(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 179 717 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
28.04.2010 Bulletin 2010/17

(51) Int Cl.:
A61G 7/10 *(2006.01)* ***B66C 7/10*** *(2006.01)*

(21) Application number: **09173878.1**

(22) Date of filing: **23.10.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
AL BA RS

(30) Priority: **23.10.2008 NL 2002133**

(71) Applicant: **Exodus Holding B.V.**
8076 PA Vierhouten (NL)

(72) Inventor: **VAN SCHEPPINGEN, Mattheas Robertus**
8077 TB Hulshorst (NL)

(74) Representative: **De Hoop, Eric**
Octrooibureau Vriesendorp & Gaade B.V.
Dr Kuyperstraat 6
2514 BB Den Haag (NL)

(54) **Ceiling lift suspension device**

(57) The invention relates to ceiling lift suspension device comprising a ceiling base element to be arranged at or near a ceiling, and a rail for guiding and supporting a trolley, wherein the rail comprises a hollow opening in a longitudinal direction of the rail for accommodating at least part of the trolley, wherein the trolley is movable in the longitudinal direction of the rail, wherein the rail is movably coupled with the ceiling base element, wherein the rail is movable in the longitudinal direction for extending the reach of the ceiling lift suspension device.

EP 2 179 717 A1

Description

BACKGROUND

[0001] The invention relates to a ceiling lift suspension device comprising a ceiling base element for arranging at or near a ceiling, and a rail for guiding and supporting a trolley, wherein the rail comprises a hollow opening along a longitudinal direction of the rail for accommodating at least part of the trolley, wherein the trolley is movable along the longitudinal direction of the rail.

[0002] Such a ceiling lift suspension device usually is used for attaching person-carrying means, such as a hoist sling or lifting sling, for assisting in the moving and/or lifting of a semi-valid person or an invalid from a wheel chair in a position next to or in front of a bed, bath or toilet, or the like, to a position in bed, bath, or on the toilet, or the like, and vice versa. These ceiling lifts normally comprise a ceiling base element and a rail extending over the entire travel the trolley should be able to move in order to displace the person to be moved properly.

[0003] Since this ceiling base element is rather long it confiscates a certain amount of space at or near the ceiling and/or it infringes or interferes with other elements or features attached to or near the ceiling.

[0004] Therefore the present invention aims to provide a ceiling lift suspension device wherein a ceiling base element confiscates a reduced amount of space.

SUMMARY OF THE INVENTION

[0005] The invention provides a ceiling lift suspension device according to claim 1. Said ceiling lift suspension device comprising a ceiling base element to be arranged at or near a ceiling, and a rail for guiding and supporting a trolley, wherein the rail comprises a hollow opening in a longitudinal direction of the rail for accommodating at least part of the trolley, wherein the trolley is movable in the longitudinal direction of the rail, **characterized in that** the rail is movably coupled with the ceiling base element, wherein the rail is movable in the longitudinal direction for projecting, at least partially, beyond the ceiling base element.

[0006] The trolley moves within the rail, and the rail moves in respect of a ceiling base element for extending the reach of the ceiling lift suspension device. The movement of the trolley in respect of the ceiling comprises a travel of the rail in respect of the ceiling and a travel of the trolley in respect of the rail. The required length of the extendable ceiling base element of the invention can be reduced to roughly half the length of the trolley travel in respect of the ceiling. In this way, the construction of a ceiling lift suspension device has become more compact.

[0007] In an embodiment, the rail is rigidly attached to a coupling device which engages the ceiling base element, wherein the coupling device is movably attached to the ceiling base element. The construction of the coupling device is a special part which construction is adjusted for providing the movable feature of the rail and the ceiling base element, wherein both the rail and the ceiling base element can be made from standard profiled beams.

[0008] In an embodiment, the ceiling base element comprises a hollow opening along a longitudinal direction of the ceiling base element for accommodating at least part of the coupling device. In an embodiment, the ceiling base element comprises a base for attaching the ceiling base element at or near the ceiling, and a beam fixedly connected to said base, wherein the beam comprises a hollow opening in a longitudinal direction of the rail for guiding and accommodating at least part of the coupling device. For the construction of the ceiling base element of this embodiment a standard rail element, as also used for guiding and supporting the trolley, may be used as such a profiled beam.

[0009] In an embodiment the opening is provided at a side of the profiled beam facing away from the base. In use the opening is substantially directed downwards, which protects the interior of the profiled beam from dust floating in the air, or the like.

[0010] In an embodiment, the coupling device comprises rollers which are arranged to run in the hollow opening of the profiled beam for guiding and supporting the coupling device. The rollers for moving the coupling device in respect of the ceiling base element provide a smooth travel with low frictional resistance which contributes to a reliable extendable ceiling lift.

[0011] In an embodiment, the coupling device comprises a plurality of roller sets which are arranged along the longitudinal direction of the rail. The forces due to the loaded trolley are distributed over several rollers.

[0012] In an embodiment, the coupling device comprises a first roller set arranged at a first end of the coupling device, a second roller set arranged at a second end of the coupling device situated opposite the first end, and at least a third roller set arranged at the coupling device substantially in or near the middle between the first end and the second end of the coupling device. The roller sets are able to sustain the moment of load caused by a use of the trolley in the case the rail is partially located beyond the ceiling base element, in other words when the rail partially sticks out of the ceiling base element in the longitudinal direction.

[0013] In an embodiment, the hollow opening of the ceiling base element comprises a longitudinal inner lower running surface for supporting first rollers of a roller set of the coupling device. During movement of the rail, the load of the rail, trolley, the person carrying means and possible a person is being supported and guided by the rollers resting on the inner lower running surface. Since the running surface in this embodiment is located within the hollow opening, a rather compact construction is achieved.

[0014] In an embodiment, the hollow opening of the ceiling base element comprises a longitudinal inner up-

per running surface for supporting second rollers of a roller set of the coupling device. During movement of the rail, the load of the rail, trolley, the person carrying means and possible a person beyond the ceiling base element, at least the second rollers at or near the end of the rail that is positioned within the ceiling base element are pushed upward to the ceiling base element. The second rollers are being supported and guided by the inner upper running surface.

[0015] In an embodiment, the rolling surface of the second rollers extends above the rolling surface of the first rollers. Thus the first rollers running over the inner lower running surface of the ceiling base element is unable to touch or to slip on the inner upper running surface of the ceiling base element. In a further embodiment, the rolling surface of the first rollers extends below the rolling surface of the second rollers. Thus the second rollers running over the inner upper running surface of the ceiling base element is unable to touch or to slip on the inner lower running surface of the ceiling base element. Although the rollers are pushed to opposing surfaces, the rollers keep rotating which causes a smooth travel and sufficient performance.

[0016] In an embodiment, the first and second rollers are arranged such that the first rollers adjoin the inner lower running surface and the second rollers adjoin the inner upper running surface. Preferably the first and second rollers are arranged to place the coupling device in the ceiling base element without play. Due to the absence of play the ceiling base element stably supports the coupling device and thus also the rail, the trolley, the person carrying means and possibly a person that is being supported.

[0017] In an embodiment, the length of the ceiling base element is at least the length of the rail. In the case the length of the ceiling base is the same as the length of the rail, the most compact ceiling lift suspension device is obtained.

[0018] In an embodiment, the rail is movable between a first position wherein the rail is substantially located between a first end of the ceiling base element and a second end of the ceiling base element situated opposite the first end of the ceiling base element, and a second position wherein the third roller set is substantially located at or near the first or second end of the ceiling base element. The rail is able to move between this first position and this second position, wherein in the second position the rail projects, at least partially, out of the ceiling base element. Moreover in the second position, the trolley can reach its uttermost, most extreme position spaced from the ceiling base element.

