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(54) **BATH LIFT DEVICE**

BADEHEBEVORRICHTUNG

DISPOSITIF DE LEVAGE POUR BAIGNOIRE

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(56) References cited:
WO-A1-01/85087 CA-A1- 2 397 503
DE-A1- 19 839 176 GB-A- 2 460 015

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DescriptionFIELD OF THE INVENTION

[0001] The present invention relates to a bath lift device for raising and lowering persons into or out of a bathtub, said device including a chassis adapted to rest, in use, on a floor of the bathtub and a supported seat adapted to be movable between a raised position, in which the seat is correctly positioned to permit a person standing outside the bathtub to sit inside said seat, and a lowered position, in which said seat is positioned at the bottom of the bathtub. Such a device is disclosed in the WO0185087.

BACKGROUND OF THE INVENTION

[0002] Bath lift devices have been widely used for aged or disabled people as a convenient means for entering or leaving a bathtub. Generally, a conventional bath lift device comprises two main parts, a fixed part resting, in use, on a floor of the bathtub and a movable part including the seat plate and the backrest.

[0003] However, in these conventional bath lift devices, the backrest and the seat plate can not be separated or only separated with some efforts. These bath lift devices are therefore often transported or removed from the bath tub as a whole with great physical efforts.

[0004] EP 1 743 615 B1 provides a solution to this problem. In this prior solution, a lock releasing device couples the backrest and the seat plate above a lowest end position. The device has a locking bolt that is movable between a locking position and a releasing position, where the bolt releases the backrest and the seat plate from each other in the releasing position. This solution permits to fix the backrest against the seat plate in order to protect the actuator from horizontal forces and therefore from side loads. However, this solution requires using extra bolts which are included in the backrest, leading to higher cost for the bath lift. Furthermore, this solution is not easily adaptable to already marketed bath lifts.

[0005] The aim of the present invention is therefore to provide a bath lift device that overcomes the deficiencies of the above mentioned solution.

SUMMARY OF THE INVENTION

[0006] In this view the present invention is concerned with a bath lift device as claimed in claim 1.

[0007] Important features of the device are defined in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] Other features and advantages of the present invention will appear more clearly from the detailed description of embodiments of the invention which are presented solely by way of a non-restricted example and

illustrated by the attached drawings in which:

Figure 1 shows a partially sectional side view of a bath lift device according to the invention in the uppermost end position of the seat plate;

Figure 2 shows a side view similar to Figure 1, but in the lowermost end position of the seat plate, the backrest being in its upright rest position;

Figure 3 shows a side view similar to Figure 2, but in the rear rest position of the backrest;

Figure 4 shows a side view similar to Figure 2, but in the front rest position of the backrest;

Figure 5a shows a perspective view of the bath lift device shown in Figure 1;

Figure 5b shows an exploded perspective view of the bath lift device shown in Figure 4;

Figure 6a shows a partially sectional view of an enlarged detail A of Figure 1 along the section plane XX' shown in Figure 10;

Figure 6b shows a view similar to Figure 6a, but in the rear rest position of the backrest;

Figure 6c shows a view similar to Figure 6a, but in the front rest position of the backrest;

Figure 7 shows a partially sectional view of the enlarged detail A of Figure 1 along the section plane YY' shown in Figure 10;

Figure 8a shows a perspective view of a clamp element supporting two locking levers.

Figure 8b shows an exploded perspective view of the clamp element illustrated in Figure 8a;

Figure 8c shows a front view of the clamp element illustrated in Figure 8a;

Figure 8d shows a sectional view taken along the direction indicated by a line A as shown in Figure 8c, the locking levers being positioned in the first locking position;

Figure 8e shows a sectional view similar to Figure 8d, but in the second locking position of the locking levers;

Figures 9a to 9i show enlarged, fragmentary side views of the bath lift device illustrated in Figures 1-4 during the successive manoeuvring steps permitting to transfer the backrest from its front rest position to its upright rest position via its rear rest position;

Figure 10 shows a rear view of the bath lift device shown in Figure 1.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0009] For the purpose of the present specification, situations and directions of elements of the bath lift device of the present invention are determined by the perspective of a user seated in the bath lift device. Accordingly, the left, respectively the right, side of the bath lift device corresponds to the left, respectively the right, side of Figures 5a and 10. The terms "upward", "downward", "rearward", "forward", "up" or "top", "down" or "bottom", "rear",

"front" follow the same rule.

[0010] In reference to Figures 1, 5a and 10, a bath lift device according the present invention is shown.

[0011] The bath lift device 10 of the present invention mainly includes a fixed part including chassis 11 adapted to rest, in use, on a floor of the bathtub and a moveable part including a seat plate 21 and a backrest 22 pivotally connected thereto, the movable part being moveable upward and downward relative to the fixed part via a lifting means. The chassis 11 is temporarily connected to the floor of the bathtub through suction cups 12 disposed underneath the chassis. The seat plate 21 is connected to the chassis 11 via a scissor-type guide mechanism 13, said mechanism comprising two pairs of support legs 131, 132, each leg being pivotally connected at a first end thereof to the chassis 11 and being slidably mounted at a second end thereof to the seat plate 22 inside a guide rail 111 of the chassis or, respectively, a guide rail 211 of the seat plate, said legs being pivotally connected at a mid-point to a pivot joint 133.

[0012] The lifting means comprises a driving means 23 arranged on the rear of the backrest 22 and a lifting member 24 that is actuated by the driving means. Without be bound by this specific solution, it will be advantageous to use a lifting means as described in the Canadian patent application CA 2 397 503. Accordingly, the lifting member 24 may advantageously be a telescopic tube including an outer tube 241 within which is received a linearly extendable inner tube 242, said outer tube 241 being fixedly connected to the backrest and said inner tube 242 being supported at its lower end by a bearing support 25 secured to the chassis. In a further embodiment of the present invention, the lifting member may be a toothed rack or a plurality of individual toothed rack segments articulated to one another. Such a lifting member has been described in the European patent EP 1 787 615 B1. Considering that the term "lifting member" used in the claims encompasses both above mentioned embodiments of the present invention, the meaning of the term "extension length of the lifting member" used in the claims may vary according to the embodiment. Therefore, when the lifting member is a telescopic tube, the term "extension length of the lifting member" corresponds to the difference between the length of the lifting member measured in the minimal extension thereof, as illustrated in Figure 2, and the length of the lifting member measured in the current extension thereof, as illustrated in Figure 1 for instance. On the other hand, when the lifting member is a toothed rack, the term "extension length of the lifting member" corresponds to the circumferential distance covered by the pinion, the teeth of which mesh with the teeth of the toothed rack, between the minimal extension of the toothed rack, as illustrated in Figure 2 of EP 1 787 615 B1, and the current extension of the toothed rack.

[0013] As shown in Figure 5a, the bath lift device 10 advantageously comprises two extension plates, respectively a left extension plate 21a and a right extension plate 21b, that are removably and/or pivotally connected

on both lateral ends of the seat plate 21, said extension plates 21a, 21b being configured to rest on the rim of the bathtub when the seat plate 21 is in its uppermost end position so that the user can easily sit inside the bath lift device 10. Therefore, when the seat plate is lowered, the extension plates 21a, 21b are folded up or withdrawn so as to permit the movement of the seat plate.

[0014] The position illustrated in Figure 1 corresponds to the uppermost end position of the seat plate 21, in which the height h_{max} between the plane P0 defined by the floor of the bathtub and the plane P1 defined by the seat plate is the greatest possible, corresponding to the maximal extension length of the lifting member. Furthermore, in this position, the backrest is in its upright rest position, corresponding to an angle α_1 between the plane P2 defined by the backrest and the plane P1 defined by the seat plate.

[0015] The position illustrated in Figure 2 corresponds to the lowermost end position of the seat plate 21, in which the height h_{min} between the plane P0 and the plane P1 is the lowest possible, corresponding to the minimal extension of the lifting member and to an extension length of the lifting member that is substantially equal to zero. In this position, the backrest 22 is in its upright rest position.

[0016] The position illustrated in Figure 3 corresponds to the rear rest position of the backrest, in which the angle α_2 between the plane P2 and the plane P1 is greater than the above mentioned angle α_1 . In this position, the seat plate 21 is in its lowermost end position.

[0017] The folded position illustrated in Figure 4 corresponds to the front rest position of the backrest, in which the plane P2 is substantially parallel to the plane P1 and close thereto. In this position, the seat plate 21 is in its lowermost end position. As shown in Figure 5b, the backrest 22 may advantageously be disconnected from the seat plate 21 in this folded position, permitting an easy removal of the bath lift device from the bath tub.

[0018] In reference to Figures 5b and 6a, connecting means permitting the pivot connection between the backrest 22 and the seat plate 21 are illustrated. Such connecting means consist in left and right tubular parts 216 provided in an upward and rearward orientated section 212 of the seat plate 21, said tubular parts being configured to be respectively received inside left and right hemitubular grooves 223 formed in left and right bottom end portions 222 of the backrest 22. Each bottom end portion 222 is also configured to be trapped inside an opening 214 of the seat plate 21 between a front face 215 of an upward and frontward orientated section 213 of the seat plate 21 and the corresponding tubular part 216, thus preventing the upward movement of the backrest relative to the seat plate.

[0019] As shown in Figure 6b, each bottom end portion 222 advantageously comprises a front bottom end 225 which is configured to abut against the section 212 of the seat plate when the backrest is in its rear rest position. In this position, a rear face 224 of the bottom end portion

222 is substantially parallel to the front face 215 of the section 213 of the seat plate and in contact therewith, thus maintaining the backrest in a relatively stable position.

[0020] As shown in Figure 6c, when the backrest 22 is in its front rest position, the bottom end portions are positioned substantially outside the opening 214, thus permitting the upward movement of the backrest relative to the seat plate.

[0021] Figure 7 illustrates a locking/release means 31 permitting to fixedly couple the backrest and the seat plate to one another when the seat plate is positioned at or above a specific height, thus preventing a pivoting movement of the backrest, and to release the backrest and the seat plate when the seat plate is positioned under said specific height, thus permitting a pivoting movement of the backrest. As explained in greater details in the following paragraphs, this specific height is reached when the lifting member 24 extends at a specific extension length. In the position shown in Figure 7, the lifting member 24 has been extended over said specific extension length. Therefore, the locking/release means 31 is positioned in a first locking position in which it prevents any pivoting movement between the backrest and the seat plate. To that end, the locking/release means 31 is configured as a locking lever pivotally connected to the backrest 22. The locking lever 31 comprises a hook portion 312 at a front bottom end thereof, said hook portion snapping into the seat plate 21, thus trapping a vertically orientated end 217 of the seat plate between a front vertical face 314 of the locking lever and a top end 315 of the hook portion 312. Thus positioned, the locking lever 31 immediately abuts against said vertically orientated end 217 when it pivots in the clockwise and counter-clockwise directions. As illustrated in Figure 7, the locking lever 31 comprises also a spring tongue 311 forward extended from a rear bottom end thereof, said spring tongue being adapted to slightly buckle when submitted to vertical constraints so as to move around the position shown in Figure 7. The function of this spring tongue 311 will be explained later. The locking lever 31 comprises also a bulged portion 313 protruding from the front vertical face 314 and positioned just above the vertically orientated end 217 in the first locking position thereof. The function of this bulged portion 313 will be explained later. Finally, the locking lever 31 comprises a nose-shaped end 316 which is positioned forward and below the vertically orientated end 217 in the first locking position thereof. The function of this nose-shaped end 316 will be explained later.

[0022] In the embodiment shown in Figures 8a to 8e, the locking/release means is configured as two locking levers 31a, 31b, respectively a left locking lever 31a and a right locking lever 31b, each locking lever being pivotally connected to a clamp element 32 which is fixedly connected to the backrest 22. The locking levers 31a, 31b have the same structure as the locking lever shown in Figure 7 and are positioned at both sides of the lifting

member 24 in their normal position of use as illustrated in Figures 5a and 5b. The upper end 317 of each locking lever 31a, 31b is respectively received inside a left or right U-shaped portion 32a, 32b of the clamp element 32, said U-shaped portion being provided with a through-hole 321 that is aligned with a corresponding through-hole 318 formed in said upper end 317 so as to lodge a bolt 33 inside said through-holes 318, 321, thus permitting the pivot connection between the locking levers 31a, 31b and the clamp element 32. Each locking lever 31a, 31b is provided with an housing 319 internally formed therein, the housing 319 being configured to partially receive a V-shaped leaf spring 34 such that said V-shaped leaf spring 34 is also partially received inside the central cavity 322 separating the two branches of the left or right U-shaped portion 32a, 32b. Thus, when the locking lever 31a or 31b is at rest, corresponding to the position illustrated in Figure 8e, a rear leg 34i and a front leg 34j thereof abut respectively against a rear end 319i and a front end 319j of the internal housing 319. As better explained in the following paragraphs, this rest position corresponds to the first locking position of the locking lever 31a or 31b. When the locking lever 31a or 31b pivots in the clockwise direction, as illustrated in Figure 8d, the front leg 34j still abuts against the front end 319j of the internal housing 319 but the rear leg 34i is pushed forward due to the contact between said rear leg 34i and an abutment 323 provided in the clamp element 32, said abutment 323 being now positioned forward with respect to the rear end 319i of the internal housing 319. Thus compressed, the leaf spring 34 tends to pivot the locking lever 31a or 31b in the counter-clockwise direction back to the rest position shown in Figure 8e. As better explained in the following paragraphs, the compressed position shown in Figure 8d may correspond to a second locking position of the locking levers 31a and 31b, in which the locking levers can not move forward relative to the backrest.

