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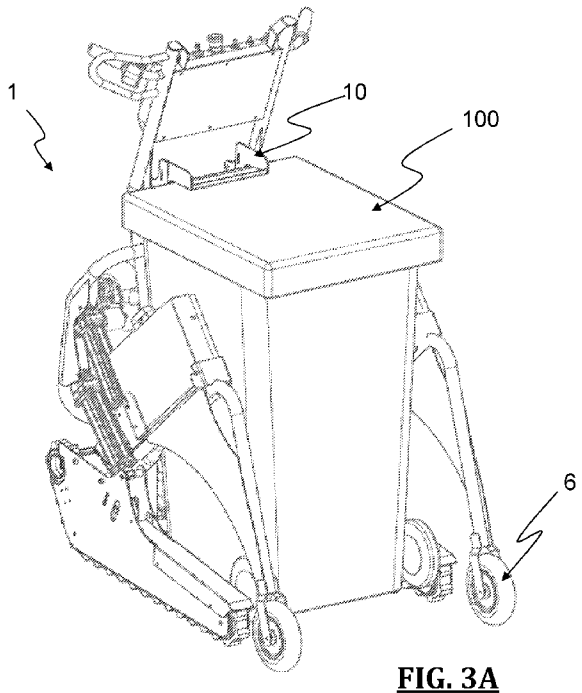

FIG. 3A

(57) Abstract: Stairlift (1) for fixed staircase and/or escalator, comprising a supporting frame (2), having a main body (2a) extended vertically and a platform (2b) adapted to carry, in cooperation with said main body, the weight of the load to be lifted on said fixed staircase and/or escalator, and a tracked movement device (3) constrained and movable on command with respect to said frame between an operative position (OP1), wherein it moves said stairlift along a fixed staircase or along a sliding plane, and a non-operative position (OP2), wherein it remains raised from said fixed staircase or said sliding plane, said frame further comprising at least one rotating back wheel (4) that rotates around a first horizontal axis (X) and is constrained integrally to said frame, said back wheel (4) being arranged, with respect to said tracked device, so that to contact said sliding plane or a first stair of an escalator, at least when said tracked movement device (3) is in its non-operative position (OP2), and to be raised from the sliding plane or from said first stair of said

WO 2019/003172 A1

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escalator, at least when said tracked movement device is in its operative position (OP1), said stairlift being characterized by comprising at least one front supporting leg (5) constrained and movable on command with respect to said frame (2) between a first position (PI), in which in cooperation with said back wheel (4), it is in contact with said sliding plane or a further stair of said escalator, and a second position (P2), in which it is raised from said escalator or said sliding plane.

"STAIRLIFT FOR FIXED STAIRCASES AND/OR ESCALATORS"

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FIELD OF THE INVENTION

The present invention refers to a stairlift for fixed staircases and/or escalators.

In particular, the stairlift in question is used to raise or lower loads, including very heavy loads, along stairs of the type fixed staircases and/or escalators. More specifically, such stairlift can be advantageously used to raise or lower both normal wheelchairs for the disabled and the bins used to move construction materials, such as concrete bales, or similar, also including those weighing more than 150 kg. Finally, such stairlift is also used to move the load along a sliding plane.

KNOWN PRIOR ART

Stairlifts used to raise extremely heavy loads on fixed staircases exist in the known art. For example, the stairlift described in the US6158536 Patent, in the name of Sunwa Ltd, comprises a supporting frame provided with wheels and a platform adapted to carry the weight of the load to be lifted along the fixed staircase, and a tracked movement device. Such tracked movement device is rotatable with respect to the frame so as to adjust the tilt of the platform with respect to same device and to provide more safety while raising or lowering the wheelchair along a staircase.

However, this type of stairlift is not suitable for use along an escalator since the reciprocal positions of the tracked movement device and platform should dynamically adapt themselves to the always variable riser of the escalator from the beginning to the end of its run. Moreover, even if such stairlift could be used on an escalator, it would have to overcome the small stair on its ends, to raise, or at the end, to lower the escalator, therefore the stair in which the stairs of the escalator disappear at the end of its active run. Tracked movement devices are not rapidly able to overcome, or at least not at the same speed as the escalator, such a level difference safely, both for those handling the stairlift and those standing in line on the escalator behind the stairlift. Moreover, it must be said that in order to ensure the proper operations of a tracked stairlift on a staircase, it must be in contact with at least three consecutive stairs at the same time, so as to prevent it from overturning. Obviously, in case of an escalator, such tracked stairlift described in the Sunwa Ltd. Patent

would only be in contact with three stairs at the same time when the first stair of this escalator, i.e. the one that first appears when facing the escalator, is in a specific position. Therefore, in practice, the possibility that the stairlift can find its balance on only two stairs is unlikely and, in a certain sense, completely random.

Finally, another issue connected to the type of stairlift described in the US6158536 Patent lies in the fact that the tracked movement, at least the one usually used in the stairlift sector, is not appropriate whenever the weight of the load being transported, together with that of the stairlift itself, exceeds 150 kg.

Therefore, the object of the present invention is to implement a stairlift that can transport a heavy load along a plane, that can also raise/lower the same weight along a fixed staircase or also along an escalator, that can even transport a load along an escalator and that could simultaneously raise or lower the load along such escalator whenever its operations should be interrupted and therefore in case of a temporary shut-down.

Another object of the present invention is to implement a stairlift also able to carry very heavy loads without any risks for those operating the stairlift or for the person being moved along the fixed staircase and/or escalator on a wheelchair.

Finally, an object of the present invention is to fulfill the aforesaid tasks by providing a rather simple stairlift from a structural point of view.

SUMMARY OF THE INVENTION

These and other objects are achieved with a stairlift for fixed staircases and/or escalators, comprising a supporting frame, having a main body extended vertically and a platform adapted to support, in cooperation with said main body, the weight of the load to be lifted on said fixed staircase and/or escalator, and a tracked movement device movably constrained on control with respect to said frame between an operative position, wherein it moves said stairlift along a fixed staircase, or along a sliding plane, and a non-operative position, wherein it remains raised from said fixed staircase or said sliding plane, said frame further comprising at least one rotating back wheel that rotates around a first horizontal axis and is constrained integrally to said frame, said back wheel being arranged, with respect to said tracked device, so that to contact with said sliding plane or a first stair of an escalator, at least when said

tracked movement device is in its non-operative position, and to be raised from said sliding plane, or from said stair of said escalator, at least when said tracked movement device is in its operative position, advantageously the stairlift comprises at least one front supporting leg constrained and movable by command with respect to said frame from one first position, in which in cooperation with said back wheel, it is in contact with said sliding plane or a further stair of said escalator, and a second position, in which it is raised from said escalator or said sliding plane.

Such solution allows the stairlift not to adopt the tracked movement device on escalators, since there is no need to exert any traction on such escalators, but to use the back wheel in cooperation with the front supporting leg to keep firm the stairlift during the ascent or descent of the stairlift along the escalator, simultaneously excluding the use of the tracked device. Moreover, whenever the escalator should be locked, the tracked device can intervene by bringing it to its operative position and by simultaneously bringing the front leg to its second position, so as to allow the stairlift to overcome the stairs of the locked escalator, as if it were on a very normal fixed staircase.

Then, according to the invention, said at least one front leg is movable with respect to said frame and in an independent manner with respect to said at least one tracked movement device. In practice, both the tracked device and the front leg are movable one independently from the other, therefore providing ample freedom to the stairlift operator and significantly simplifying the structure of the stairlift itself.

Still according to the invention, the platform is constrained to or made in one piece with said main frame body, so as to ensure that said frame can be tilted around said back wheel. Moreover, the main body and platform are L-shaped.

Moreover, and advantageously, the back wheel is motorized. This characteristic allows the same stairlift to rapidly overcome the last stair of the escalator, thanks to the traction exerted by the driving wheel. Compared to the stairlifts of known art, such characteristic is of considerable interest since it facilitates the going out of the stairlift from the escalator at a speed comparable to that of escalator itself during its normal operations. In the stairlifts of known art, wherein only the tracked movement device is used, it is very difficult, slow and sometimes impossible for the stairlift to

go out and, therefore, to overcome the small difference in level between the last stair (both in ascent and in descent) and the upper, or lower, landing of the escalator, under which such last stair disappears, thus involving huge safety risks for both the stairlift operator and people in line behind the stairlift along the escalator. These difficulties then increase if the load to be transported reaches or exceeds 150 kilograms since, in such case, the tracked movement devices themselves are not able to develop the traction needed to make the stairlift overcome that small difference in level.

Still according to the invention, the tracked movement device is further rotatably constrained on command with respect to the frame around a second horizontal rotation axis, said second rotation axis being different from, and arranged above, said rotation axis of said at least one motorized wheel.

Moreover, said at least one front supporting leg is constrained rotatably on command around a third axis of rotation with respect to the frame. Preferably, said front supporting leg comprises a first idle wheel on its own free end. Therefore, in practice, the back wheel and the idle wheel arranged on the end of the front supporting leg cooperate together to slide the stairlift on a plane, or to allow its access on an escalator and to stably support it along the entire run of the escalator itself.

Still according to the invention, the stairlift comprises at least one first actuator for the rotation of said tracked movement device with respect to said frame and at least one second actuator for the rotation of said front leg with respect to said frame. Preferably, said first actuator and/or said second actuator are of the rod and cylinder type, wherein the rod of said first actuator is rotatably constrained to said movement device, the rod of said second actuator is rotatably constrained to said supporting leg and the respective cylinders of said first actuator and said second actuator are rotatably constrained to said main body of said frame, in two distinct points.

Still according to the invention, whenever said load to be carried comprises a bin provided with a box-like container and a lid rotatable with respect to said box-like container, the main body of the stairlift comprises a locking element for said lid, at least when said bin is placed on said platform. Such locking element is rotatably

constrained to said main body between a locking position with said lid and a second unlocking position with said lid. In this way, the content of the load is maintained inside the container without any risk of overturning.

Moreover, the stairlift comprises at least one electric battery to feed the electric components of said stairlift. Said electric battery is integrally arranged with said at least one front supporting leg. Such arrangement of the battery provides a series of advantages, among which the possibility to avoid further encumbrances in the area where the movement transmission means of normal stairlifts are usually positioned, therefore on the back of the stairlift.