[0019] Furthermore the invention relates to a Ceiling lift suspension device according to claim 5, which partially provides a mechanical reversal of the suspension device according to claim 1. In this embodiment, the coupling device comprises a hollow opening along a longitudinal direction of the rail for accommodating at least part of the ceiling base element. This embodiment provides an alternative construction to for a ceiling lift suspension device according to the present invention. In an embodiment, the ceiling base element comprises rollers which are arranged to run in the hollow opening for being guided and supported through the coupling device, wherein the rollers are preferably arranged within a plurality of roller sets which are arranged along the longitudinal direction of the rail. In this alternative construction, the rollers and the roller sets are provided on the ceiling base element and their position is essentially stationary with respect to the ceiling. In an embodiment, the coupling device comprises a first hollow opening along a longitudinal direction of the ceiling base element for accommodating at least part of the coupling device, wherein the rail comprises a second hollow opening in a longitudinal direction of the rail for accommodating at least part of the trolley. In an embodiment the coupling device and the rail are made from the same elongated profiled beam, in particular the same standard rail element. Said elongated profiled beam or standard rail element of the coupling device and the rail are mounted back-to-back to each other.

[0020] According to a further aspect, the invention provides a ceiling assembly comprising a ceiling lift suspension device and at least one casing comprising at least one electric device, wherein the casing is attached to the ceiling lift suspension device, preferably forming one unity with the ceiling lift suspension device. The assembly can be attached to the ceiling and provides a multipurpose unit comprising a ceiling base element for carrying a ceiling lift, when necessary.

[0021] In an embodiment, the casing extends substantially parallel to the ceiling base element. Since the assembly comprises a ceiling lift suspension device and a casing oriented in the same direction, a compact design and installation arrangement at the ceiling is achieved.

[0022] In an embodiment, a first end of the casing is located at or near a first end of the ceiling base element and a second end of the casing is located at or near a second end of the ceiling base element situated opposite the first end of the ceiling base element. The assembly comprising a ceiling lift suspension device and casings having substantially the same length are advantageous regarding compact design and installation arrangement at the ceiling as well.

[0023] In an embodiment, the electric device is a lighting unit. Thus a ceiling lift suspension device and a lighting unit can be combined and placed as a unit above a bed, bath, or the like.

[0024] In an embodiment, a first casing and/or a second casing is located at both sides of the ceiling lift suspension device. Thus the ceiling base element can be used as a backbone between a first and a second casing.

[0025] In an embodiment, a cover element covering at least part of a bottom side of the ceiling lift suspension device, abuts at least one casing. The cover element protects at least the inner sides of the rail and the ceiling base element, especially the running surfaces, from dust accumulating coming from the air. Furthermore the cover

element can hide the ceiling lift suspension device from view.

[0026] The various aspects and features described and shown in the specification can be applied, individually, wherever possible. These individual aspects, in particular the aspects and features described in the attached dependent claims, can be made subject of divisional patent applications.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] The invention will be elucidated on the basis of an exemplary embodiment shown in the attached drawings, in which:

Figure 1A shows an isometric side view of a ceiling base element according to an embodiment of a ceiling lift suspension device;
Figure 1B shows an isometric side view of a coupling device according to an embodiment of a ceiling lift suspension device;
Figure 1C shows an isometric side view of a rail according to an embodiment of a ceiling lift suspension device;
Figure 2 shows a front view of the coupling device for a ceiling lift according to figure 1B;
Figure 3A and 3B show a ceiling lift suspension device comprising the ceiling base element according to figure 1A, the coupling device according to figure 1B and the rail according to figure 1C, where the coupling device and the rail are respectively in a first position and in an extended second position;
Figure 4 shows an isometric bottom view of an assembly comprising the ceiling lift suspension device according to figure 3 and two casings comprising at least one electric device according to an embodiment of the invention;
Figure 5A shows a front view of the assembly according to figure 4;
Figure 5B shows a front view of an alternative embodiment of the assembly according to figure 4;
Figure 6A, 6B and 6C schematically show examples of embodiments of the present invention in use.

DETAILED DESCRIPTION OF THE INVENTION

[0028] Figure 1A shows a ceiling base element 2 of a suspension device of a ceiling lift. In this example, the ceiling base element 2 comprises a profiled beam extending in a direction R, comprising a first end 28 and a second end 29 opposed from the first end 28.

[0029] This profiled beam comprises an upper plane 19 for arranging it at a supporting structure, such as a ceiling (not shown), for mounting purposes. To mount the ceiling base element to a ceiling, the profiled beam comprises in this example holes 26. The profiled beam 2 is symmetric with respect to a plane of symmetry S which extends perpendicular to the upper plane 19 of profiled beam and parallel to direction R.

[0030] The cross sectional shape of this profiled beam 2 comprises an upper flange 21. Connected to this upper flange 21 are two side walls 22, which project out of the plane of the upper flange 21 and stretch parallel with respect to each other along the upper flange 21 in the direction R. The side walls 21 are arranged at a distance for providing a hollow opening therein between. At the side of the side walls 21 facing away from the upper flange 21, said side walls 21 are provided with a flanged part 24, which stretches substantially parallel to the upper flange 21 and partially closes off the bottom side of the hollow opening, except for a longitudinal slot 25.

[0031] In the longitudinal direction R the interior of this profiled beam comprises inner lower running surfaces 281, 282, on both sides of the longitudinal slot 25, each on one of the flange parts 24, and an inner upper running surface 283. These running surfaces 281, 282 and 283 are typically arranged to support a movable object traveling within the ceiling base element 2. This movable object being a coupling device 3 is described hereinafter.

[0032] Figure 1B shows a coupling device 3 extending parallel with direction R and comprising a first end 38 and a second end 39 situated opposite the first end 38. In the longitudinal direction R, the coupling device 3 comprises a profiled beam have a T-shaped cross-section, comprising a longitudinal upward body 30 perpendicularly oriented on a flange body 300 extending between the first end 38 and the second end 39 of coupling device 3.

[0033] The coupling device 3 comprises a first roller set 31 at the first end 38, middle roller sets 330 and a second roller set 32 at the second end 39. The middle roller sets 330 in this example comprises two roller sets 33 and 34, each comprising a similar structure as the first roller set 31 and the second roller set 32.

[0034] Each roller set 31, 32, 33 and 34 comprises first rollers 311, 313 for running over the inner lower running surfaces 281, 282 of the ceiling base element 2 to support the coupling device 3 on the ceiling base element 2. Each roller set 31, 32, 33 and 34 also comprises second rollers 312 for abutting against the inner upper running surface 283 of the ceiling base element 2 to support the coupling device 3 on the ceiling base element 2. This will further be described in the description of figure 3.

[0035] The rollers 311, 312 and 313 are provided on both sides of the upward body 30, as shown in figure 2. In this example, each roller 311, 312, 313 has substantially same diameter D and width dimensions. The first rollers 311, 313 are rotatable around first axis 316, 318 comprising a common centerline A. The second rollers 312 are rotatable around a second axis 317 comprising common centerline B, which is offset vertically above centerline A.

[0036] In order to provide that only the second rollers 312 abut the upper running surface 283, the upper rolling surface M of the second rollers 312 extends above the upper rolling surface L of the first rollers 311, 313. In order to provide that only the first rollers 311, 313 abut the lower

running surface 283, the lower rolling surface O of the first rollers 311, 313 extends below the lower rolling surface P of the second rollers 312.

[0037] Figure 1C shows a rail 4 of a ceiling lift wherein the rail 4 comprises a profiled beam extending in the direction R, comprising a first end 48 and a second end 49 situated opposite the first end 48 of the rail 4. In the longitudinal direction R this profiled beam also comprises a hollow interior accommodating inner lower running surfaces 291, 292. These running surfaces 291, 292 are typically arranged to support a movable object traveling within the rail 4, like a trolley (not shown).

[0038] This profiled beam is symmetric regarding a plane of symmetry U which is perpendicular to running surfaces 291, 292 and parallel with direction R. In this example, the cross sectional shape of this profiled beam 4 is in a downward direction similar to the cross sectional shape of the ceiling base element 2. However, tips 410 of an upper flange 41 of the rail 4 differs from the flange 21 of the ceiling base element 2. The upper flange 41 comprises tips 410 that are curved upwardly to end substantially parallel with the flange 41. Since the profiled beam is symmetric in a plane of symmetry U, the tips 410 of the flange 41 are pointing towards each other. By this way, rail 4 comprises a slot 49 above the flange 41 extending along its longitudinal direction parallel with direction R. The slot 49 comprises a rectangular shape to accommodate and fixing the flange body 300 of coupling device 3.

