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(54) AN ELEVATOR SYSTEM AND METHOD

AUFZUGSSYSTEM UND -VERFAHREN

SYSTÈME D'ASCENSEUR ET PROCÉDÉ

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Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] This invention relates to an elevator system and to a method for operating an elevator system, and more particularly to a multipurpose elevator system.

DESCRIPTION OF PRIOR ART

[0002] A challenge with traditional elevators is that the provided elevator car is usually optimized for transporting persons. However, in certain situations, such as during the construction of the building, for instance, there also exists a need to transport heavy cargo to upper parts of the building.

[0003] Some buildings are provided with separate elevator cars for transporting persons and separate for transporting cargo. However, for practical reasons this is not the case in all buildings. Previously known elevators are disclosed in JP S55132081U, CN 209127832U, JP 2000211856A and CN 109911745A, for instance.

[0004] Consequently, in some installations, the same elevator car which is used for transporting persons also needs to be used for transporting cargo. When such a need arises, a common problem is how to be able to get the heavy cargo into the elevator car and out of the elevator car without damaging the elevator car in such a way that it no longer looks tidy and nice for transport of persons.

SUMMARY OF THE INVENTION

[0005] An object of the present invention is to solve the above-mentioned drawback and to provide an elevator system which is well suited for use both to transport persons and cargo. This object is achieved with the elevator system according to independent claim 1 and the method according to independent claim 12.

[0006] Use of an elevator car where the floor is provided with at least a first and a second rotatably suspended roll providing a rolling floor surface, and with a floor section consisting of one or more floor elements which are movable between a load bearing position, where they are aligned on top of the rolling floor surface, and a transport position, where the rolling floor surface is revealed, makes the elevator car excellent to use both for persons and cargo.

[0007] Preferred embodiments of the invention are disclosed in the dependent claims.

BRIEF DESCRIPTION OF DRAWINGS

[0008] In the following the present invention will be described in closer detail by way of example and with reference to the attached drawings, in which

Figure 1 illustrates an elevator car with floor elements in a cargo transport position,
Figure 2 illustrates the elevator car of Figure 1 with the floor elements in a passenger load bearing position, Figure 3 to 5 illustrate a second embodiment of an elevator car, and
Figure 6 illustrates a flow chart of a method.

DESCRIPTION OF AT LEAST ONE EMBODIMENT

[0009] Figure 1 illustrates a simplified side view of an elevator system 1 with an elevator car 2 which is arranged to move vertically in a hoistway 3 between landings 4 of a building 16. The elevator car is moved by a hoisting machinery 5 which is controlled by an elevator control 6. The hoisting machinery 5 utilizes a rope 18 to move the elevator car 2 and a counterweight 19 in the hoistway 3. For simplicity, all details and elements participating in moving the elevator car are not illustrated in Figures 1 and 2. One alternative is to utilize a similar solution as illustrated in Figure 5.

[0010] The floor 20 of the elevator car 2 is provided with at least a first and a second roll 7, which are rotatably suspended in the elevator car 2 for rotation around rotation axles 8. The ensure easy loading and unloading, the rotation axles 8 are in the illustrated example parallel to a door opening 9 of the elevator car 2, due to which a heavy object may be directly pushed into the elevator car from the door opening 9 onto the rolls 7.

[0011] In the illustrated example it is by way of example assumed that the number of rolls 7 is larger than two, so that a major part of the bottom area of the elevator car is provided with rolls 7. The rolls may be rotatably suspended from the bottom part of the elevator car or alternatively from the side walls 17 of the elevator car. Irrespectively of the number of rolls 7, the uppermost parts of the rolls that at each moment are located uppermost together provide a rolling surface 10 at a plane illustrated by dotted line 10. This rolling surface 10 carries in the cargo transport position heavy objects that are pushed into or out of the elevator car 2 on the rolls.

[0012] An advantage with the rolling surface 10 provided by the rolls 7 is that when loading or unloading cargo into the elevator car 2, the cargo can slide along the rolling surface due to the rotation of the rolls 7. This significantly simplifies loading and unloading of heavy cargo.

[0013] As transportation of persons requires a steady base for the persons to stand on, the elevator car 2 is provided with a floor section comprising one or more floor elements 11, which are movable between a load bearing position, where the one or more floor elements are aligned on top of the rolling floor surface 10 and provide a fixed floor surface, and a transport position, where the rolling floor surface 10 is revealed.

[0014] Figure 1 illustrates the one or more floor elements 11 in the transport position, where the elevator car is optimized for transport of cargo, and Figure 2 illustrates

the one or more floor elements 11 in the load bearing position, where the one or more floor elements 11 are aligned on top of the rolling floor surface 10 and provide a fixed floor surface for carrying the weight of person standing on it.

[0015] In the illustrated example it is by way of example assumed that the elevator car 2 is provided with two floor elements 11, which are movable between the load bearing position and the transport position by rotation around pivot points 12. In that case each of the floor elements 11 is separately attached by pivot points to the elevator car, preferably proximate to the opposite side walls of the elevator car. Proximity to the side walls 17 is advantageous, as in that case the area of the rolling surface 10 becomes as large as possible in the transport position. The pivot points 12 make it possible to lift each floor element 11 from the horizontal load bearing position illustrated in Figure 2 to an upright vertical transport position illustrated in Figure 1. In that case each floor element is located along a side wall 17 of the elevator car in an upright position, due to which the rolling surface 10 is revealed between the two floor elements. Naturally a similar solution may be utilized also in case only one floor element is in use. However, in that case this single floor element will extend to a larger height along the side wall 17 of the elevator car 2, which makes the elevator floor element heavier and more clumsy to move between the transport and load bearing positions. The pivot points 12 may be implemented by means of hinges, for instance.

[0016] Alternatively, or in addition to using hinges as the pivot points 12 which facilitate moving the floor elements manually between the load bearing position and the transport position, the elevator car may be provided with a drive unit 13 (or drive units) such as an electric motor, a hydraulic motor or hydraulic cylinder, or a pneumatic motor or pneumatic cylinder which can be used to move the one or more floor elements 11 between the load bearing position and the transport position. In that case a control panel of the elevator car 2, for instance, may be used to control the movement of the one or more floor elements 11 by utilizing electric power, hydraulic power or pneumatic power.