Finally, the stairlift comprises at least one auxiliary back driven wheel combined with said main body and means to displace said auxiliary back wheel between a position at least partially retracted in the main body and a position jutting with respect to said main body. Such auxiliary wheel, arranged at a greater height than the one on which said at least one back wheel is, is extremely useful, especially in its extended position and when the frame is tilted backwards at an angle of more than 45° with respect to the vertical. In this case, in fact, the stability and safety of the stairlift are considerably increased.

BRIEF DESCRIPTION OF THE FIGURES

These and other aspects of the present invention will be more evident to the field technician from the following description of a preferred embodiment of the present invention, provided by way of example and not of limitation, referring to the attached figures, in which:

figures 1A and 1B show two axonometric views of the stairlift according to the invention;

figures 2A and 2B respectively show a side view and a sectional side view of the stairlift in figure 1A;

figures 3A and 3B show an axonometric view and a side view of the stairlift in figure 1A with a bin to be transported;

figures 4A and 4B show a side view of the stairlift in figure 1A, tilted backwards with an auxiliary back wheel, respectively in a retracted position and in an extended position;

figures 5A and 5B show a side view of the stairlift according to the invention and engaged in facing a fixed staircase;

figures 6A-6D show a side view of the stairlift according to the invention and engaged in facing an escalator.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE PRESENT INVENTION

Referring particularly to such figures, with numeral 1 a stairlift according to the invention is shown.

As better shown in figures 1A and 1B, the stairlift 1 comprises a tubular supporting frame 2 having a main body 2a extended vertically and a platform 2b adapted to support the weight of the load 100 to be lifted on a staircase 300 and/or escalator 400, or to move along the sliding plane 200. The main body 2a and the platform 2b are substantially L-shaped. Moreover, the stairlift comprises a tracked movement device 3 constrained and movable on command to the frame 2 between an operative position OP1 (see figures 5A and 5B), wherein the tracked device 3 moves the stairlift 1 along a fixed staircase 300, or along a sliding plane 200 (not shown in the figures annexed, but deductible from figure 5A), and a non-operative position OP2 (in all the remaining figures), wherein it remains raised from an escalator 400, or from the sliding plane 200. By the way, it must be noted that a fixed staircase 300 also refers to an escalator 400 that is not however moving, or that is locked or stopped in any of its positions. In practice, an escalator 400 can also become a fixed staircase 300 in case of issues with the actuation mechanism of the escalator 400 itself.

The axis K of the motor 3a that controls the trackers 3b of the tracked device 3 is shown in figure 2A, arranged orthogonally to the plane of the figure.

The frame 2 further comprises two coaxial back wheels 4 rotatable on themselves around a first horizontal axis X and integrally constrained to the frame 2. Figure 2B shows the axis X arranged orthogonally to the sheet.

It should be noted that, in an alternative embodiment of the invention, the platform 2b can also be constrained to the main body 2a without thereby departing from the protection scope of the present invention. Anyway, when the frame 2 is tilted with

respect to a horizontal plane, it rotates around the back wheels 4. Therefore, in practice, the load 100 and the frame 2 rotate integrally around the axis X of the two back wheels 4.

These two back wheels 4 are arranged, with respect to the tracked device 3, so as to be in contact with the sliding plane 200, or a first stair 401 of the escalator 400, at least when the tracked movement device 3 is in its non-operative position OP2 and when they are raised from the sliding plane 200 or from the escalator 400, at least when the tracked movement device 3 is in its operative position OP1.

Advantageously, the stairlift 1 comprises two front supporting legs 5, substantially in the shape of an inverted L when assembled to form the stairlift 1, which are movably constrained on command with respect to the frame 2, between a first position P1 (shown in figures 1A, 1B, 2A, 2B, 3A, 3B, 4A, 4B and 6A-6D) in which, in cooperation with the two back wheels 4, are in contact with a sliding plane 200 or with a further stair 402 of the escalator 400, and a second position P2 (see figures 5A and 5B), in which they are raised from the escalator 400, or from a sliding plane 200. It should be noted that the Owner has verified that, in order to achieve better stability and safety for the stairlift 1 along an escalator 400, the first stair 401 and a further stair 402 must not be adjacent, and therefore that another stair 404 (or more stairs in alternative embodiments) must be interposed in-between them.

This allows the stairlift 1 to adopt the tracked movement device 3 on fixed staircases 300 and not on escalators 400, since there is no need to exert any traction on the latter, therefore eliminating all aforesaid issues concerning the use of a tracked stairlift used for the lifting along an escalator. However, when the stairlift 1 faces an escalator 400, it can advantageously use the back wheels 4 that, in cooperation with the two front supporting legs 5, allow to both access the escalator 400 and maintain the stability of the stairlift 1 during the ascent, or descent, along the escalator 400. Moreover, also if the escalator 400 is locked, the tracked device 3 can intervene by bringing it to its operative position OP1 and by simultaneously bringing the front legs 5 to their second position P2, so as to allow the stairlift 1 to overcome the stairs of the locked escalator 400, which at this point has become a fixed staircase 300.

Moreover, the two front legs 5 are movable with respect to the frame 2 independently

with respect to the tracked movement device 3, thus providing complete freedom to the operator to make the front legs 5 or tracked movement device 3 move as needed.

According to a peculiar aspect of the invention the two back wheels 4 are motorized. This allows the same stairlift 1 to rapidly overcome the last stair 403 of the escalator 400, thanks to the traction exerted by the driving wheels 4. Compared to the stairlifts of known art, this characteristic is of considerable interest since it facilitates the going out of the stairlift 1 from the escalator 400 at a speed comparable to that of escalator 400 itself during its normal operations, thus avoiding any risk for the operator or people in line on the escalator 400 and right behind the stairlift 1. In the stairlifts of known art, wherein only the tracked movement device is used, it is very difficult, slow and sometimes impossible for the stairlift to go out and, therefore, to overcome the small difference in level between the last stair (both in ascent and in descent) and the upper, or lower, landing of the escalator, under which such last stair disappears, thus involving huge safety risks for both the stairlift operator and people in line behind the stairlift along the escalator. These difficulties then increase if the load to be transported reaches or exceeds 150 kilograms.

The acceleration of the two back driving wheels 4 can be achieved on operator command just before the stairlift 1 reaches the last stair 403 of the escalator 400.

As better shown in figures 5A and 5B, the tracked movement device 3 is further rotatably constrained on command with respect to said frame 2 around a second horizontal axis of rotation Y that is distinct from and arranged above the first horizontal axis X of the two back wheels 4 (see figures 2A and 2B).

Moreover, also the two front supporting legs 5 are rotatably constrained, on command, with respect to the frame 2 around a third horizontal axis Z (shown in figure 2B). Moreover, the two front legs 5 each comprise on their free end 5a an idle wheel 6 used to slide the stairlift 1 on a horizontal plane 200 or to allow the stairlift 1 to access or go out from the escalator 400.

Moreover, the stairlift 1 comprises two first actuators 7 for the rotation of the tracked movement device 3 with respect to the frame 2, and two actuators 8 for the rotation of the two front legs 5 with respect to the frame 2.

In particular, the first actuator 7 and the second actuator 8 are of the rod 7a, 8a and

cylinder 7b, 8b type, wherein the rod 7a of each first actuator 7 is rotatably constrained, in a point 60, to the movement device 3, the rod 8a of each second actuator 8 is rotatably constrained, in a point 61, to the respective front supporting leg 5, and the cylinders 7a, 7b of the two first 7 and second 8 actuators are rotatably constrained to the main body 2a of the frame 2. In an alternative embodiment not shown herein, the cylinder and rod can also be mounted in an opposite way without thereby departing from the protection scope of the present invention. Moreover, there can also be a different number of actuators, such as for example, a single first actuator 7 and a single second actuator 8, without thereby departing from the protection scope of the present invention.

As anticipated above, the stairlift 1 is also used to transport heavy loads 100, such as, for example, bins 100 containing construction materials or similar. A bin 100 of this kind is provided with a box-like container 101 and a lid 102 rotatable with respect to the box-like container 101.

According to the invention, the main body 2 comprises a locking element 10 to lock the lid 102, at least when the bin 100 is placed on the platform 2b. Such locking element 10 is constrained rotatably to the main body 2a around a fourth horizontal axis L, between a locking position V1 with the lid 102 and an unlocking position V2 with the lid 102 (such position is not shown in the figures annexed). This makes the ascent or descent of the stairlift 1 considerably safer along an escalator 400 or fixed staircase 300.

According to a preferred aspect of the invention visible in the embodiment shown herein, the stairlift 1 comprises two electric batteries 20 to feed the electric components of the stairlift 1 itself. Advantageously, the two batteries 20 are arranged integrally with the two front supporting legs 5 of the stairlift 1.

Finally, the stairlift 1 comprises two auxiliary back driven wheels 30 combined with the main body 2a of the frame 2 and means 31 to move the two auxiliary back wheels 30 between a partially retracted position S1 in the main body 2a and a jutting position S2, with respect to the main body 2a.

These two idle or motorized auxiliary wheels 30, arranged at a greater height with respect to the one on which the two back wheels 4 are, according to the embodiment

of the invention are extremely useful especially in their extended position and when the frame 2 is tilted backwards at an angle greater than 45° with respect to the vertical. In fact, in this way, both the stability and safety provided by the stairlift 1 are considerably increased.

Various operations performed by the stairlift 1 when facing a fixed staircase 300 and an escalator 400 are explained in detail hereinafter.

When the stairlift 1 must face a fixed staircase 300 in ascent, it is rotated at 180° with respect to the normal advancing position, therefore facing the fixed staircase 300 on its back side 1b.

In this arrangement shown in figure 5A, the tracked movement device 3 is brought to its operative position OP1. In such position, each first actuator 7 acts so as to extend its rod 7a to the maximum of its run, in order to tilt the frame 2 backwards. Subsequently, the two front legs 5 are brought to their second position P2, i.e. raised as much as possible from the normal sliding surface (figure 5B). This is obtained by retracting the rod 8a of each second actuator 8 within the respective cylinder 8b. In this arrangement, the two back wheels 4 do not touch the ground, only the tracked movement device 3 is in contact with the sliding plane 200. Such arrangement of the stairlift 1 is similar to the one normally combined with the stairlifts of known art, as described in the aforesaid Sunwa Patent.