[0023] In reference Figures 9a to 9i, the successive manoeuvring steps permitting to transfer the backrest from its front rest position to its rear rest position and from its rear rest position to its upright rest position are shown.

[0024] In Figure 9a, the bath lift device 10 is in its folded position, the backrest 22 being in the front rest position thereof and the locking lever(s) 31 being in the rest position shown in Figure 8e. The bath lift device has been fixed to the floor of the bathtub through the suction cups 12. The lifting member 24 is positioned in its completely retracted state. In this configuration, a piston rod 243, which is fixedly connected at the lower end of the inner tube 242 of the lifting member 24, as shown in Figure 5b and 9a, is close to the spring tongue 311 of the locking lever(s) 31. This piston rod 243 is provided with a rib 244 protruding from a top face thereof, said rib being in close proximity to the spring tongue 311.

[0025] In Figure 9b, the backrest 22 has been manually moved rearward till the nose-shaped end 316 of the locking lever(s) 31 abuts against a top face 218 of the upward

and frontward orientated section 213 of the seat plate 21. Thus, the locking lever(s) 31 progressively pivots in the clockwise direction, which causes the compression of the leaf spring 34. Therefore, the movement of the backrest is relatively smooth from the position shown in Figure 9b to the position shown in Figure 9c, in which the nose-shaped end 316 reaches the junction between the top face 218 and the vertically orientated end 217. During this movement, the spring tongue 311 of the locking lever(s) 31 elastically deforms under the effect of compression caused by the rib 244 of the piston rod 243.

[0026] In Figure 9d, the backrest 22 has been further moved rearward till the nose-shaped end 316 abuts against the lower end of the vertically orientated end 217. During this movement, the spring tongue 311 elastically returns to a non-compressed state as soon as it is positioned behind the rib 244. As previously explained, the locking lever(s) 31 being forced to move forward under the action of the V-shaped leaf spring 34, the spring tongue 311 abuts against the rib 244, thus maintaining the locking lever(s) in the second locking position thereof.

[0027] In Figure 9e, the backrest 22 has been further moved rearward till the lower end of the inner tube 242 abuts against the bottom 253 of a central cavity formed inside the bearing support 25. As shown in Figure 9f, this bottom 253 defines a cam profile extending between a front face 251 and a rear face 252, said front and rear faces 251, 252 defining respectively a front and a rear abutments against which abuts the lower end of the inner tube 242 respectively in the rear rest position of the backrest and in the upright rest position thereof. Thus, in the position shown in Figure 9e, the lower end of the inner tube abutting against the front face 251, the backrest 22 is in its rear rest position. From this position, it is possible to manually tilt the backrest forward so that the backrest returns to its front rest position. Figure 9f illustrates an intermediate position of the backrest during the transfer of the backrest from its rear rest position and its front rest position. As shown, this transfer may be done because the locking lever(s) 31 is locked in its second locking position. Indeed, if the locking lever(s) was configured as in Figure 8e, the top end 315 of the hook portion 312 would abut against the seat plate 21, thus preventing the forward movement of the backrest.

[0028] In Figure 9g, the lifting member 24 extends under the action of the driving means. During this extension, the lower end of the inner tube 242 follows the cam profile defined by the bearing support 25, thus leading to a forward movement of the backrest 22. Furthermore, the locking lever(s) 31 being secured on the outer tube 241, the spring tongue 311 starts to move upward relative to the piston rod 243. Therefore, this spring tongue does not abut anymore against the rib 244 and the locking lever(s) 31 pivots counter-clockwise under the action of the leaf spring 34. In the position shown in Figure 9g, the bulged portion 313 of the locking lever(s) abuts against the vertically orientated end 217 of the seat plate 21.

[0029] In Figure 9h, the lifting member 24 has been

further extended until the lower end of the inner tube 242 abuts against the rear face 252 of the bearing support 25, thus configuring the backrest 22 in the upright rest position thereof. The front vertical face 314 of the locking lever(s) abuts against the vertically orientated end 217 of the seat plate 21 under the action of the leaf spring 34, which is substantially configured as in Figure 8e. Furthermore, the seat plate 21 starts to lift up.

[0030] In Figure 9i, the lifting member 24 has been further extended until the locking lever(s) 31 reaches the first locking position illustrated in Figure 7. In this position, the leaf spring 34 is configured as in Figure 8e. Advantageously, the specific extension length of the lifting member from which the locking lever(s) is in its first locking position may correspond substantially to a third of the maximal extension length of said lifting member. Any further extension of the lifting member 24 from this specific extension length leads to a concomitant lifting of the backrest 22 and the seat plate 21 and the impossibility to tilt the backrest 22 relative to the seat plate 21. Furthermore, in this first locking position, the locking lever(s) 31 prevents the lifting member 24 from being damaged by the bending constraints applied by the user. Indeed, the user load applied to the seat plate 21 causes bending constraints on the lifting member 24 that may be very problematic as the lifting member 24 extends, the overlap between the outer tube 241 and the inner tube 242 getting smaller and smaller. By blocking the movement of the backrest, the locking lever(s) relieves the lifting member from the load applied by the user, thus reducing the risk of breakage of the lifting member.

Claims

1. Bath lift device (10) for raising and lowering persons into or out of a bathtub comprising:
 - a chassis (11) to rest on a portion of the bath tub;
 - a seat plate (21) and a backrest (22) pivotally connected thereto, said backrest being pivotally movable relative to said seat plate between three rest positions, i.e. an upright rest position, corresponding to the normal position of use, a rear rest position, in which the backrest is positioned rearward relative to the upright rest position, and a front rest position, in which the backrest is positioned forward relative to the upright position;
 - a lifting means for adjusting the height of the seat plate (21) between a lowermost end position and an uppermost end position, the lifting means comprising a driving means (23) mounted to the backrest (22) and a lifting member (24) to be actuated by the driving means (23);
 - a bearing support (25) secured to the chassis (11) and provided with a cam profile (253) in

- which a lower end of the lifting member (24) is engaged so as to permit the movement of the backrest (22) between the rear rest position and the upright rest position;
- at least one locking lever (31), that is pivotally connected to the backrest (22), said locking lever being adapted to define at least one first locking position, in which the locking lever (31) prevents a pivoting movement of the backrest (22) relative to the seat plate (21) in the upright rest position of the backrest (22) when the lifting member (24) extends over a specific extension length and permits said pivoting movement when the lifting member (24) is retracted under said specific extension length.
2. Bath lift device (10) according to claim 1, wherein the locking lever (31) is adapted to define at least one second locking position, in which the locking lever (31) can not move forward relative to the backrest (22).
 3. Bath lift device (10) according to claim 2, wherein the locking lever (31) comprises a spring tongue (311) that is adapted to abut against a rib (244) of a piston rod (243) which is fixedly connected at the lower end of the lifting member (24) when the locking lever (31) is in the second locking position.
 4. Bath lift device (10) according to any one of the preceding claims, wherein the locking lever (31) comprises a hook portion (312) that can snap into the seat plate (21) in the first locking position of the locking lever.
 5. Bath lift device (10) according to claim 4, wherein the hook portion (312) comprises a nose-shaped end (316), which temporarily abuts against the seat plate (21) during the movement of the backrest (22) between the front rest position and the rear rest position, thus permitting a smooth transfer of the backrest.
 6. Bath lift device (10) according to any one of the preceding claims, wherein the locking lever (31) comprises a bulged portion (313), which temporarily abuts against the seat plate (21) during the movement of the backrest between the rear rest position and the upright rest position, thus gradually transferring the locking lever (31) from the second locking position thereof to the first locking position thereof.
 7. Bath lift device (10) according to any one of the preceding claims, wherein the locking lever (31) is forced moving toward the first locking position under the action of a V-shaped leaf spring (34) that is partially lodged inside an internal housing (319) of the locking lever (31).
 8. Bath lift device (10) according to claim 7, wherein the leaf spring (34) has a front leg (34j) and a rear leg (34i), said front leg, respectively said rear leg, abutting against a front end (319j), respectively a rear end (319i), of the internal housing (319) when the locking lever (31) is configured as in the first locking position thereof and said rear leg (319i) abutting against an abutment (323) provided in a clamp element (32), which is fixedly connected to the backrest (22) and to which is pivotally connected the locking lever (31), when the locking lever (31) is configured differently as in the first locking position thereof.
 9. Bath lift device (10) according to any one of the preceding claims, wherein the lifting member (24) is a telescopic tube including an outer tube (241) within which is received a linearly extendable inner tube (242), said outer tube (241) being fixedly connected to the backrest (22) and said inner tube (242) being supported at its lower end by the bearing support (25).
 10. Bath lift device (10) according to any one of claims 1 to 8, wherein the lifting member (24) is a toothed rack or a plurality of individual toothed rack segments articulated to one another.
 11. Bath lift device (10) according to any one of the preceding claims, wherein suction cups (12) are disposed underneath the chassis (11) so as to temporarily connect the chassis to the floor of the bathtub.
 12. Bath lift device (10) according to any one of the preceding claims, wherein the seat plate (21) is connected to the chassis (11) via two pairs of support legs (131, 132), each leg being pivotally connected at a first end thereof to the chassis (11) and being slidably mounted at a second end thereof to the seat plate (21), said legs being pivotally connected at a mid-point to a pivot joint (133).
 13. Bath lift device (10) according to any one of the preceding claims, comprising two locking levers (31a, 31b), respectively a left locking lever (31a) and a right locking lever (31b), an upper end (317) of the left, respectively the right, locking lever (31a, 31b) being received inside a left, respectively a right, U-shaped portion (32a, 32b) of a clamp element (32) which is fixedly connected to the backrest (22), said left, respectively said right, U-shaped portion (32a, 32b) being provided with a through-hole (321) that is aligned with a corresponding through-hole (318) formed in said upper end (317) so as to lodge a bolt (33) inside said through-holes (318, 321), thus permitting the pivot connection between the locking levers and the clamp element.
 14. Bath lift device (10) according to any one of the pre-

ceding claims, wherein the cam profile (253) of the bearing support (25) extends between a front face (251) and a rear face (252), said front face (251) defining a front abutment against which abuts the lower end of the lifting member (24) when the backrest (22) is in its rear rest position and said rear face (252) defining a rear abutment against which abuts said lower end when the backrest (22) is in its upright rest position.

15. Bath lift device (10) according to any one of the preceding claims, wherein the specific extension length of the lifting member (24) above which the pivot movement of the backrest (22) relative to the seat plate (21) is prevented corresponds substantially to a third of the maximal extension length of said lifting member (24).

Patentansprüche

1. Badehebevorrichtung (10) zum Anheben und Absenken von Personen in eine oder aus einer Badewanne, aufweisend:

- ein Gestell (11), das auf einem Teil der Badewanne liegt;
- eine Sitzplatte (21) und eine Rückenlehne (22), die schwenkbar mit dieser verbunden ist, wobei die Rückenlehne relativ zu der Sitzplatte zwischen drei Ruhepositionen schwenkbar bewegbar ist, d. h. einer aufrechten Ruheposition, die der normalen Verwendungsposition entspricht, einer hinteren Ruheposition, in der die Rückenlehne relativ zu der aufrechten Ruheposition nach hinten positioniert ist, und einer vorderen Ruheposition, in der die Rückenlehne relativ zu der aufrechten Ruheposition nach vorne positioniert ist;
- ein Hebemittel zum Einstellen der Höhe der Sitzplatte (21) zwischen einer untersten Endposition und einer obersten Endposition, wobei das Hebemittel ein Antriebsmittel (23), das an der Rückenlehne (22) montiert ist, und ein Hebeelement (24), das durch das Antriebsmittel (23) betätigt wird, aufweist;
- einen Lagerträger (25), der an dem Gestell (11) gesichert ist und mit einem Nockenprofil (253) versehen ist, in das ein unteres Ende des Hebeelements (24) einrastet, sodass die Bewegung der Rückenlehne (22) zwischen der hinteren Ruheposition und der aufrechten Ruheposition möglich ist;
- mindestens einen Verriegelungshebel (31), der schwenkbar mit der Rückenlehne (22) verbunden ist, wobei der Verriegelungshebel ausgebildet ist, mindestens eine erste Verriegelungsposition zu definieren, in der der Verriegelungshebel (31) eine Schwenkbewegung der Rückenlehne (22) relativ zu der Sitzplatte (21) in der aufrechten Ruheposition der Rückenlehne (22) verhindert, wenn sich das Hebeelement (24) über eine bestimmte Auszugslänge erstreckt, und die Schwenkbewegung zulässt, wenn das Hebeelement (24) unter die bestimmte Auszugslänge zurückgezogen wird.

lunge (24) über eine bestimmte Auszugslänge erstreckt, und die Schwenkbewegung zulässt, wenn das Hebeelement (24) unter die bestimmte Auszugslänge zurückgezogen wird.

