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(71) Applicant: **ORONA, S. COOP.**
20120 Hernani (Guipuzcoa) (ES)

(72) Inventor: **COCHO ERAUSKIN, Endika**
20120 Hernani (Guipúzcoa) (ES)

(74) Representative: **Herrero & Asociados, S.L.**
Cedaceros, 1
28014 Madrid (ES)

(54) **ELEVATOR APPARATUS AND OPERATING METHOD OF SAID ELEVATOR APPARATUS**

(57) The invention relates to an elevator apparatus comprising:
- a traveling assembly (1),
- a shaft (3) where the traveling assembly (1) can be displaced,
- a shaft element (4) which at some point of the path of the traveling assembly (1) is located in a space between a wall (3') of the shaft (3) and said traveling assembly (1), and
- covering means (5) located in the traveling assembly (1) which can be displaced between an active position and an inactive position, such that the minimum distance between the wall (3') of the shaft (3) and the covering means (5) in the active position is smaller than in the inactive position, where the covering means (5) automatically switch from the active position to the inactive position when the traveling assembly (1) is located in its path next to the shaft element (4).

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Description

Technical Field of the Invention

[0001] A first aspect of the present invention relates to an elevator apparatus, whereas a second aspect relates to an operating method of said elevator apparatus, being applicable in the industry of elevator apparatus, and more specifically in the field of safety systems and devices, which allows dispensing with having to install safety rails on the traveling assembly in certain cases in which said safety rail is required.

Background of the Invention

[0002] In machine room-less elevator apparatus, a minimum number of elements and components are located outside the shaft of the elevator apparatus where the traveling assembly is displaced, such that performing inspection, maintenance or repair work on the elevator apparatus requires an operator getting into the shaft, where said maintenance operator commonly has to be on the roof of the car to gain access to components such as the drive unit, which is usually located in the upper end area of the shaft, such that while performing jobs of this type, the roof of the car is used as a work platform by the operator.

[0003] There is a risk of falling into the shaft while performing said maintenance work on the roof of the car. Said risk increases as the free space between the traveling assembly and the shaft wall of the elevator apparatus increases. This is why different applicable regulations establish a series of requirements for reducing the risk of falling in the event that the free space between the traveling assembly and the shaft wall is excessive. The means known in the prior art to prevent the risk of falling into the shaft can be rails and/or fixed flaps (attachments, prolongations and/or extensions) on the roof of the car.

[0004] The actual use of rails involves certain intrinsic risks, such as those resulting from limbs being trapped at end positions or from enabling non-ergonomic work positions when an operator is close to and/or leaning against them. Furthermore, in addition to limiting free work space, they often times reduce the space available for locating a refuge space required on the roof of the traveling assembly to prevent the risk of crushing when the traveling assembly is at one of its end positions.

[0005] The arrangement of fixed flaps, as described in different patent documents, *inter alia,* European patent application no. EP-1849732-A1 and Japanese patent application no. JP-2002128433-A, reduces the risk of falling into the shaft, which allows dispensing with the placement of the rail in certain cases.

[0006] The problem that arises with said fixed flaps is that the ability to transversely cover the free space between the traveling assembly and the shaft wall is conditioned by the shaft elements (element protruding from the shaft wall or the counterweight itself) with which a collision is possible, sometimes rendering it insufficient in preventing the operator from falling into the shaft.

Description of the Invention

[0007] This patent proposes transversely covering the free space between the traveling assembly and the shaft wall of the elevator apparatus using a mobile flap, where there can even be a projection or a collision between the mobile flap and the shaft element (element protruding from the shaft wall or the counterweight itself) at certain points of the path of the traveling assembly, thereby preventing the risk of the operator falling between the free space between the traveling assembly and the shaft wall of the elevator apparatus. To that end, the condition that the mobile flap is drawn and/or pulled in when it passes said shaft element (element protruding from the shaft wall or the counterweight itself) must be met, such that they do not contact one another during said transient situation. This solution prevents having to install a rail on the roof of the traveling assembly.

[0008] A first aspect of the present invention relates to an elevator apparatus, which allows dispensing with installing a rail on the roof of the traveling assembly by means of the prolongation of the traveling assembly to the shaft wall to the point where it prevents the risk of the operator, who is located on the roof of the traveling assembly, falling while performing maintenance work or other kinds of work, such as inspection, repair and updates, for example. The invention allows preventing this risk of falling while at the same time preventing the mobile flap from colliding with a shaft element when they pass one another.