When descending from a fixed staircase 300, the stairlift 1 faces the staircase in its normal advancing direction, therefore on its front side 1a. As in case of a descent, also in this case the tracked movement device 3 is brought to its operative position OP1. In such position, each first actuator 7 acts so as to extend the rod 7a to the maximum of its run, in order to tilt the frame 2 backwards. Also in this case, the two front legs 5 are instead brought to their second position P2, i.e. raised as much as possible from the sliding surface 200, i.e. from the upper landing of the fixed staircase 300. In such arrangement, the two back wheels 4 do not touch the ground, but only the tracked movement device 3 is in contact with the sliding plane 200, or with the fixed staircases 300. Such arrangement of the stairlift 1, as in the previous case, is similar to the one combined with the stairlifts of known art, such as the one described in the Sunwa Patent.

When the stairlift 1 must face an escalator 400, in ascent, it is rotated by 180° with respect to the normal advancing position, therefore facing the escalator 400 on its back side 1b, i.e. on the side of the stairlift 1 where the two back wheels 4 are positioned.

In such arrangement shown in figure 6A, the tracked movement device 3 is brought to its non-operative position OP2. In this case, the rod 7a of each first actuator 7 is retracted within the respective cylinder 7b. Moreover, the two second actuators 8 act so as to extend the respective rod 8a as much as possible of its run, so as to ensure that the two front legs 5 are brought to their first position P1, i.e. lowered as much as possible on the sliding plane 200. In such arrangement, the frame 2 of the stairlift 1 rotates around the two back wheels 4 by tilting backwards. The two back wheels 4 therefore touch the ground, while the tracked movement device 3 is no longer in contact with the sliding plane 200. In this position, the stairlift 1 is brought closer to the escalator 400 and the back wheels 4 are turned counterclockwise to allow the stairlift 1 to reach the first stair 401 of the escalator 400. As the riser of each stair of the escalator 400 is raised, therefore both the first stair 401 on which the two back wheels 4 are resting and the subsequent stairs 404 and 402, the stairlift 1 starts to rotate by passing from a backward tilted position (see figure 6A) to an increasingly less tilted position (see figure 6B) until reaching a position in which the platform 2b is substantially horizontal (see figure 6C). As shown in figures 6B-6D, the two front legs 5 are resting on a further stair 402 of the escalator 400, different than the one on which the two back wheels 4 are resting. In particular, the Owner experimented that maximum safety can be achieved by maintaining the ends 5a of the two front legs 5 in contact, or even when the two idle wheels 6 on the ends 5a of each front leg 5 are maintained two stairs under the one on which the two back wheels 4 are resting.

Finally, before leaving the escalator 400, therefore when the riser of the stair 401 on which the two driving wheels 4 of the stairlift 1 are resting, gradually lowers with respect to the stair 404 following it, the stairlift 1 begins to tilt backwards again (see figure 6D) since the riser of the stair 402 on which the ends 5a of the two front legs 5, or the idle wheels 6, are resting is greater than that of the first stair 401 with respect to the stair 404. In this position, in order to facilitate the going out from the

escalator 400, the operator actuates the rotation of the two motorized back wheels 4, so as to ensure that the stairlift 1 can overcome the small difference in level, or the final stair, 403 between the last stair 401 and the upper landing 200, under which such last stair 401 disappears (see figure 6D).

In case of descent from an escalator 400, the stairlift 1 faces the escalator 400 in its normal advancing direction, i.e. with its front side 1a, repeating the same steps of the stairlift 1 when facing the ascent on the escalator 400. In fact, the tracked movement device 3 is brought to its non-operative position OP2 thanks to the first two actuators 7 that act so as to retract the rod 7a within the respective cylinder 7b. Moreover, the two second actuators 8 act so as to extend their rod 8a to the maximum of its run, so as to ensure that the two front legs 5 are brought to their first position P1, i.e. lowered as much as possible on the sliding plane 200. In such arrangement, the frame 2 of the stairlift 1 rotates around the axis of rotation X of the two back wheels 4, tilting backwards. The two back wheels 4 and the two idle wheels 6 arranged on the ends 5a of each front leg 5 touch the ground, while the tracked movement device 3 is no longer in contact with the sliding plane 200. In this position, the stairlift 1 is brought closer to the escalator 400 with the idle wheels 6 until meeting a further stair 402 of the escalator 400. At this point, the stairlift 1 slides forward with the raiser of the further stair 402 on which the two idle wheels 6 are resting and which, meanwhile, increases until reaching its maximum height. At this point, the two back wheels 4 are resting on the first stair 401 of the escalator 400, for which the raiser, at least initially, is null. Such first stair 401 is not directly adjacent to the further stair 402 on which the two idle wheels 6 are resting, but is separated from the latter by yet another stair 404. During this process, the stairlift 1 rotates from the backward tilted position to an increasingly less tilted position, until reaching a position in which the platform 2b is substantially horizontal. As shown in figures 6A-6D, the two front legs 5 are resting on a different stair 402 than the one on which the two back wheels 4 are resting. In particular, the Owner has experimented that maximum safety can be achieved by resting the two front legs 5, or better the two idle wheels 6 placed at the ends 5a of each front leg 5, two stairs under the one on which the two motorized back wheels 4 are resting.

Instead, when the stairlift 1 is on an escalator 400 that is suddenly locked, therefore in an arrangement in which the tracked device 3 is in its non-operative position OP2 and the two front legs 5 are in their first position P1, therefore as shown in figure 6B, the same steps taken in case of a fixed staircase 300 must be taken to ensure that the stairlift 1 can continue its ascent or descent. Therefore, the operator must activate the first two actuators 7 by bringing the tracked movement device 3 to its operative position OP1. Simultaneously, the two second actuators 8 are activated so as to bring the two front legs 5 to their second, non-operative, position P2. At this point, the ascent or descent of the stairlift 1 will continue as in the case of a fixed staircase 300.

CLAIMS

1. Stairlift (1) for fixed staircase and/or escalator, comprising a supporting frame (2), having a main body (2a) extended vertically and a platform (2b) adapted to carry, in cooperation with said main body, the weight of the load to be lifted on said fixed staircase and/or escalator, and a tracked movement device (3) constrained and movable by command with respect to said frame between an operative position (OP1), wherein it moves said stairlift along a fixed staircase or along a sliding plane, and a non-operative position (OP2), wherein it remains raised from said fixed staircase or said sliding plane, said frame further comprising at least one rotating back wheel (4) that rotates around a first horizontal axis (X) and is constrained integrally to said frame, said back wheel (4) being arranged, with respect to said tracked device, so that to contact said sliding plane or a first stair of an escalator, at least when said tracked movement device (3) is in its non-operative position (OP2), and to be raised from said sliding plane or said escalator, at least when said tracked movement device is in its operative position (OP1), said stairlift being characterized by comprising at least one front supporting leg (5) constrained and movable by command with respect to said frame (2) between a first position (P1), in which in cooperation with said back wheel (4), it is in contact with said sliding plane or a further stair of said escalator, and a second position (P2), in which it is raised from said escalator or said sliding plane.

2. Stairlift (1) for fixed staircase or escalator, characterized in that said at least one front leg (5) is movable with respect to said frame (2) independently of said at least one tracked movement device (3).

3. Stairlift (1) according to one or more of claims 1 or 2, characterized in that said back wheel (4) is motorized.

4. Stairlift (1) according to one or more of claims 1 to 3, characterized in that said tracked movement device (3) is further constrained and rotates by command with respect to said frame (2) around a second horizontal rotation axis (Y), said second rotation axis (Y) being different from, and arranged above, said first horizontal axis (X) of said at least one back wheel.

5. Stairlift (1) according to one or more of claims 1 to 4, characterized in that said at

least one front supporting leg (5) is constrained and rotates by command with respect to said frame (2) around a third horizontal axis (Z).

6. Stairlift (1) according to claims 1 to 5, characterized in that said front leg (5) comprises, at its own free end (5a), a first idle wheel (6).

7. Stairlift (1) according to one or more of claims 1 to 6, characterized by comprising at least one first actuator (7) for rotating said tracked movement device (3) with respect to said frame and at least one second actuator (8) for rotating said front leg (5) with respect to said frame (2).

8. Stairlift (1) according to claim 7, characterized in that said first actuator and/or said second actuator are of rod (7a, 8a) and cylinder (7b, 8b) type, wherein the rod of said first actuator is rotatably constrained to said movement device (3), the rod of said second actuator is rotatably constrained to said supporting leg (5) and the cylinder (7b, 8b) of said first actuator (7) and said second actuator (8) is rotatably constrained to said main body (2a) of said frame (2), or vice versa.

9. Stairlift (1) according to one or more of the preceding claims, wherein said load (100) to be carried comprises a bin provided with a box-shaped container (101) and a lid (102) rotatable with respect to said box-shaped container, characterized in that said main body (2) comprises a locking element (10) to lock said lid (102), at least when said bin is placed on said platform (2b), said locking element (10) being constrained to said main body and rotatable around a fourth horizontal axis (L), between an engagement position (V1) and a disengagement position (V2) with said lid.

10. Stairlift (1) according to one or more of the preceding claims, characterized by comprising at least one electrical battery (20) for power supplying the electrical components of said stairlift, said at least one electrical battery being arranged integrally with said at least one front supporting leg (5).

11. Stairlift (1) according to one or more of the preceding claims, characterized by comprising at least one auxiliary back wheel (30) combined with said main body (2a) of said frame (2), and means (31) for the displacement of said at least one auxiliary back wheel (30) between a position at least partially retracted in the main body (2a) and a position jutting with respect to said main body (2a).