[0017] Still another alternative for moving the one or more floor elements 11 into the transport position is to completely remove the elements from the elevator car 2 to an elevator landing 4. In that case no pivot points are needed, but instead the elevator car may be provided with attachment points for attaching the one or more floor elements in position with screws (if needed), for instance, when the one or more floor elements 11 are in the load bearing position.

[0018] In the example illustrated in Figures 1 and 2, the elevator car 2 is provided with a sensor 14 providing the elevator control 6 with an indication about the position of the one or more floor elements 11. In this way the elevator control obtains information when the one or more floor elements 11 are in the transport position and when they are in the load bearing position. This information is useful, because it may be advantageous to stop the elevator car at different heights in the hoistway 3 in relation to the landings 4 depending on the position of the one or more floor elements 11.

[0019] From Figure 1 it can be seen, that when the one or more floor elements 11 are in the transport position, the elevator control 6 has stopped the elevator car at a height in the hoistway 3 where the rolling surface 10 is located a distance D above the upper surface of the landing 4. This is advantageous, as a load transported to the elevator car on a trolley having wheels, may be easily transferred directly from the trolley onto the rolling surface. Depending on the implementation, in the transport position, the elevator car 2 is preferably stopped at a height where the rolling floor surface 10 is at the same height or above the upper surface of the landing 4.

[0020] Correspondingly, it can be seen from Figure 2 that when the one or more floor elements 11 are in the passenger load bearing position, in other words ready to receive passengers, the elevator control 6 has stopped the elevator car 2 in the hoistway 3 at a height where an upper surface of the one or more floor elements 11 is at the same height as the upper surface of the landing 4.

[0021] Consequently, when taking into account also the thickness of the one or more floor elements 11 laying on top of the rolling floor surface 10 in Figure 2, it is clear that the elevator control 6 is configured to stop the elevator car 2 at a higher position in relation to the landing 4 when the one or more floor elements 11 are in the transport position, than when the one or more floor elements 11 are in the load bearing position.

[0022] As the need for transporting heavy objects is typically at its maximum when a building is being constructed, a construction time modification of the elevator car illustrated in Figures 1 and 2 may be utilized only during the construction time of the building. Consequently, for the construction time of the building the elevator car 2 may be set in a hybrid mode, where the rolling floor surface 10 and the one or more floor elements 11 have been provided to the floor 20 of the elevator car. Atthat stage, the elevator car is well suited for both transport of cargo and passengers, depending on if the one or more floor elements 11 are in the passenger load bearing position illustrated in Figure 1 or in the transport position illustrated in Figure 2. However, once the construction time modification is no longer needed as the building is completed, this hybrid mode may no longer be needed. At that stage the elevator car may be set in a person transport mode, by removing the rolls providing the rolling floor surface 10 and the floor elements 11. Consequently, the floor 20 of the elevator car may be revealed and possibly provided with a new coating for more permanent transport of passengers. At that stage the elevator control 6 may, if necessary, be set into a new mode ensuring that the upper surface of the floor 20 is at the same level as the upper surface of the landings 4 in the hoistway, when the elevator car 2 stops at a landing.

[0023] Figures 3 to 5 illustrate a second embodiment of

an elevator car 2'. The second embodiment is very similar as the one explained in connection with Figures 1 to 2. Therefore, in the following, the embodiment of Figures 3 to 5 will mainly be explained by pointing out the differences.

[0024] In Figure 3 the elevator car is set into a hybrid mode, for the construction time of the building, for instance, due to which it is provided with rolls 7 providing a rolling surface 10 and one or more floor elements 11, which can be moved between the cargo transport position (illustrated in Figure 3) and the passenger load bearing position, as has been illustrated and explained in connection with Figures 1 and 2.

[0025] However, in Figure 4 it is by way of example assumed that the construction of the building has ended (for instance), such that the construction time modification with the hybrid mode is no longer needed. Consequently, the elevator car 2' has been set in a person transport mode by removing the rolling floor surface 10 and the one or more floor elements 11 from the elevator car 2' to reveal the floor 20 of the elevator car 2'. Possibly, a new surface coating has been provided to the floor 20 to make it suitable and tidy for passenger transport.

[0026] In the embodiment of Figures 3 to 5, the elevator car has additionally been provided with a height adjustable roof construction to obtain an increased interior height well suited for loading of long or high objects 15' into an elevator car 2'.

[0027] As can be seen in Figure 3, objects 15' which are higher than the height of the door opening 9' in the elevator car 2' can easily be loaded onto the rolling floor surface by tilting at the door, and subsequently turning into an upright position. After this the objects 15' can slide deeper into the elevator car 2' on the rolling surface.

[0028] When comparing Figures 3 and 4 illustrating the same elevator car 2', one can observe that in Figure 3 the interior height of the elevator car is higher than in Figure 4.

[0029] There are at least two different ways of providing a height adjustable roof construction. A first alternative is to provide one single roof element 21' which can be attached in at least two alternative height positions to the elevator car 2'. This has been illustrated in Figure 3 by way of example. The roof element 21' has attachment holes 22' at two different vertical heights, so that bolts 23' can protrude through the holes 22' on the selected height and attach the roof element 21' at a desired height position to the walls of the elevator car 2'. Bolts and holes are naturally only one example of devices suitable for providing height adjustment for a single roof element 21'. As an alternative, it is possible to utilize a mechanism which attaches the roof element to the elevator car and moves the roof element vertically when a lever is pulled, for instance.

[0030] Another alternative to provide a height adjustable roof construction is to utilize two different roof elements. In this alternative the first roof element 21' illustrated in Figure 3, which provides an increased interior height for the elevator car 2' is replaced by a second roof element 21" as illustrated in Figure 4, when the increased interior height is no longer necessary. Again, attachment of the second roof element 21" may be implemented with bolts 23', for instance.