[0039] Figure 3A and 3B show a cross-section of the elements shown in figure 1A, 1B and 1C, wherein the ceiling base element 2 is arranged at a ceiling 5, guiding and supporting the coupling device 3 which is fixedly connected to the rail 4 carrying a trolley 7. The rail 4 is movable between a first position (shown in figure 3A) wherein the rail 4 is substantially located within the ceiling base element 2 and a second position (shown in figure 3B) wherein the third roller set assembly is substantially located at or near an end of the ceiling base element 2.

[0040] When the trolley 7 of the ceiling lift is loaded by a load F with the rail 4 in its first position (shown in figure 3A), the rail 4 distributes the downward load F via the abutting first rollers 311, 313 of the roller sets 31, 32, 33, 34 of the coupling device 3 to the ceiling base rail 2.

[0041] When the trolley of the ceiling lift is loaded by a load F with the rail 4 in its second position (shown in figure 3B), the load F causes reaction forces G and H via the abutting first rollers 311, 313 of a middle roller set 34 on the coupling device 3, sustained by the ceiling base rail 2. Due to a moment, the load F causes a reaction force I via the abutting second rollers 312 of the second roller set 32 on the coupling device 3, sustained by the ceiling base rail 2.

[0042] During a movement of the rail 4 from its first position to its second position, the rollers that abut the internal lower and upper running surfaces are transmitting the load to the ceiling base element 2 while rotating around their rotation axis. By this way, the coupling device 3, the rail 4 including the trolley 7 are able to move out from the ceiling base element 2. In order to provide a smooth transition between the first and second transition, the offset between the first and second rollers of each roller set is set to minimize, and preferably remove, any play between the coupling element 3 and the ceiling base element 2, at least in vertical direction.

[0043] In the embodiment shown in figures 1A, 1B and 1C, the coupling device 3 is provided with a first limitation element 36 and a second limitation element 37 (as shown in figure 1A). Also the ceiling base element 2 is provided with at least one corresponding third limitation element 27 (as shown in figure 1A). When the coupling device 3 is moving from its first position to its second position, the first limitation element 36 of the coupling device 3 collides with the third limitation element 27 of the ceiling base element 2 in order to prevent the coupling device 3, the rail 4 including the trolley from passing through its second position.

[0044] The coupling device 3, the rail 4 including the trolley are able to ride the opposite direction, from its second position in the direction to its first position, loaded and/or unloaded. Furthermore, the rail 4 can be provided with blocking elements 47 at or near an end of the rail 4, as shown in figure 4, in order to prevent a trolley 7 from falling out of the rail 4. Usually both ends of the rail 4 are provided with such blocking elements 47.

[0045] Figure 4 shows an assembly comprising a ceiling lift suspension device which is fixed to the ceiling 5. The ceiling lift suspension device is located between two casings 51 and 52 parallel with direction R. A first end 511 of the casing 51 and a first end 521 of the casing 52 are located at or near a first end 28 of the ceiling base element. A second end 512 of the casing 51 and a second end 522 of the casing 52 are located at or near the second end 29 (not shown) of the ceiling base element.

[0046] The casings 51 and 52 can accommodate electric devices. In this example, both casings 51, 52 comprise lighting units (not shown) placed inside said casings 51, 52. In this example the casings 51, 52 are opaque, whereas the side cover 6 is made from a transparent material for transmitting the light from the light source. Said casings 51, 52 can be provided with a light source, for example, containing a series of LED's. LED lighting consumes relatively little electric power which contributes to saving energy for example in hospitals in general. Moreover, using LED's of different basic color the light of these LED's can be mixed for emitting colored light wherein the color may be selected by the user.

[0047] However, the casings 51, 52 can also be provided with lamps, light bulbs or TL-bars which are still commonly applied.

[0048] In this embodiment the lighting units have substantially the same length as the ceiling base element 2, or can be distributed over the length of the side cover 6. The height of the casings 51, 52 is in this example at least as high as the ceiling lift suspension device. In the embodiment as shown in figure 5A, the height H of the

ceiling lift suspension device 2, 3, 4 is smaller than the height h of the casings 51, 52. In this case, a cover 53 for covering the ceiling lift suspension device 2, 3, 4 when not in use, may be placed flush with the casings 51, 52.

[0049] An alternative exemplary embodiment is shown in figure 5B. In this embodiment the ceiling base element 102 comprises a profiled beam have a T-shaped cross-section, comprising a longitudinal downward body perpendicularly oriented on a flange body 1300. The ceiling base element 102 comprises rollers in a manner comparable to the coupling element 3 as shown in figure 1B. In this alternative embodiment, the rollers are fixed in position in between the casings 151, 152.

[0050] A first rail 103 is used as coupling device. Said first rail 103 having internal upper running surfaces 1281, 1282 and internal lower running surface 1283 for accommodating the rollers of the ceiling base element 102 therein between, preferably with little or no play.

[0051] A second rail 104 is connected to the first rail 103, wherein the rails 103, 104 are mounted back-to-back at the interface 119. The second rail 104 is arranged to support en guide the movable trolley 107.

[0052] Figure 6A, 6B and 6C show various uses of a ceiling lift suspension device according to the invention.

[0053] Figure 6A shows a ceiling lift 1 wherein the suspension device is fixed to the ceiling 5 for lifting a person, for example from a wheelchair (not shown) into a bath 91, or vice versa. In this example, the ceiling lift 1 is supported by the ceiling 5.

[0054] Figure 6B and 6C show examples of a ceiling lift 1 wherein the suspension device is fixed near the ceiling 5 for lifting a person from a wheelchair (not shown) into a bed 92, or vice versa.

[0055] In figure 6B, the ceiling lift 1 is fixed to a beam 55 near the ceiling, wherein the beam 55 is supported by two walls 551, 552.

[0056] In figure 6C, the ceiling lift 1 is fixed to a ceiling beam 56 which is supported by the sloping roof construction 561 and 562, which roof construction is commonly applied in living houses.

[0057] The examples shown in figure 6B and 6C indicate the ceiling lift suspension device comprises a rail 4 which can be brought in a second position to provide a trolley 7 to move to a position next to the bed 91. However, in these figures, the second position next to the bed 91 can be at a first side 911 of the bed 91 or a second side 912 of the bed 91 situated opposite the first side 911 of the bed 912.

[0058] It is noted the ceiling lift suspension device according to these exemplary embodiments comprises a trolley 7 movable supported by the rail 4, which rail 4 is movable supported by the ceiling bas element 2.

[0059] It is to be understood that the above description is included to illustrate the operation of the preferred embodiments and is not meant to limit the scope of the invention. For example, in an embodiment where the ceiling lift suspension device is integrated with electrical units, such a unit is not limited to lighting units only. Lighting units can be replaced or added by any feature running on electric power, such as possibly LCD screen applications, cameras and the like.

[0060] From the above discussion, many variations will be apparent to one skilled in the art that would yet be encompassed by the spirit a scope of the present invention.

Claims

1. Ceiling lift suspension device comprising a ceiling base element to be arranged at or near a ceiling, and a rail for guiding and supporting a trolley, wherein the rail comprises a hollow opening in a longitudinal direction of the rail for accommodating at least part of the trolley, wherein the trolley is movable in the longitudinal direction of the rail, **characterized in that** the rail is movably coupled with the ceiling base element, wherein the rail is movable in the longitudinal direction for projecting, at least partially, beyond the ceiling base element, **characterized in that**
the rail is rigidly attached to a coupling device which engages the ceiling base element, wherein the coupling device is movably attached to the ceiling base element, wherein the ceiling base element comprises a hollow opening along a longitudinal direction of the rail for accommodating at least part of the coupling device, and wherein the coupling device comprises rollers which are arranged to run in the hollow opening to be guided and supported by the ceiling base element.