[0009] The elevator apparatus proposed by the invention comprises:

- a traveling assembly, which in turn comprises a car,
- a shaft, comprising at least one wall, where the traveling assembly can be displaced according to a path defined by a displacement direction,
- at least one shaft element, which may be fixed or mobile, and which at some point of the path of the traveling assembly is located in a space between said at least one wall and said traveling assembly, and
- covering means located in the traveling assembly, where said covering means can be displaced between an active position and an inactive position, such that the minimum distance between said at least one wall of the shaft and the covering means in the active position is smaller than in the inactive position, such that the covering means in the inactive position cannot contact said at least one shaft element at any point of the path of the traveling assembly, whereas they can contact it in the active position when the traveling assembly is located in its path next to said at least one shaft element.

[0010] According to the invention, the covering means automatically switch from the active position to the inactive position when the traveling assembly is located in its path next to said at least one shaft element.

[0011] The safety issue underlying distance requirements established in different applicable regulations is the prevention of an operator who is located on the roof of the traveling assembly from falling through the free space between the traveling assembly and the shaft wall. As discussed above, this issue is resolved in the prior art by means of rails or the extension of fixed elements, with the problems discussed above.

[0012] Unlike the safety elements of the prior art, the invention allows automatically switching from the active to the inactive position when the traveling assembly passes the shaft element. The invention thereby allows preventing use of a rail given that the covering means maintain the minimum distance required between the covering means and the shaft wall, along the entire path of the traveling assembly, but are drawn and/or pulled in when passing a shaft element, such as the counterweight.

[0013] The covering means are extended in the active position, and the minimum distance between the covering means and the shaft wall is reduced, i.e., they can take up a space which is in vertical projection with the shaft element, whereas the covering means are retracted in the inactive position, preventing collision with any shaft element while traveling. Although it has been defined that the covering means and the shaft element can collide in the active position, it must be taken into account that there may not be any contact in said situation, even though a small enough minimum distance, within the tolerances established by applicable regulations, is maintained in order for said contact to take place.

[0014] Therefore, the covering means, which can consist of a mobile flap, have the function of increasing the projection on the horizontal plane of the traveling assembly so that there is no risk of falling through the free space between the traveling assembly and the shaft wall, which is ultimately the problem to be solved. The covering means have sufficient resistance to withstand a person falling. Said covering means are located or mounted on the traveling assembly such that they can move with respect to said traveling assembly, but without actually being separated from it, i.e., they are articulated to or mounted on said traveling assembly in a guided manner, allowing for a certain path of movement. In this regard, taking into consideration the definition provided, the covering means, as such, are considered to be mobile, and the defined distances are distances referring to said covering means. Nevertheless, the mounting, location or connection of the covering means in or to any part of the traveling assembly can logically be done by means of fixed structural elements that play no part in the definitions of distances provided, i.e., said fixed structural elements can be located a smaller distance from the wall than the covering means themselves are when they are in the active position. The distance defined in the invention is always between the covering means, which are mobile, and the shaft wall. On the other hand, the covering means can be rigid or flexible.

[0015] It is contemplated that the covering means comprise regulating means for defining their active position, i.e., the covering means do not have to be completely extended or deployed to fulfill the function of preventing the risk of falling.

[0016] It is also contemplated that the regulating means can allow adjusting the location or the relative position of the covering means with respect to the traveling assembly.

[0017] The path of the traveling assembly defines the displacement direction as a displacement between an initial point and another final point, considered to define a path of the traveling assembly that is understood as any sequence of displacements that can be made between the two end points.

[0018] The possibility of the elevator apparatus comprising means for detecting the relative position of said at least one shaft element with respect to the traveling assembly and activation means acting on the covering means for switching them between the active and inactive positions is contemplated. Several embodiments for the activation means and the means for detecting the relative position between the shaft element and the traveling assembly, according to the invention are described below.

[0019] It is also contemplated that the covering means are kept in the inactive position in a normal elevator apparatus operating mode. Nevertheless, though not a preferred embodiment, it is also contemplated that in the normal mode the covering means are in the active position and switch to the inactive position only when they pass the shaft element, logically to prevent a collision.

[0020] On the other hand, it is contemplated that the covering means are in the active position in an elevator apparatus inspection mode, except that when the traveling assembly is located in its path next to said at least one shaft element, they automatically switch to the inactive position, such that the covering means and said at least one shaft element do not contact one another. According to a preferred embodiment, it is contemplated that once the shaft element has been overcome or surpassed, the method then comprises the covering means automatically switching back to the active position.

[0021] According to an embodiment of the invention, a shaft element is a counterweight. In this embodiment, it is contemplated that the traveling assembly comprises at least one lateral plane facing the counterweight, the covering means being located in correspondence with said at least one lateral plane.