[0031] As is clear from Figures 3 and 4, while the building is constructed or there is for some other reason a need for transporting heavy and/or large sized cargo, the construction time modification for the elevator car 2' can be implemented by setting the elevator car into the hybrid mode. In that case the rolling floor surface 10, the one or more floor elements 11 and the increased interior height may be provided with the adjustable roof construction.

[0032] Figure 5 illustrates in more detail an example of how the hoisting carried out with the hoisting machinery 5 and the rope 18 can be implemented. This solution can be utilized both for the embodiment of Figures 1 to 2 and for the embodiment of Figures 3 to 4.

[0033] As can be seen from Figure 5, the rope 18 is led via pulleys 24' and the hoisting machinery 5 in such a way that the elevator car 2' is suspended from below. This leaves the upper part of the elevator car free, so that a height adjustable roof construction can be implemented.

[0034] Figure 6 is a flow chart of a method for operating an elevator system. This method can be implemented for the embodiment of Figures 1 to 2 or for the embodiment of Figures 3 to 5.

[0035] In step A the elevator car is set in a hybrid mode for the construction time of the building, for instance. This involves providing a floor of the elevator car with a rolling floor surface, and providing the elevator car with a floor section comprising one or more floor elements which are movable between a load bearing position, where the floor elements are aligned on top of the rolling floor surface, and a transport position, where the rolling floor surface is revealed in the elevator car.

[0036] Step B is not necessary in all implementations. However, in case an increased interior height is needed during the construction time, setting of the elevator car in the hybrid mode may include also step B. In that case the interior height of the elevator car is adjusted to an increased interior height. This may be implemented as has been explained in connection with Figures 3 to 5, for instance.

[0037] In step C, once the construction time modification is no longer needed, the elevator car is set in a person transport mode. This involves removing the rolling floor surface and the one or more floor elements from the elevator car to reveal the floor of the elevator car.

[0038] Step D is not necessary in all implementations. However, if the interior height of the elevator car has been increased with a step B, in step D the interior height of the elevator car can be adjusted to a lower height.

[0039] It is to be understood that the above description and the accompanying figures are only intended to illustrate the present invention. It will be obvious to a person skilled in the art that the invention can be varied and modified without departing from the scope of the inven-

tion.

Claims

1. An elevator system (1, 1'), comprising:

   a hoistway (3),
   an elevator car (2, 2') arranged in the hoistway, and
   an elevator control (6) controlling the elevator car (2, 2') to move vertically in the hoistway (3) between landings (4) of a building (16), wherein a floor (20) of the elevator car (2, 2') is provided with at least a first and a second roll (7) which are rotatably suspended in the elevator car for rotation around rotation axles (8) which are parallel to a door opening (9, 9') of the elevator car to provide a rolling floor surface (10), **characterized in that**
   a floor section comprising one or more floor elements (11) which are movable between a load bearing position, where the floor elements (11) are aligned on top of the rolling floor surface (10) and provide a fixed floor surface, and a transport position, where the rolling floor (10) surface is revealed in the elevator car (2, 2').

2. The elevator system according to claim 1, wherein the one or more floor elements (11) are movable between the load bearing position and the transport position by rotation around pivot points (12).

3. The elevator system according to claim 2, wherein the pivot points (12) are arranged proximate to the walls (17) of the elevator car (2, 2').

4. The elevator system according to claim 2 or 3, wherein the pivot points (12) are provided by hinges.

5. The elevator system according to one of claims 2 to 4, wherein the elevator car (2, 2') is provided with a drive unit (13) for rotating the one or more floor elements (11) around the pivot points (12).

6. The elevator system according to claim 5, wherein the drive unit (13) rotates the one or more floor elements (11) around the pivot points (12) by electric power, hydraulic power or pneumatic power.

7. The elevator system according to one of claims 1 to 6, wherein

   the elevator car (2, 2') is provided with a sensor (14) providing the elevator control (6) with an indication about the position of the one or more floor elements (11), and
   the elevator control is configured to control the stopping of the elevator car (2, 2') at different heights in relation to a landing (4) of the hoistway (3) depending whether the one or more floor elements (11) are in the load bearing position or in the transport position.

8. The elevator system according to claim 7, wherein the elevator control (6) is configured to stop the elevator car (2, 2') at a higher position in relation to the landing (4) when the one or more floor elements (11) are in the transport position than when the one or more floor elements (11) are in the load bearing position.

9. The elevator system according to one of claims 1 to 8, wherein the elevator control (6) controls the elevator car (2, 2') to stop at a height where an upper surface of the one or more floor elements (11) is at the same height as an upper surface of the landing (4), when the one or more floor elements (11) are in the load bearing position.

10. The elevator system according to one of claims 1 to 9, wherein the elevator control (6) controls the elevator car (2, 2') to stop at a height where the rolling floor surface (10) is at the same height or above the upper surface of the landing (4), when the one or more floor elements (11) are in the transport position.

11. The elevator system according to one of claims 1 to 10, wherein the elevator car (2') is provided with a height adjustable roof construction, where the interior height in the elevator car (2') can be adjusted by attaching one single roof element (21') in at least two alternative height positions, or by replacing a first roof element (21') with a second roof element (21") providing a different interior height than the first roof element.

12. A method for operating an elevator system, **characterized in that** the method comprises:

   setting (A) the elevator car in a hybrid mode by providing a floor (20) of the elevator car (2, 2') with a rolling floor surface (10), and by providing the elevator car with a floor section comprising one or more floor elements (11) which are movable between a load bearing position, where the floor elements (11) are aligned on top of the rolling floor surface (10), and a transport position, where the rolling floor (10) surface is revealed in the elevator car (2, 2'), and
   setting (C) the elevator car (2') in a person transport mode by removing the rolling floor surface (10) and the one or more floor elements (11) from the elevator car to reveal the floor of the elevator car.

13. The method according to claim 12, wherein setting the elevator car (2') in the hybrid mode comprises adjusting (B) an interior height of the elevator car (2') by a height adjustable roof construction to obtain an increased interior height.

