 which extends to the bottom portion of the hoisting machine 3a since the hoisting machine 3a constitutes an obstacle. In the other respects, the elevator system according to the instant embodiment of the invention is essentially identical with the elevator system described hereinbefore in conjunction with the first embodiment. Thus, in the elevator system according to the instant embodiment of the invention, although the overall height of the elevator shaft 1 is greater than that of the elevator shaft in the elevator system according to the first embodiment by the size or dimension of the hoisting machine 3a. However, substantially equivalent advantageous effects can be obtained.

INDUSTRIAL APPLICABILITY

[0033] The present invention has provided the elevator system which includes the machine room disposed in the space overlapping neither the space in which the elevator car moves upward and downward within the elevator shaft of the elevator system nor the virtual space in the assumed case where the elevator car has moved along the extended path in the up/down direction. The machine room is comprised of the machine room floor provided, protruding substantially horizontally from the wall surface of the elevator shaft, the shifting means for allowing a maintenance man or woman to get on the machine room floor from the elevator car or a building, and the extension floor provided projectably from the machine room floor substantially horizontally. The extension floor can be provided so as to move reciprocatively between the housed position at which the extension floor is so housed as not to protrude into the space

in which the elevator car moves in the up/down direction and the virtual space defined in the assumed case where the elevator car has moved along a path extended in the up/down direction and the protruding position where the extension floor is protruded from the machine room floor so as to extend the machine room floor. The heightwise distance from the machine room floor and the extension floor to the ceiling of the elevator shaft is selected so as to allow the maintenance man or woman to work. By virtue of the arrangement described above, the machine room can be provided within the elevator shaft without increasing the overall height of the elevator shaft while ensuring a sufficient workspace for the machine room.

[0034] In the elevator system, the machine room floor mentioned above can be equipped with the upstanding machine room wall along the outer peripheral edge for the dropping preventing purpose. By virtue of this feature, the maintenance man or woman can work with safety while tools and the like used for the work can be prevented from dropping into the elevator shaft. Thus, the safety can be enhanced significantly.

[0035] Further, the machine room floor can be disposed on the beams spanned between the inner walls of the elevator shaft. With this arrangement, the machine room floor can be implemented with sufficiently high strength so as to withstand the loads of the elevator car and the counterweight as well as those of the hoisting machine and the control console.

[0036] The extension floor can be so implemented as to constitute a part of the wall of the machine room at the housed position with the lower end portion of the extension floor being rotatably connected to the machine room floor so that the extension floor can be fallen toward the shaft space of the elevator car to be thereby set to the protruding position. With this arrangement, the extension floor can be housed neatly without preventing any obstruction to the other spaces, whereby work efficiency can be improved.

[0037] Further, the extension floor can be provided with the extension floor dropping-preventing wall along the outer peripheral edge thereof for the dropping-preventing purpose. Thus, the maintenance man or woman can work with safety with the tools and the like used for the work being prevented from dropping into the elevator shaft, whereby the safety can further enhanced.

[0038] Furthermore, the extension floor projecting to the protruding position can be supported by the wire spanned between the extension floor and the elevator shaft. With this arrangement, the extension floor can positively be supported in a simple structure with the supporting structure being realized in a reduced space.

[0039] Moreover, the extension floor can be realized substantially in a rectangular shape and rotatably connected to the machine room floor along one side thereof while the extension floor dropping-preventing walls can be provided along the other three sides, respectively, wherein adjacent ones of the extension floor dropping-preventing walls and the machine room walls can mutually be interconnected. Thus, the extension floor drop preventing walls can be secured stably, whereby the safety can be enhanced.

[0040] Besides, the shifting means can be constituted by the ladder capable of moving to the machine room floor by way of the ceiling of the elevator car. Thus, the shifting means can be implemented in a simple structure, involving reduction in the cost.