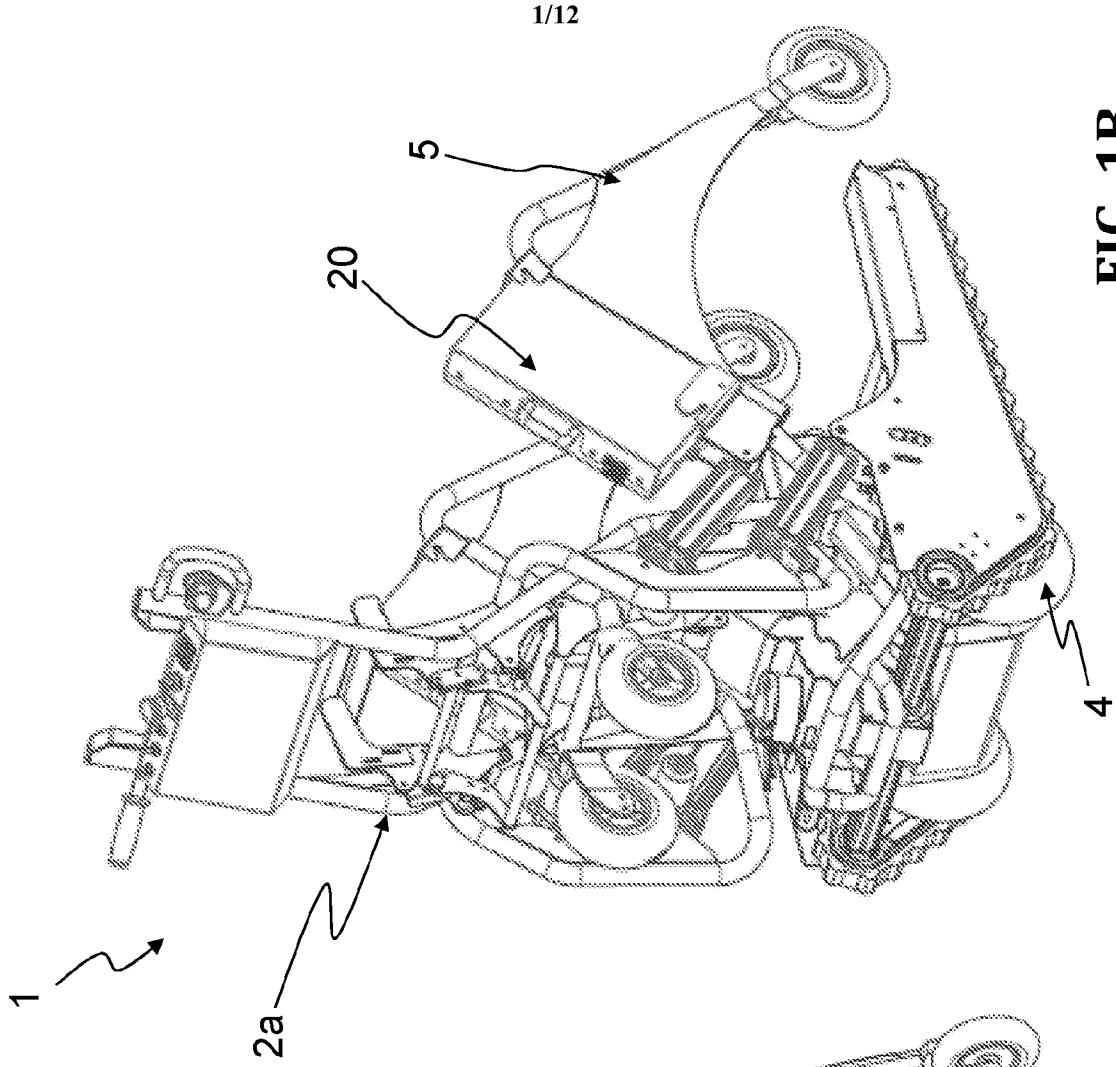

FIG. 1B

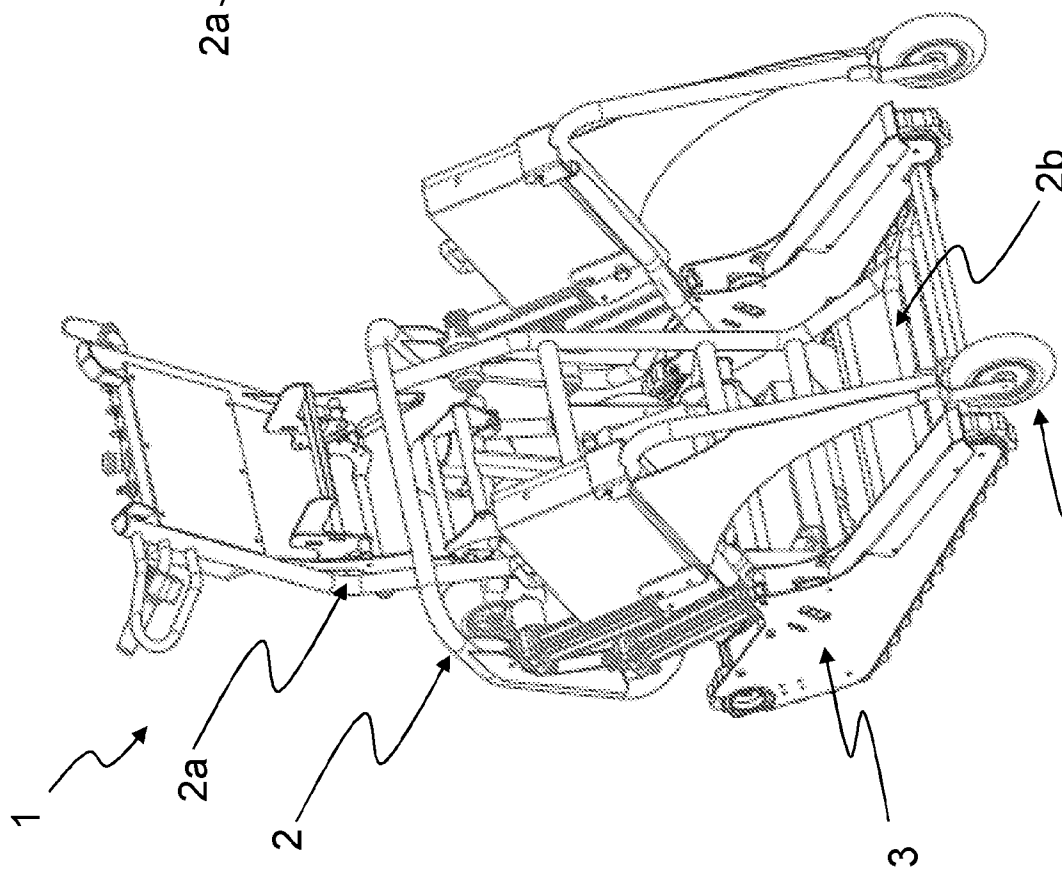

FIG. 1A

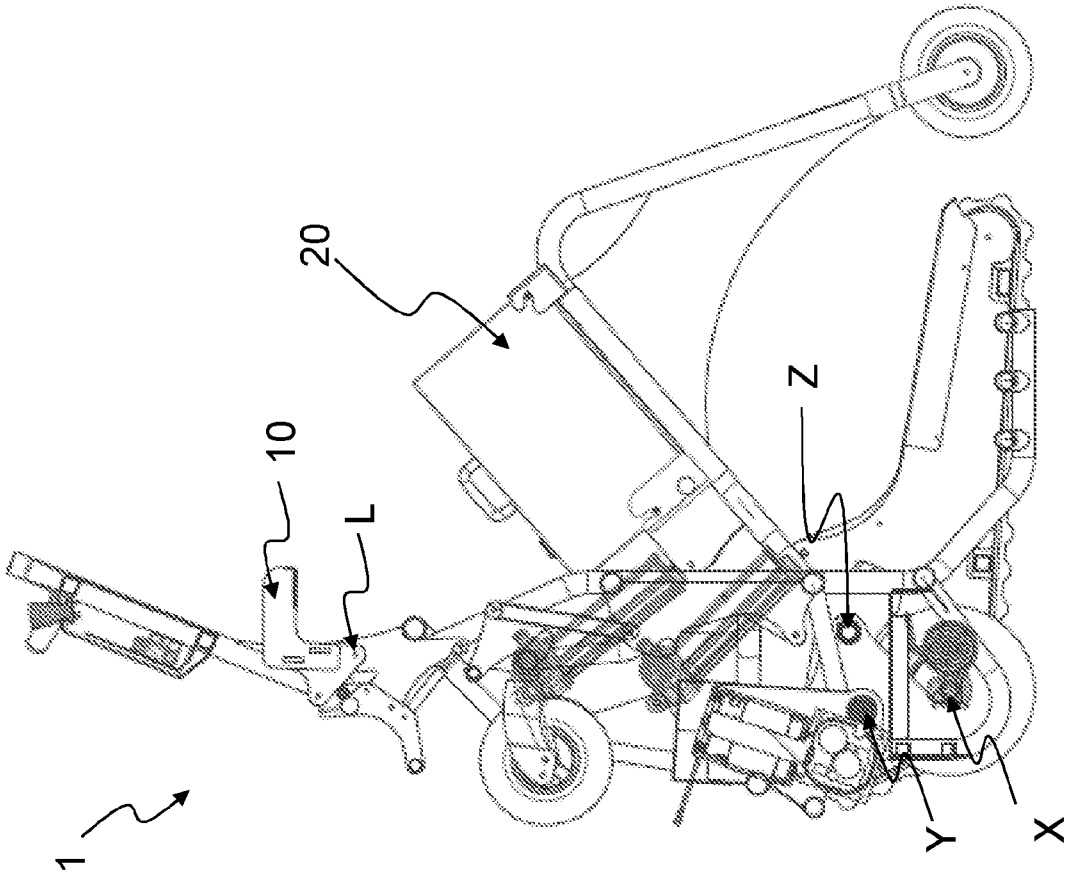

FIG. 2B

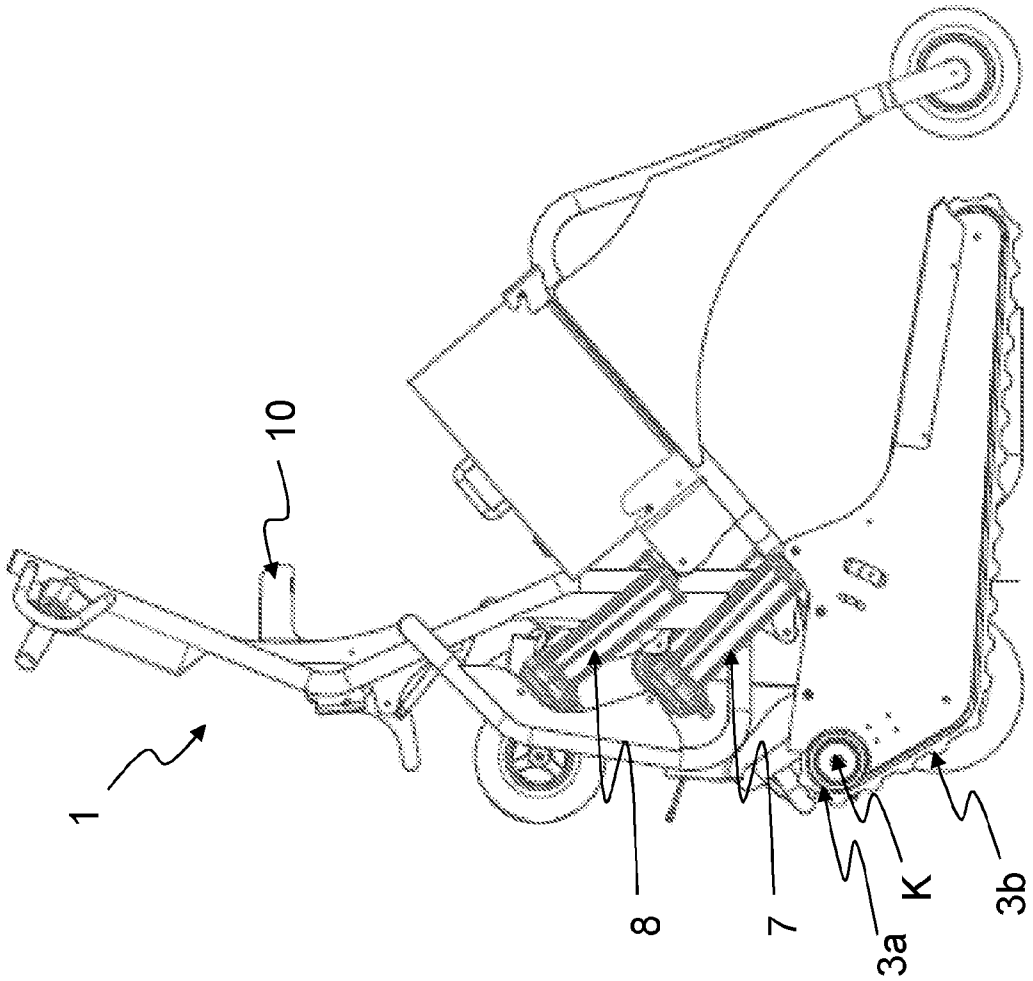

FIG. 2A

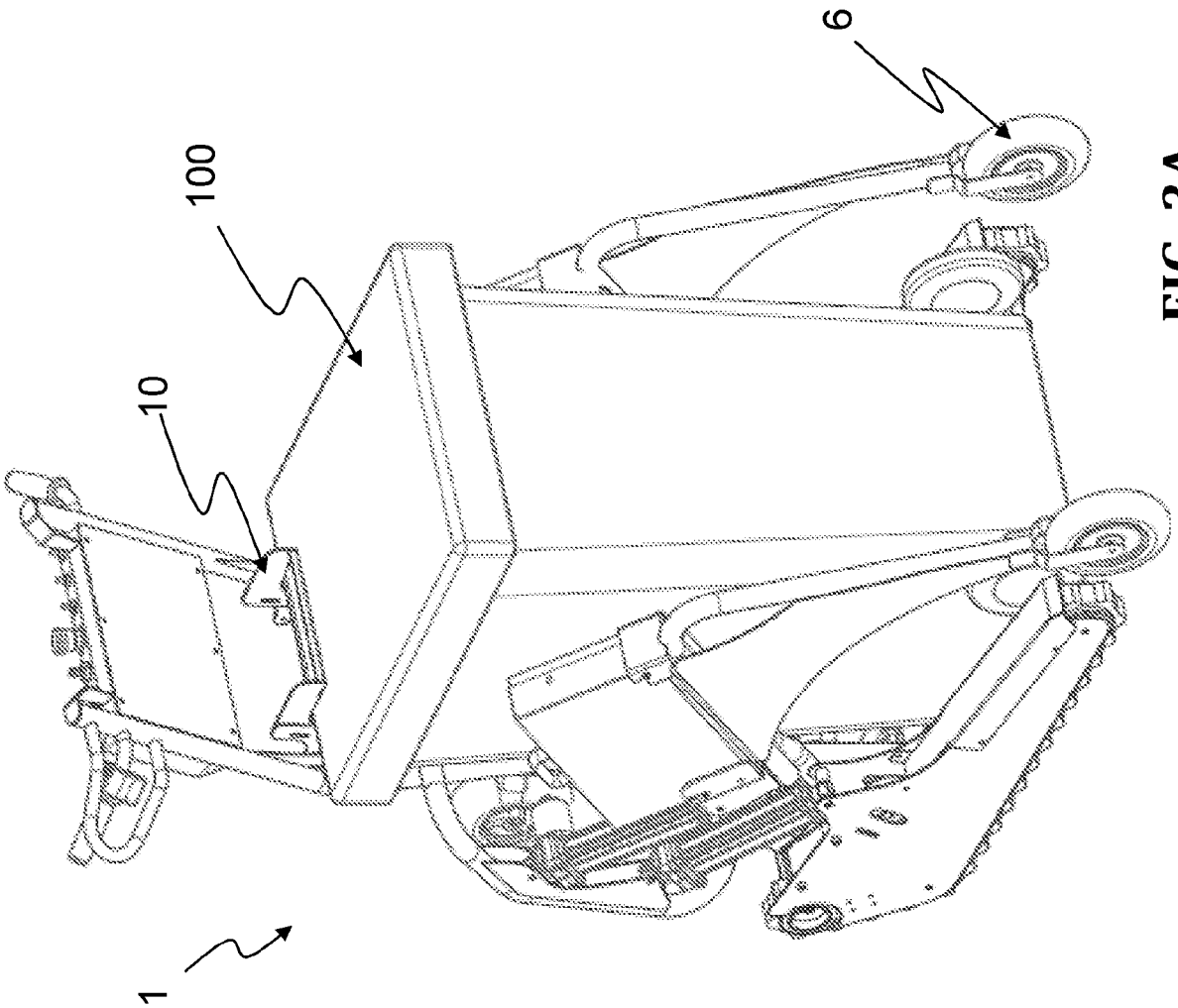

FIG. 3A

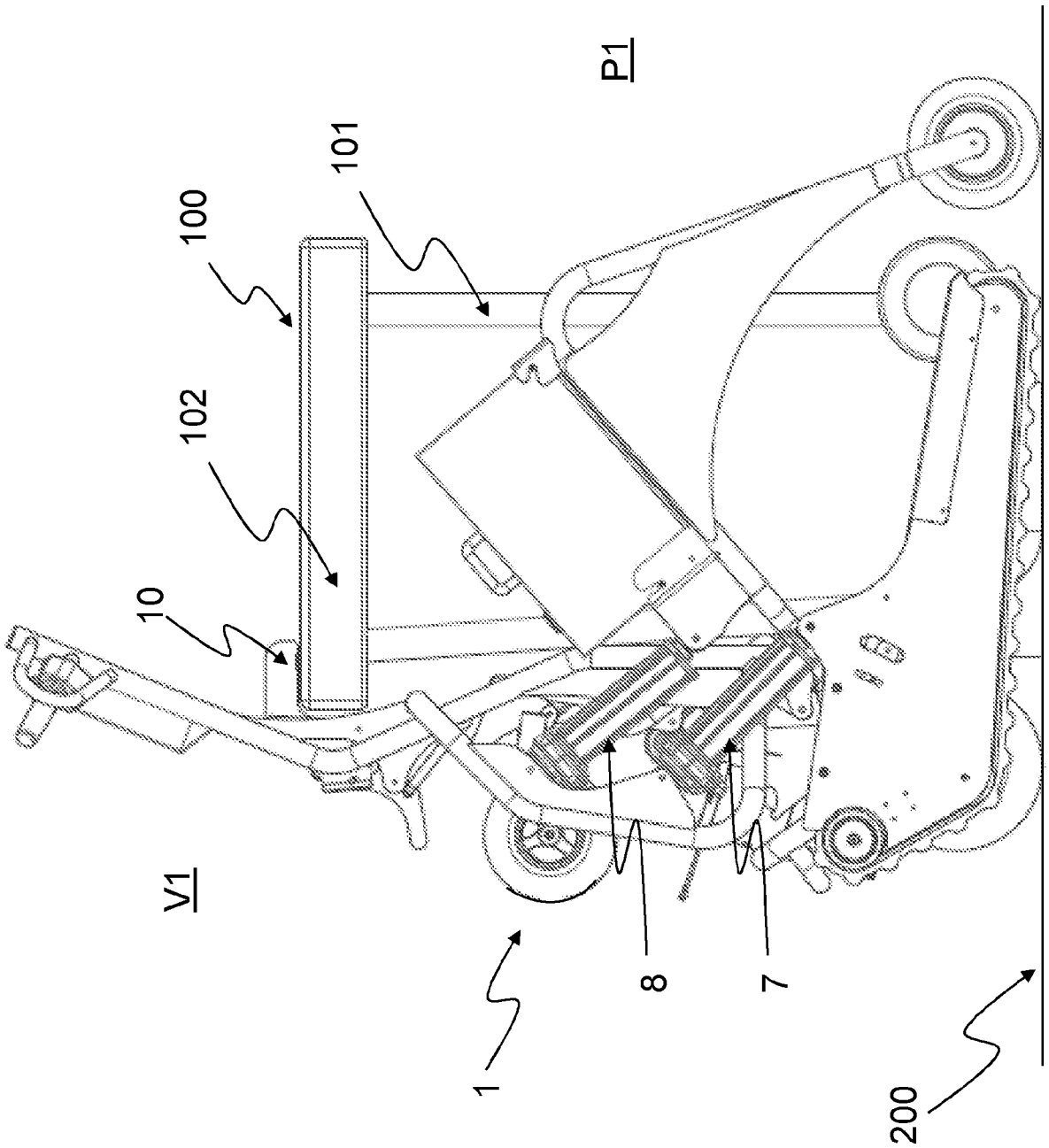

FIG. 3B

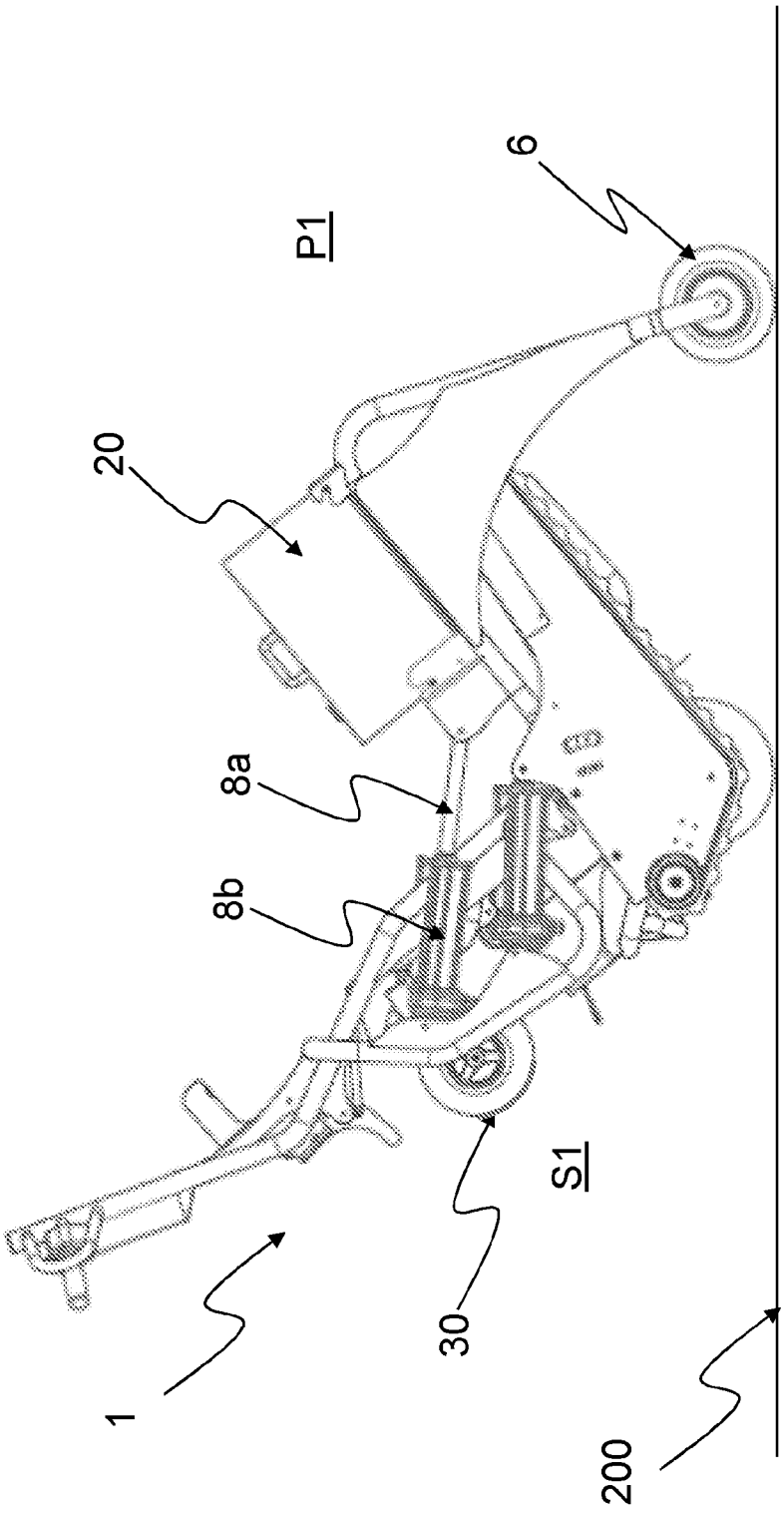

FIG. 4A

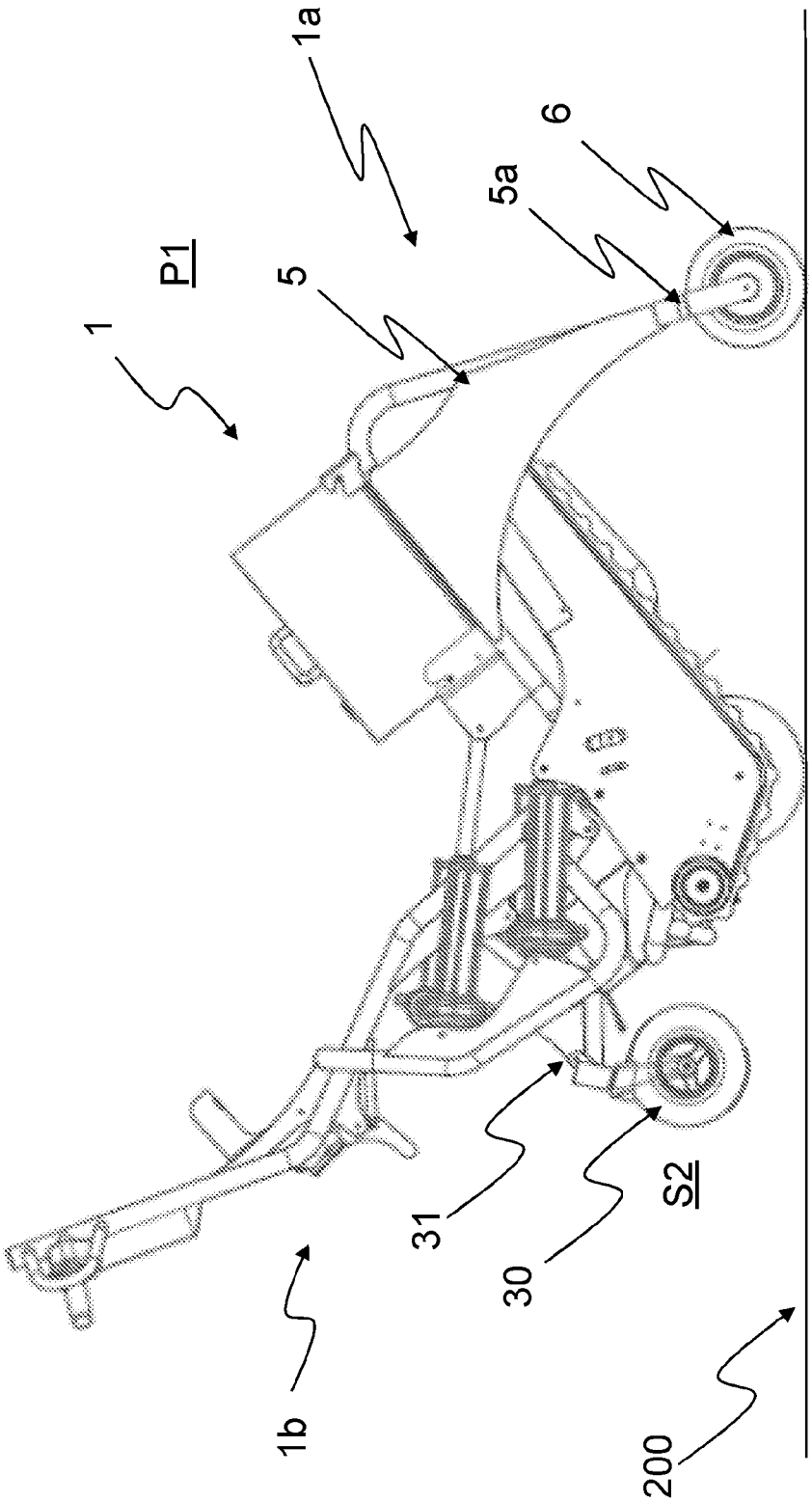