2. Badehebevorrichtung (10) nach Anspruch 1, wobei der Verriegelungshebel (31) ausgebildet ist, mindestens eine zweite Verriegelungsposition zu definieren, in der sich der Verriegelungshebel (31) nicht relativ zur Rückenlehne (22) nach vorne bewegen kann.
3. Badehebevorrichtung (10) nach Anspruch 2, wobei der Verriegelungshebel (31) eine Federzunge (311) aufweist, die ausgebildet ist, gegen eine Rippe (244) einer Kolbenstange (243) zu liegen, die fest am unteren Ende des Hebeelements (24) verbunden ist, wenn sich der Verriegelungshebel (31) in der zweiten Position befindet.
4. Badehebevorrichtung (10) nach einem der vorangehenden Ansprüche, wobei der Verriegelungshebel (31) ein Hakenteil (312) aufweist, das in der ersten Verriegelungsposition des Verriegelungshebels in die Sitzplatte (21) einschnappen kann.
5. Badehebevorrichtung (10) nach Anspruch 4, wobei das Hakenteil (312) ein nasenförmiges Ende (316) aufweist, das während der Bewegung der Rückenlehne (22) zwischen der vorderen Ruheposition und der hinteren Ruheposition vorübergehend gegen die Sitzplatte (21) liegt, wodurch ein reibungsloses Verstellen der Rückenlehne möglich ist.
6. Badehebevorrichtung (10) nach einem der vorangehenden Ansprüche, wobei der Verriegelungshebel (31) ein Wölbungsteil (313) aufweist, das während der Bewegung der Rückenlehne (22) zwischen der hinteren Ruheposition und der aufrechten Ruheposition vorübergehend gegen die Sitzplatte (21) liegt, wodurch der Verriegelungshebel (31) allmählich aus seiner zweiten Verriegelungsposition in seine erste Verriegelungsposition verstellt wird.
7. Badehebevorrichtung (10) nach einem der vorangehenden Ansprüche, wobei der Verriegelungshebel (31) unter der Wirkung einer V-förmigen Blattfeder (34), die teilweise in einem Innengehäuse (319) des Verriegelungshebels (31) aufgenommen ist, zwangsweise in die erste Verriegelungsposition bewegt wird.
8. Badehebevorrichtung (10) nach Anspruch 7, wobei die Blattfeder (34) einen vorderen Schenkel (34j) und

einen hinteren Schenkel (34i) hat, wobei der vordere Schenkel, beziehungsweise der hintere Schenkel, gegen ein vorderes Ende (319j) beziehungsweise ein hinteres Ende (319i) des Innengehäuses (319) liegt, wenn der Verriegelungshebel (31) in seiner ersten Verriegelungsposition konfiguriert ist, und der hintere Schenkel (319i) gegen eine Auflage (323) liegt, die in einem Klemmelement (32) vorgesehen ist, das fest mit der Rückenlehne (22) verbunden ist und mit dem der Verriegelungshebel (31) schwenkbar verbunden ist, wenn der Verriegelungshebel (31) anders als in seiner ersten Verriegelungsposition konfiguriert ist.

9. Badehebevorrichtung (10) nach einem der vorangehenden Ansprüche, wobei das Hebeelement (24) ein teleskopisches Rohr ist, das ein Außenrohr (241) enthält, in dem ein linear ausrückbares Innenrohr (242) aufgenommen ist, wobei das Außenrohr (241) fest mit der Rückenlehne (22) verbunden ist und das Innenrohr (242) an seinem unteren Ende durch den Lagerträger (25) gestützt ist.
10. Badehebevorrichtung (10) nach einem der Ansprüche 1 bis 8, wobei das Hebeelement (24) eine Zahnstange oder eine Vielzahl einzelner Zahnstangensegmente ist, die aneinander angelenkt sind.
11. Badehebevorrichtung (10) nach einem der vorangehenden Ansprüche, wobei Saugnäpfe (12) unterhalb des Gestells (11) angeordnet sind, um das Gestell vorübergehend mit dem Boden der Badewanne zu verbinden.
12. Badehebevorrichtung (10) nach einem der vorangehenden Ansprüche, wobei die Sitzplatte (21) mit dem Gestell (11) über zwei Paare von Stützbeinen (131, 132) verbunden ist, wobei jedes Bein an seinem ersten Ende schwenkbar mit dem Gestell (11) verbunden ist und an seinem zweiten Ende gleitfähig an der Sitzplatte (21) montiert ist, wobei die Beine an einem Mittelpunkt mit einem Drehgelenk (133) schwenkbar verbunden sind.
13. Badehebevorrichtung (10) nach einem der vorangehenden Ansprüche, aufweisend zwei Verriegelungshebel (31a, 31b), einen linken Verriegelungshebel (31a) beziehungsweise einen rechten Verriegelungshebel (31b), wobei ein oberes Ende (317) des linken beziehungsweise des rechten Verriegelungshebels (31a, 31b) in einem linken beziehungsweise rechten U-förmigen Teil (32a, 32b) eines Klemmelements (32) aufgenommen ist, das fest mit der Rückenlehne (22) verbunden ist, wobei das linke beziehungsweise rechte U-förmige Teil (32a, 32b) mit einem Durchgangsloch (321) versehen ist, das mit einem entsprechenden Durchgangsloch (318) ausgerichtet ist, das im oberen Ende (317) gebildet ist,

um so eine Schraube (33) im Inneren der Durchgangslöcher (318, 321) aufzunehmen, wodurch die Schwenkverbindung zwischen den Verriegelungshebeln und dem Klemmelement möglich ist.

14. Badehebevorrichtung (10) nach einem der vorangehenden Ansprüche, wobei sich das Nockenprofil (253) des Lagerträgers (25) zwischen einer Vorderfläche (251) und einer Rückfläche (252) erstreckt, wobei die Vorderfläche (251) eine vordere Auflage definiert, gegen die das untere Ende des Hebeelements (24) liegt, wenn sich die Rückenlehne (22) in ihrer hinteren Ruheposition befindet, und die Rückfläche (252) eine hintere Auflage definiert, gegen die das untere Ende wenn sich die Rückenlehne (22) in ihrer aufrechten Ruheposition befindet.
15. Badehebevorrichtung (10) nach einem der vorangehenden Ansprüche, wobei die bestimmte Auszugslänge des Hebeelements (24) über der die Schwenkbewegung der Rückenlehne (22) relativ zur Sitzplatte (21) verhindert ist, im Wesentlichen einem Drittel der maximalen Auszugslänge des Hebeelements (24) entspricht.

Revendications

1. Dispositif de levage pour baignoire (10) servant à lever et descendre des personnes dans une baignoire et hors de celle-ci comprenant :
 - un châssis (11) destiné à reposer sur une partie de la baignoire ;
 - une plaque d'assise (21) et un dossier (22) raccordés de manière pivotante, ledit dossier étant apte à être déplacé de manière pivotante par rapport à ladite plaque d'assise entre trois positions d'arrêt, c'est-à-dire une position d'arrêt verticale, correspondant à la position normale d'utilisation, une position d'arrêt arrière, dans laquelle le dossier est positionné vers l'arrière par rapport à la position d'arrêt verticale, et une position d'arrêt avant, dans laquelle le dossier est positionné vers l'avant par rapport à la position verticale ;
 - un moyen de levage servant à régler la hauteur de la plaque d'assise (21) entre une position extrême inférieure et une position extrême supérieure, le moyen de levage comprenant un moyen d'entraînement (23) installé sur le dossier (22) et un organe de levage (24) destiné à être actionné par le moyen d'entraînement (23) ;
 - un support d'appui (25) fixé au châssis (11) et pourvu d'un profil à effet de came (253) dans lequel une extrémité inférieure de l'organe de levage (24) est logée de façon à permettre le déplacement du dossier (22) entre la position

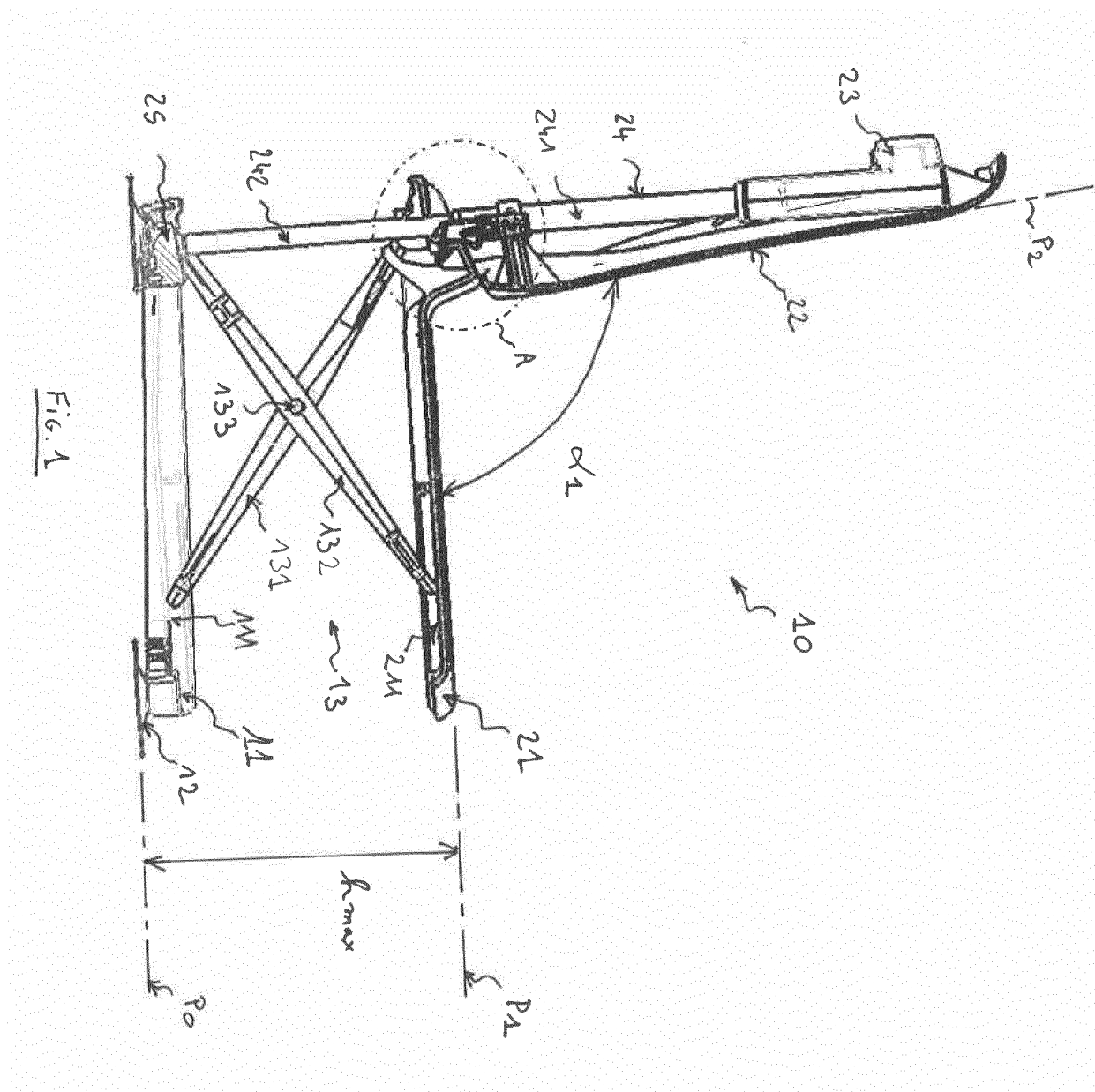
- d'arrêt arrière et la position d'arrêt verticale ;
 - au moins un levier de blocage (31), qui est raccordé de manière pivotante au dossier (22), ledit levier de blocage étant conçu pour définir au moins une première position de blocage, dans laquelle le levier de blocage (31) empêche un mouvement de pivotement du dossier (22) par rapport à la plaque d'assise (21) dans la position d'arrêt verticale du dossier (22) lorsque l'organe de levage (24) s'étend sur une longueur d'extension spécifique et permet ledit mouvement de pivotement lorsque l'organe de levage (24) est rétracté à une longueur inférieure à ladite longueur d'extension spécifique.
2. Dispositif de levage pour baignoire (10) selon la revendication 1, dans lequel le levier de blocage (31) est conçu pour définir au moins une deuxième position de blocage, dans laquelle le levier de blocage (31) ne peut pas se déplacer vers l'avant par rapport au dossier (22).
 3. Dispositif de levage pour baignoire (10) selon la revendication 2, dans lequel le levier de blocage (31) comprend une languette élastique (311) qui est conçue pour venir en appui contre une nervure (244) d'une tige de piston (243) qui est raccordée de manière fixe à l'extrémité inférieure de l'organe de levage (24) lorsque le levier de blocage (31) se trouve dans la deuxième position de blocage.
 4. Dispositif de levage pour baignoire (10) selon l'une quelconque des revendications précédentes, dans lequel le levier de blocage (31) comprend une partie formant crochet (312) qui peut s'emboîter dans la plaque d'assise (21) dans la première position de blocage du levier de blocage.
 5. Dispositif de levage pour baignoire (10) selon la revendication 4, dans lequel la partie formant crochet (312) comprend une extrémité en forme de nez (316), qui vient temporairement en appui contre la plaque d'assise (21) au cours du déplacement du dossier (22) entre la position d'arrêt avant et la position d'arrêt arrière, de façon à permettre ainsi un transfert fluide du dossier.
 6. Dispositif de levage pour baignoire (10) selon l'une quelconque des revendications précédentes, dans lequel le levier de blocage (31) comprend une partie saillante (313), qui vient temporairement en appui contre la plaque d'assise (21) au cours du déplacement du dossier entre la position d'arrêt arrière et la position d'arrêt verticale, de façon à transférer ainsi graduellement le levier de blocage (31) de sa deuxième position de blocage à sa première position de blocage.
 7. Dispositif de levage pour baignoire (10) selon l'une quelconque des revendications précédentes, dans lequel le levier de blocage (31) est déplacé de force en direction de la première position de blocage sous l'action d'un ressort à lame (34) en forme de V qui est partiellement inséré à l'intérieur d'un logement intérieur (319) du levier de blocage (31).
 8. Dispositif de levage pour baignoire (10) selon la revendication 7, dans lequel le ressort à lame (34) comporte une patte avant (34j) et une patte arrière (34i), ladite patte avant, respectivement ladite patte arrière, venant en appui contre une extrémité avant (319j), respectivement une extrémité arrière (319i), du logement intérieur (319) lorsque le levier de blocage (31) est configuré comme dans sa première position de blocage et ladite patte arrière (319i) venant en appui contre une butée (323) prévue dans un élément de serrage (32), qui est raccordé de manière fixe au dossier (22) et auquel est raccordé de manière pivotante le levier de blocage (31), lorsque le levier de blocage (31) est configuré différemment de sa première position de blocage.
 9. Dispositif de levage pour baignoire (10) selon l'une quelconque des revendications précédentes, dans lequel l'organe de levage (24) est un tube télescopique comprenant un tube extérieur (241) à l'intérieur duquel est reçu un tube intérieur (242) extensible de manière linéaire, ledit tube extérieur (241) étant raccordé de manière fixe au dossier (22) et ledit tube intérieur (242) étant supporté au niveau de son extrémité inférieure par le support d'appui (25).
 10. Dispositif de levage pour baignoire (10) selon l'une quelconque des revendications 1 à 8, dans lequel l'organe de levage (24) est une crémaillère ou une pluralité de segments de crémaillère individuels articulés les uns aux autres.
 11. Dispositif de levage pour baignoire (10) selon l'une quelconque des revendications précédentes, dans lequel des ventouses (12) sont disposées sous le châssis (11) de façon à raccorder temporairement le châssis au fond de la baignoire.
 12. Dispositif de levage pour baignoire (10) selon l'une quelconque des revendications précédentes, dans lequel la plaque d'assise (21) est raccordée au châssis (11) par le biais de deux paires de pieds de support (131, 132), chaque pied étant raccordé de manière pivotante à sa première extrémité au châssis (11) et étant monté de manière coulissante à sa seconde extrémité sur la plaque d'assise (21), lesdits pieds étant raccordés de manière pivotante au niveau d'un point médian à un organe de liaison pivot (133).