[0022] On the other hand, according to another embodiment of the invention, a shaft element is a fixed element located in the shaft. Specifically, it is contemplated that said shaft element protrudes from the shaft wall. In other words, a protrusion of the shaft wall is considered a shaft element; in such case, an irregularity or protuber-

ance of the shaft itself can collide with the covering means in the event that said means were kept in the active position while passing.

[0023] The possibility of the covering means being located in the upper area of the traveling assembly is contemplated.

[0024] It is contemplated that the covering means themselves can be used as a work platform by operators.

[0025] It is contemplated that the covering means may adopt any shape and/or geometry corresponding with the free space between the traveling assembly and the wall which is to be transversely covered.

[0026] It is contemplated that the displacement of the covering means between the active and inactive positions occurs due to angular displacement with respect to the traveling assembly, i.e., by means of collapse, or by linear displacement with respect to the traveling assembly, i.e., in a telescopic or extendable manner, and even by a combination of both.

[0027] It is contemplated that the elevator apparatus comprises at least one sensor detecting the position of the covering means.

[0028] A second aspect of the invention relates to an operating method of an elevator apparatus like the one described above, wherein if the covering means are in the active position and the traveling assembly is being displaced, when said traveling assembly is located in its path next to said at least one shaft element, the covering means automatically switch to the inactive position.

[0029] The possibility of the method having the covering means in the inactive position in a normal operating mode is contemplated, such that when the elevator apparatus switches to an inspection mode the covering means switch to the active position. It is contemplated that this switching of the covering means from the inactive position to the active position when the elevator apparatus switches to the inspection mode is done both automatically, i.e., without the specific intervention of an operator for activating the covering means independently of the activation of the inspection mode, and manually, i.e., after selecting the inspection mode, the operator has to intentionally activate the covering means independently.

[0030] The free space between the traveling assembly and the shaft wall is thereby transversely covered when the apparatus is in inspection mode or when the operator gets on the roof of the traveling assembly. Normal elevator apparatus operation switches to inspection mode when a person gets on the roof of the traveling assembly, and this can in turn be done manually or automatically.

[0031] It is contemplated that once the passing situation is overcome, the covering means return to the active position when the elevator apparatus is in inspection mode. It is also contemplated that when switching from inspection mode to normal mode, the covering means switch from the active position to the inactive position, either manually or automatically, and they remain in the inactive position.

Description of the Drawings

[0032] To complement the description that is being made and for the purpose of aiding to better understand the features of the invention according to a preferred practical embodiment thereof, a set of drawings is attached as an integral part of said description, where the following is depicted in an illustrative and non-limiting manner:

Figure 1 shows two schematic elevational views of the active and inactive positions, respectively in views a and b, of an embodiment of the elevator apparatus of the invention, wherein the shaft element is a counterweight and the covering means perform angular displacement.

Figure 2 shows two schematic perspective views of the active and inactive positions, respectively in views a and b, depicted in the embodiment of Figure 1, of an embodiment wherein the activation means are mechanical.

Figure 3 shows two schematic elevational views of the active and inactive positions, respectively in views a and b, of an embodiment wherein the shaft element is a fixed element located in the shaft and the covering means perform angular displacement.

Preferred Embodiment of the Invention

[0033] In view of the described drawings, particularly the general views of Figures 1 and 3, it can be seen how in one of the possible embodiments of the invention the elevator apparatus proposed by the invention comprises:

- a traveling assembly (1), which has been schematically depicted as an assembly in which the car is not distinguished from its corresponding structural part,
- a shaft (3), comprising at least one wall (3'), where the traveling assembly (1) can be displaced according to a path defined by a displacement direction (2),
- at least one shaft element (4), which may be fixed, like in the embodiment of Figure 3, or mobile, like in the embodiment of Figure 1, and which at some point of the path of the traveling assembly (1) is located in a space between said wall (3') and said traveling assembly (1), and
- covering means (5) located in the traveling assembly (1).

[0034] The covering means (5) can be displaced between an active position and an inactive position, such that the minimum distance between said wall (3') of the shaft (3) and the covering means (5) in the active position is smaller than in the inactive position.

[0035] Therefore, the covering means (5) in the inactive position cannot contact the shaft element (4) at any point of the path of the traveling assembly (1), whereas

they can contact it in the active position when the traveling assembly (1) is located in its path next to the shaft element (4). The fact that they may contact one another does not necessarily mean that said contact has to happen, but rather the minimum distance between the traveling assembly and the shaft element is so small that in the event of any minor transverse displacement of the traveling assembly (1) and/or shaft element (4) due to the clearance of the guiding system, vibrations, elastic deformations, etc., in the case of being mobile, can mean that said contact happens.