2. Ceiling lift suspension device according to claim 1, wherein the rollers are arranged in a plurality of roller sets which are arranged along the longitudinal direction of the rail.

3. Ceiling lift suspension device according to claim 2, wherein the coupling device comprises a first roller set arranged at a first end of the coupling device, a second roller set arranged at a second end of the coupling device situated opposite the first end, and at least a third roller set arranged at the coupling device substantially in or near the middle between the first end and the second end of the coupling device.

4. Ceiling lift suspension device according to claim 3, wherein the coupling device is movable between a first position wherein the coupling device is substantially located between a first end of the ceiling base element and a second end of the ceiling base element situated opposite the first end of the ceiling base element, and a second position wherein the third roller set is substantially located at or near the first or second end of the ceiling base element.

5. Ceiling lift suspension device comprising a ceiling base element to be arranged at or near a ceiling, and a rail for guiding and supporting a trolley, wherein the rail comprises a hollow opening in a longitudinal direction of the rail for accommodating at least part of the trolley, wherein the trolley is movable in the longitudinal direction of the rail, **characterized in that** the rail is movably coupled with the ceiling base element, wherein the rail is movable in the longitudinal direction for projecting, at least partially, beyond the ceiling base element, **characterized in that**
the rail is rigidly attached to a coupling device which engages the ceiling base element, wherein the coupling device comprises a hollow opening along a longitudinal direction of the rail for accommodating at least part of the ceiling base element, and wherein the ceiling base element comprises rollers which are arranged to run in the hollow opening for being guided and supported by the coupling device.

6. Ceiling lift suspension device according to claim 5, wherein the rollers are preferably arranged within a plurality of roller sets which are arranged along the longitudinal direction of the rail.

7. Ceiling lift suspension device according to claim 6, wherein the ceiling base element comprises a first roller set arranged at a first end of the ceiling base element, a second roller set arranged at a second end of the ceiling base element situated opposite the first end, and at least a third roller set arranged at the ceiling base element substantially in or near the middle between the first end and the second end of the ceiling base element.

8. Ceiling lift suspension device according to claim 7, wherein the coupling device is movable between a first position wherein the coupling device is substantially located between the first end of the ceiling base element and the second end of the ceiling base element, and a second position wherein an end of the coupling device is substantially located at or near the third roller set.

9. Ceiling lift suspension device according to any one of the previous claims, wherein the hollow opening of the ceiling base element or the coupling device comprises a longitudinal inner lower running surface for supporting first rollers of a roller set of the coupling device.

10. Ceiling lift suspension device according to any one of the previous claims, wherein the hollow opening of the ceiling base element or the coupling device comprises a longitudinal inner upper running surface for supporting second rollers of a roller set of the coupling device.

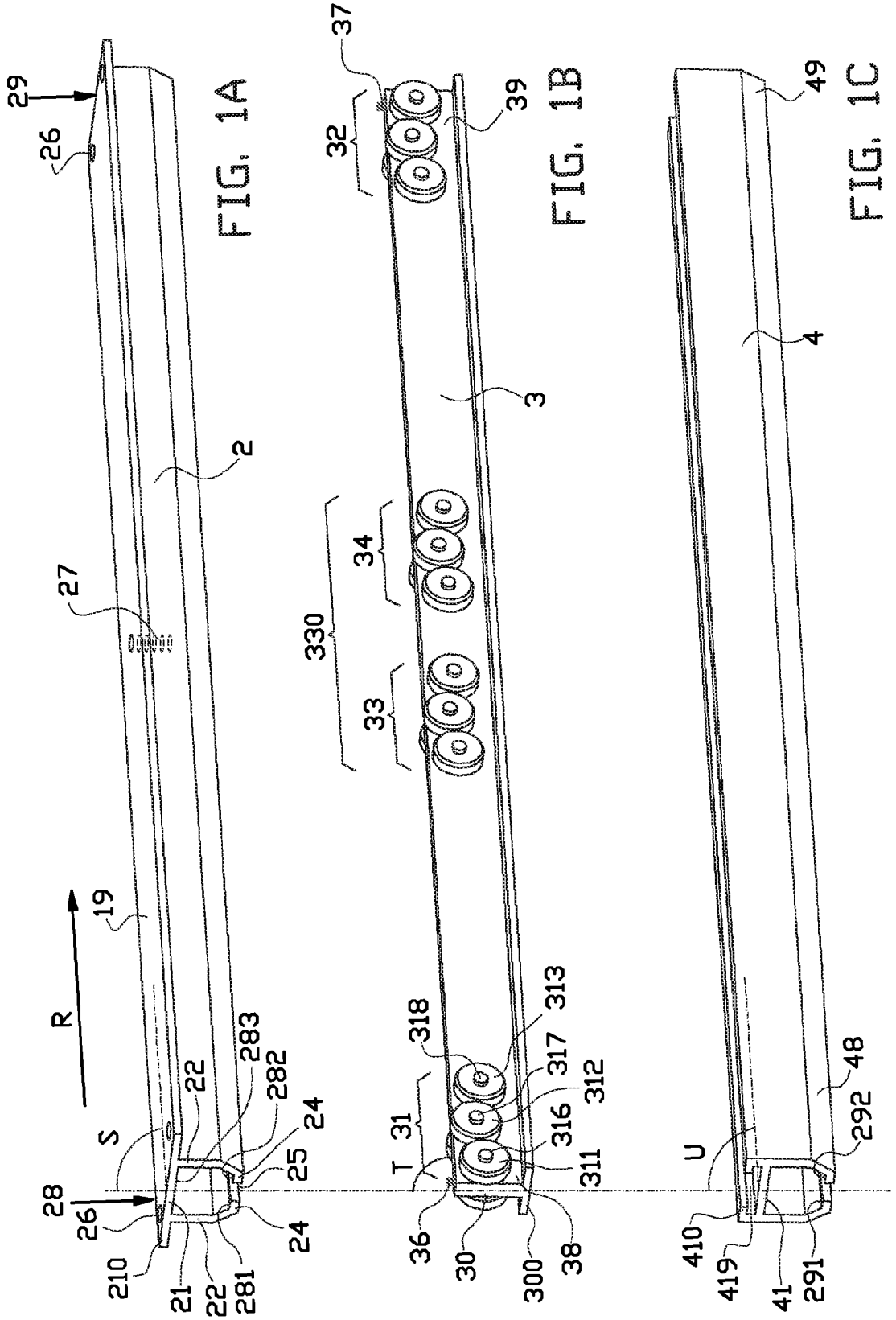
11. Ceiling lift suspension device according to claims 9 and 10, wherein the rolling surface of the second rollers extends above the rolling surface of the first rollers.

12. Ceiling lift suspension device according to any one of the previous claims, wherein the rollers have substantially the same diameter and/or wherein the length of the ceiling base element has at least the length of the rail.

13. Ceiling assembly comprising a ceiling lift suspension device according to any one of the preceding claims and at least one casing comprising at least one electric device, wherein the casing is attached to the ceiling lift suspension device, preferably forming one unity with the ceiling lift suspension device, wherein the electric device preferably is a lighting unit.

14. Ceiling assembly according to claim 13, wherein the casing extends substantially parallel to the ceiling base element, preferably wherein a first end of the casing is located at or near a first end of the ceiling base element and a second end of the casing is located at or near a second end of the ceiling base element situated opposite the first end of the ceiling base element.

15. Ceiling assembly according to claim 13 or 14, wherein a first casing and/or a second casing is located at both sides of the ceiling lift suspension device, preferably wherein a cover element covering at least part of a bottom side of the ceiling lift suspension device, abuts at least one casing.