13. Dispositif de levage pour baignoire (10) selon l'une quelconque des revendications précédentes, comprenant deux leviers de blocage (31a, 31b), respectivement un levier de blocage gauche (31a) et un levier de blocage droit (31b), une extrémité supérieure (317) du levier de blocage gauche (31a), respectivement du levier de blocage droit (31b), étant reçue à l'intérieur d'une partie en forme de U gauche (32a), respectivement d'une partie en forme de U droite (32b), d'un élément de serrage (32) qui est raccordé de manière fixe au dossier (22), ladite partie en forme de U gauche (32a), respectivement ladite partie en forme de U droite (32b), étant pourvue d'un trou traversant (321) qui est aligné avec un trou traversant (318) correspondant formé dans ladite extrémité supérieure (317) à des fins d'insertion d'un boulon (33) à l'intérieur desdits trous traversants (318, 321), de façon à permettre ainsi la liaison pivot entre les leviers de blocage et l'élément de serrage.
14. Dispositif de levage pour baignoire (10) selon l'une quelconque des revendications précédentes, dans lequel le profil à effet de came (253) du support d'appui (25) s'étend entre une face avant (251) et une face arrière (252), ladite face avant (251) définissant une butée avant contre laquelle l'extrémité inférieure de l'organe de levage (24) vient en appui lorsque le dossier (22) se trouve dans sa position d'arrêt arrière et ladite face arrière (252) définissant une butée arrière contre laquelle ladite extrémité inférieure vient en appui lorsque le dossier (22) se trouve dans sa position d'arrêt verticale.
15. Dispositif de levage pour baignoire (10) selon l'une quelconque des revendications précédentes, dans lequel la longueur d'extension spécifique de l'organe de levage (24) au-dessus de laquelle le mouvement de pivotement du dossier (22) par rapport à la plaque d'assise (21) est bloqué correspond essentiellement à un tiers de la longueur d'extension maximale dudit organe de levage (24).

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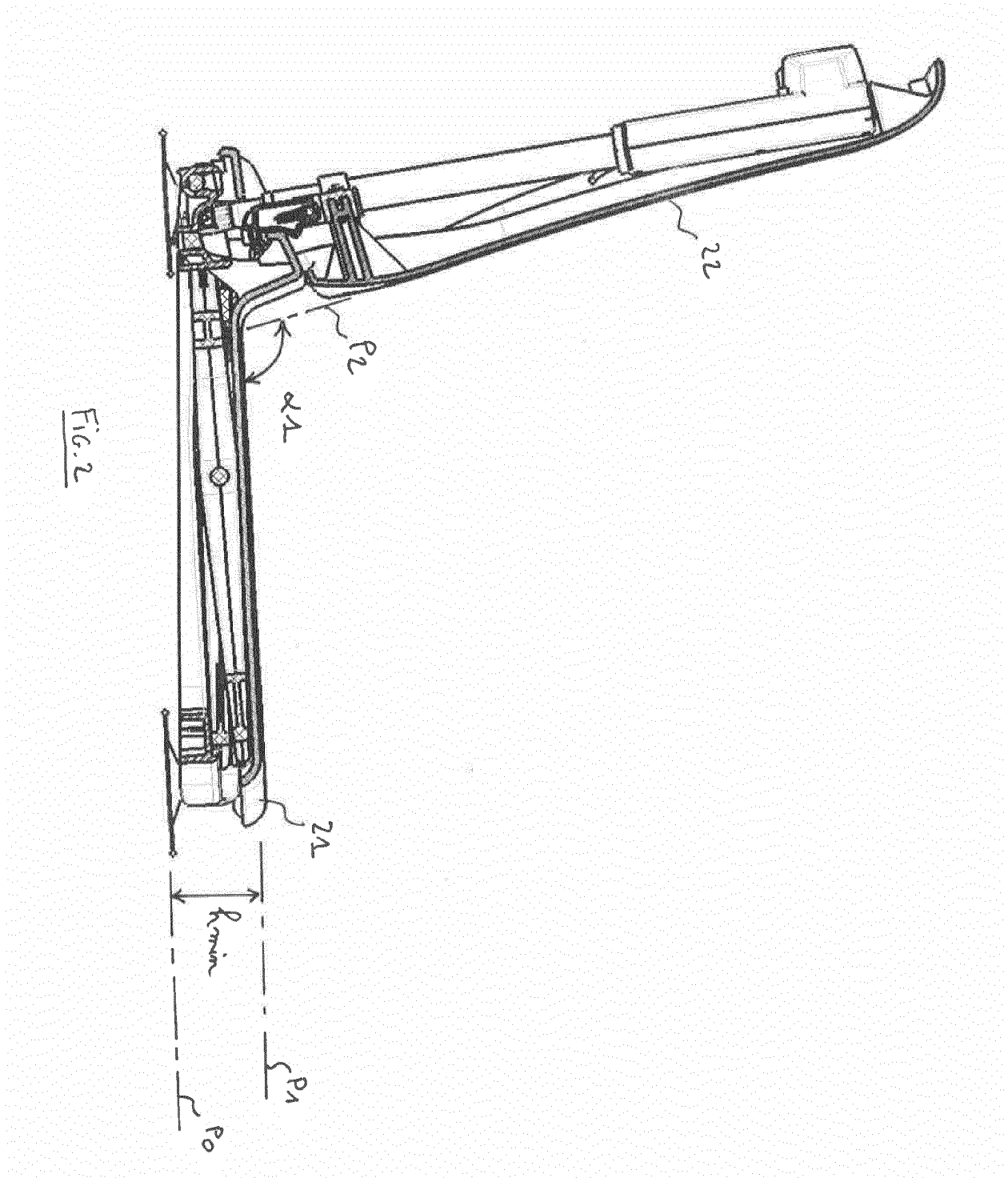