[0036] According to the invention, the covering means (5) automatically switch from the active position, depicted in views a of Figures 1 to 3, to the inactive position, depicted in views b of said figures, when the traveling assembly (1) is located in its path next to the shaft element (4).

[0037] The covering means (5) are extended in the active position and the minimum distance between the covering means (5) and the wall (3') of the shaft (3) is reduced, whereas the covering means (5) are retracted in the inactive position, preventing any possibility of collision with any shaft element (4) while traveling.

[0038] Therefore, the covering means (5) can consist of a mobile flap made from sheet metal, plastic board, grating or netting, that have the function of increasing the projection on the horizontal plane of the traveling assembly (1) in order to eliminate the risk of falling through the free space between the traveling assembly (1) and the wall (3') of the shaft (3). The covering means (5) have sufficient strength to support an operator performing, for example, ordinary maintenance and/or repair work. The covering means can be rigid or flexible.

[0039] As can be inferred from the schematic depiction provided in the drawings, the covering means (5) are located or mounted on the traveling assembly (1) such that they can move with respect to said traveling assembly (1), but without actually being separated from it, i.e., they are articulated to or mounted on the traveling assembly (1), like in the case of Figures 1 to 3, allowing for a certain path of movement. In this regard, taking into consideration the definition provided, the covering means (5), as such, are considered to be mobile, and the defined distances are distances referring to said covering means (5). Nevertheless, the mounting, location or connection of the covering means (5) in or to any part of the traveling assembly (1) can logically be done by means of fixed structural elements that play no part in the definitions of distances provided. In other words, said fixed structural elements can be located a smaller distance from the wall (3') than the distance between the covering means (5) and they wall when the former are in the active position

[0040] It is contemplated that the covering means (5) comprise regulating means for defining their active position, i.e., the covering means (5) do not have to be completely extended or deployed, as depicted in the drawings, to fulfill the function of preventing the risk of falling.

[0041] It is also contemplated that the regulating means can allow adjusting the location or the relative position of the covering means with respect to the traveling assembly.

[0042] The possibility of the elevator apparatus comprising means for detecting the relative position of the shaft element (4) with respect to the traveling assembly (1) and activation means (6) acting on the covering means (5) for switching them between the active and inactive positions is contemplated.

- Among the various options, the use of absolute position detection sensors for detecting the position of the traveling assembly in the shaft of the elevator apparatus where it is displaced is contemplated.
- Relative position or proximity sensors.

[0043] Among those options contemplated for the activation means (6) the following options, *inter alia,* are contemplated:

- Mechanical means, depicted in Figure 2, which can consist of a latch anchored to a fixed element of the elevator apparatus, such as guides, guide holders, offsets or the actual wall (3') of the shaft (3), or else anchored to the actual shaft element (4) in order for it to hit the actual covering means (5), such that the activation means (6), and not the actual shaft element (4), act with the covering means (5).
- Electromechanical means, which can consist of an electromagnet that deploys the covering means (5) when it receives, from the means for detecting the position described above, a signal indicating the traveling assembly (1) and shaft element (4) are passing one another.

[0044] According to a preferred embodiment, in a normal elevator apparatus operating mode, the covering means (5) are kept in the inactive position.

[0045] On the other hand, it is contemplated that in an elevator apparatus inspection mode, the covering means (5) are in the active position, except that when the traveling assembly (1) is located in its path next to the shaft element (4), they switch to the inactive position automatically, such that the covering means (5) and the shaft element (4) do not contact one another.

[0046] According to a preferred embodiment, it is contemplated that once the shaft element (4) has been overcome or surpassed, the method then comprises the covering means (5) automatically switching back to the active position.

[0047] In any case, the following situations are possible according to the invention.

[0048] In the normal mode:

1. The covering means (5) are always in the inactive position until an operator gets on the roof of the traveling assembly (1).

2. The covering means (5) are always in the active position and automatically switch to an inactive position when passing the shaft element (4).

[0049] In the inspection mode:

1. The covering means (5) are always in the active position when an operator gets on the roof of the traveling assembly (1).
2. One of the following two situations must happen for the traveling assembly (1) to move in the inspection mode:

2.1. The covering means (5) are in the active position (at least one sensor detects it).
2.2. The covering means (5) are in the inactive position (at least one sensor detects it), and furthermore the operation control system of the elevator apparatus recognizes, by means of sensors for detecting the relative position of the shaft element (4) with respect to the traveling assembly (1), that the traveling assembly is in the crossing area. The operator is guaranteed to have no risk of falling only when these two conditions are met.