29
26
2
27
19
R
S
22
283
282
24
25
28
26
24
210
21
22
281
FIG. 1A
37
32
39
330
34
33
3
318
313
317
312
316
311
T
31
36
30
300
38
FIG. 1B
49
4
U
48
292
410
419
41
291
FIG. 1C

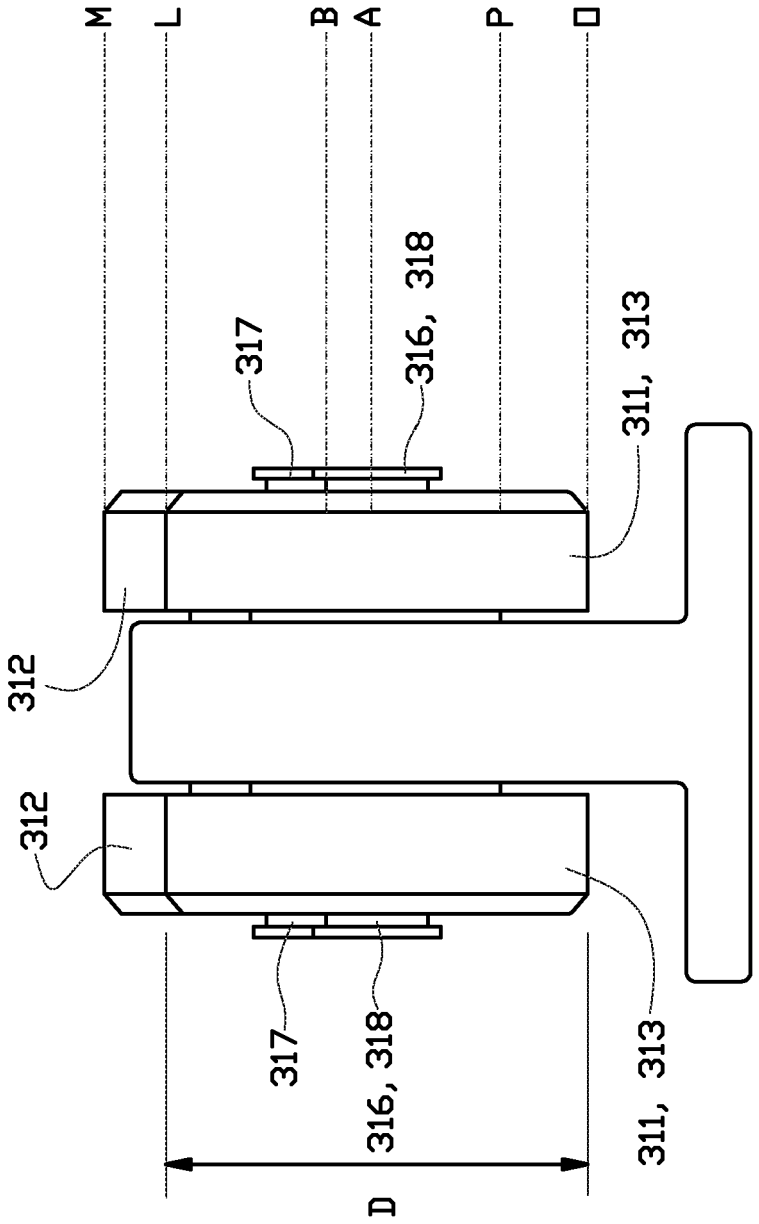


FIG. 2

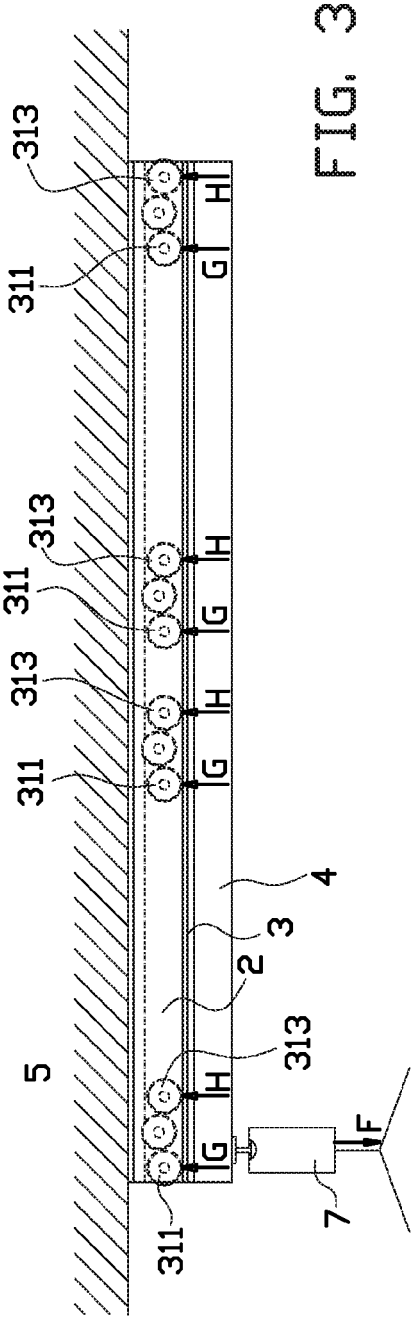

313
311
313
311
313
311
5
311
313
4
3
2
G
H
F
7

FIG. 3A

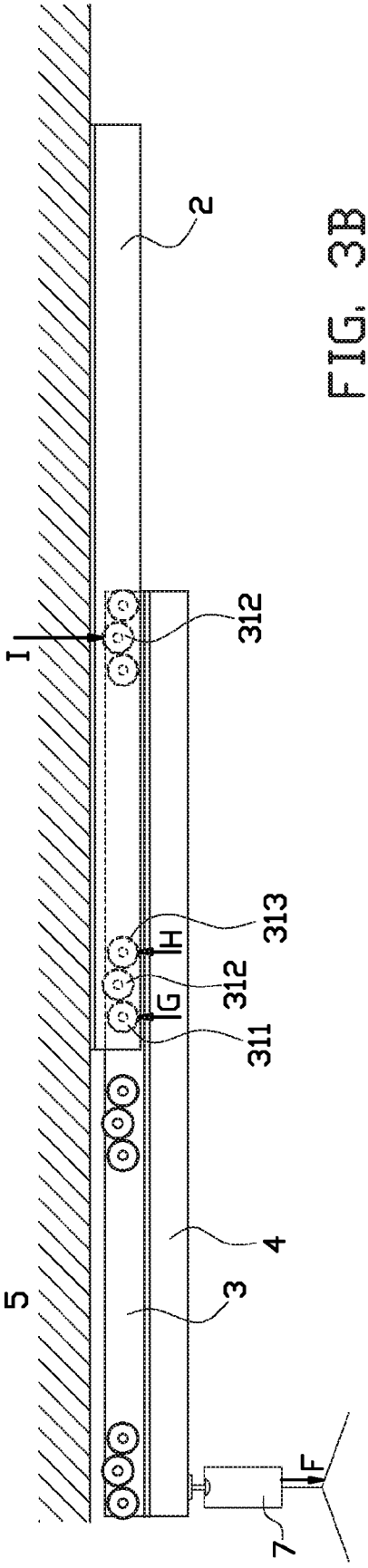

2
I
312
313
312
311
5
4
3
G
H
F
7

FIG. 3B

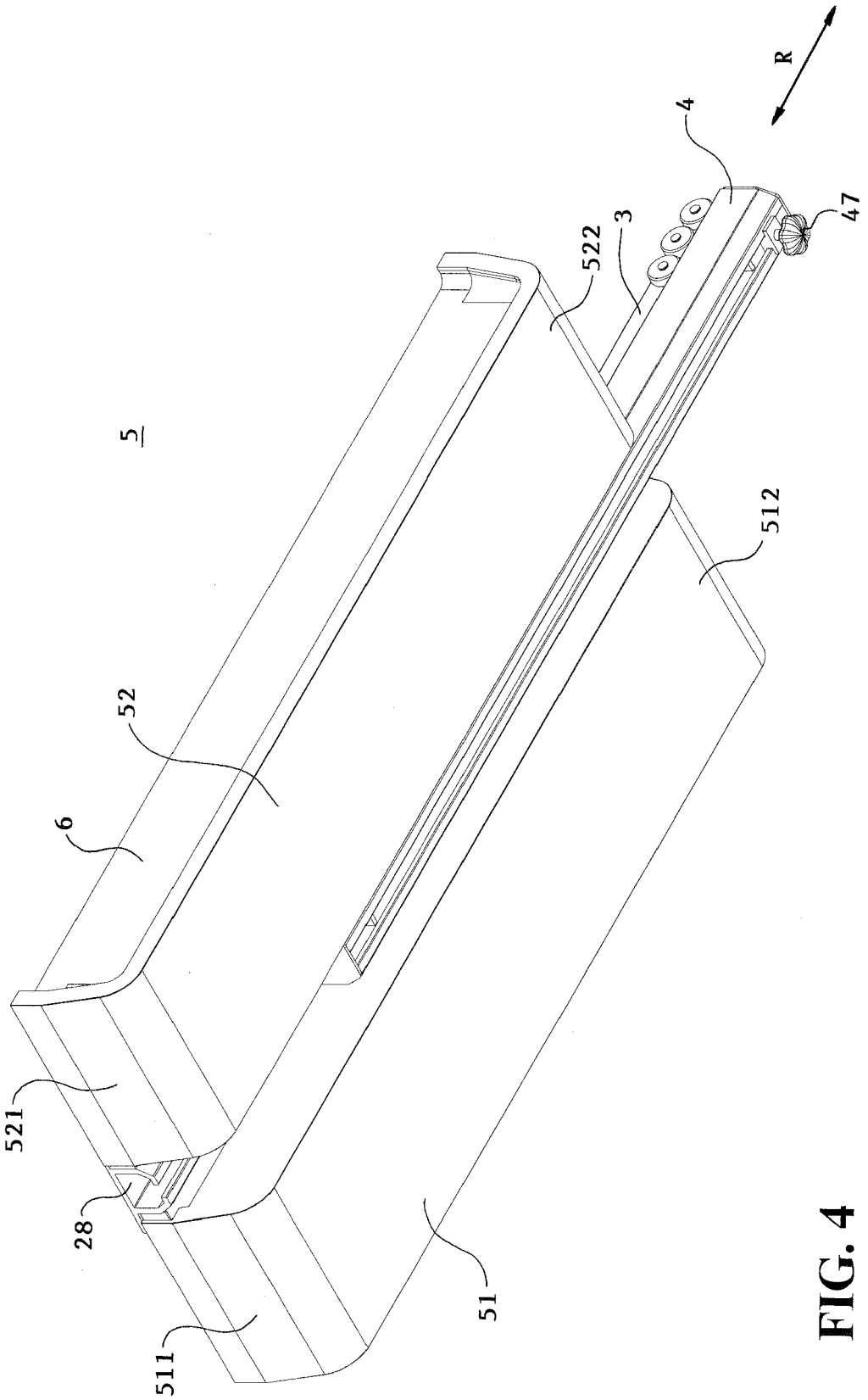


FIG. 4

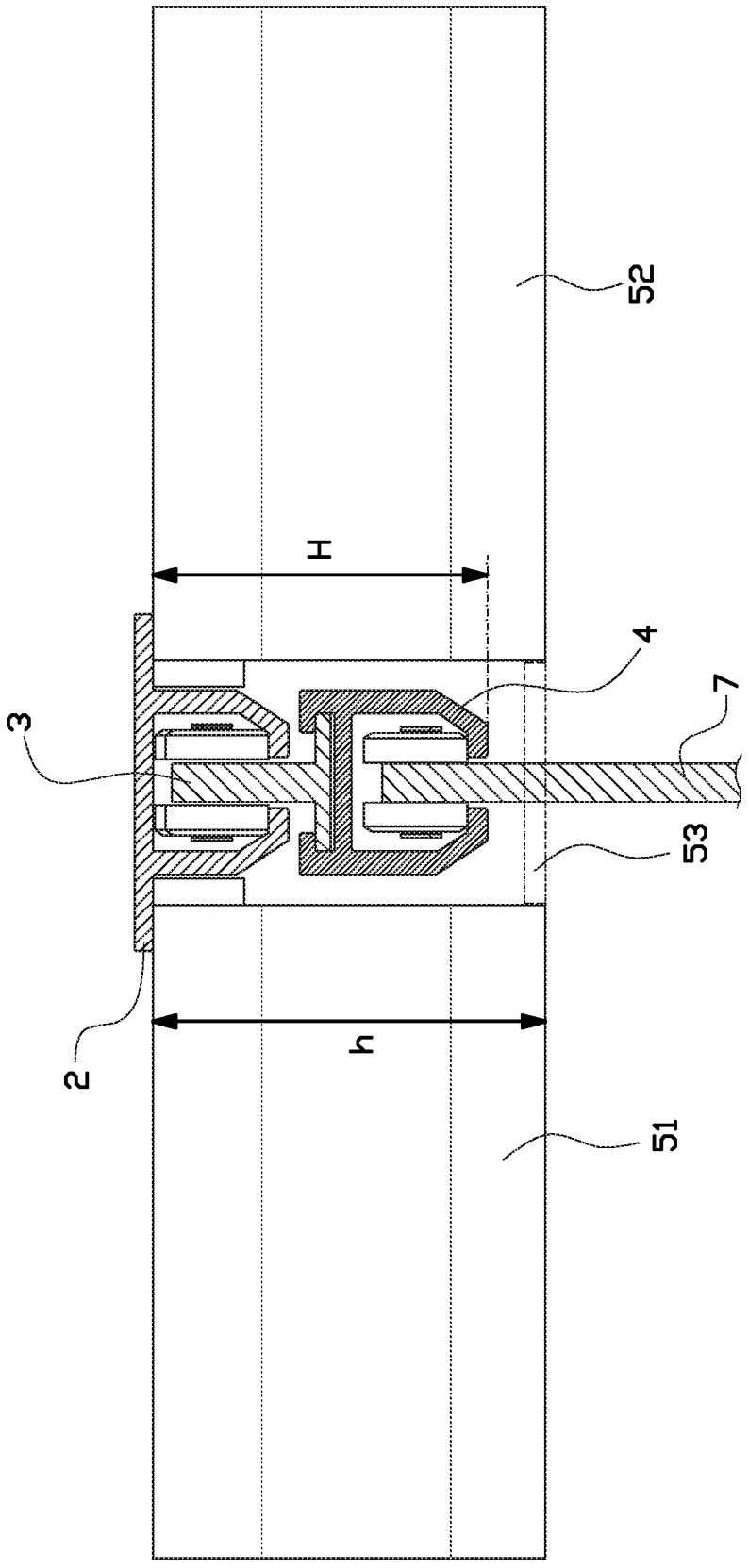


FIG. 5A

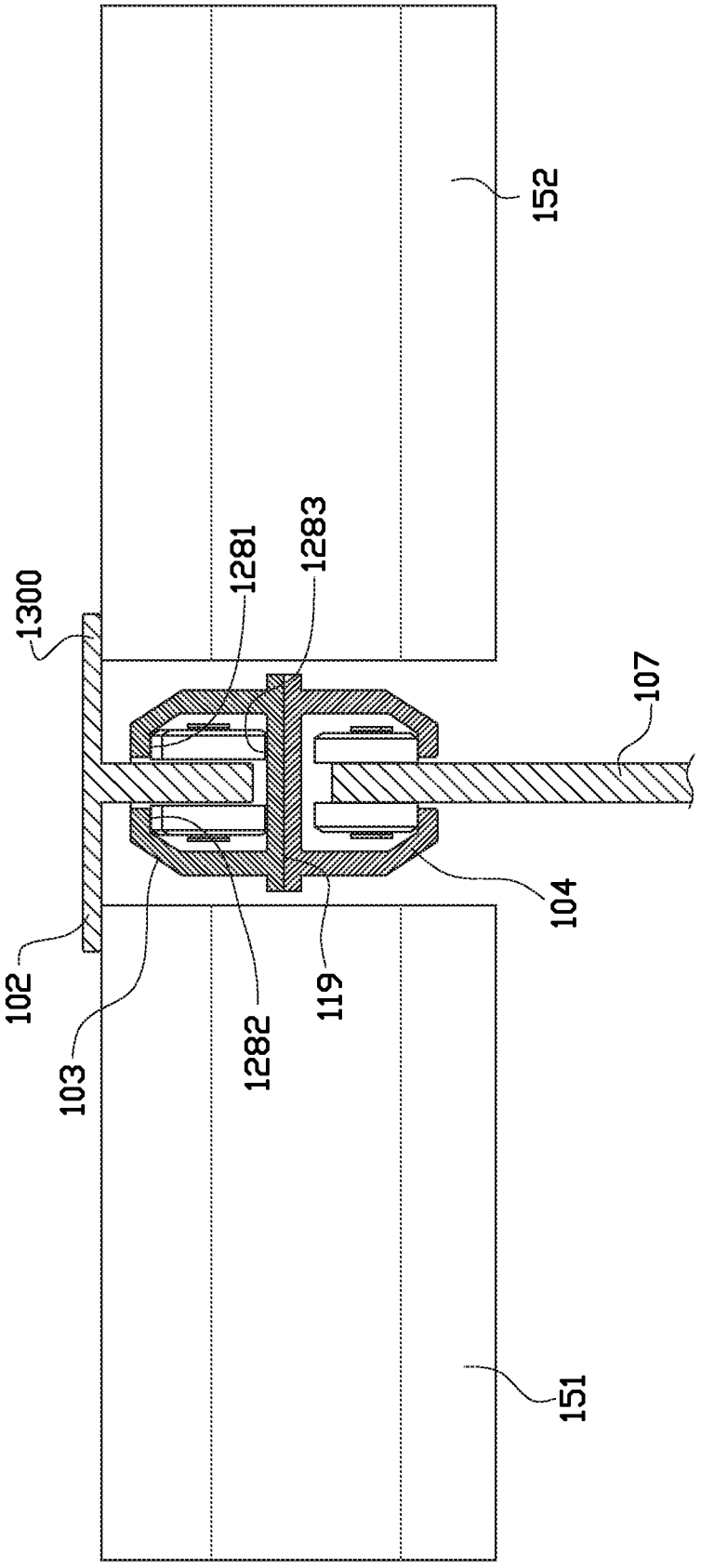


FIG. 5B

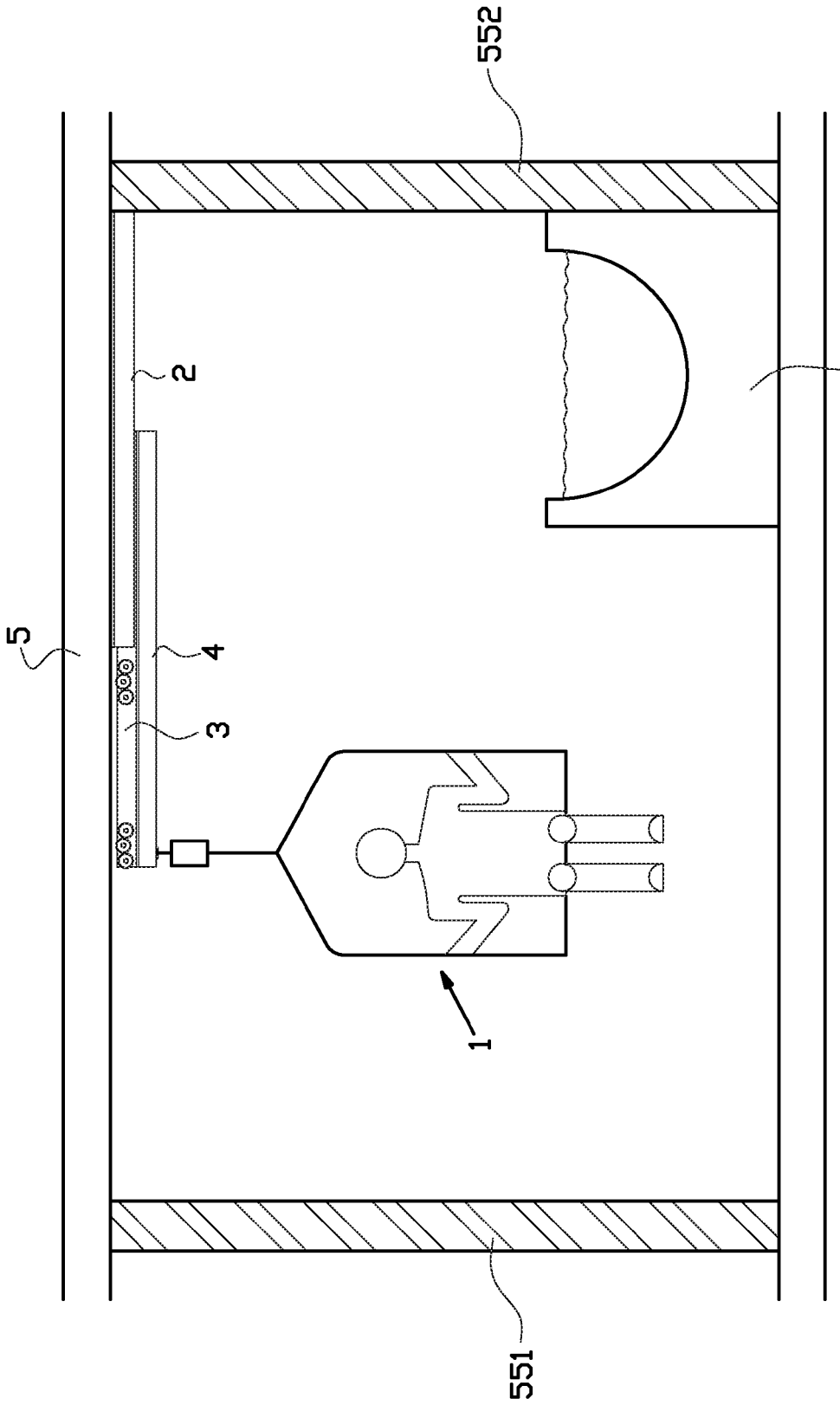


FIG. 6A

FIG. 6B

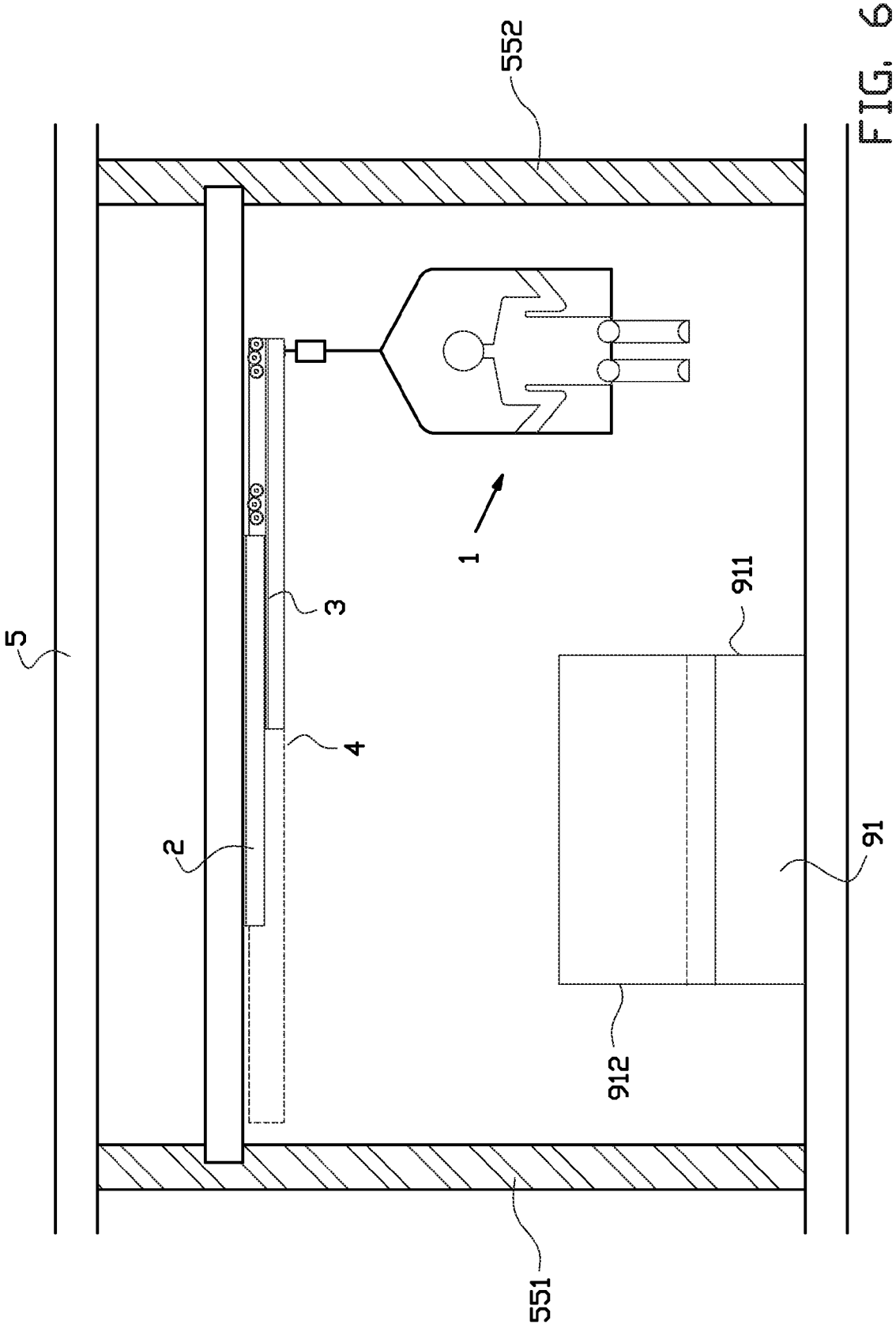