Fig. 3

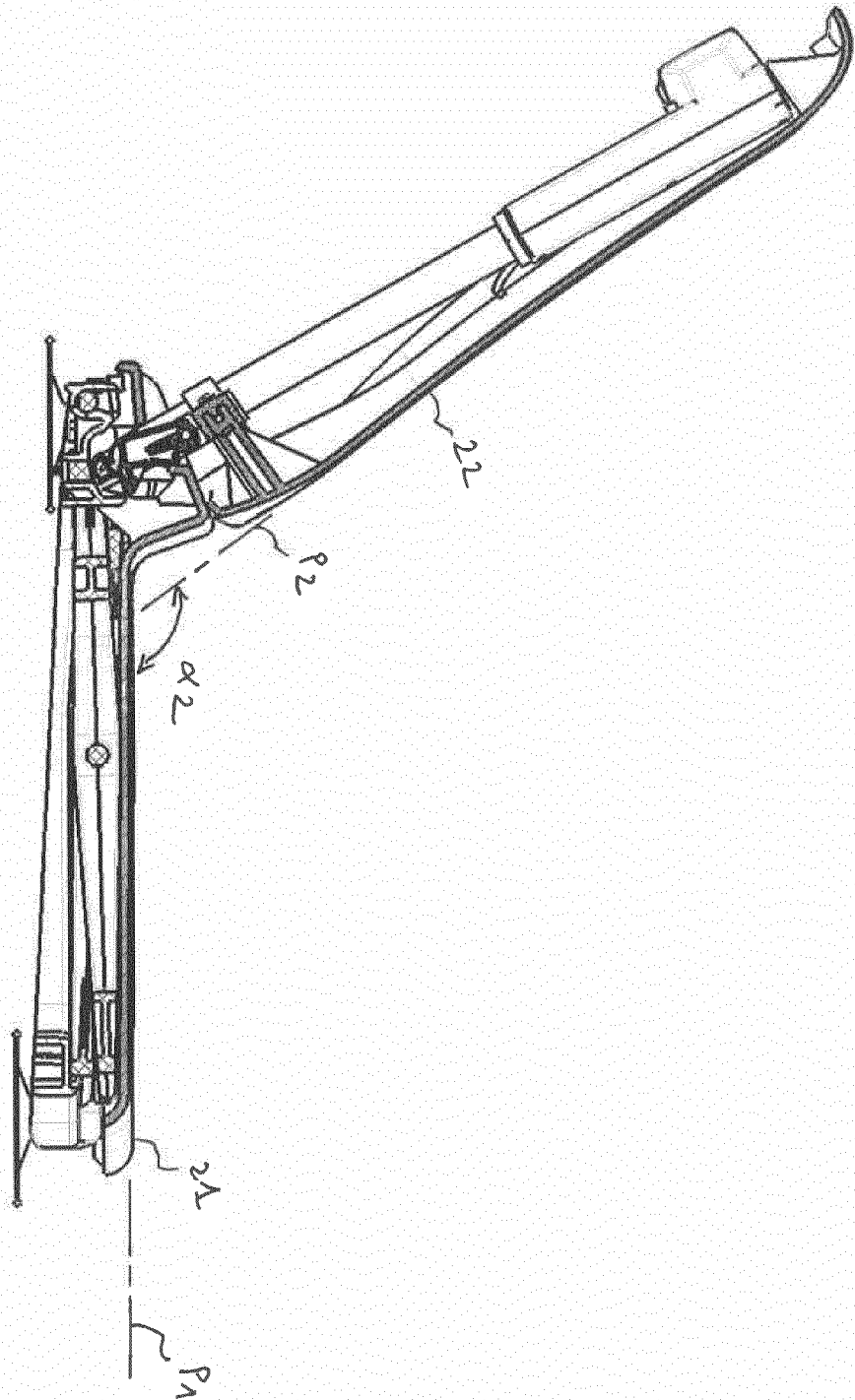
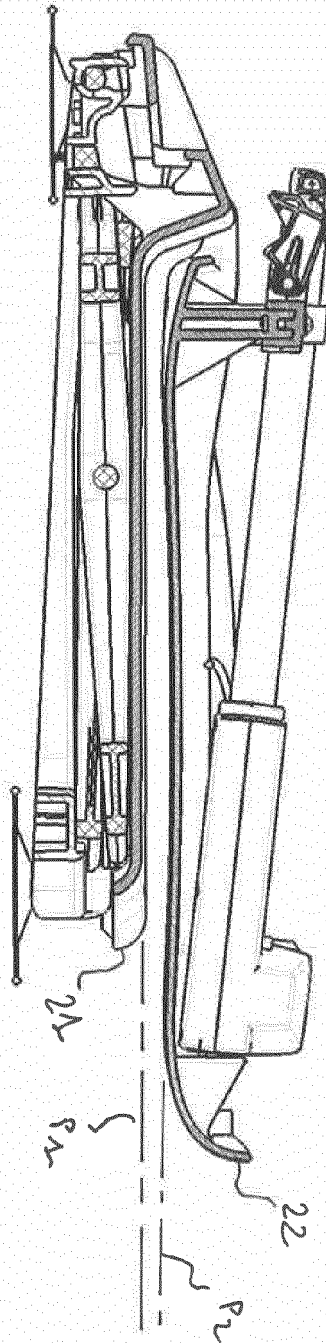
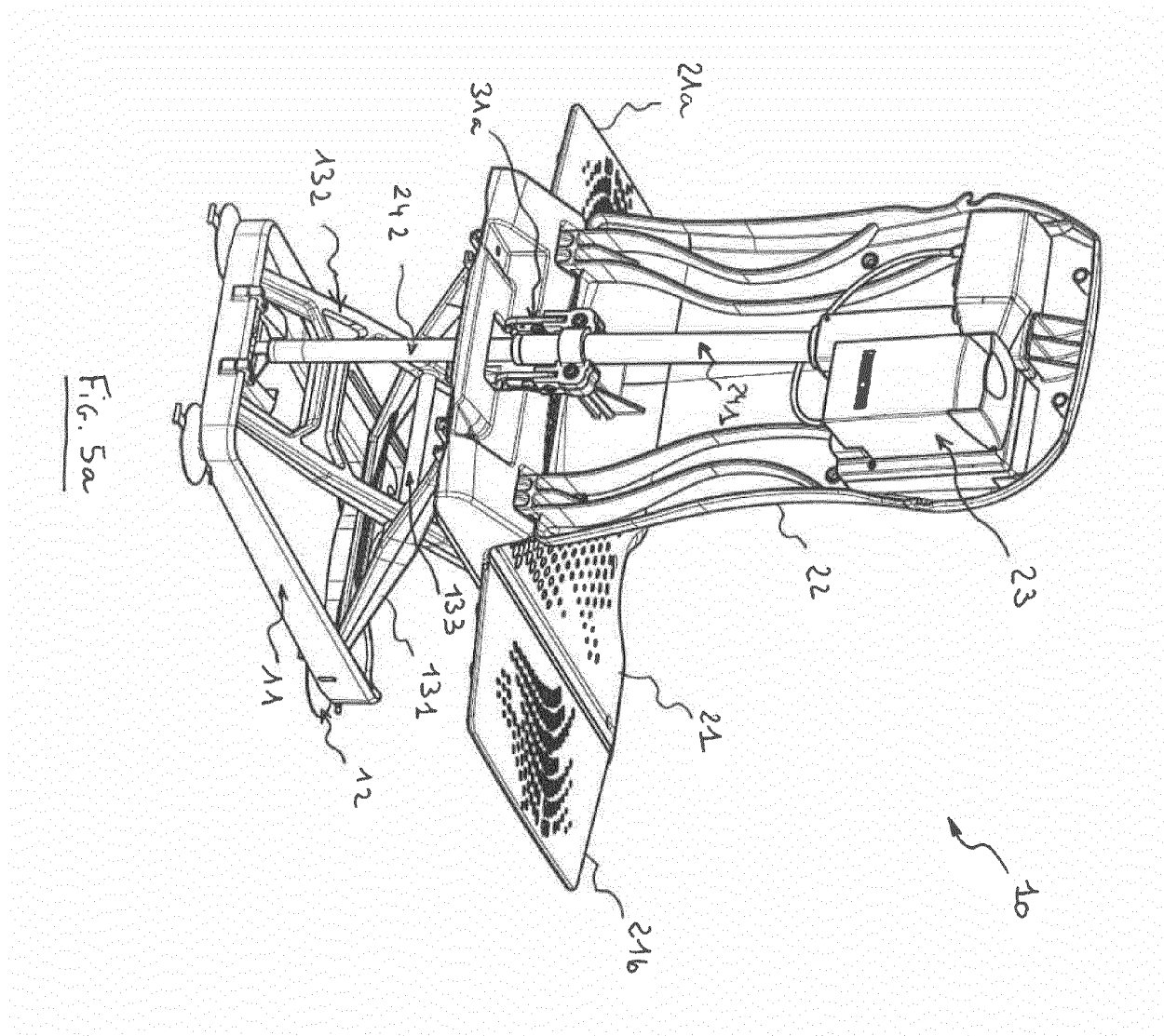
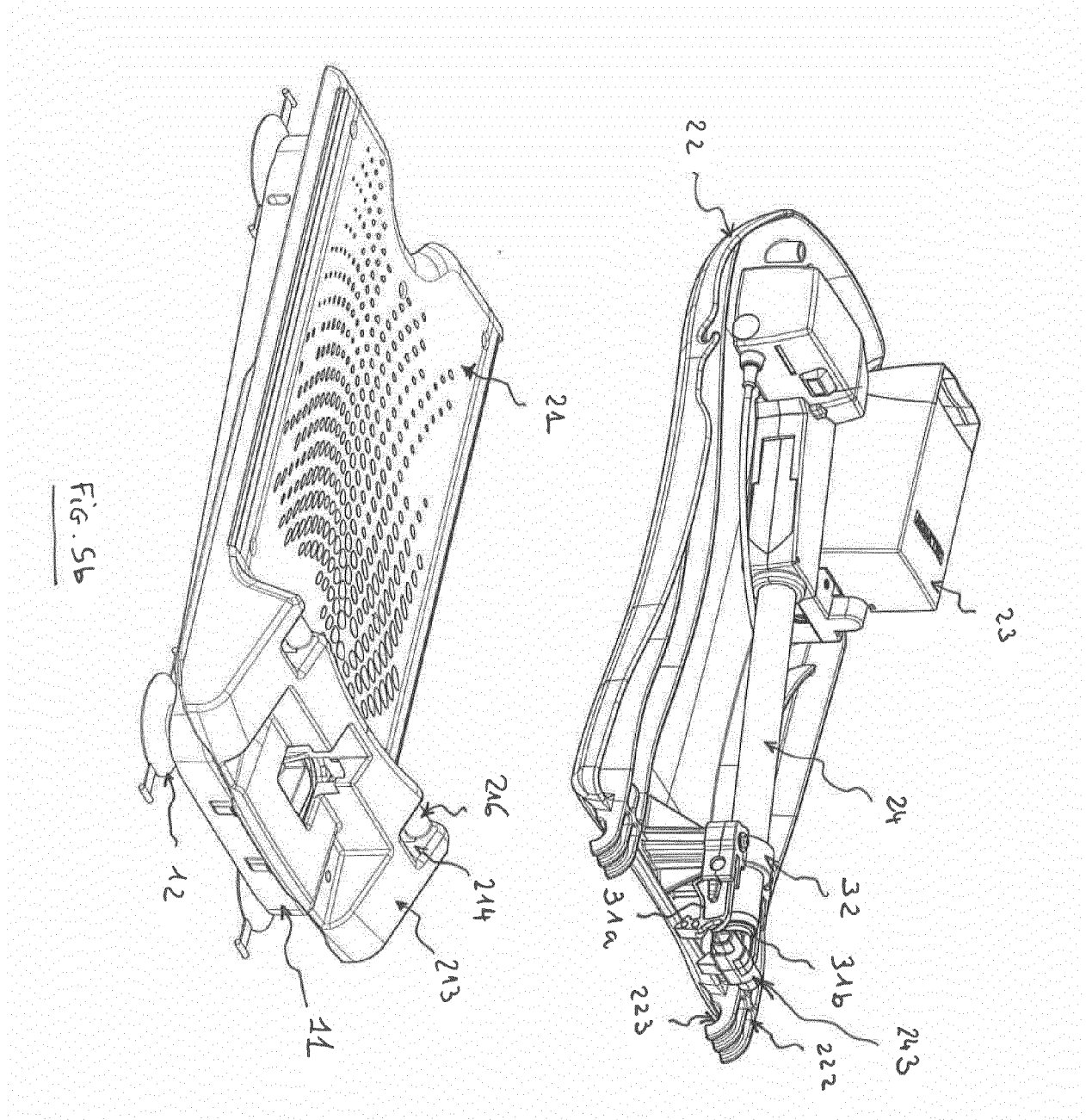
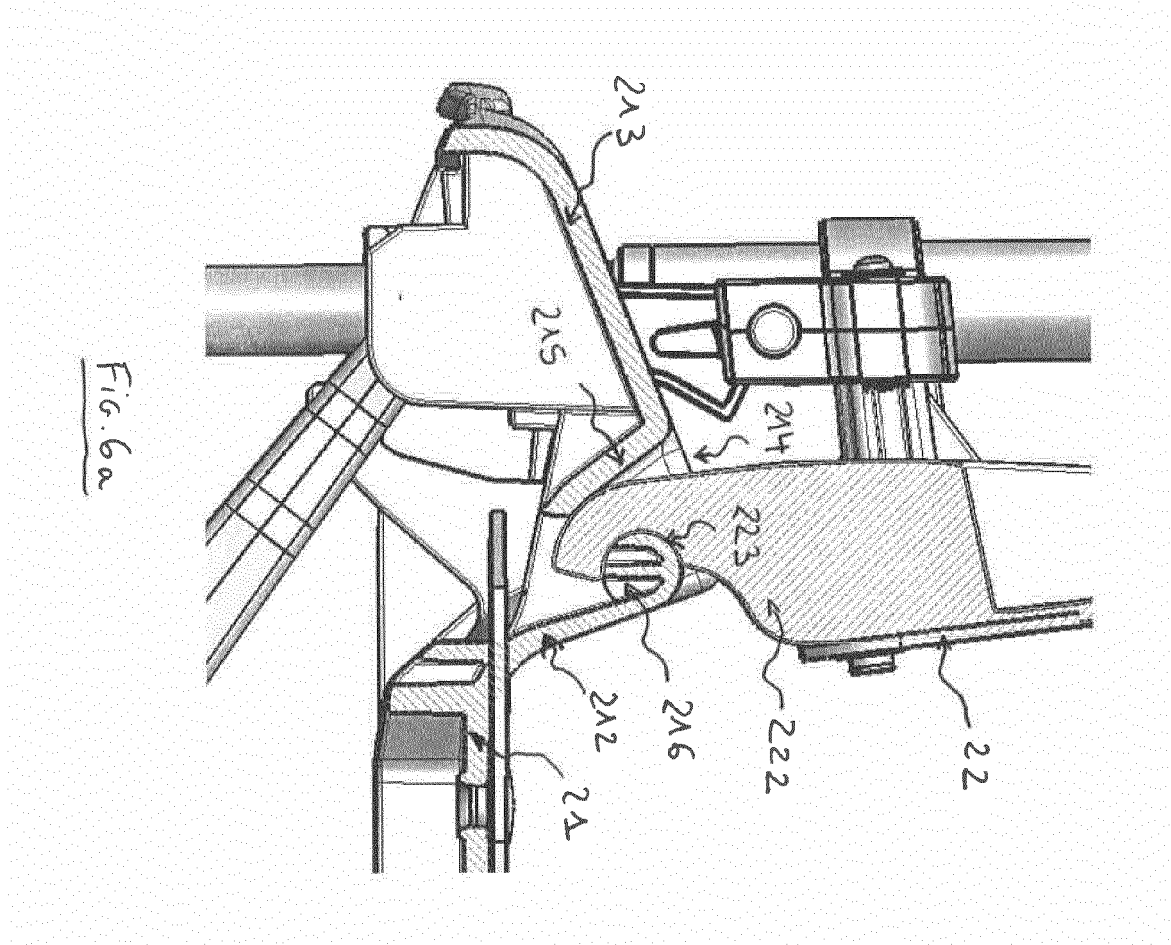