Claims

1. An elevator system,

characterized in that said elevator system comprises a machine room disposed in a space which overlaps neither a space in which an elevator car moves upward and downward within an elevator shaft of said elevator system nor a virtual space defined in the case where said elevator car has moved along an extended path in the up/down direction,

said machine room comprises

a machine room floor provided, protruding substantially horizontally from a wall surface of said elevator shaft,

shifting means for allowing a maintenance man to get on said machine room floor from said elevator car or a building, and

an extension floor provided projectably from said machine room floor substantially in a horizontal direction,

said extension floor being provided so as to move reciprocatively between a housed position at which said extension floor is so housed as not to protrude into the space in which said elevator car moves in the up/down direction and the virtual space defined in the case where said elevator car has moved along a path extended in the up/down direction and a protruding position at which said extension floor is protruded from said machine room floor so as to extend said machine room floor, and

that heightwise distance from said machine room floor and said extension floor to a ceiling of said elevator shaft is selected so as to allow the maintenance person to work.

2. An elevator system set forth in claim 1, **characterized in that** said machine room floor is equipped with an upstanding machine room wall along an outer peripheral edge for the dropping preventing purpose.

3. An elevator system set forth in claim 1 or 2, **characterized in that** said machine room floor is disposed on beams spanned between inner walls of said elevator shaft.

4. An elevator system set forth in any one of claims 1

to 3, **characterized in that** said extension floor constitutes a part of a wall of said machine room at said housed position and that a lower end portion of said extension floor is rotatably connected to said machine room floor so that said extension floor can be fallen toward the shaft space of said elevator car to be thereby set to said protruding position.

5. An elevator system set forth in any one of claims 1 to 4, **characterized in that** said extension floor is provided with an extension floor dropping-preventing wall along an outer peripheral edge thereof for the dropping-preventing purpose.

6. An elevator system set forth in any one of claims 1 to 5, **characterized in that** said extension floor projecting to said protruding position is supported by a wire spanned between said extension floor and said elevator shaft.

7. An elevator system set forth in claim 5, **characterized in that** said extension floor is substantially of a rectangular shape and rotatably connected to said machine room floor along one side thereof while said extension floor dropping-preventing walls are provided along the other three sides, respectively, wherein adjacent ones of said extension floor dropping-preventing walls and said machine room walls are mutually interconnected.

8. An elevator system set forth in any one of claims 1 to 7, **characterized in that** said shifting means is constituted by a ladder capable of moving to said machine room floor by way of the ceiling of said elevator car.