14. The method according to claim 13, wherein the height adjustment comprises attaching a single roof element (21') of the elevator car (2') to a higher one of at least two alternative attachment positions, or replacing a first roof element (21') with a second roof element (21")providing a different interior height than the first roof element.

15. The method according to one of claims 13 - 14, wherein setting (D) the elevator car (2') in the person transport mode comprises adjusting the interior height of the elevator car (2') to a lower height than the increased interior height.

Patentansprüche

1. Aufzugssystem (1, 1'), umfassend:

einen Aufzugsschacht (3),
eine Aufzugskabine (2, 2'), die in dem Aufzugsschacht eingerichtet ist, und
eine Aufzugssteuerung (6), welche die Aufzugskabine (2, 2') steuert, um sich vertikal in dem Aufzugsschacht (3) zwischen Absätzen (4) eines Gebäudes (16) zu bewegen, wobei
ein Boden (20) der Aufzugskabine (2, 2') mit mindestens einer ersten und einer zweiten Rolle (7) versehen ist, die drehbar in der Aufzugskabine zur Drehung um Drehachsen (8), die parallel zu einer Türöffnung (9, 9') der Aufzugskabine sind, zum Bereitstellen einer Rollbodenoberfläche (10) aufgehängt sind, **dadurch gekennzeichnet, dass**
eine Bodensektion, die ein oder mehrere Bodenelemente (11) umfasst, die zwischen einer lasttragenden Position, wo die Bodenelemente (11) oben auf der Rollbodenoberfläche (10) ausgerichtet sind und eine feste Bodenoberfläche bereitstellen, und einer Transportposition beweglich sind, wo die Rollbodenoberfläche (10) in der Aufzugskabine (2, 2') sichtbar ist.

2. Aufzugssystem nach Anspruch 1, wobei das eine oder die mehreren Bodenelemente (11) zwischen der lasttragenden Position und der Transportposition durch Drehung um Drehpunkte (12) beweglich sind.

3. Aufzugssystem nach Anspruch 2, wobei die Drehpunkte (12) in der Nähe der Wände (17) der Aufzugskabine (2, 2') eingerichtet sind.

4. Aufzugssystem nach Anspruch 2 oder 3, wobei die Drehpunkte (12) durch Scharniere bereitgestellt sind.

5. Aufzugssystem nach einem der Ansprüche 2 bis 4, wobei die Aufzugskabine (2, 2') mit einer Antriebseinheit (13) zum Drehen des einen oder der mehreren Bodenelemente (11) um die Drehpunkte (12) versehen ist.

6. Aufzugssystem nach Anspruch 5, wobei die Antriebseinheit (13) das eine oder die mehreren Bodenelemente (11) durch elektrische Leistung, hydraulische Leistung oder pneumatische Leistung um die Drehpunkte (12) dreht.

7. Aufzugssystem nach einem der Ansprüche 1 bis 6, wobei

die Aufzugskabine (2, 2') mit einem Sensor (14) versehen ist, welcher der Aufzugssteuerung (6) eine Angabe über die Position des einen oder der mehreren Bodenelemente (11) bereitstellt, und
die Aufzugssteuerung dazu ausgestaltet ist, das Anhalten der Aufzugskabine (2, 2') auf unterschiedlichen Höhen in Bezug auf einen Absatz (4) des Aufzugsschachts (3) abhängig davon zu steuern, ob das eine oder die mehreren Bodenelemente (11) sich in der lasttragenden Position oder in der Transportposition befinden.

8. Aufzugssystem nach Anspruch 7, wobei die Aufzugssteuerung (6) dazu ausgestaltet ist, die Aufzugskabine (2, 2'), wenn das eine oder die mehreren Bodenelemente (11) sich in der Transportposition befindet bzw. befinden, an einer höheren Position in Bezug auf den Absatz (4) anzuhalten als wenn das eine oder die mehreren Bodenelemente (11) sich in der lasttragenden Position befindet bzw. befinden.

9. Aufzugssystem nach einem der Ansprüche 1 bis 8, wobei die Aufzugssteuerung (6) die Aufzugskabine (2, 2') steuert, um auf einer Höhe anzuhalten, wo eine obere Oberfläche des einen oder der mehreren Bodenelemente (11) sich auf der gleichen Höhe befindet wie eine obere Oberfläche des Absatzes (4), wenn das eine oder die mehreren Bodenelemente (11) sich in der lasttragenden Position befindet bzw. befinden.

10. Aufzugssystem nach einem der Ansprüche 1 bis 9, wobei die Aufzugssteuerung (6) die Aufzugskabine (2, 2') steuert, um auf einer Höhe anzuhalten, wo die Rollbodenoberfläche (10) sich auf der gleichen Höhe wie oder über der oberen Oberfläche des Absatzes (4) befindet, wenn das eine oder die mehreren

Bodenelemente (11) sich in der Transportposition befindet bzw. befinden.

11. Aufzugssystem nach einem der Ansprüche 1 bis 10, wobei die Aufzugskabine (2') mit einer höhenverstellbaren Dachkonstruktion versehen ist, wo die Innenhöhe in der Aufzugskabine (2') durch Anbringen eines einzigen Dachelements (21') in mindestens zwei alternativen Höhenpositionen oder durch Ersetzen eines ersten Dachelements (21') mit einem zweiten Dachelement (21") verstellt werden kann, das eine unterschiedliche Innenhöhe bereitstellt als das erste Dachelement.