Fig. 4









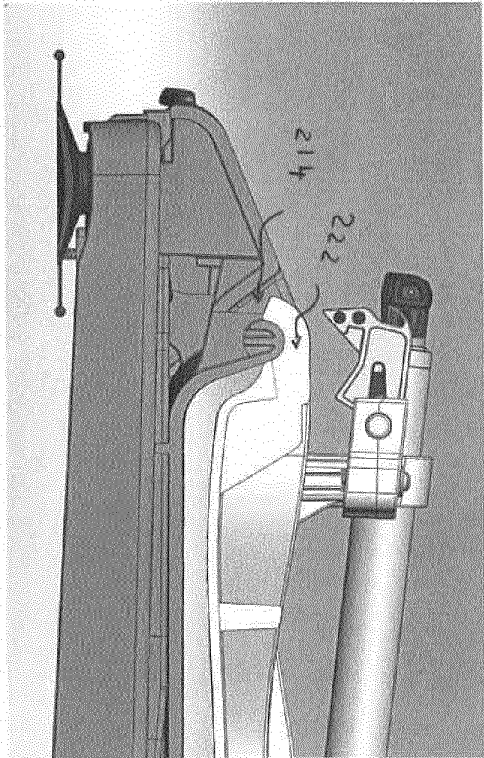


Fig. 6c

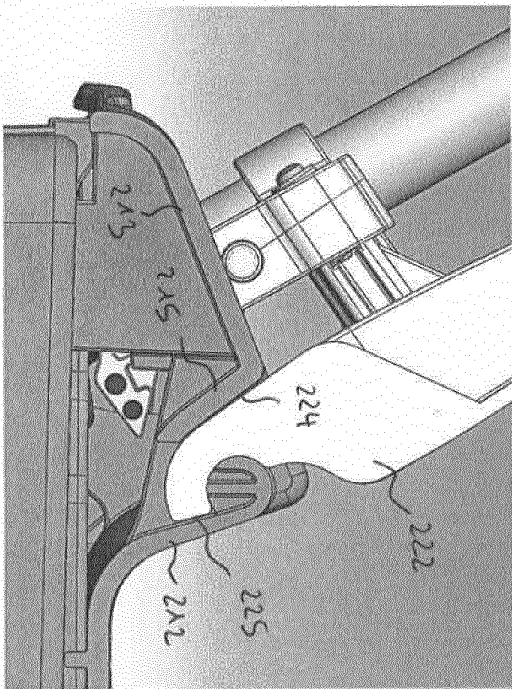
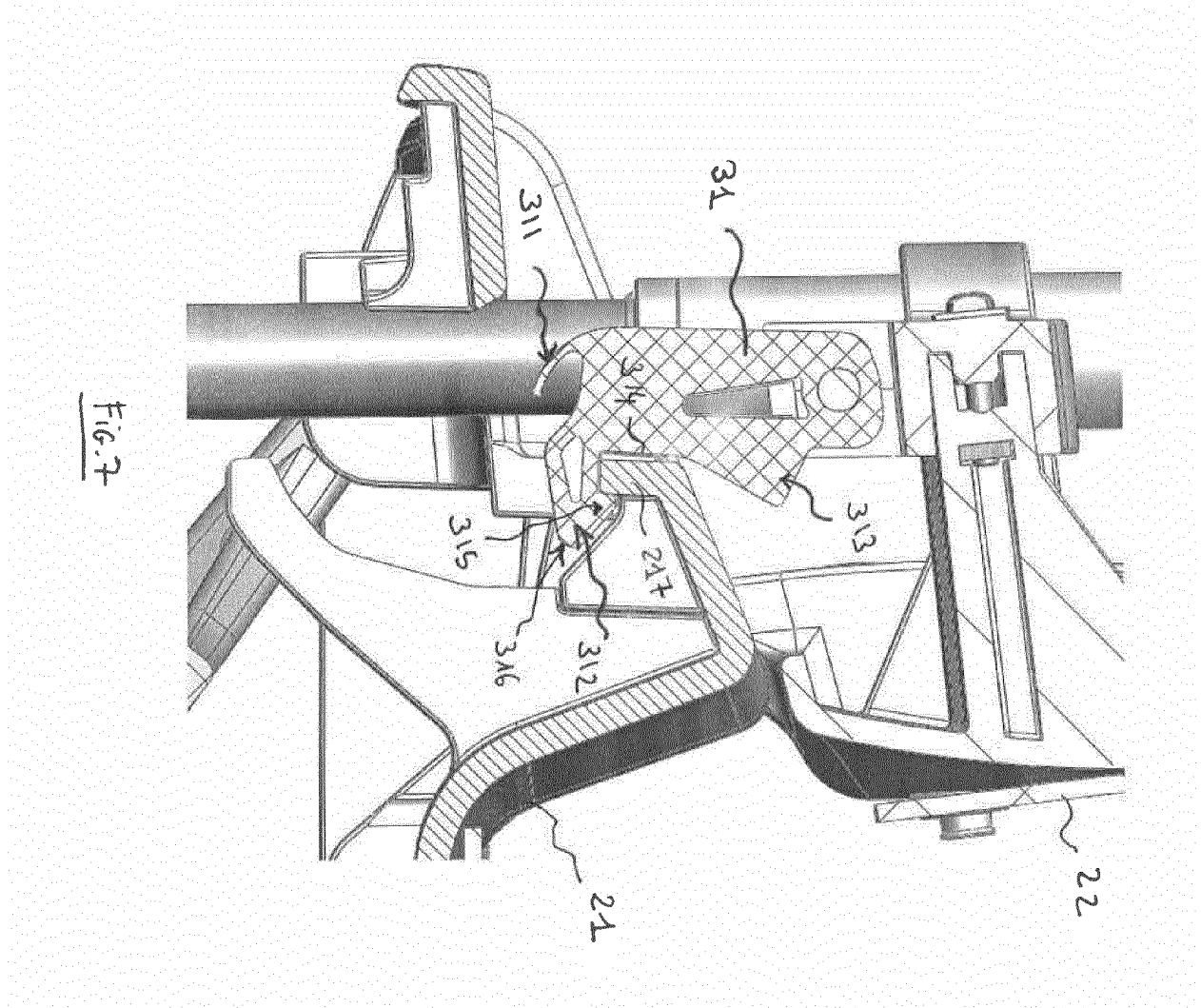