[0050] According to an embodiment of the invention depicted in Figure 1, the shaft element (4) is a counterweight. In this embodiment, it is contemplated that the traveling assembly (1) comprises at least one lateral plane facing the counterweight (4), the covering means (5) being located in correspondence with said lateral plane.

[0051] On the other hand, according to another embodiment of the invention depicted in Figure 3, the shaft element (4) is a fixed element located in the shaft (3). Specifically, it is contemplated that said shaft element (4) protrudes from the wall (3') of the shaft (3). In other words, a protrusion of the wall (3') of the shaft (3) is considered a shaft element (4); in such case, an irregularity or protuberance of the shaft (3) itself can collide with the covering means (5) in the event that said covering means (5) are kept in the active position while passing.

[0052] The possibility of the covering means (5) being located in the upper area of the traveling assembly (1), like in the cases depicted in the drawings, is contemplated.

[0053] It is contemplated that the displacement of the covering means (5) between the active and inactive positions is caused by angular displacement with respect to the traveling assembly (1), i.e., by means of collapse, as depicted in Figures 1 to 3, or by linear displacement with respect to the traveling assembly (1), i.e., in a telescopic or extendable manner, and even by a combination of both, not depicted in the drawings.

[0054] Additionally, it is also contemplated that the elevator apparatus comprises at least one sensor detecting the position of the actual covering means (5); said sensor preferably comprises an electrical contact.

[0055] A second aspect of the invention relates to an operating method of an elevator apparatus such as the one described above, wherein if the covering means (5) are in the active position and the traveling assembly (1) is being displaced, when said traveling assembly (1) is located in its path next to said at least one shaft element (4), the covering means (5) automatically switch to the inactive position.

[0056] The possibility of the method comprising the covering means (5) in the inactive position in a normal operating mode is contemplated, such that when the elevator apparatus switches to an inspection mode the covering means (5) switch to the active position. It is contemplated that this switching of the covering means (5) from the inactive position to the active position when the elevator apparatus switches to the inspection mode is done both automatically, i.e., without the specific intervention of an operator for activating the covering means (5) independently of the activation of the inspection mode, and manually, i.e., after selecting the inspection mode, the operator has to intentionally activate the covering means (5) independently.

[0057] The free space between the traveling assembly and the shaft wall is thereby transversely covered when the apparatus is in inspection mode or when the operator gets on the roof of the traveling assembly. Normal elevator apparatus operation switches to inspection mode when a person gets on the roof of the traveling assembly, and this can in turn be done manually or automatically.

[0058] It is contemplated that once the passing situation is overcome, the covering means return to the active position when the elevator apparatus is in inspection mode. It is also contemplated that when switching from inspection mode to normal mode, the covering means switch from the active position to the inactive position, either manually or automatically, and they remain in the inactive position.

[0059] In view of this description and set of drawings, the person skilled in the art will understand that the embodiments of the invention that have been described can be combined in many ways within the object of the invention. The invention has been described according to preferred embodiments thereof, but for the person skilled in the art it is evident that many variations can be introduced in said preferred embodiments without exceeding the object of the claimed invention.

Claims

1. Elevator apparatus comprising:

- a traveling assembly (1),
- a shaft (3), comprising at least one wall (3'), where the traveling assembly (1) can be displaced according to a path defined by a displacement direction (2),

- at least one shaft element (4), which may be fixed or mobile, and which at some point of the path of the traveling assembly (1) is located in a space between said at least one wall (3') and said traveling assembly (1), and
- covering means (5) located in the traveling assembly (1), where said covering means (5) can be displaced between an active position and an inactive position, such that the minimum distance between said at least one wall (3') of the shaft (3) and the covering means (5) in the active position is smaller than in the inactive position, such that the covering means (5) in the inactive position cannot contact said at least one shaft element (4) at any point of the path of the traveling assembly (1), whereas they can contact it in the active position when the traveling assembly (1) is located in its path next to said at least one shaft element (4),

characterized in that
the covering means (5) automatically switch from the active position to the inactive position when the traveling assembly (1) is located in its path next to said at least one shaft element (4).

2. Elevator apparatus according to claim 1, comprising means for detecting the relative position of said at least one shaft element (4) with respect to the traveling assembly (1) and activation means (6) acting on the covering means (5) to automatically switch them from the active position to the inactive position.

3. Elevator apparatus according to any of the preceding claims, wherein the covering means (5) are kept in the inactive position in a normal elevator apparatus operating mode.

4. Elevator apparatus according to any of the preceding claims, wherein in an elevator apparatus inspection mode, the covering means (5) are in the active position, except that when the traveling assembly (1) is located in its path next to said at least one shaft element (4), they switch to the inactive position, such that the covering means (5) and said at least one shaft element (4) do not contact one another.