12. Verfahren für den Betrieb eines Aufzugssystems, **dadurch gekennzeichnet, dass** das Verfahren umfasst:

Einstellen (A) der Aufzugskabine in einem hybriden Modus durch Versehen eines Bodens (20) der Aufzugskabine (2, 2') mit einer Rollbodenoberfläche (10) und durch Versehen der Aufzugskabine mit einer Bodensektion, die ein oder mehrere Bodenelemente (11) umfasst, die zwischen einer lasttragenden Position, wo die Bodenelemente (11) oben auf der Rollbodenoberfläche (10) ausgerichtet sind, und einer Transportposition beweglich sind, wo die Rollbodenoberfläche (10) in der Aufzugskabine (2, 2') sichtbar ist, und
Einstellen (C) der Aufzugskabine (2') in einem Personentransportmodus durch Entfernen der Rollbodenoberfläche (10) und des einen oder der mehreren Bodenelemente (11) von der Aufzugskabine, um den Boden der Aufzugskabine sichtbar zu machen.

13. Verfahren nach Anspruch 12, wobei das Einstellen der Aufzugskabine (2') im hybriden Modus das Verstellen (B) einer Innenhöhe der Aufzugskabine (2') durch eine höhenverstellbare Dachkonstruktion umfasst, um eine erhöhte Innenhöhe zu erhalten.

14. Verfahren nach Anspruch 13, wobei die Höhenverstellung das Anbringen eines einzigen Dachelements (21') der Aufzugskabine (2') auf eine höhere von mindestens zwei alternativen Anbringungspositionen oder das Ersetzen eines ersten Dachelements (21') mit einem zweiten Dachelement (21") umfasst, das eine unterschiedliche Innenhöhe als das erste Dachelement bereitstellt.

15. Verfahren nach einem der Ansprüche 13 bis 14, wobei das Einstellen (D) der Aufzugskabine (2') in dem Personentransportmodus das Verstellen der Innenhöhe der Aufzugskabine (2') auf eine niedrigere Höhe als die erhöhte Innenhöhe umfasst.

Revendications

1. Système d'ascenseur (1, 1') comprenant :

une gaine d'ascenseur (3),
une cabine d'ascenseur (2, 2') agencée dans la gaine d'ascenseur, et
une commande d'ascenseur (6) commandant la cabine d'ascenseur (2, 2') pour se déplacer verticalement dans la gaine d'ascenseur (3) entre les paliers (4) d'un bâtiment (16), dans lequel :
un plancher (20) de la cabine d'ascenseur (2, 2') est prévu avec au moins un premier et un second rouleau (7) qui sont suspendus, en rotation, dans la cabine d'ascenseur pour la rotation autour des essieux de rotation (8) qui sont parallèles à une ouverture de porte (9, 9') de la cabine d'ascenseur pour fournir une surface de plancher roulante (10), **caractérisé en ce que** :
une section de plancher comprenant un ou plusieurs éléments de plancher (11) qui sont mobiles entre une position de support de charge, dans laquelle les éléments de plancher (11) sont alignés sur le dessus de la surface de plancher roulante (10) et fournissent une surface de plancher fixe, et une position de transport, dans laquelle la surface de plancher roulante (10) est dévoilée dans la cabine d'ascenseur (2, 2').

2. Système d'ascenseur selon la revendication 1, dans lequel les un ou plusieurs éléments de plancher (11) sont mobiles entre la position de support de charge et la position de transport par la rotation autour des points de pivot (12).

3. Système d'ascenseur selon la revendication 2, dans lequel les points de pivot (12) sont agencés à proximité des parois (17) de la cabine d'ascendeur (2, 2').

4. Système d'ascenseur selon la revendication 2 ou 3, dans lequel les points de pivot (12) sont fournis par les charnières.

5. Système d'ascenseur selon l'une des revendications 2 à 4, dans lequel la cabine d'ascenseur (2, 2') est prévue avec une unité d'entraînement (13) pour faire tourner les un ou plusieurs éléments de plancher (11) autour des points de pivot (12).

6. Système d'ascenseur selon la revendication 5, dans lequel l'unité d'entraînement (13) fait tourner les un ou plusieurs éléments de plancher (11) autour des points de pivot (12) par alimentation électrique, alimentation hydraulique ou alimentation pneumatique.

7. Système d'ascenseur selon l'une des revendications 1 à 6, dans lequel :

la cabine d'ascenseur (2, 2') est prévue avec un capteur (14) dotant la commande d'ascenseur (6) d'une indication concernant la position des un ou plusieurs éléments de plancher (11), et
la commande d'ascenseur est configurée pour commander l'arrêt de la cabine d'ascenseur (2, 2') à différentes hauteurs par rapport à un palier (4) de la gaine d'ascenseur (3) selon si les un ou plusieurs éléments de plancher (11) sont dans la position de support de charge ou dans la position de transport.

8. Système d'ascenseur selon la revendication 7, dans lequel :
la commande d'ascenseur (6) est configurée pour arrêter la cabine d'ascenseur (2, 2') dans une position plus haute par rapport au palier (4), lorsque les un ou plusieurs éléments de plancher (11) sont dans la position de transport que lorsque les un ou plusieurs éléments de plancher (11) sont dans la position de support de charge.

9. Système d'ascenseur selon l'une des revendications 1 à 8, dans lequel la commande d'ascenseur (6) commande la cabine d'ascenseur (2, 2') pour qu'elle s'arrête à une hauteur où une surface supérieure des un ou plusieurs éléments de plancher (11) est à la même hauteur qu'une surface supérieure du palier (4), lorsque les un ou plusieurs éléments de plancher (11) sont dans la position de support de charge.

10. Système d'ascenseur selon l'une des revendications 1 à 9, dans lequel la commande d'ascenseur (6) commande la cabine d'ascenseur (2, 2') pour qu'elle s'arrête à une hauteur où la surface de plancher roulante (10) est à la même hauteur ou au-dessus de la surface supérieure du palier (4), lorsque les un ou plusieurs éléments de plancher (11) sont dans la position de transport.

11. Système d'ascenseur selon l'une des revendications 1 à 10, dans lequel la cabine d'ascenseur (2') est dotée d'une construction de toit réglable en hauteur, où la hauteur intérieure dans la cabine d'ascenseur (2') peut être réglée en fixant un seul élément de toit (21') dans au moins deux positions de hauteur en variante, ou en remplaçant un premier élément de toit (21') par un second élément de toit (21") fournissant une hauteur intérieure différente du premier élément de toit.