FIG. 1

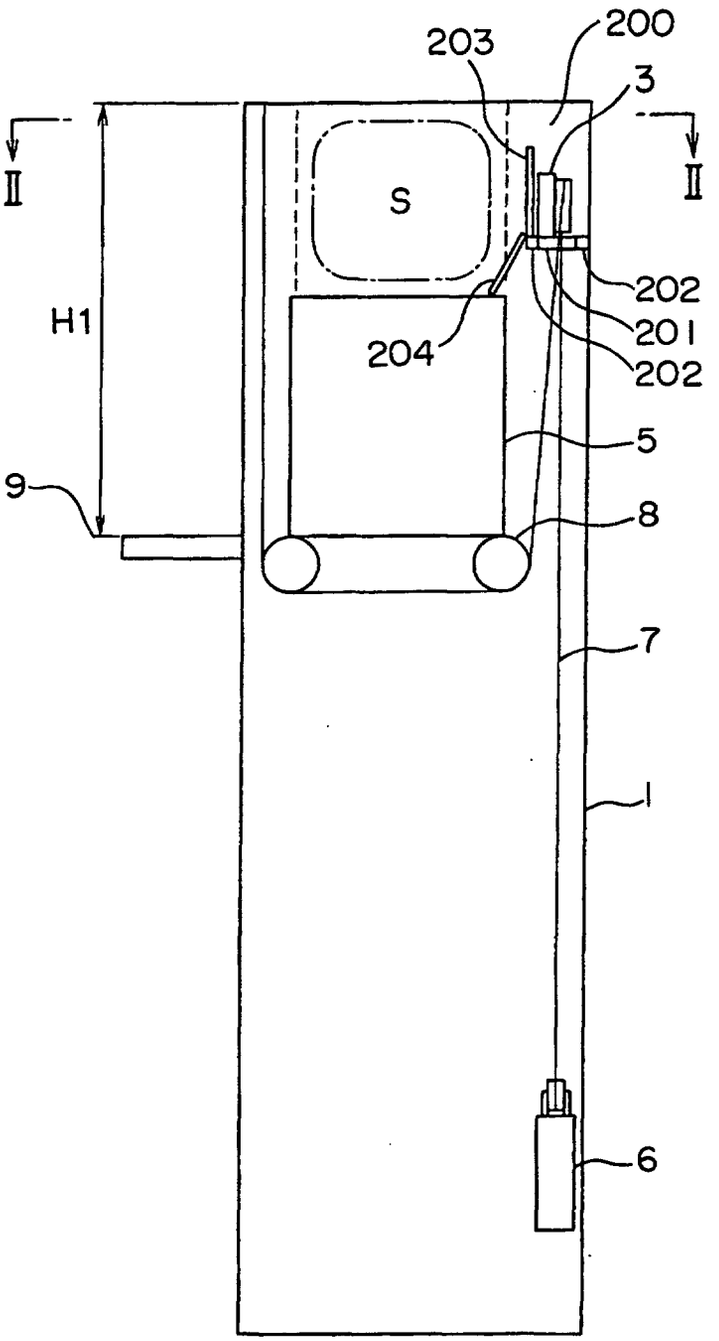


FIG. 2

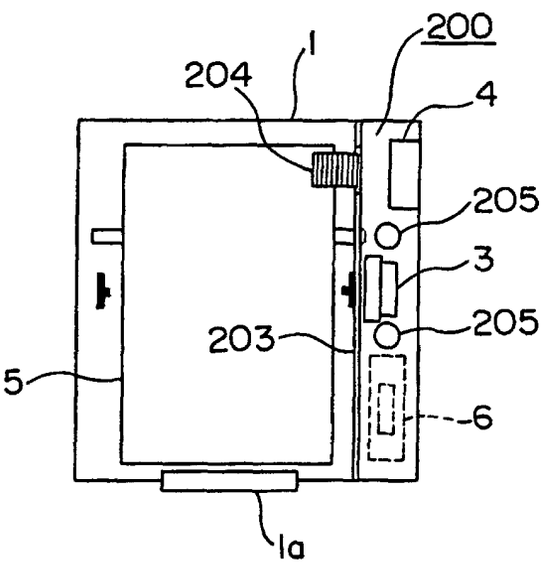


FIG. 3

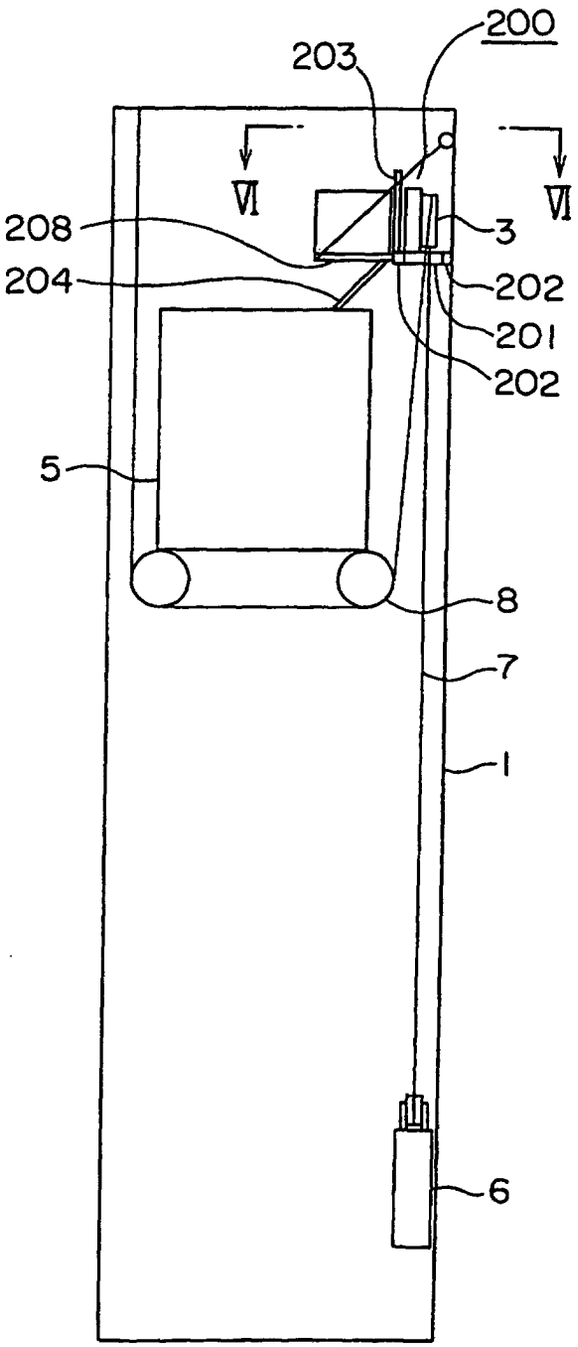