Fig. 6b



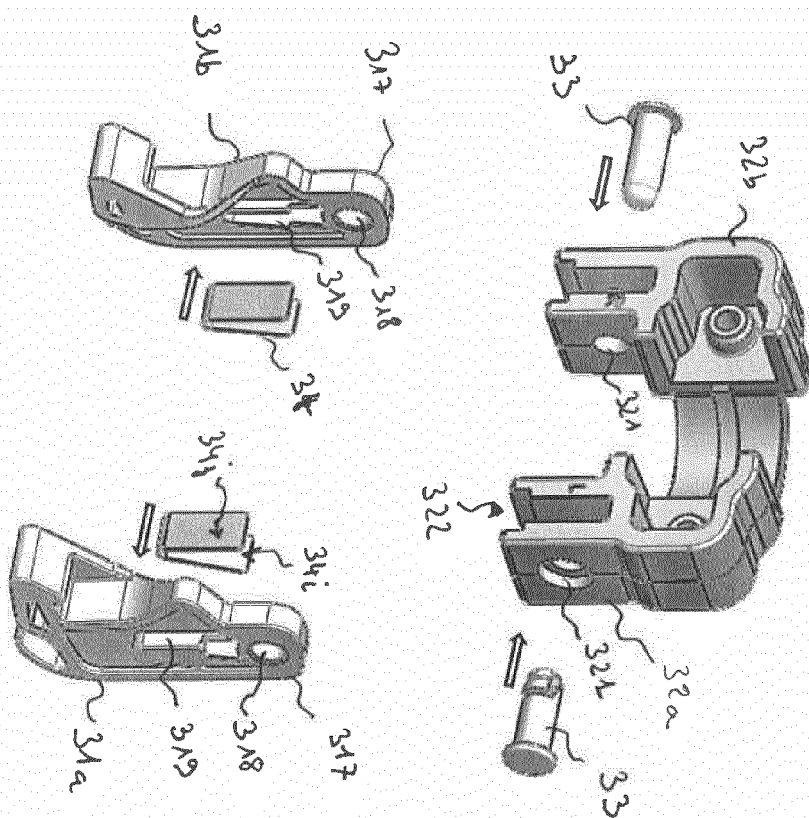


Fig. 8b

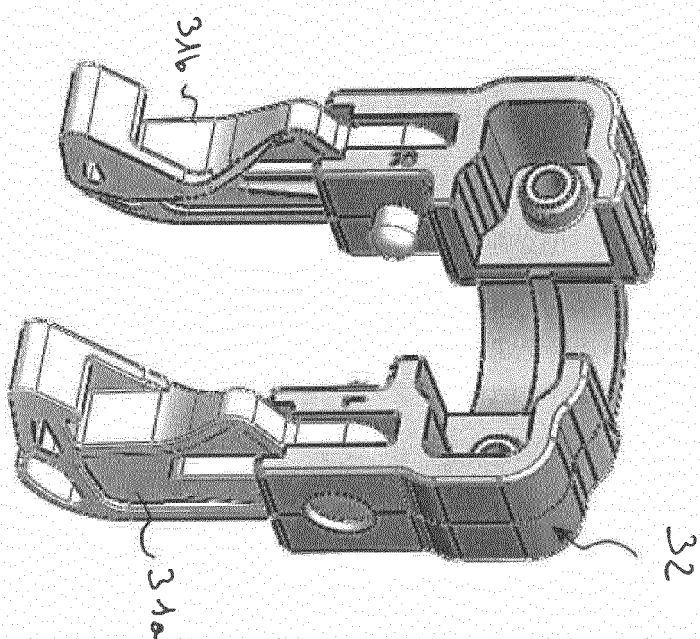
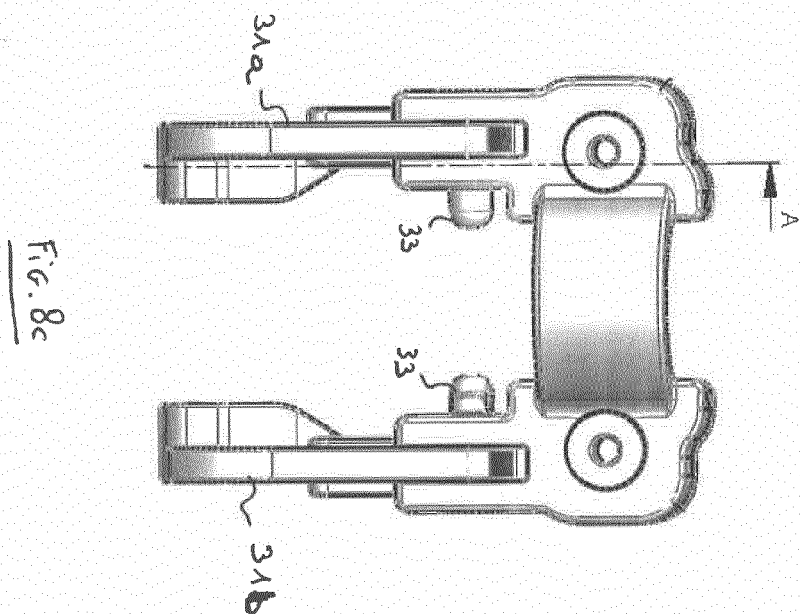
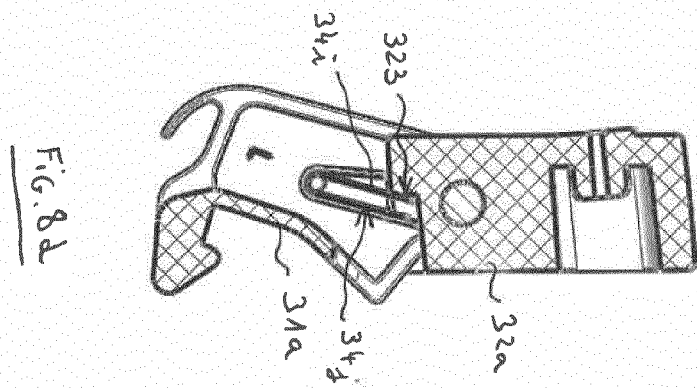
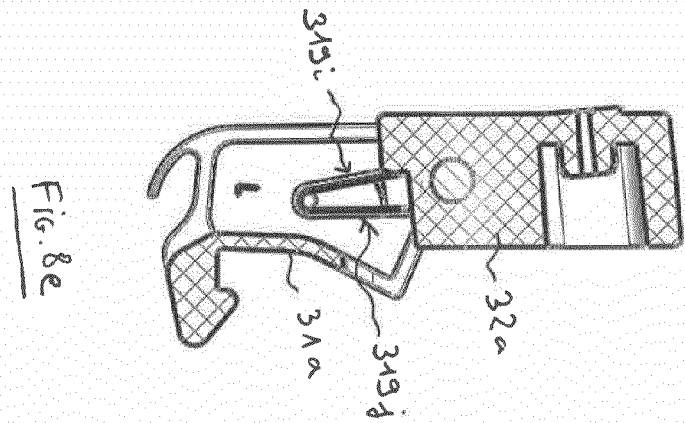
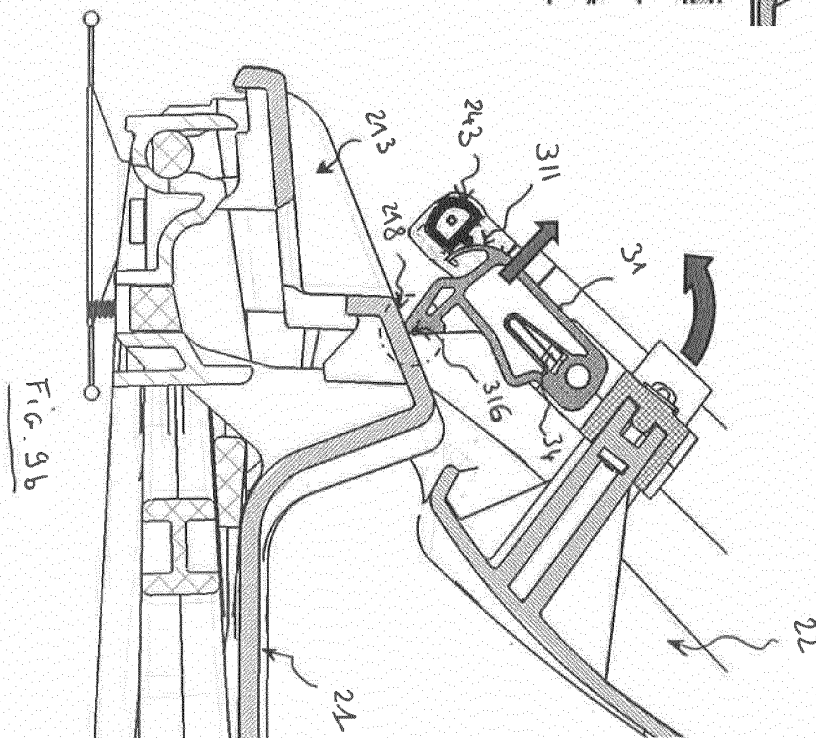
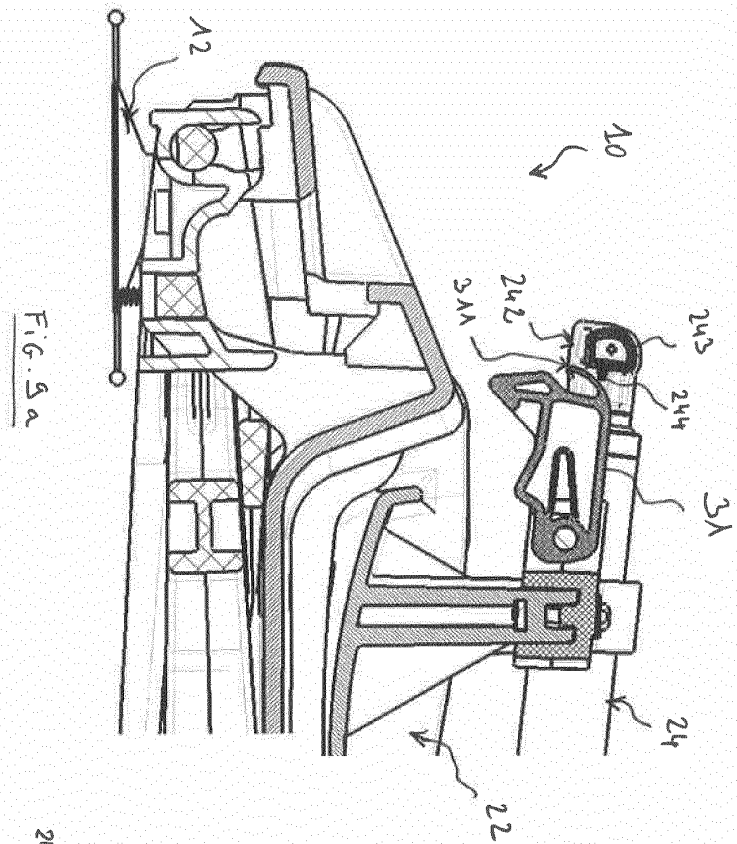
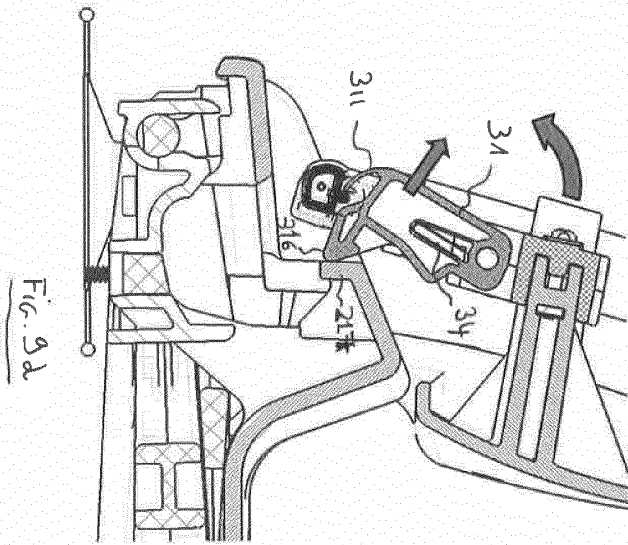
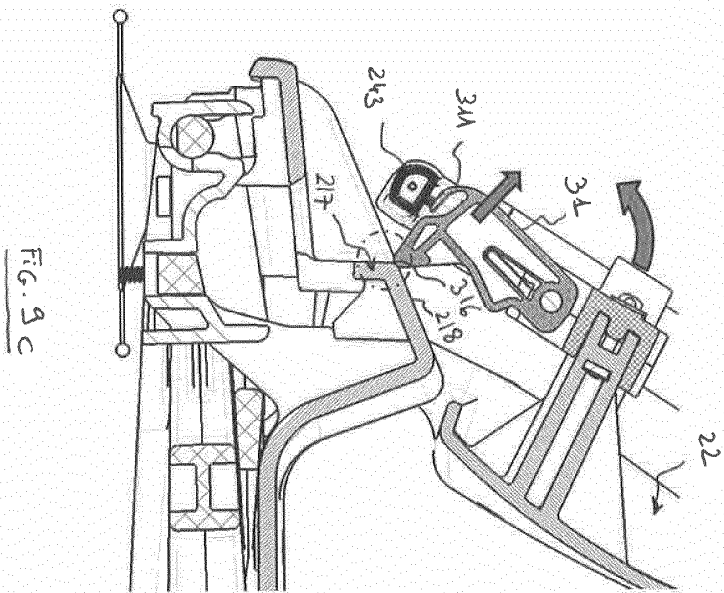
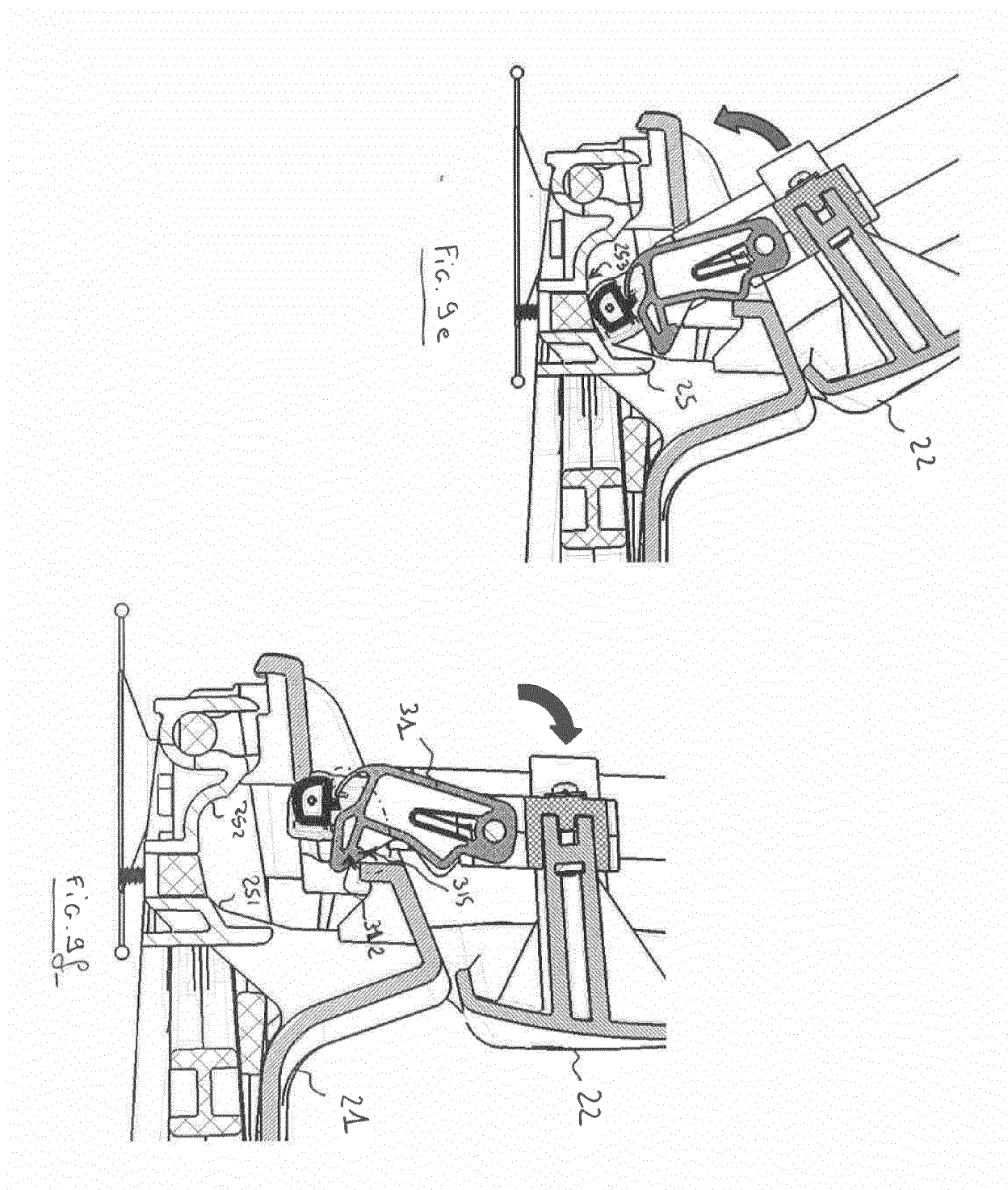