12. Procédé pour actionner un système d'ascenseur, **caractérisé en ce que** le procédé comprend les étapes consistant à :

régler (A) la cabine d'ascenseur dans un mode hybride en dotant un plancher (20) de la cabine d'ascenseur (2, 2'), d'une surface de plancher roulante (10), et en dotant la cabine d'ascenseur d'une section de plancher comprenant un ou plusieurs éléments de plancher (11) qui sont mobiles entre une position de support de charge, dans laquelle les éléments de plancher (11) sont alignés sur le dessus de la surface de plancher roulante (10), et une position de transport, dans laquelle la surface de plancher roulante (10) est dévoilée dans la cabine d'ascenseur (2, 2'), et
régler (C) la cabine d'ascenseur (2') dans un mode de transport de personnes en retirant la surface de plancher roulante (10) et les un ou plusieurs éléments de plancher (11) de la cabine d'ascenseur pour laisser apparaître le plancher de la cabine d'ascenseur.

13. Procédé selon la revendication 12, dans lequel l'étape consistant à régler la cabine d'ascenseur (2') dans le mode hybride comprend l'étape consistant à régler (B) une hauteur intérieure de la cabine d'ascenseur (2') par une construction de toit réglable en hauteur afin d'obtenir une hauteur intérieure accrue.

14. Procédé selon la revendication 13, dans lequel le réglage en hauteur comprend l'étape consistant à fixer un seul élément de toit (21') de la cabine d'ascenseur (2') dans une position plus haute d'au moins deux positions de fixation en variante, ou remplacer le premier élément de toit (21') par un second élément de toit (21") fournissant une hauteur intérieure différente du premier élément de toit.

15. Procédé selon l'une des revendications 13 à 14, dans lequel l'étape consistant à régler (D) la cabine d'ascenseur (2') dans le mode de transport de personnes comprend l'étape consistant à régler la hauteur intérieure de la cabine d'ascenseur (2') à une hauteur plus basse que la hauteur intérieure accrue.

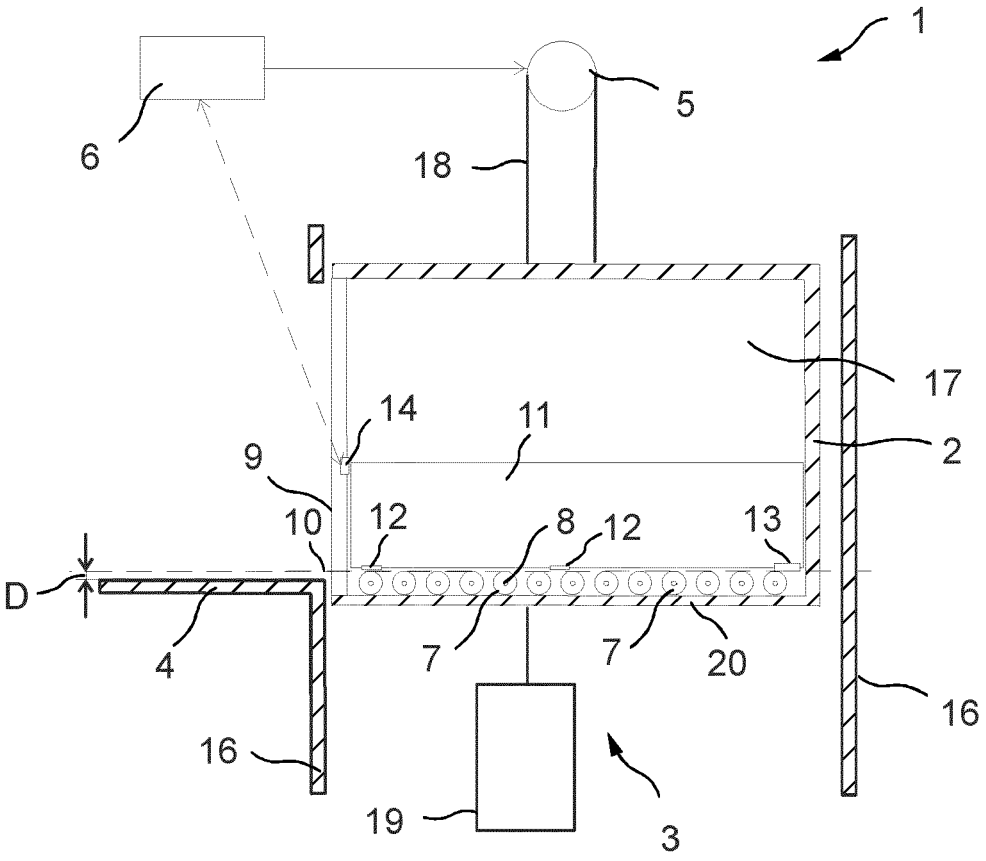
1
5
6
18
17
14
11
2
9
10
12
8
12
13
D
4
7
7
20
16
16
19
3