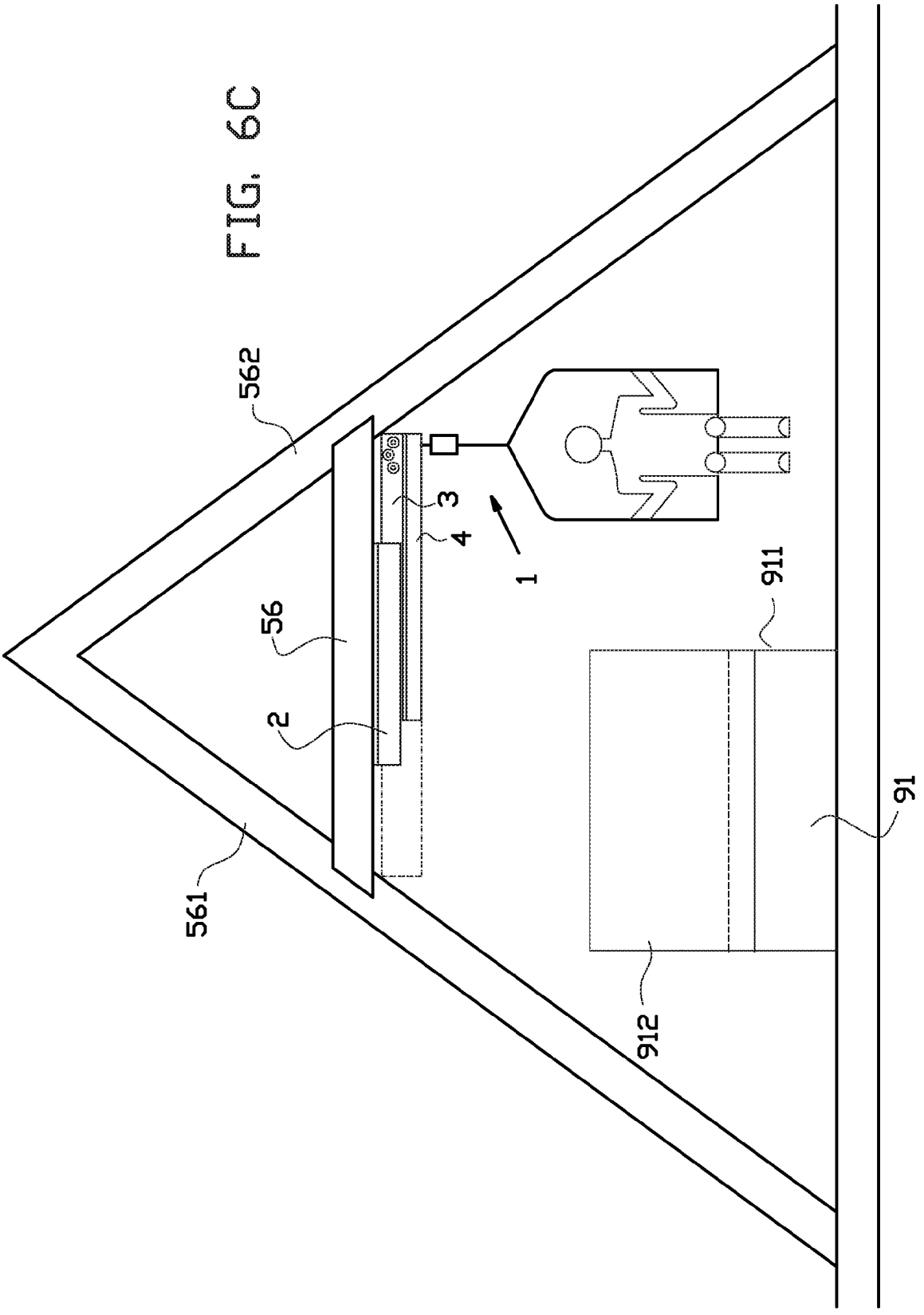


FIG. 6C



Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 09 17 3878

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 2004/211950 A1 (SPRINGETT DAVID ROY [US] ET AL) 28 October 2004 (2004-10-28) * paragraph [0032] - paragraph [0041] * * figures 7, 8 *	1-4,9 8,11-15	INV. A61G7/10 B66C7/10
X A	WO 01/74285 A2 (BHM MEDICAL INC [CA]) 11 October 2001 (2001-10-11) * page 21, line 4 - page 22, line 1 * * page 22, line 3 - page 23, line 3 * * page 37, line 6 - line 27 * * figures 7, 8, 11, 60-62 *	5-7,10 8,11-15	
A	FR 1 427 076 A (FRANCE NEIGE) 4 February 1966 (1966-02-04) * page 2, column 1, line 47 - column 2, line 14 * * figure 1 *	1,5	