FIG. 4

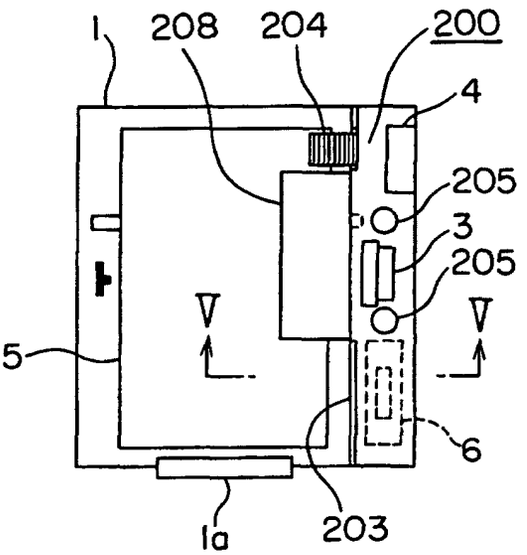


FIG. 5

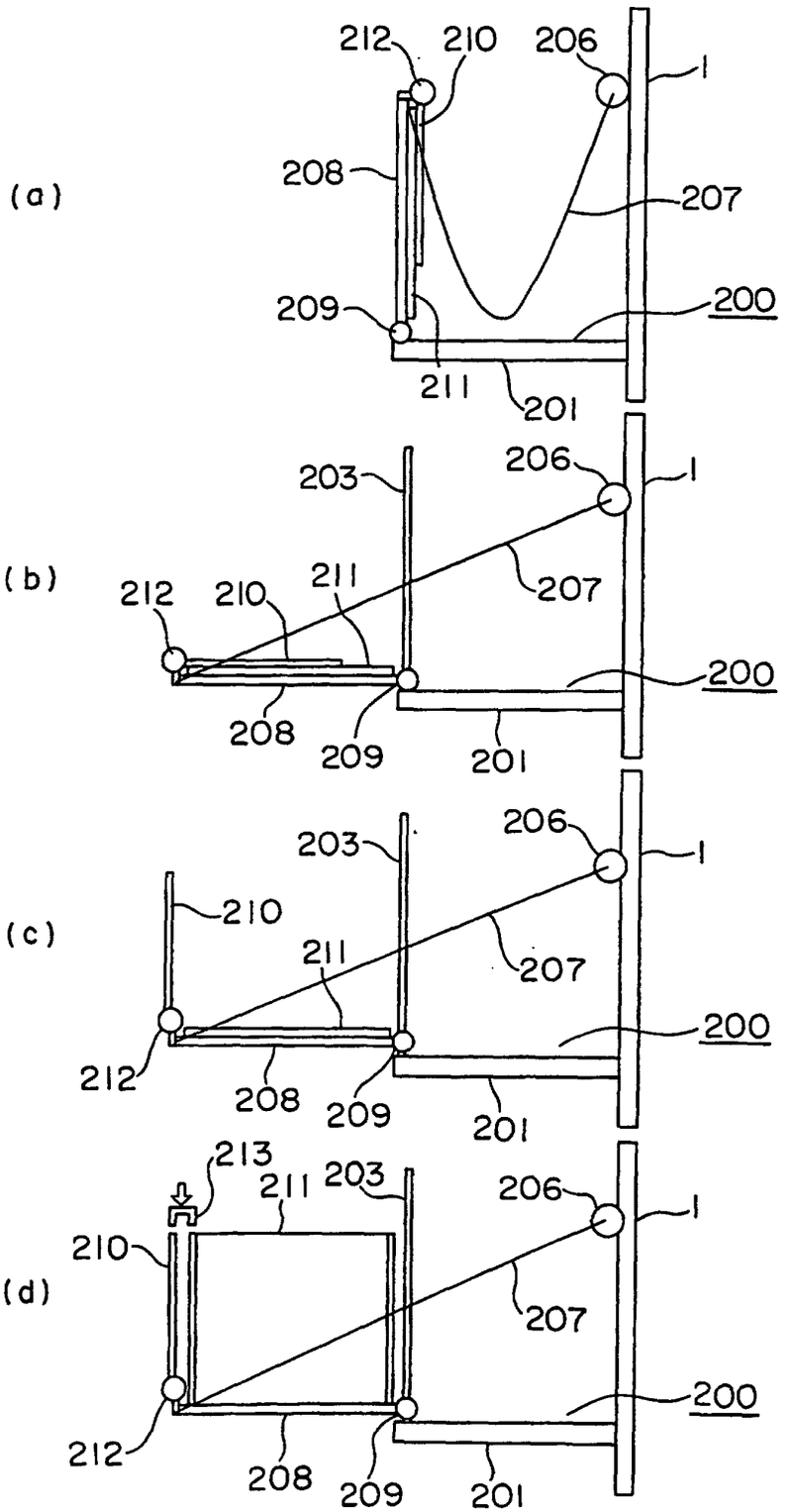