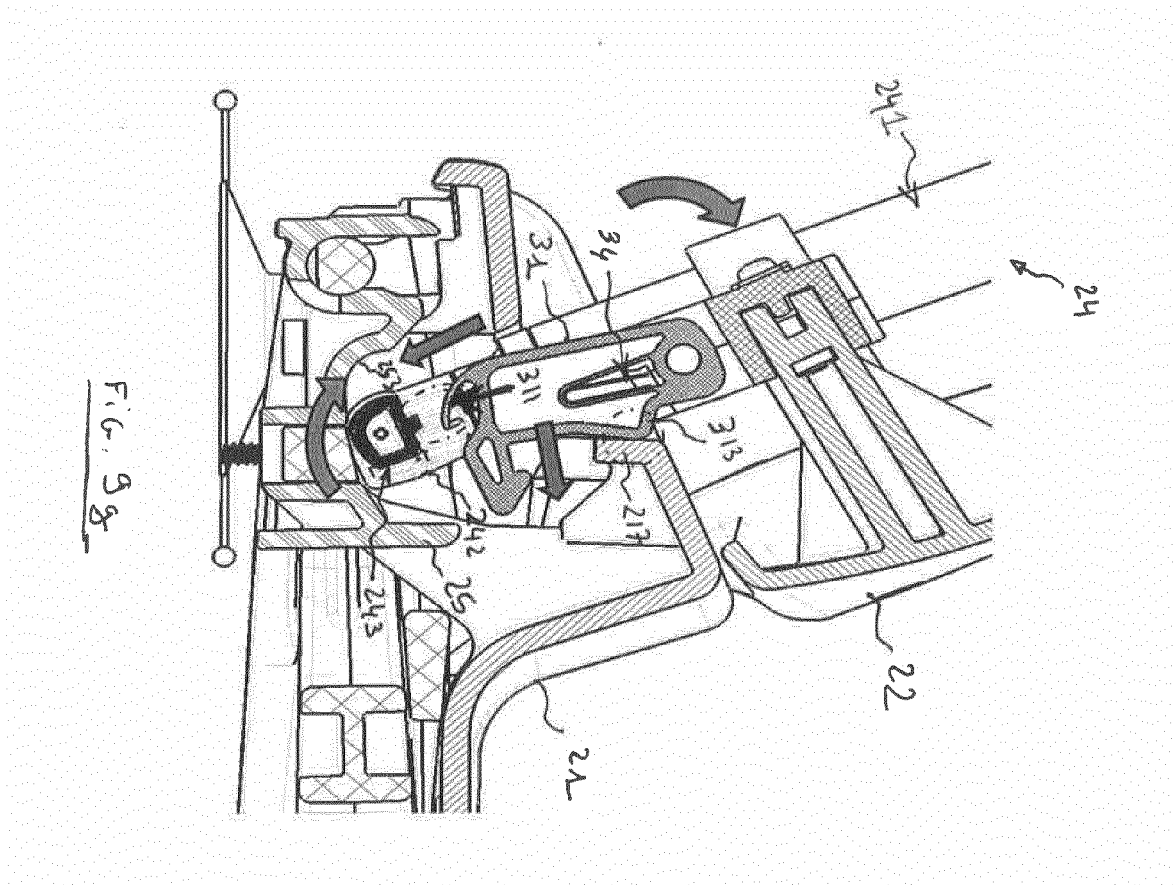
Fig. 8a

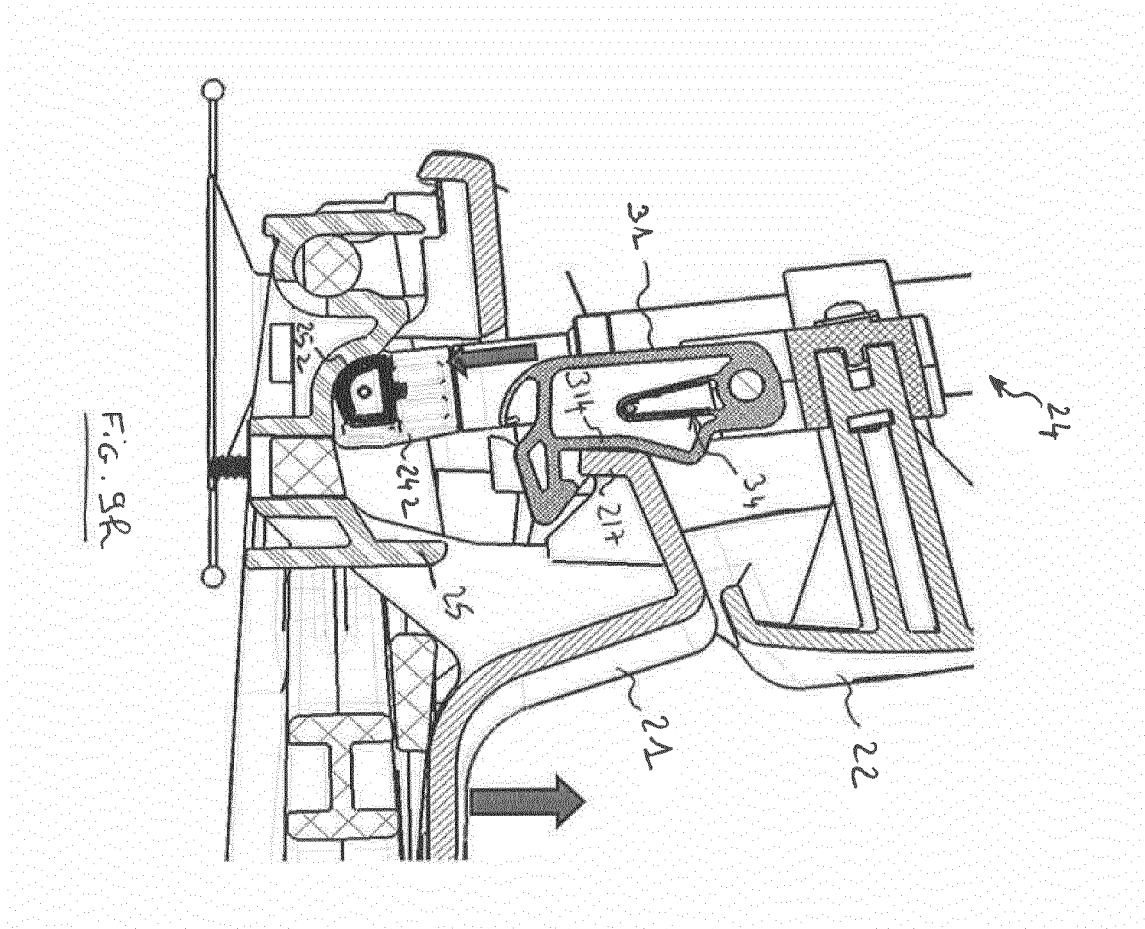


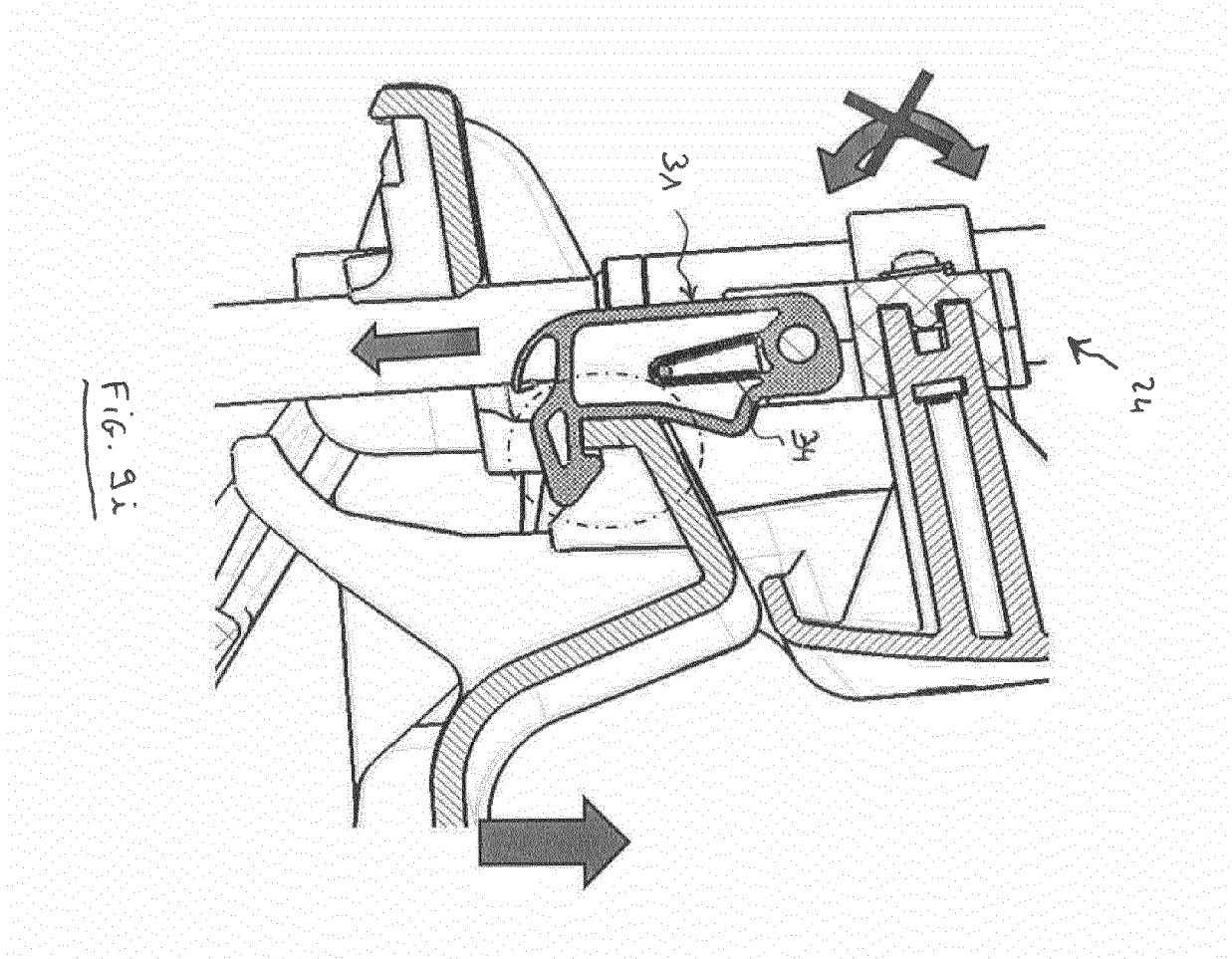












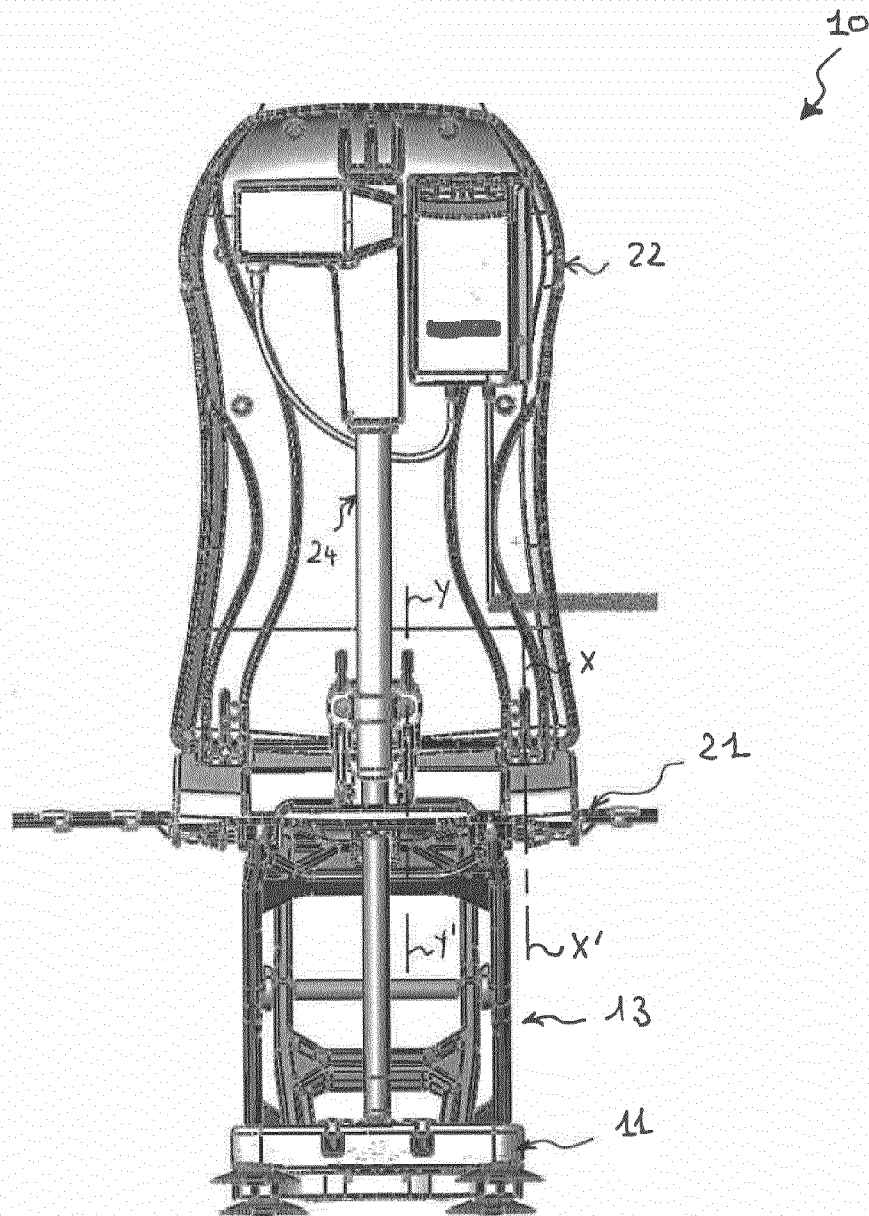


Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 0185087 A [0001]
- EP 1743615 B1 [0004]
- CA 2397503 [0012]
- EP 1787615 B1 [0012]