A	DE 42 11 860 C1 (SIEMENS AG [DE]) 9 December 1993 (1993-12-09) * column 3, line 10 - line 23 * * column 2, line 62 - line 67 * * column 3, line 24 - line 26 * * figure 2 *	1,5	TECHNICAL FIELDS SEARCHED (IPC) A61G B66C
A	EP 1 477 148 A (ERGOLET AS [DK]) 17 November 2004 (2004-11-17) * paragraph [0023] * * paragraph [0025] - paragraph [0026] * * figures 2b,3-5 *	1	
A	EP 1 709 949 A (SCHNAKE CHRISTOPH [DE]) 11 October 2006 (2006-10-11) * paragraph [0040] - paragraph [0041] * * figures 5,6 *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	25 January 2010	Ong, Hong Djien

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 09 17 3878

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

25-01-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004211950 A1	28-10-2004	NONE	
WO 0174285 A2	11-10-2001	AT 415139 T	15-12-2008
		AU 4401401 A	15-10-2001
		CA 2303619 A1	30-09-2001
		DK 1267791 T3	16-03-2009
		EP 1267791 A2	02-01-2003
		EP 1616546 A2	18-01-2006
		US 2002014568 A1	07-02-2002
FR 1427076 A	04-02-1966	CH 428137 A	15-01-1967
DE 4211860 C1	09-12-1993	NONE	
EP 1477148 A	17-11-2004	AT 345107 T	15-12-2006
		DE 60309671 T2	29-03-2007
		WO 2004100848 A1	25-11-2004
		US 2008271242 A1	06-11-2008
		US 2006260502 A1	23-11-2006
EP 1709949 A	11-10-2006	DE 102006016496 A1	19-10-2006

EPO FORM P0459

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