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FIG. 6

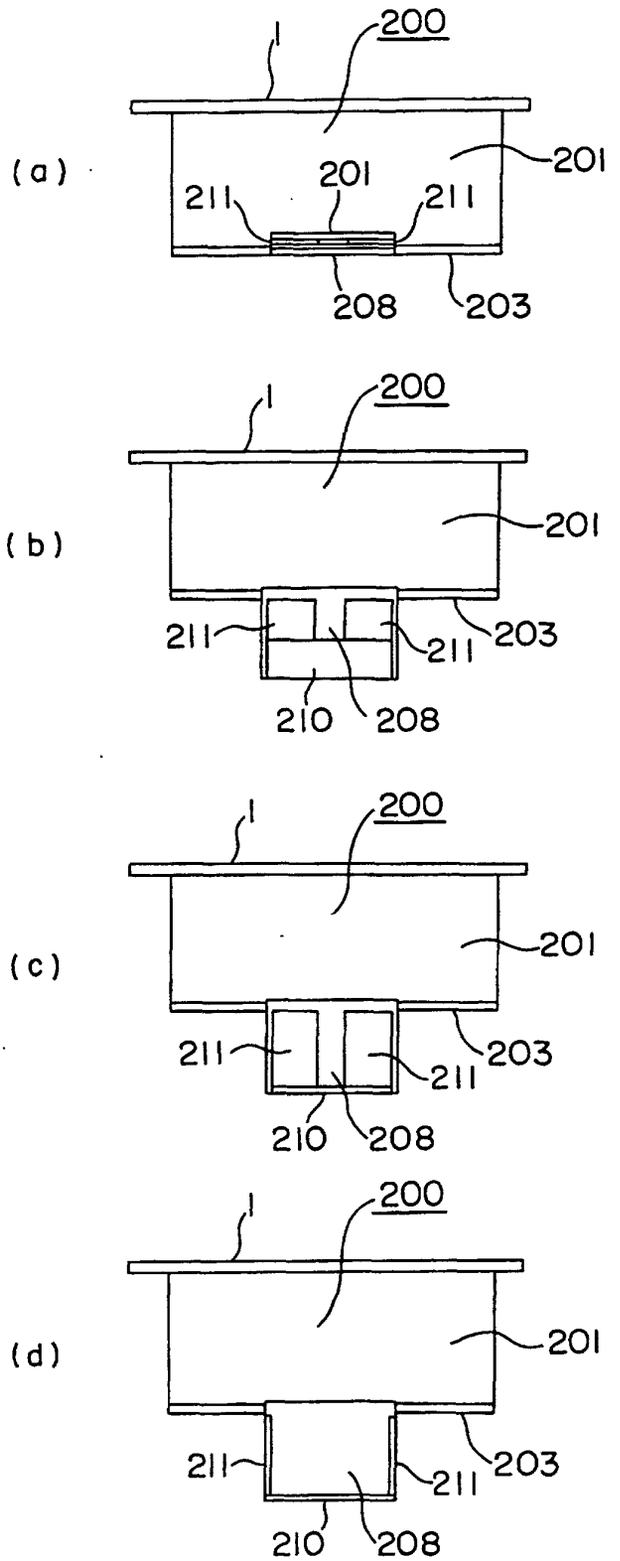
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FIG. 7