FIG. 1

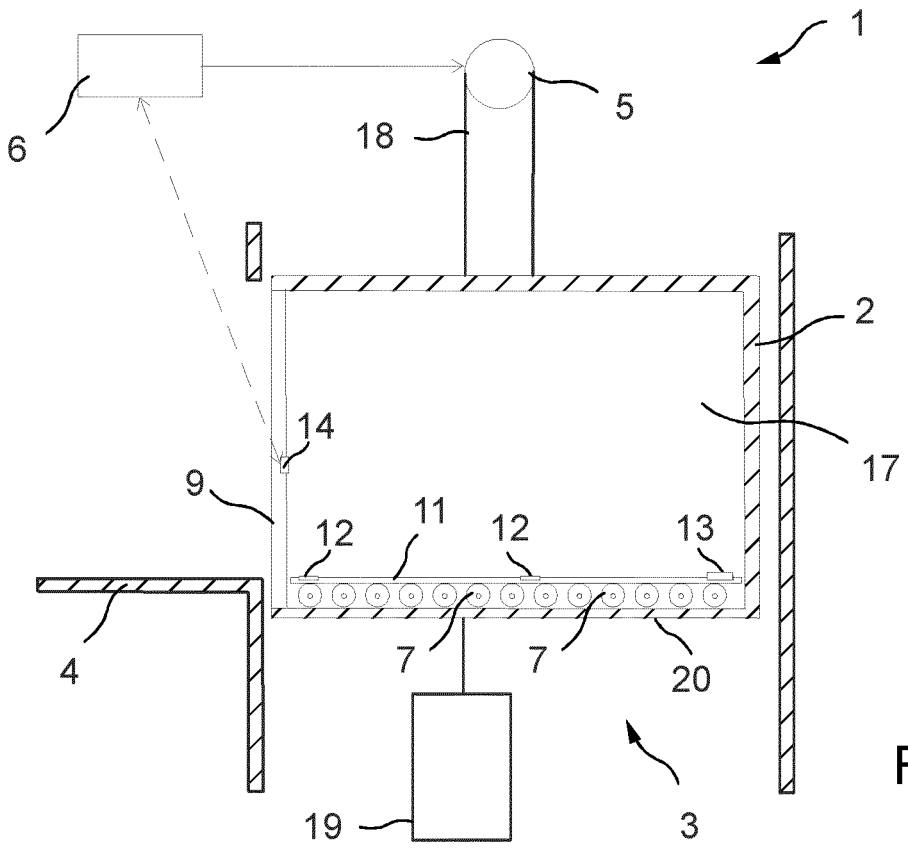
1
5
6
18
2
14
17
9
12
11
12
13
4
7
7
20
19
3