FIG.4B

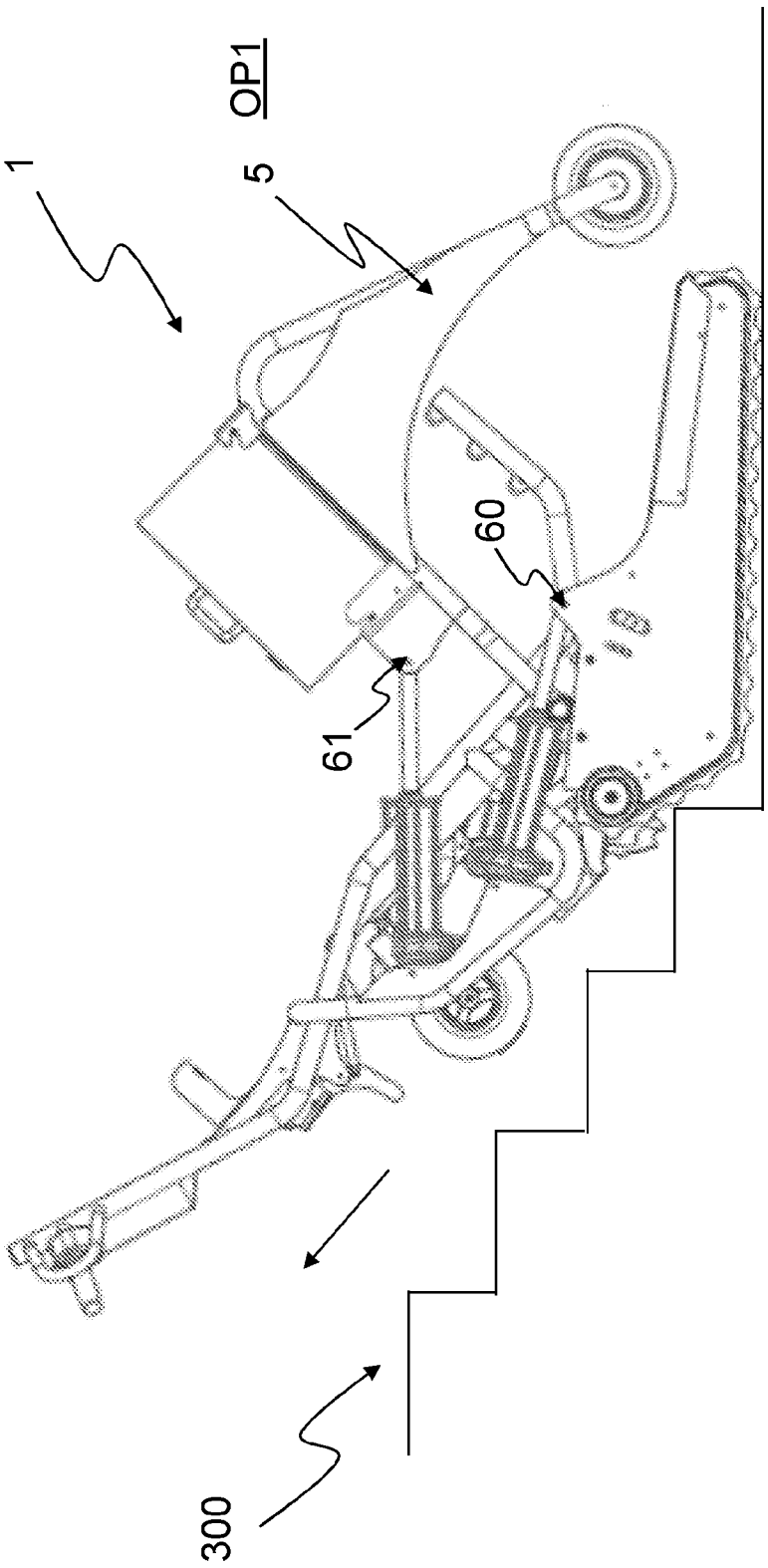

FIG.5A

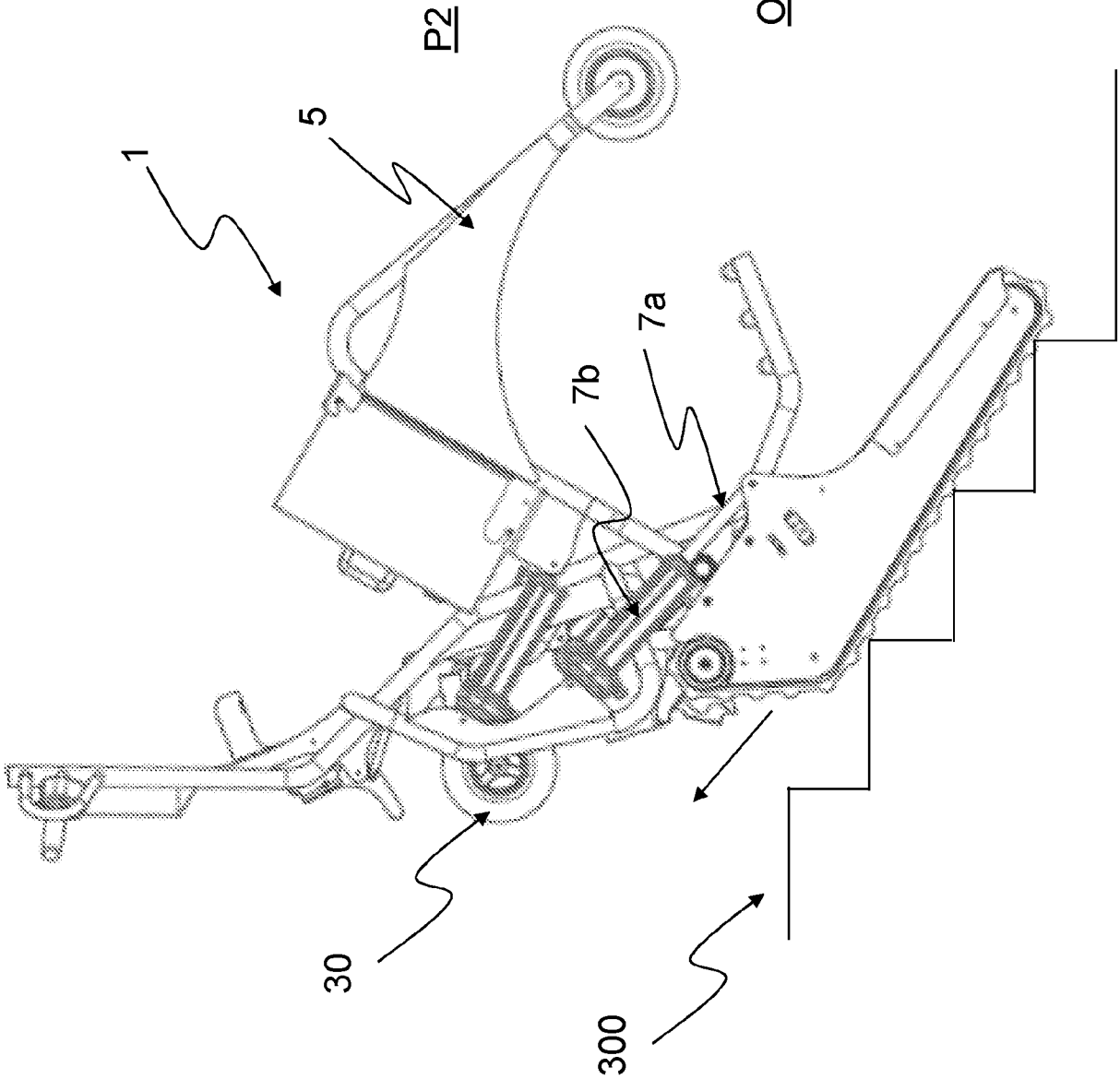

FIG.5B

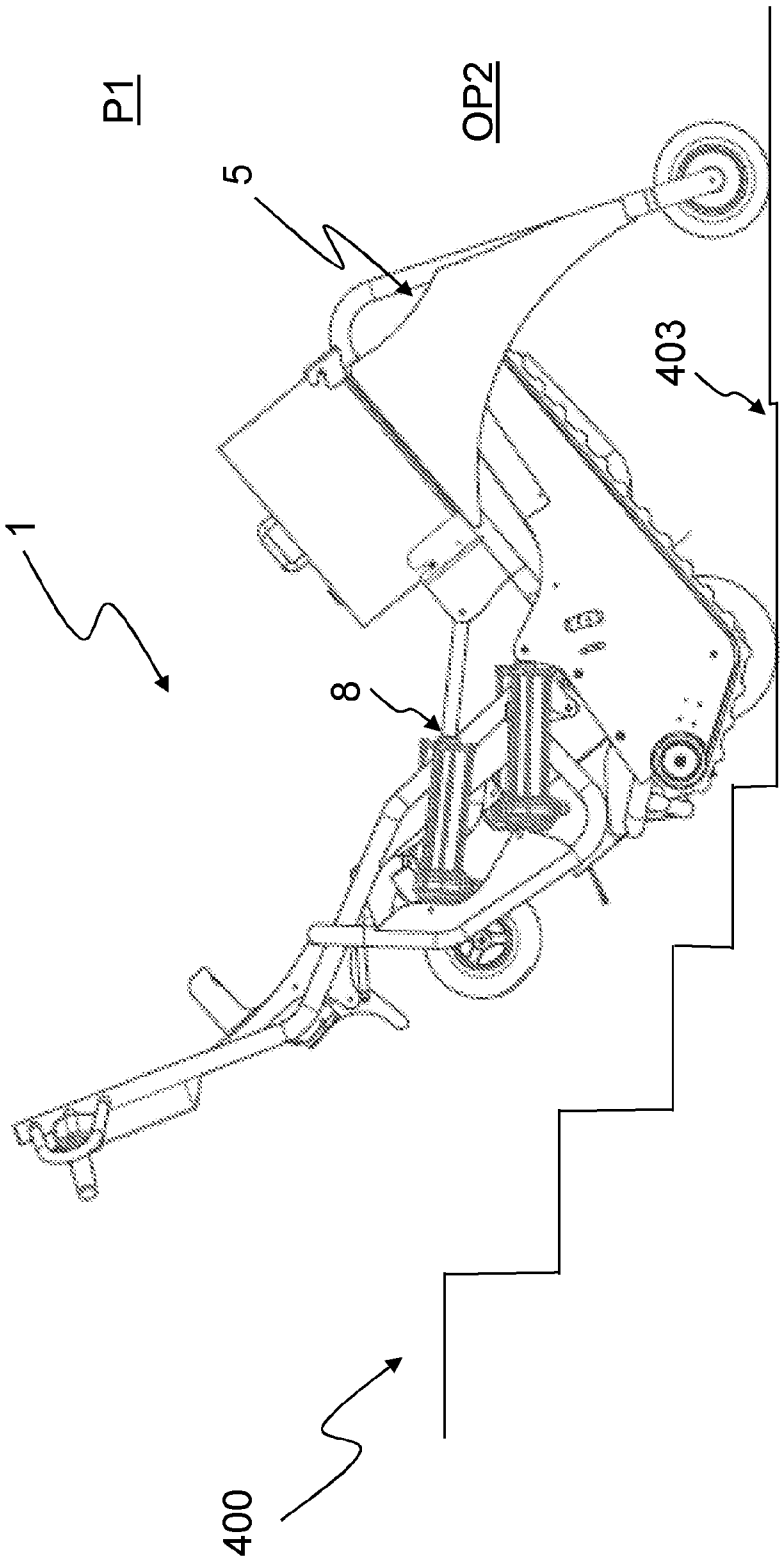

FIG.6A

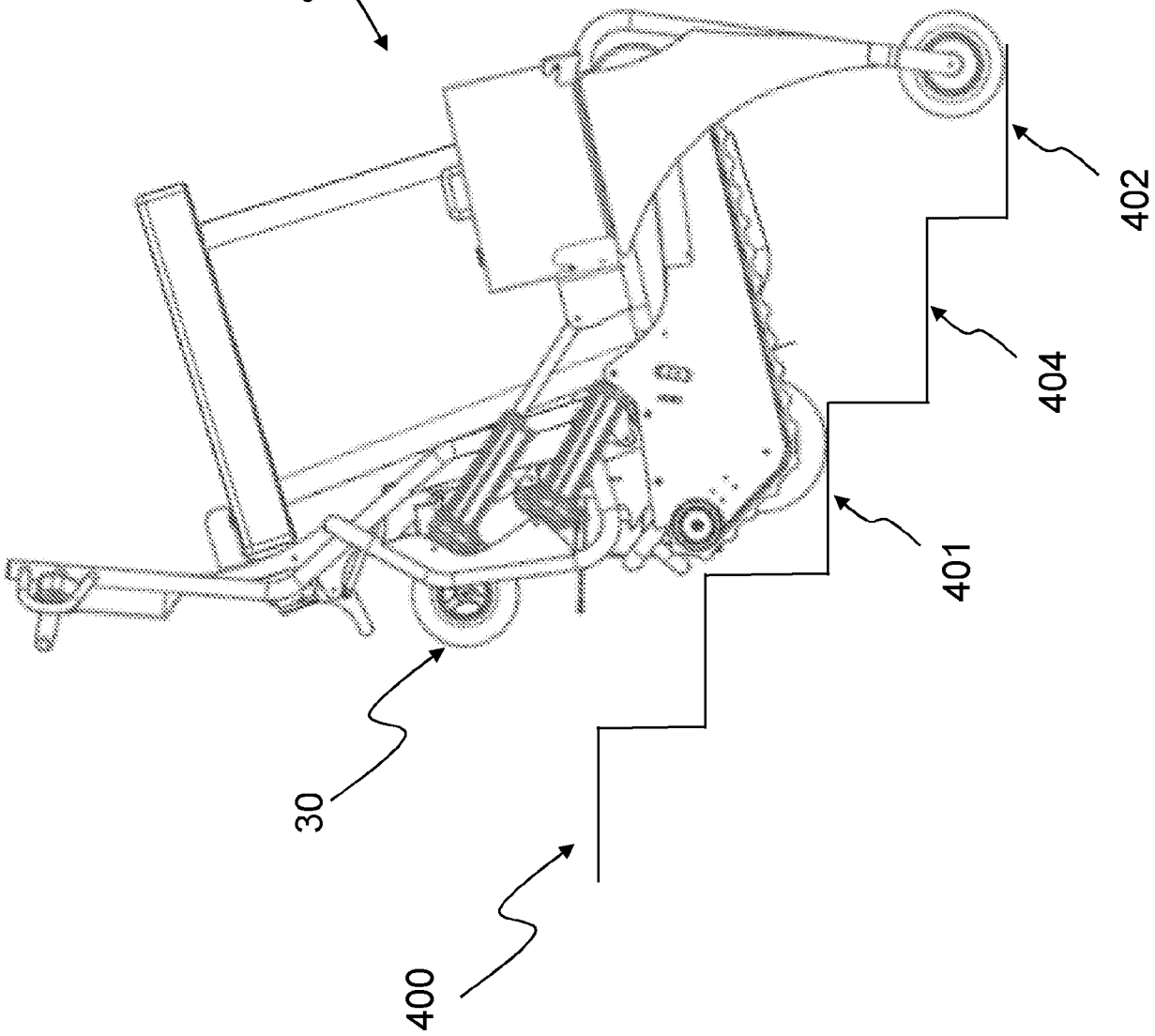

FIG.6B

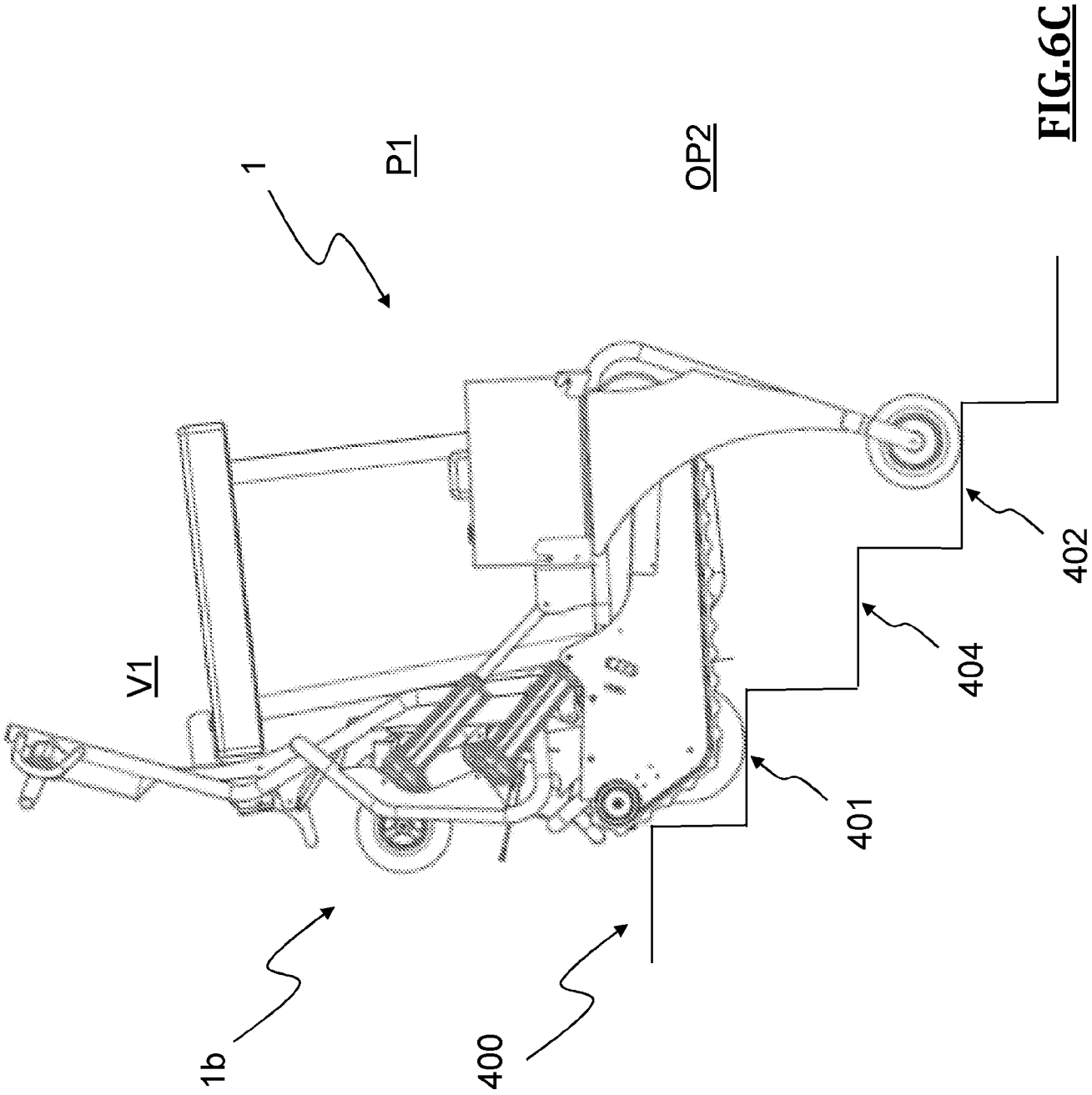

FIG.6C

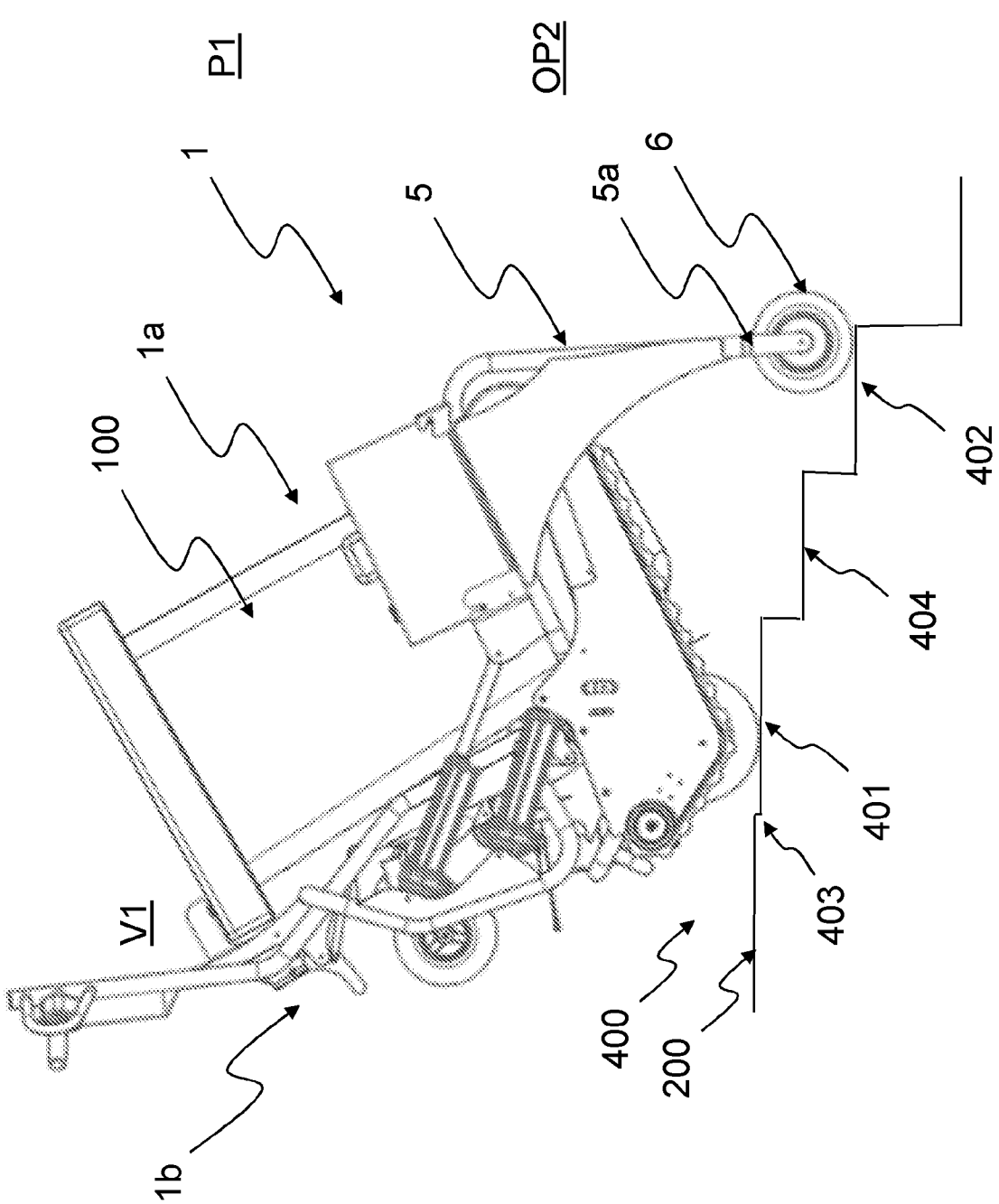

FIG.6D

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2018/054799

A. CLASSIFICATION OF SUBJECT MATTER
INV. B62B5/02 A61G5/06
ADD. B62D55/075 B66B9/08

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61G B66B B62B B62D

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 2006/124366 A1 (LE MASNE DE CHERMONT HERVE [FR]) 15 June 2006 (2006-06-15) pages 1-5, paragraphs 0114, 0068	1-4,6-8, 10,11 9
X A	WO 94/07452 A1 (AUSTRALIAN TRANSCENDERS INT [AU]; DAVIS FREDERICK HARRY [AU]; HANCOCK) 14 April 1994 (1994-04-14) pages 1-12; figures 1-5	1-8 9-11
A	EP 1 616 545 A1 (SUNWA LTD [JP]) 18 January 2006 (2006-01-18) the whole document	1-11
A	US 2014/259420 A1 (LAMBARTH CLIFFORD EDWIN [US] ET AL) 18 September 2014 (2014-09-18) abstract; figure 17	1-11

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 October 2018	12/11/2018

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Lohse, Georg

2

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2018/054799

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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2

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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