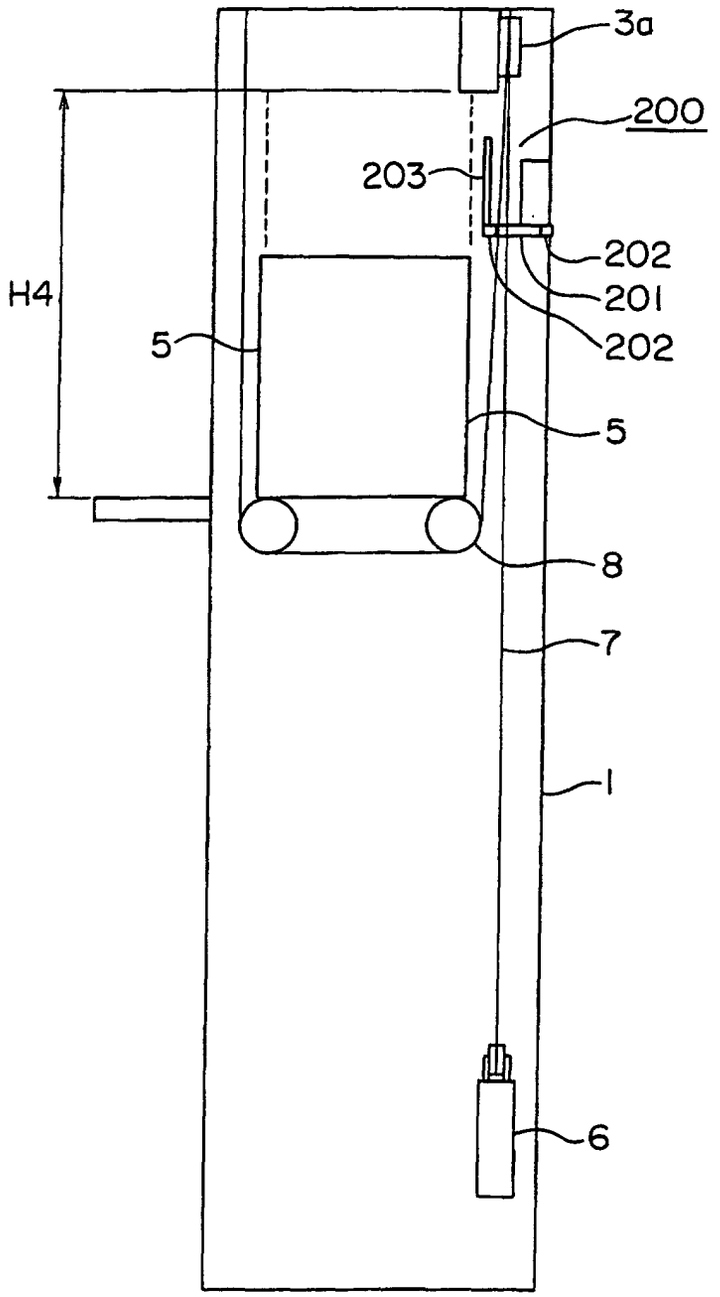


FIG. 8

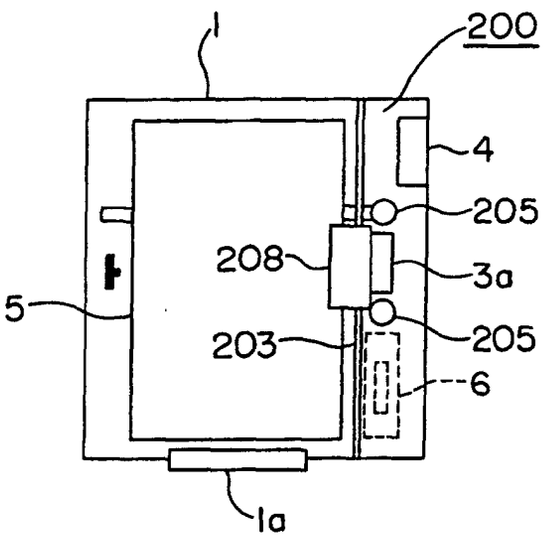
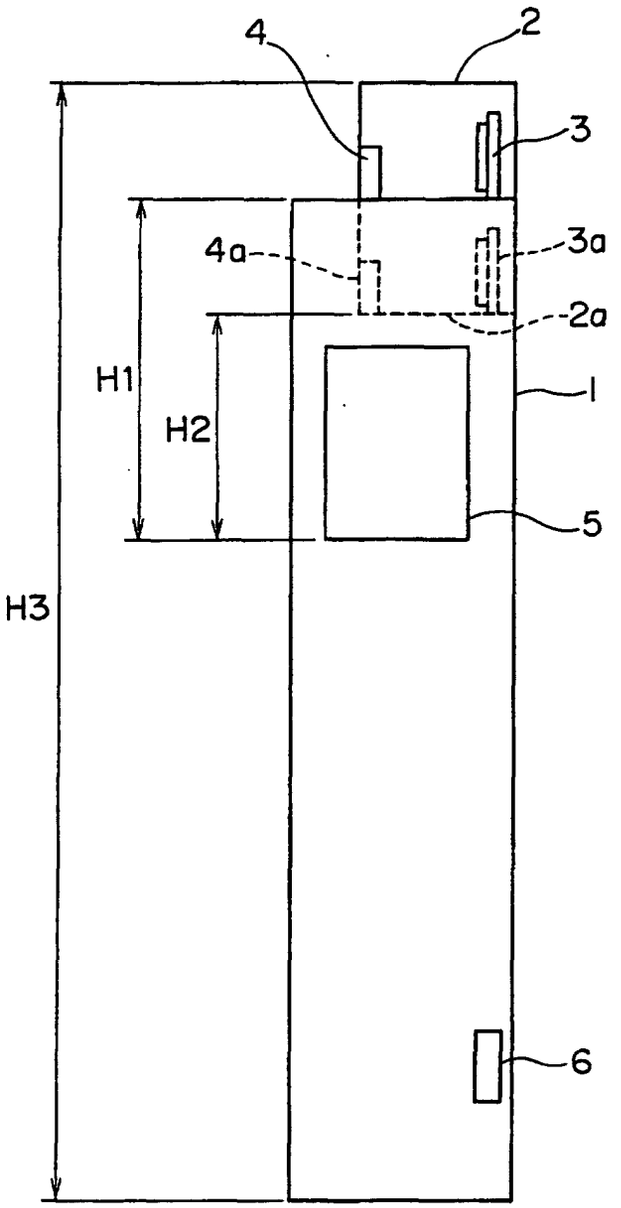


FIG. 9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP02/02508

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl[7] B66B7/00, 5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl[7] B66B5/00-11/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2002
Kokai Jitsuyo Shinan Koho	1971-2002	Toroku Jitsuyo Shinan Koho	1994-2002

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2001-253658 A (Mitsubishi Electric Corp.), 18 September, 2001 (18.09.01), (Family: none)	1-8
A	JP 2002-46951 A (Mitsubishi Electric Corp.), 12 February, 2002 (12.02.02), (Family: none)	1-8
A	JP 2001-139249 A (Toshiba Elevator and Building Systems Corp., Toshiba Corp.), 22 May, 2001 (22.05.01), (Family: none)	1-8
A	JP 2001-220077 A (Mitsubishi Electric Building Techno-Service Co., Ltd.), 14 August, 2001 (14.08.01), (Family: none)	1-8

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 December, 2002 (10.12.02)	24 December, 2002 (24.12.02)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP02/02508

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2001-48437 A (Hitachi Building Systems Co., Ltd.), 20 February, 2001 (20.02.01), (Family: none)	1-8

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