5. Elevator apparatus according to any of the preceding claims, wherein a shaft element (4) is a counterweight.

6. Elevator apparatus according to any of claims 1 to 4, wherein a shaft element (4) is a fixed element located in the shaft (3).

7. Elevator apparatus according to claim 6, wherein a shaft element (4) protrudes from the wall (3') of the shaft (3).

8. Elevator apparatus according to any of the preceding claims, wherein the covering means (5) are located in the upper area of the traveling assembly (1).

9. Elevator apparatus according to any of the preceding claims, comprising at least one sensor detecting the position of the covering means (5).

10. Operating method of an elevator apparatus according to any of the preceding claims, wherein if the covering means (5) are in the active position and the traveling assembly (1) is being displaced, when said traveling assembly (1) is located in its path next to said at least one shaft element (4), the covering means (5) automatically switch to the inactive position.

11. Method according to claim 10, having the covering means (5) in the inactive position in a normal operating mode, such that the covering means (5) switch to the active position when the elevator apparatus switches to an inspection mode.

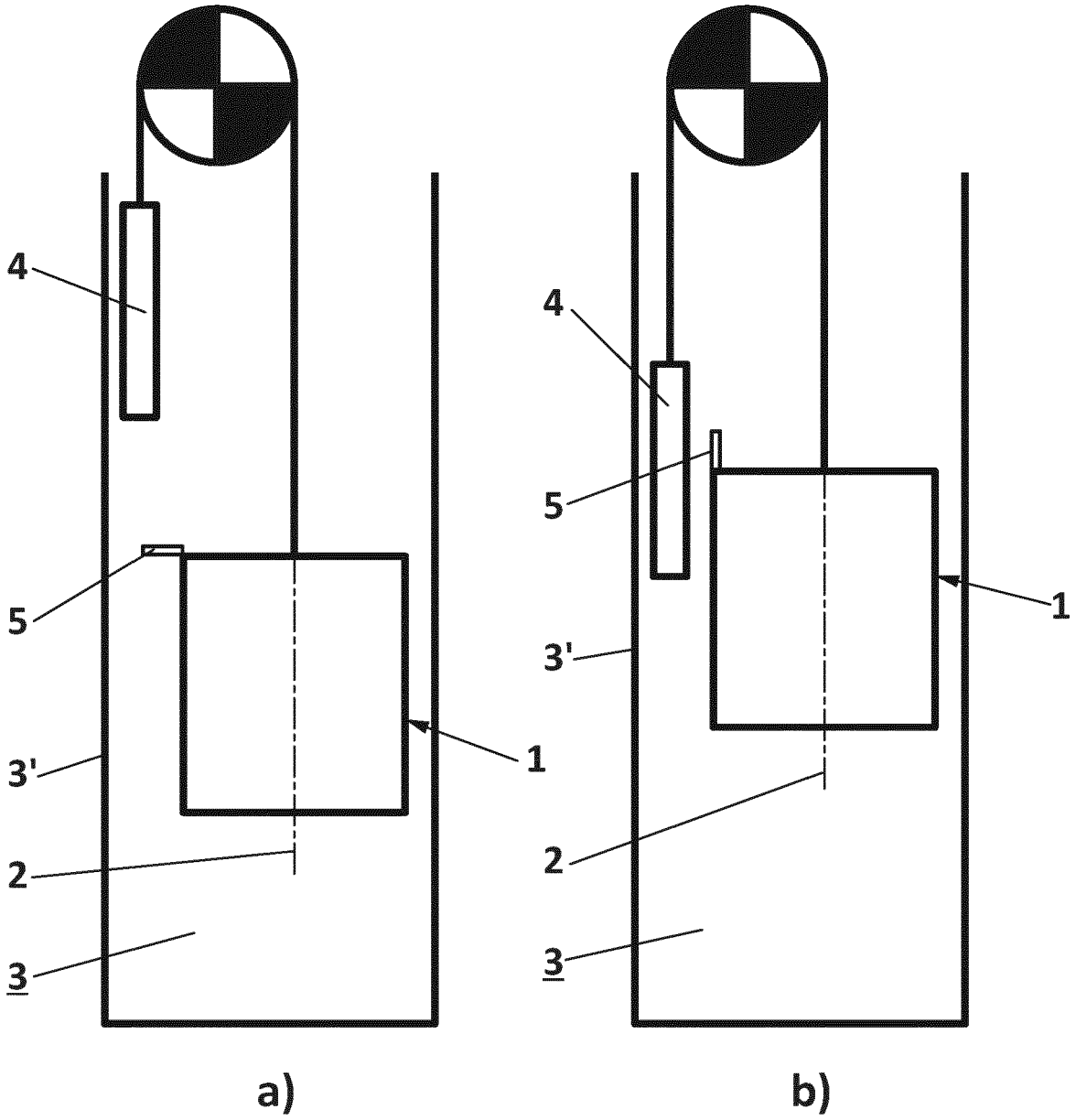

FIG. 1

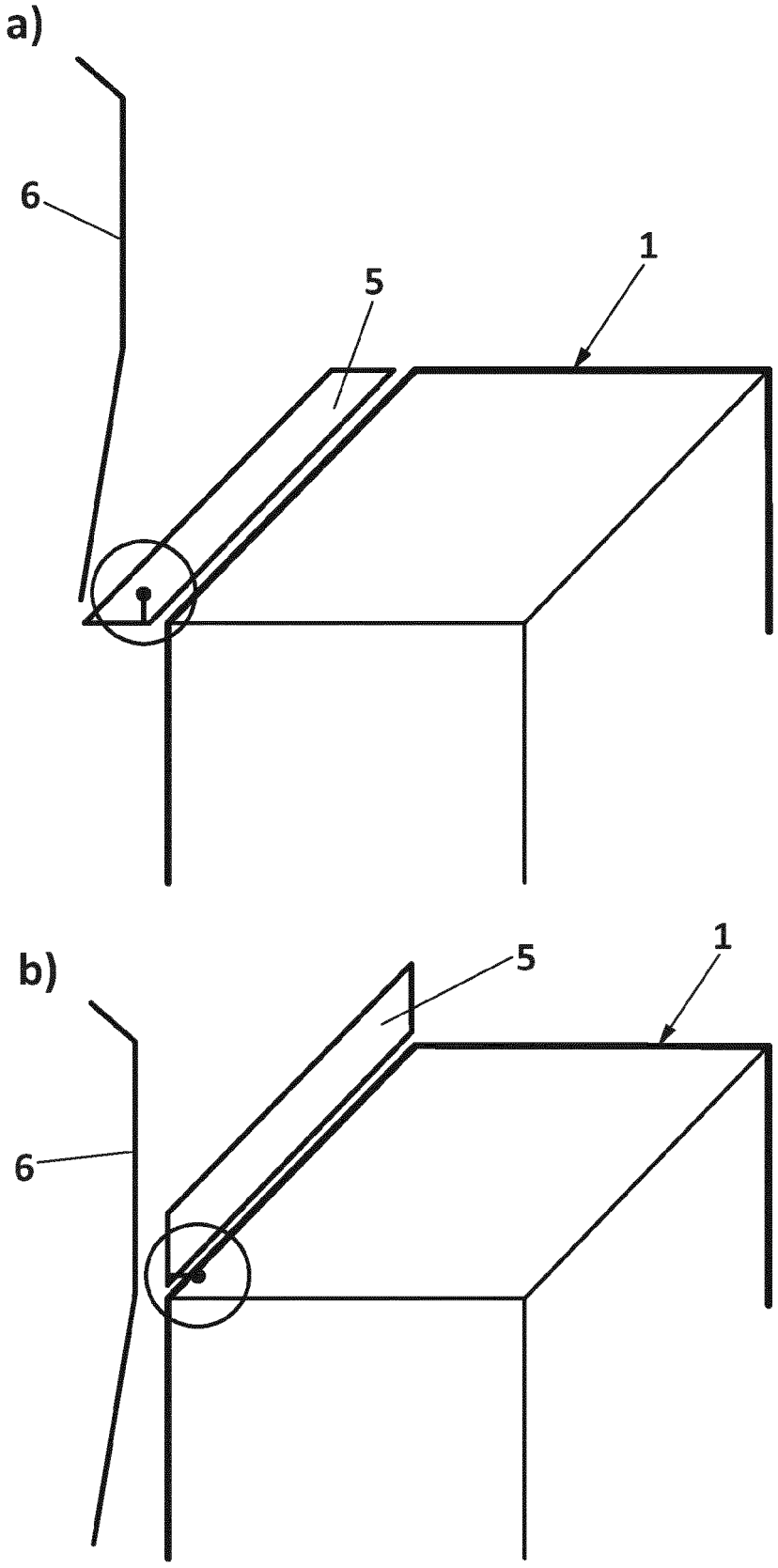

FIG. 2

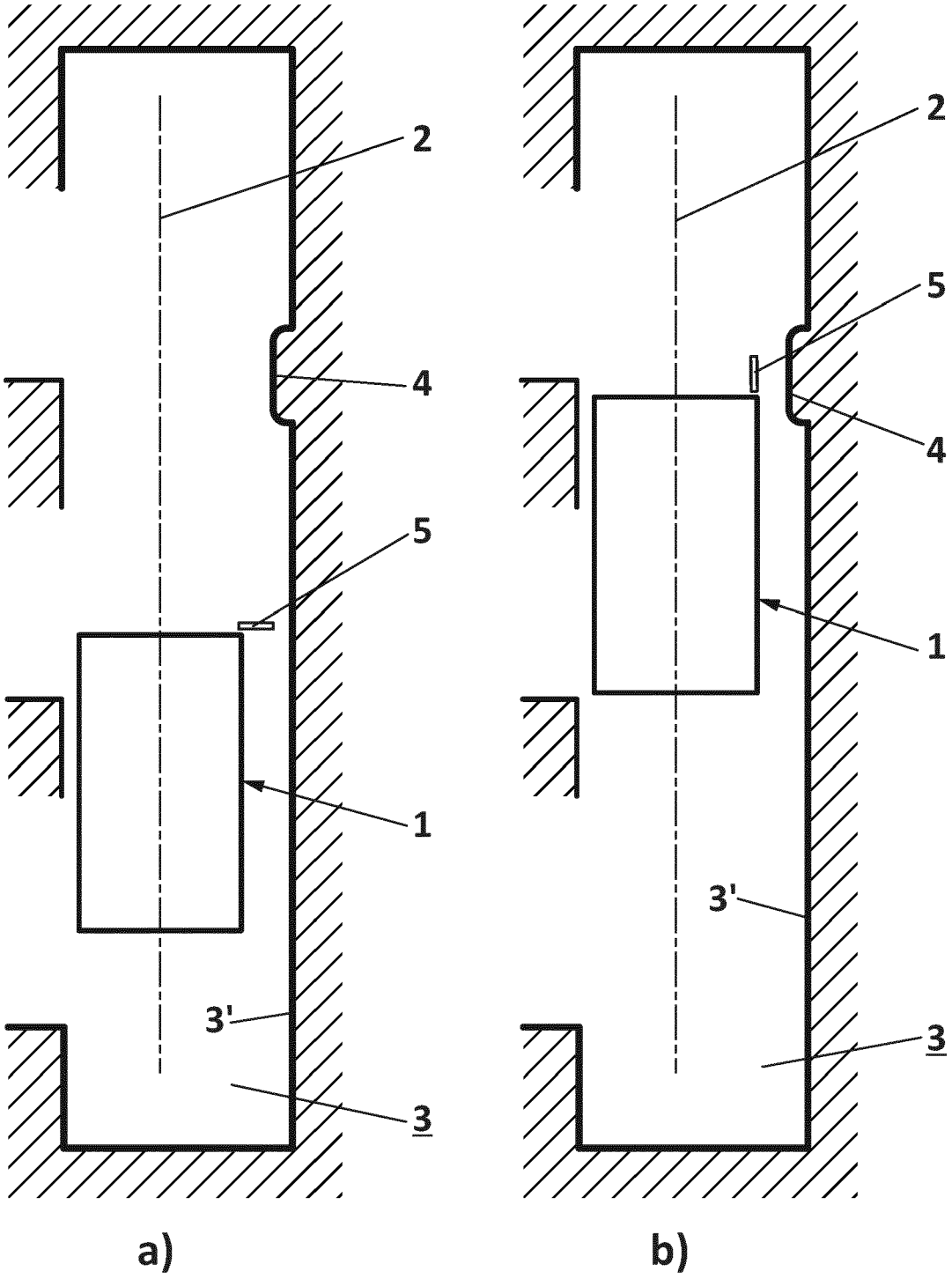

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 17 38 2518

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	EP 1 849 732 A1 (INVENTIO AG [CH]) 31 October 2007 (2007-10-31) * figures 2-7 *	1-11	INV. B66B5/00
A	JP 2010 137981 A (HITACHI BUILDING SYS CO LTD) 24 June 2010 (2010-06-24) * abstract; figures 1-4 *	1-11	
A	JP H08 133617 A (MITSUBISHI ELECTRIC BILL TECH) 28 May 1996 (1996-05-28) * abstract; figures 1-21 *	1-11	
A	JP H05 330752 A (MITSUBISHI ELECTRIC CORP) 14 December 1993 (1993-12-14) * abstract; figures 1-7 *	1-11	

TECHNICAL FIELDS SEARCHED (IPC)

B66B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 December 2017	Miklos, Zoltan

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 38 2518

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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18-12-2017

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JP H05330752 A	14-12-1993	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- JP 2002128433 A **[0005]**