FIG. 2

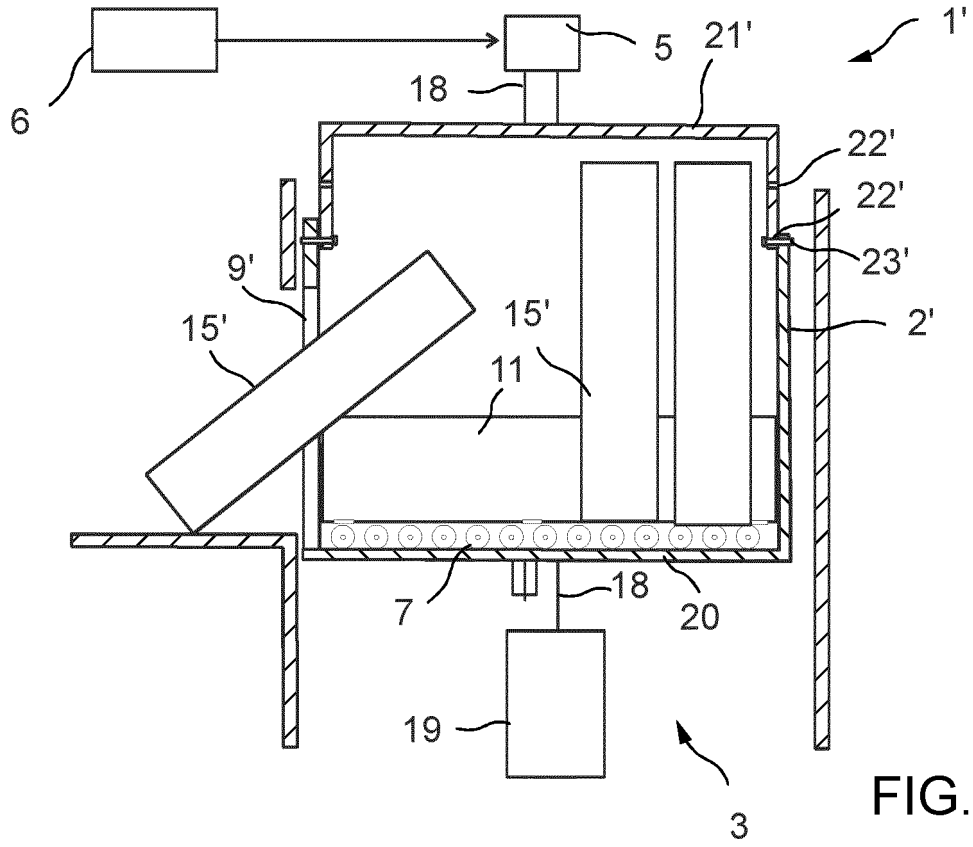

FIG. 3

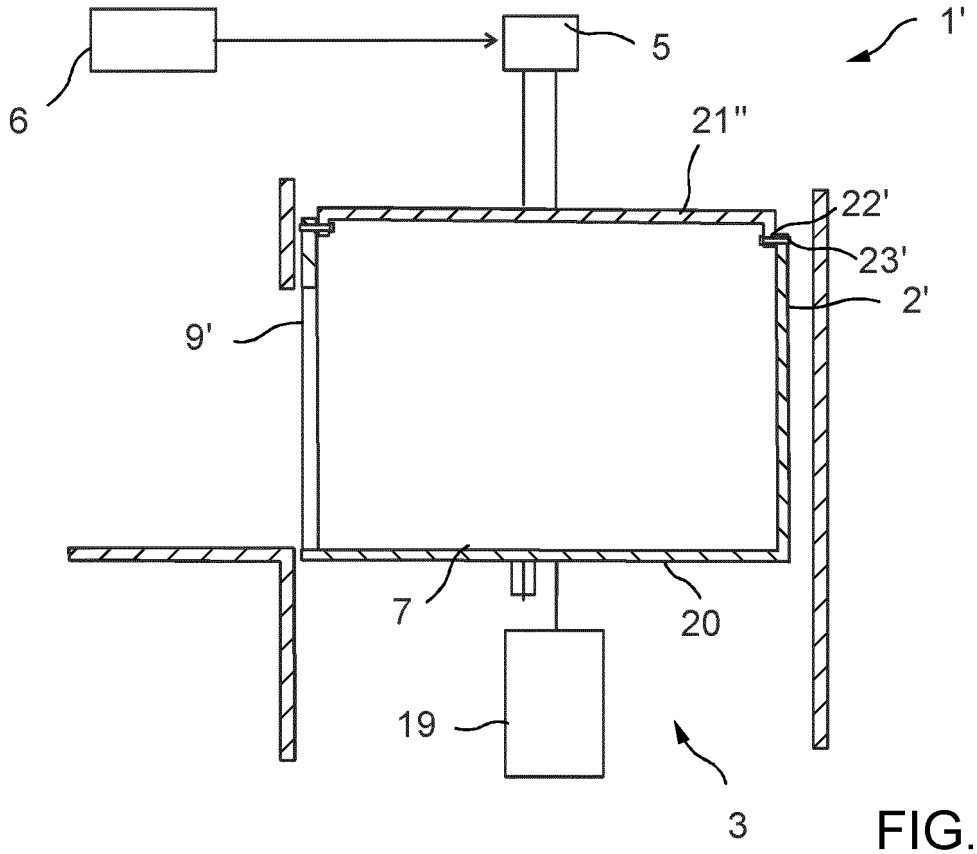

FIG. 4

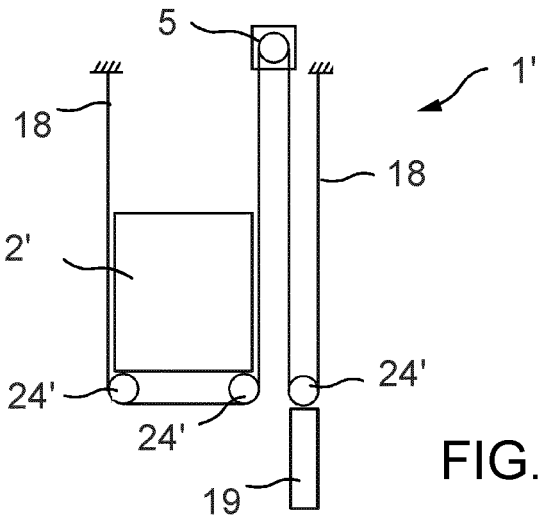
5
1'
18
18
2'
24'
24'
24'
19

FIG. 5

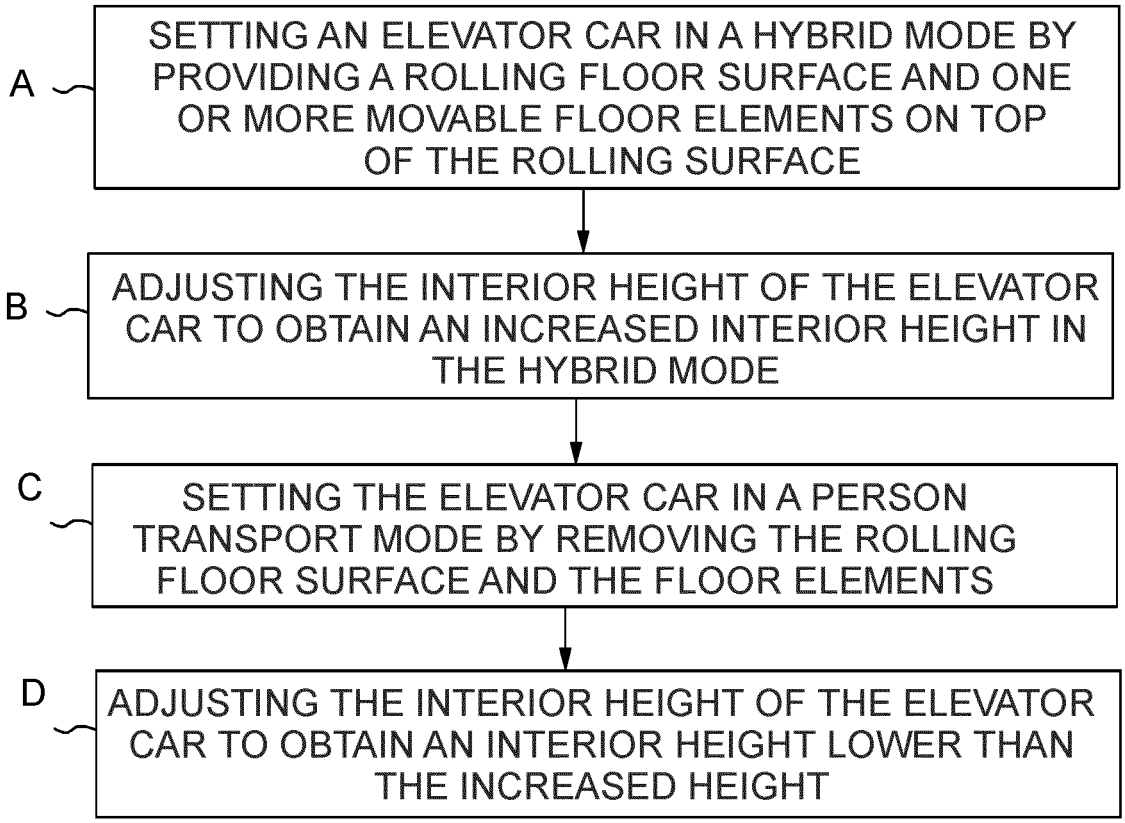
A
SETTING AN ELEVATOR CAR IN A HYBRID MODE BY PROVIDING A ROLLING FLOOR SURFACE AND ONE OR MORE MOVABLE FLOOR ELEMENTS ON TOP OF THE ROLLING SURFACE
B
ADJUSTING THE INTERIOR HEIGHT OF THE ELEVATOR CAR TO OBTAIN AN INCREASED INTERIOR HEIGHT IN THE HYBRID MODE
C
SETTING THE ELEVATOR CAR IN A PERSON TRANSPORT MODE BY REMOVING THE ROLLING FLOOR SURFACE AND THE FLOOR ELEMENTS
D
ADJUSTING THE INTERIOR HEIGHT OF THE ELEVATOR CAR TO OBTAIN AN INTERIOR HEIGHT LOWER THAN THE INCREASED HEIGHT

FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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